



LSC TRANSPORTATION CONSULTANTS, INC.

1889 York Street
Denver, CO 80206
(303) 333-1105
FAX (303) 333-1107
E-mail: lsc@lscdenver.com

August 25, 2022

Mr. James Spehalski
Marathon Land Company
9750 W. Cambridge Place
Littleton, CO 80127

Re: Harmony Phase 5
Aurora, CO
LSC #210910

Dear Mr. Spehalski:

In response to your request, LSC Transportation Consultants, Inc. has prepared this updated traffic impact analysis for the proposed Harmony Phase 5 development to address City comments. As shown on Figure 1, the site is located south of E. Exposition Avenue and east of S. Powhaton Road in eastern 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 2024 and 2040 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 a traffic impact study (TIS) for the entire Harmony Master Plan dated March 9, 2017. The Master TIS was updated June 27, 2022. LSC also prepared site-specific traffic reports for the ASP Harmony Ridge P-8 School, dated October 12, 2018, Harmony Phase 3, dated November 4, 2020, and Harmony Phase 4, dated July 16, 2021.

LAND USE AND ACCESS

Figure 2 shows the conceptual site plan. The site is proposed to include 358 residential dwelling units and a school site. Full movement access is proposed to E. Exposition Avenue, Trussville Road and E. Mississippi Avenue. An additional right-in/right-out-only access is proposed to S. Powhaton Road. The proposed land use and access is consistent with the Harmony Master Traffic Impact Study dated June 27, 2022.

PEDESTRIAN CONNECTIVITY

Figure 2 shows all of the proposed sidewalks and trails within the proposed Harmony Phase 5 site. As shown in the Figure 2, the proposed pedestrian system provides for access between the residential uses and the school site and to the adjacent parcels.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

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

- **S. Powhatan Road** is a north-south roadway west of the site. The posted speed limit is 45 mph in the vicinity of the site. S. Powhatan Road is planned to be widened to a four-lane arterial roadway by 2040. In the vicinity of the site it is currently a two-lane roadway except for a section from just south of Alameda Avenue to just north of E. 1st Avenue where the east half of the final cross-section has been constructed. This half section is planned to be extended to just south of E. Exposition Avenue as part of Harmony Phase 4.
- **E. Mississippi Avenue** is a planned an east-west, four-lane minor arterial roadway south of the site. The north half of the E. Mississippi Avenue cross-section will be constructed between S. Powhatan Road and Trussville Road as part of the currently proposed Harmony Phase 5.
- **E. Exposition Avenue** is a planned east-west, two-lane collector roadway north of the site. The north half of the final E. Exposition Avenue cross-section will be constructed between S. Powhatan Road and Monaghan Road as part of Harmony Phase 4 and the south half will be constructed as part of the currently proposed Harmony Phase 5.
- **Trussville Road** is north-south, two-lane collector roadway that currently extends from E. Alameda Avenue to E. 1st Avenue. Trussville Road will be extended south to E. Exposition Avenue as part of Harmony Phase 4 and further south to E. Mississippi Avenue as part of the currently proposed Harmony Phase 5. The intersections with E. Exposition Avenue and E. Mississippi are planned as modern roundabouts.

Existing Traffic Conditions

Figure 3 shows the existing traffic volumes, lane geometries, and traffic controls in the site's vicinity on a typical weekday. The daily traffic volumes are based on the attached traffic counts conducted by Counter Measures in March, 2022.

2024 and 2040 Background Traffic

Figure 4 shows the estimated 2024 background traffic based a two percent annual growth rate for through traffic on S. Powhatan Road plus estimates of additional traffic projected to be generated by buildout of Harmony Phases 1 through 4 located north of the currently proposed Phase 4 and Phase 1 of the Sky Ranch development located south of I-70 between S. Powhatan Road and Hayesmount Road. The 2024 background traffic volumes assume E. Exposition

Avenue has not been constructed east to Monaghan Road and Monaghan Road has not been constructed north of E. Alameda Avenue or south of E. Exposition Avenue.

Figure 5 shows the estimated 2040 background traffic based on recent NEATS modeling updates and the Master Traffic Studies for Harmony and Sky Ranch. Figures 4 and 5 also show the estimated 2024 and 2040 lane geometries and traffic controls in the vicinity of the site.

2024 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 4 and 5 were analyzed to determine the 2024 and 2040 background levels of service using Synchro. Table 1 shows the level of service analysis results. The level of service reports are attached.

1. **E. Exposition Avenue/S. Powhatan Road:** All movements at this intersection are projected to operate at LOS “C” or better during the peak hours through 2040 assuming this intersection is initially constructed as a two-stage, stop-sign controlled intersection similar to the existing intersections of S. Powhatan Road/E. 1st Avenue/E. Ellsworth Avenue and S. Powhatan Road/E. Alameda Avenue. By 2040 it was assumed that S. Powhatan Road would be constructed to its final four-lane cross-section and that the intersection with E. Exposition Avenue would be converted to traffic signal control. S. Powhatan Road/E. Exposition Avenue is projected to operate at an overall LOS “B” as a signalized intersection during both morning and afternoon peak hours through 2040.
2. **E. Exposition Avenue/Phase 5 W. Access/Phase 4 W. Access:** All movements at this stop-sign controlled intersection are expected to operate at LOS “C” or better during both morning and afternoon peak-hours through 2040.
3. **E. Exposition Avenue/Phase 5 E. Access/Phase 4 E. 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.
4. **E. Exposition Avenue/Trussville Road:** This roundabout controlled intersection is expected to operate at an overall LOS “A” during both morning and afternoon peak-hours through 2040.
5. **S. Powhatan Road/RIRO 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.
6. **Trussville Road/North Site Access/Future Access:** All movements at this stop-sign controlled intersection are expected to operate at LOS “A” during both morning and afternoon peak-hours through 2040.

7. **S. Powhatan Road/E. Mississippi Avenue:** All movements at this intersection are projected to operate at LOS “C” or better during the peak hours through 2024 assuming this intersection is initially constructed as a two-stage, stop-sign controlled intersection similar to the existing intersections of S. Powhatan Road/E. 1st Avenue/E. Ellsworth Avenue and S. Powhatan Road/E. Alameda Avenue. By 2040 it was assumed that S. Powhatan Road would be constructed to its final four-lane cross-section and that the intersection with E. Mississippi Avenue would be converted to traffic signal control. As a signalized intersection is expected to operate at an overall LOS “B” during both morning and afternoon peak-hours through 2040.
8. **E. Mississippi Avenue/Future Access/Phase 5 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.
9. **E. Mississippi Avenue/Trussville Road:** This roundabout controlled intersection is expected to operate at an overall LOS “A” during both morning and afternoon peak-hours through 2040.
10. **Trussville Road/South Site Access/Future Access:** All movements at this stop-sign controlled intersection are expected to operate at LOS “A” during both morning and afternoon peak-hours through 2040.
11. **Trussville Road/Middle Site Access/Future Access:** All movements at this stop-sign controlled intersection are expected to operate at LOS “A” during both morning and afternoon peak-hours through 2040.

TRIP GENERATION

Table 2 shows the estimated average weekday, morning peak-hour, and afternoon peak-hour trip generation for the proposed land use based on the rates from *Trip Generation, 11th Edition, 2021* by the Institute of Transportation Engineers (ITE).

Harmony Phase 5 is expected to generate about 5,571 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 450 vehicles would enter and about 513 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 284 vehicles would enter and about 208 vehicles would exit.

DIRECTIONAL DISTRIBUTION

Figures 6 and 7 shows the estimated directional distribution of the residential and school site-generated traffic volumes on the area roadways, respectively. The estimates were based on the location of the site with respect to the regional population, employment, and activity centers; the site’s proposed land use; and the assumptions of the Master TIS.

TRIP ASSIGNMENT

Figure 8 shows the estimated assignment of the 2024 residential site-generated traffic volumes based on the trip generation estimate (from Table 1) and the 2024 residential directional distribution shown in Figure 6. It assumes no connection northeast or southeast.

Figure 9 shows the estimated assignment of the 2024 school site-generated traffic volumes based on the trip generation estimate (from Table 1) and the 2024 school directional distribution shown in Figure 7. It assumes no connection northeast or southeast.

Figure 10 shows the total 2024 site-generated traffic and is the sum of the volumes in Figures 8 and 9.

Figure 11 shows the estimated assignment of the 2040 residential site-generated traffic volumes based on the trip generation estimate (from Table 1) and the 2040 residential directional distribution shown in Figure 6.

Figure 12 shows the estimated assignment of the 2040 school site-generated traffic volumes based on the trip generation estimate (from Table 1) and the 2040 school directional distribution shown in Figure 7. It assumes no connection northeast or southeast.

Figure 13 shows the total 2040 site-generated traffic and is the sum of the volumes in Figures 11 and 12.

2024 AND 2040 TOTAL TRAFFIC

Figure 14 shows the estimated 2024 total traffic which is the sum of the 2024 background traffic volumes (from Figure 4) and the 2024 site-generated traffic volumes (from Figure 10). Figure 14 also shows the recommended 2024 lane geometry and traffic control.

Figure 15 shows the estimated 2040 total traffic which is the sum of the 2040 background traffic volumes (from Figure 5) and the 2040 residential and school site-generated traffic volumes (from Figure 13). Figure 15 also shows the recommended 2040 lane geometry and traffic control.

PROJECTED LEVELS OF SERVICE

The intersections in Figures 14 and 15 were analyzed to determine the 2024 and 2040 total levels of service. Table 1 shows the level of service analysis results. The level of service reports are attached.

- 1. E. Exposition Avenue/S. Powhatan Road:** All movements at this intersection are projected to operate at LOS “D “ or better during the peak hours through 2024 assuming this intersection is initially constructed as a two-stage, stop-sign controlled intersection similar to the existing intersections of S. Powhatan Road/E. 1st Avenue/E. Ellsworth Avenue and S. Powhatan Road/E. Alameda Avenue. By 2040 it was assumed that S. Powhatan Road would be constructed to its final four-lane cross-section and that the intersection with E. Exposition Avenue would be converted to traffic signal control. S. Powhatan Road/E.

Exposition Avenue is projected to operate at an overall LOS “C” or better as a signalized intersection during both morning and afternoon peak hours through 2040.

2. **E. Exposition Avenue/Phase 5 W. Access/Phase 4 W. Access:** All movements at this stop-sign controlled intersection are expected to operate at LOS “C” or better during both morning and afternoon peak-hours through 2040.
3. **E. Exposition Avenue/Phase 5 E. Access/Phase 4 E. Access:** All movements at this stop-sign controlled intersection are expected to operate at LOS “C” or better during both morning and afternoon peak-hours through 2040.
4. **E. Exposition Avenue/Trussville Road:** This roundabout controlled intersection is expected to operate at an overall LOS “A” during both morning and afternoon peak-hours through 2040.
5. **S. Powhaton Road/RIRO 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.
6. **Trussville Road/North Site Access/Future 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.
7. **S. Powhaton Road/E. Mississippi Avenue:** All movements at this intersection are projected to operate at LOS “C” or better during the peak hours through 2024 assuming this intersection is initially constructed as a two-stage, stop-sign controlled intersection similar to the existing intersections of S. Powhaton Road/E. 1st Avenue/E. Ellsworth Avenue and S. Powhaton Road/E. Alameda Avenue. By 2040 it was assumed that S. Powhaton Road would be constructed to its final four-lane cross-section and that the intersection with E. Mississippi Avenue would be converted to traffic signal control. As a signalized intersection is expected to operate at an overall LOS “B” during both morning and afternoon peak-hours through 2040.
8. **E. Mississippi Avenue/Future Access/Phase 5 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.
9. **E. Mississippi Avenue/Trussville Road:** This roundabout controlled intersection is expected to operate at an overall LOS “A” during both morning and afternoon peak-hours through 2040.
10. **Trussville Road/South Site Access/Future 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.
11. **Trussville Road/Middle Site Access/Future 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.

95TH PERCENTILE QUEUE LENGTHS AND RECOMMENDED TURN LANES

The estimated 2040 95th percentile queue lengths for the intersections in the study area are shown in Table 3. Table 3 also shows the recommended turn lane lengths based on the NR-B classification criteria in the *CDOT State Highway Access Code* and the projected 95th percentile queue lengths.

TRAFFIC SIGNAL WARRANT ANALYSIS

Tables 4 and 5 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 intersections of S. Powhatan Road/E. Exposition Avenue (#1) and S. Powhatan Road/E. Mississippi Avenue (#7). The off-peak traffic volumes were based on the 2040 background and total morning and afternoon peak hour volumes shown in Figures 5 and 10 and 24-hour traffic counts conducted on S. Powhatan Road south of E. Alameda Avenue by Counter Measures in March, 2022. The intersections of S. Powhatan Road/E. Exposition Avenue and S. Powhatan Road/ E. Mississippi Avenue are both expected to meet traffic signal warrants by 2040 based on the projected background traffic volumes.

RECOMMENDED IMPROVEMENTS

Table 6 shows the recommended improvements by 2024 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 12 and 13, and the projected 95th percentile queue lengths shown in Table 3. A design speed of 45 mph was assumed for S. Powhatan Road and E. Mississippi Avenue. A design speed of 35 mph was assumed for all other street segments.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

1. Harmony Phase 5 is expected to generate about 5,517 vehicle-trips on the average week-day, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, about 450 vehicles would enter and about 513 vehicles would exit the site. During the afternoon peak-hour, about 284 vehicles would enter and about 208 vehicles would exit.

Projected Levels of Service

2. All of the signalized and roundabout controlled intersections in the study area are expected to operate at LOS “C” or better during both morning and afternoon peak-hours through 2040 with the recommended improvements.
3. All movements at the unsignalized intersections in the study area are expected to operate at LOS “D” or better during both morning and afternoon peak-hours through 2040.

Conclusions

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

Recommendations

5. The recommended improvements for 2024 and 2040 are shown in Figures 14 and 15 and detailed in Tables 3 and 6.

* * * * *

We trust our findings will assist you in gaining approval of the proposed Harmony Phase 5 development. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By



Christopher S. McGranahan, PE, PTOE
Principal

CSM/wc

8-25-22

Enclosures: Tables 1 - 6
Figures 1 - 13
Key Pages from NEATS and *Harmony Master TIA*
Traffic Counts
Level of Service Definitions
Level of Service Reports
Queuing Reports

Table 1 (Page 1 of 2)
Intersection Levels of Service Analysis
Harmony Phase 5
Aurora, Colorado
LSC #210910; August, 2022

Intersection No. & Location	Traffic Control	2024 Background Traffic				2024 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
1) <u>S. Powhaton Road NB/E. Exposition Avenue</u>	TWSC																
EB Through		B	10.8	A	0.0	C	15.2	C	23.6	--	--	--	--	--	--	--	--
WB Through		B	12.9	C	15.0	B	12.8	C	16.2	--	--	--	--	--	--	--	--
WB Right		A	9.5	B	10.6	B	11.7	B	11.9	--	--	--	--	--	--	--	--
101) <u>S. Powhaton Road SB/E. Exposition Avenue</u>	TWSC																
WB Left		B	12.9	B	13.6	D	27.2	C	20.5	--	--	--	--	--	--	--	--
1) <u>S. Powhaton Road/E. Exposition Avenue</u>	Signalized																
EB Left		--	--	--	--	--	--	--	--	D	36.1	D	40.8	C	34.6	D	39.7
EB Through/Right		--	--	--	--	--	--	--	--	D	37.5	D	42.5	C	34.6	D	40.9
EB Approach & Delay		--	--	--	--	--	--	--	--	D	36.5	D	41.2	C	34.6	D	40
WB Left		--	--	--	--	--	--	--	--	D	37.8	D	40.7	C	33.5	D	38.9
WB Through/Right		--	--	--	--	--	--	--	--	D	43.7	D	49.9	D	50.8	D	50.5
WB Approach & Delay		--	--	--	--	--	--	--	--	D	40.6	D	45.2	D	43.8	D	45.3
NB Left		--	--	--	--	--	--	--	--	A	9.2	A	9.0	B	14.2	B	10.8
NB Through		--	--	--	--	--	--	--	--	B	11.6	B	12.5	B	18.2	B	14.9
NB Right		--	--	--	--	--	--	--	--	B	10.1	B	11.6	B	15.6	B	13.7
NB Approach & Delay		--	--	--	--	--	--	--	--	B	11.4	B	12.3	B	17.8	B	14.6
SB Left		--	--	--	--	--	--	--	--	A	8.2	A	9.4	B	13.4	B	19.5
SB Through/Right		--	--	--	--	--	--	--	--	B	10.0	B	10.8	B	14.6	B	13
SB Approach & Delay		--	--	--	--	--	--	--	--	A	9.8	B	10.6	B	14.3	B	12.9
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	--	--	17.6		15.9		23.3		19.0	
Entire Intersection LOS		--	--	--	--	--	--	--	--	B		B		C		B	
2) <u>E. Exposition Avenue/Phase 5 W. Access/Phase 4 W. Access</u>	TWSC																
NB Approach		--	--	--	--	C	18.0	B	14.4	B	12.0	C	15.5	C	16.1	C	19.2
EB Left		A	7.6	A	7.5	A	8.1	A	7.7	A	8.0	A	7.9	A	8.4	A	8.1
WB Left		--	--	--	--	A	0.0	A	0.0	A	7.6	A	8.2	A	7.9	A	8.5
SB Approach		A	9.4	A	9.0	B	11.0	A	9.4	B	11.8	B	14.0	B	14.4	C	16.5
3) <u>E. Exposition Avenue/Phase 5 E. Access/Phase 4 E. Access</u>	TWSC																
NB Approach		--	--	--	--	C	15.5	B	12.4	--	--	--	--	C	16.9	C	18.6
EB Left		A	7.5	A	7.5	A	7.9	A	7.6	A	8.0	A	7.9	A	8.3	A	8.1
WB Left		--	--	--	--	A	0.0	A	0.0	--	--	--	--	A	7.9	A	8.4
SB Approach		A	9.1	A	8.8	B	10.3	A	9.1	B	11.1	B	11.7	B	13.2	B	13.3
4) <u>E. Exposition Avenue/Trussville Road</u>	Roundabout																
EB Approach		A	2.8	A	3.2	A	4.3	A	3.6	A	3.8	A	5.9	A	6.1	A	7.1
WB Approach		A	3.3	A	3.1	A	4.2	A	3.4	A	5.1	A	5.0	A	7.8	A	6.1
NB Approach		--	--	--	--	A	4.2	A	3.4	A	3.6	A	4.6	A	6.3	A	5.8
SB Approach		A	3.2	A	2.9	A	4.3	A	3.2	A	4.1	A	4.1	A	6.3	A	4.9
Entire Intersection Delay (sec /veh)			3.2		3.2		4.3		3.5		4.5		5.4		6.9		6.4
Entire Intersection LOS			A		A		A		A		A		A		A		A
5) <u>S. Powhaton Road/RIRO Access</u>	TWSC																
WB Right		--	--	--	--	A	9.2	B	10.4	B	10.6	B	12.6	B	10.8	B	12.8
6) <u>Trussville Road/North Site Access/Future Access</u>	TWSC																
NB Left		--	--	--	--	A	7.5	A	7.3	--	--	--	--	A	7.5	A	7.5
EB Approach		--	--	--	--	A	9.8	A	9.0	--	--	--	--	B	11.0	B	10.3
WB Approach		--	--	--	--	--	--	--	--	A	8.7	A	8.7	A	9.7	A	9.1
SB Left		--	--	--	--	--	--	--	--	A	7.3	A	7.3	A	7.6	A	7.4

Table 1 (Page 2 of 2)
Intersection Levels of Service Analysis
Harmony Phase 5
Aurora, Colorado
LSC #210910; August, 2022

Intersection No. & Location	Traffic Control	2024 Background Traffic				2024 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
7) <u>NB S. Powhaton Road/E. Mississippi Avenue</u>	TWSC																
EB Through		--	--	--	--	B	12.3	C	17.2	--	--	--	--	--	--	--	--
WB Through		--	--	--	--	B	13.0	C	16.2	--	--	--	--	--	--	--	--
WB Right		--	--	--	--	A	9.2	B	10.6	--	--	--	--	--	--	--	--
107) <u>SB S. Powhaton Road/E. Mississippi Avenue</u>																	
WB Right		--	--	--	--	C	17.4	B	14.4	--	--	--	--	--	--	--	--
7) <u>S. Powhaton Road/E. Mississippi Avenue</u>	Signalized																
EB Left		--	--	--	--	--	--	--	--	D	39.0	D	39.6	D	41.8	D	41.9
EB Through		--	--	--	--	--	--	--	--	D	38.7	D	40.3	D	43.3	D	42.9
EB Right		--	--	--	--	--	--	--	--	A	0.0	A	0.0	A	0.0	A	0.0
EB Approach & Delay		--	--	--	--	--	--	--	--	D	39.0	D	39.8	D	42.1	D	42.2
WB Left		--	--	--	--	--	--	--	--	D	40.5	D	42.4	D	38.9	D	41.8
WB Through		--	--	--	--	--	--	--	--	D	45.6	D	45.6	D	47.1	D	46.3
WB Right		--	--	--	--	--	--	--	--	A	0.0	A	0.0	A	0.0	A	0.0
WB Approach & Delay		--	--	--	--	--	--	--	--	D	42.6	D	43.7	D	41.8	D	43.5
NB Left		--	--	--	--	--	--	--	--	A	7.9	B	7.8	A	8.0	A	8.0
NB Through		--	--	--	--	--	--	--	--	A	9.7	A	11.3	A	9.8	B	11.8
NB Right		--	--	--	--	--	--	--	--	A	8.8	B	9.0	A	9.5	A	9.6
NB Approach & Delay		--	--	--	--	--	--	--	--	A	9.4	B	10.7	A	9.6	B	11.0
SB Left		--	--	--	--	--	--	--	--	A	7.4	A	8.3	A	7.5	A	8.8
SB Through		--	--	--	--	--	--	--	--	B	10.9	B	10.5	B	10.9	B	10.5
SB Right		--	--	--	--	--	--	--	--	A	9.2	B	10.4	A	9.2	B	10.4
SB Approach & Delay		--	--	--	--	--	--	--	--	B	10.5	B	10.2	B	10.5	B	10.2
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	--	--	17.5		14.8		19.1		15.6	
Entire Intersection LOS		--	--	--	--	--	--	--	--	B		B		B		B	
8) <u>E. Mississippi Avenue/Future Access/Phase 5 Access</u>	TWSC																
NB Approach		--	--	--	--	--	--	--	--	B	10.0	B	11.0	B	11.1	B	12.3
EB Left or Approach		--	--	--	--	A	7.6	A	7.4	A	7.7	A	7.6	A	8.0	A	7.8
WB Left		--	--	--	--	--	--	--	--	A	7.4	A	8.0	A	7.6	A	8.0
SB Approach		--	--	--	--	A	9.5	A	8.7	B	10.5	B	10.9	B	11.0	B	10.8
9) <u>E. Mississippi Avenue/Trussville Road</u>	Roundabout																
EB Approach		--	--	--	--	--	--	--	--	A	3.1	A	3.9	A	3.5	A	4.0
WB Approach		--	--	--	--	--	--	--	--	A	3.5	A	3.5	A	4.0	A	3.7
NB Approach		--	--	--	--	--	--	--	--	A	3.5	A	3.9	A	4.0	A	4.1
SB Approach		--	--	--	--	--	--	--	--	A	3.4	A	3.5	A	4.4	A	3.8
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	--	--	3.4		3.7		4.0		3.9	
Entire Intersection LOS		--	--	--	--	--	--	--	--	A		A		A		A	
10) <u>Trussville Road/South Site Access/Future Access</u>	Roundabout																
NB Left		--	--	--	--	A	7.5	A	7.3	--	--	--	--	A	7.5	A	7.4
EB Approach		--	--	--	--	A	9.8	A	8.9	--	--	--	--	B	10.3	A	9.5
WB Approach		--	--	--	--	--	--	--	--	A	8.7	A	8.8	A	9.6	A	9.0
SB Left		--	--	--	--	--	--	--	--	A	7.3	A	7.3	A	7.5	A	7.4
11) <u>Trussville Road/Middle Site Access/Future Access</u>	Roundabout																
NB Left		--	--	--	--	A	7.5	A	7.3	--	--	--	--	A	7.5	A	7.4
EB Approach		--	--	--	--	A	9.9	A	9.1	--	--	--	--	B	10.7	A	9.7
WB Approach		--	--	--	--	--	--	--	--	A	8.8	A	8.9	A	9.9	A	9.2
SB Left		--	--	--	--	--	--	--	--	A	7.3	A	7.3	A	7.5	A	7.4

Table 2
ESTIMATED TRAFFIC GENERATION
Harmony Phase 5
Aurora, CO
LSC #210910; August, 2022

Trip Generating Category	Quantity	Trip Generation Rates ⁽¹⁾					Vehicle-Trips Generated				
		Average	AM Peak-Hour		PM Peak-Hour		Average	AM Peak-Hour		PM Peak-Hour	
		Weekday	In	Out	In	Out	Weekday	In	Out	In	Out
Single-Family Detached Housing ⁽²⁾	358 DU ⁽³⁾	9.43	0.182	0.518	0.592	0.348	3,376	65	185	212	125
Elementary School ⁽⁴⁾	772 Students	2.27	0.400	0.340	0.074	0.086	1,752	309	263	57	67
Middle School/Junior High ⁽⁵⁾	211 Students	2.10	0.362	0.308	0.072	0.078	443	76	65	15	16
Total =							5,571	450	513	284	208

Notes:

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

(2) ITE Land Use #210 - Single Family Detached Housing - Average Rate

(3) DU = Dwelling Unit

(4) ITE Land Use #520 - Elementary School - Average Rate

(5) ITE Land Use #522 - Middle School/Junior High - Average Rate

Table 3 (Page 1 of 2)
95th Percentile Queue Lengths
Harmony Phase 5
Aurora, CO
LSC #210910; August, 2022

Intersection No. & Location	2040	Turn Lane Lengths Proposed ⁽¹⁾ (feet)	95th Percentile Queue Length	
	Assumed		2040 Total	
	Posted		AM Peak	PM Peak
	Speed Limit (mph)		(feet)	(feet)
<u>1) S. Powhaton Road/E. Exposition Avenue</u>				
EB Left	35	200	33	46
EB Through/Right	35	---	18	19
WB Left	35	250	232	175
WB Through/Right	35	---	83	71
NB Left	45	275	5	8
NB Through	45	---	166	223
NB Right	45	275	19	36
SB Left	45	275	82	117
SB Through/Right	45	---	163	267
<u>2) E. Exposition Avenue/Phase 5 W. Access/Phase 4</u>				
NB Approach	25	---	10	15
EB Left	35	200	<3	3
WB Left	35	200	<3	3
EB Right	35	200	<3	<3
SB Approach	25	---	10	10
<u>3) E. Exposition Avenue/Phase 5 E. Access/Phase 4 E. Access</u>				
NB Approach	25	---	8	5
EB Left	35	200	<3	3
WB Left	35	200	<3	<3
EB Right	35	200	<3	<3
SB Approach	25	---	8	5
<u>4) E. Exposition Avenue/Trussville Road</u>				
EB Approach	35	---	25	50
WB Approach	35	---	50	25
NB Approach	35	---	25	25
SB Approach	35	---	<3	<3
<u>5) S. Powhaton Road/RIRO Access</u>				
NB Right	45	275	<3	<3
WB Right	25	---	3	3
<u>6) Trussville Road/North Site Access/Future Access</u>				
NB Left	35	200	<3	<3
EB Approach	25	---	3	<3
WB Approach	25	---	3	3
SB Left	35	200	<3	<3

Notes:

- (1) Auxiliary turn lane lengths on arterial roadways are based on 45 mph and the NR-B classification in the *CDOT State Highway Access Code* and the 95th percentile queue length.
A redirect taper of 45:1 is appropriate for 45 mph and 20:1 for 35 mph.
The lengths shown are consistent with Recommended Improvements shown in Table 6.

Table 3 (Page 2 of 2)
95th Percentile Queue Lengths
Harmony Phase 5
Aurora, CO
LSC #210910; August, 2022

Intersection No. & Location	2040	Turn Lane Lengths Proposed ⁽¹⁾ (feet)	95th Percentile Queue Length	
	Assumed Posted Speed Limit (mph)		2040 Total	
			AM Peak (feet)	PM Peak (feet)
7) <u>S. Powhatan Road/E. Mississippi Avenue</u>				
EB Left	45	275	193	174
EB Through	45	---	34	56
EB Right	45	275	0	0
WB Left	45	275	157	95
WB Through	45	---	57	38
WB Right	45	275	0	0
NB Left	45	275	22	53
NB Through	45	---	88	214
NB Right	45	275	21	26
SB Left	45	2 @ 275	27	68
SB Through	45	---	175	170
SB Right	45	275	20	35
8) <u>E. Mississippi Avenue/Future Access/Phase 5 Access</u>				
NB Approach	25	---	8	5
EB Left	45	275	3	5
EB Right	45	275	<3	<3
WB Left	45	275	<3	3
SB Approach	25	---	10	8
9) <u>E. Mississippi Avenue/Trussville Road</u>				
EB Approach	45	---	<3	<3
WB Approach	45	---	<3	<3
NB Approach	35	---	<3	<3
SB Approach	35	---	<3	<3
10) <u>Trussville Road/South Site Access/Future Access</u>				
NB Left	35	200	<3	<3
EB Approach	25	---	3	<3
WB Approach	25	---	<3	<3
SB Left	35	200	<3	<3
11) <u>Trussville Road/Middle Site Access/Future Access</u>				
NB Left	35	200	<3	<3
EB Approach	25	---	3	3
WB Approach	25	---	3	<3
SB Left	35	200	<3	<3

Notes:

- (1) Auxiliary turn lane lengths on arterial roadways are based on 45 mph and the NR-B classification in the *CDOT State Highway Access Code* and the 95th percentile queue length.
A redirect taper of 45:1 is appropriate for 45 mph and 20:1 for 35 mph.
The lengths shown are consistent with Recommended Improvements shown in Table 6.

Table #4
Intersection #1 - Powhaton Road/E. Exposition Avenue
Harmony Phase 5
Aurora, CO
LSC #210910; August, 2022

Warrant Analysis⁽¹⁾

Warrant 1: Eight Hour Vehicular Volume Evaluation												Warrant 2: Four Hour Vehicular Volume Evaluation			Warrant 3: Peak Hour Vehicular Volume Evaluation				
Warrant Thresholds												70% Warrant	Warrant Threshold		70% Warrant	Warrant Threshold			
Warrant Threshold Met?												Threshold	Met?		Threshold	Met?			
Hour	Major ⁽²⁾	Minor 1 ⁽³⁾ EB Leg	Minor 2 ⁽³⁾ WB Leg	Condition A (70%)		Condition B (70%)		North Leg		South Leg		Minor Minimum	EB	WB	Minor Minimum	EB	WB		
2040 Background Traffic ⁽⁴⁾																			
12-1 AM	141	4	35	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No		
1-2 AM	59	1	14	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No		
2-3 AM	80	2	16	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No		
3-4 AM	66	1	15	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No		
4-5 AM	289	6	69	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No		
5-6 AM	613	14	137	420	140	630	70	No	No	No	No	175	No	No	315	No	No		
6-7 AM	807	22	163	420	140	630	70	No	No	Yes	Yes	110	No	Yes	220	No	No		
7-8 AM	1335	33	293	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes		
8-9 AM	1193	30	257	420	140	630	70	No	No	Yes	Yes	80	No	Yes	120	No	Yes		
9-10 AM	1078	26	239	420	140	630	70	No	No	Yes	Yes	80	No	Yes	145	No	Yes		
10-11 AM	1108	25	249	420	140	630	70	No	No	Yes	Yes	80	No	Yes	120	No	Yes		
11-12 PM	1234	29	279	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes		
12-1 PM	1282	26	136	420	140	630	70	No	No	No	Yes	80	No	Yes	100	No	Yes		
1-2 PM	1274	27	132	420	140	630	70	No	No	No	Yes	80	No	Yes	100	No	Yes		
2-3 PM	1420	29	148	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes		
3-4 PM	1914	38	201	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes		
4-5 PM	2165	43	229	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes		
5-6 PM	2379	46	254	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes		
6-7 PM	1474	29	156	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes		
7-8 PM	948	17	102	420	140	630	70	No	No	No	Yes	80	No	Yes	180	No	No		
8-9 PM	777	14	85	420	140	630	70	No	No	No	Yes	140	No	No	265	No	No		
9-10 PM	595	12	61	420	140	630	70	No	No	No	No	230	No	No	370	No	No		
10-11 PM	536	11	56	420	140	630	70	No	No	No	No	230	No	No	370	No	No		
11-12 AM	213	4	22	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No		
Numbers of Hours the Warrant is Met								0	0	11	15	0		14			0	12	
Warrant Met?								Yes				Yes		Yes				Yes	

2040 Total Traffic ⁽⁴⁾																					
12-1 AM	162	4	40	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No				
1-2 AM	68	1	17	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No				
2-3 AM	89	2	21	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No				
3-4 AM	75	1	19	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No				
4-5 AM	328	6	82	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No				
5-6 AM	687	14	168	420	140	630	70	No	No	Yes	Yes	175	No	No	315	No	No				
6-7 AM	889	22	214	420	140	630	70	No	No	Yes	Yes	110	No	Yes	220	No	No				
7-8 AM	1493	33	365	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes				
8-9 AM	1330	30	324	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes				
9-10 AM	1207	26	296	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes				
10-11 AM	1245	25	307	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes				
11-12 PM	1388	29	341	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes				
12-1 PM	1362	26	155	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes				
1-2 PM	1350	27	151	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes				
2-3 PM	1506	29	170	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes				
3-4 PM	2030	38	230	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes				
4-5 PM	2298	43	261	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes				
5-6 PM	2527	46	288	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes				
6-7 PM	1564	29	178	420	140	630	70	No	No	Yes	Yes	80	No	Yes	100	No	Yes				
7-8 PM	1008	17	116	420	140	630	70	No	No	No	Yes	80	No	Yes	145	No	No				
8-9 PM	829	14	96	420	140	630	70	No	No	No	Yes	110	No	No	220	No	No				
9-10 PM	630	12	71	420	140	630	70	No	No	No	No	175	No	No	315	No	No				
10-11 PM	568	11	64	420	140	630	70	No	No	No	No	230	No	No	370	No	No				
11-12 AM	225	4	25	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No				
														0		14					
Numbers of Hours the Warrant is Met														0		0		14		16	
Warrant Met?														Yes							
														0		14					
														Yes							
																0		12			
																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
(4) Off peak traffic volumes are based on the 24-hour machine counts on Powhaton Road south of E. Alameda Avenue conducted by Counter Measures March 2022

Source: LSC Transportation Consultants, Inc.

Table #5
Intersection #7 - Powhatan Road/E. Mississippi Avenue
Harmony Phase 5
Aurora, CO
LSC #210910; August, 2022

Warrant Analysis⁽¹⁾

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	Warrant Threshold		70% Warrant	Warrant Threshold	
Hour	Major ⁽²⁾	Minor 1 ⁽³⁾ EB Leg	Minor 2 ⁽³⁾ WB Leg	Condition A (70%)		Condition B (70%)		North Leg		South Leg		Threshold Minor Minimum	Met? EB WB		Threshold Minor Minimum	Met? EB WB	
2040 Background Traffic ⁽⁴⁾																	
12-1 AM	141	25	21	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No
1-2 AM	57	11	9	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No
2-3 AM	66	19	14	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No
3-4 AM	62	13	11	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No
4-5 AM	277	55	46	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No
5-6 AM	554	126	97	420	140	630	70	No	No	No	No	230	No	No	370	No	No
6-7 AM	666	189	135	420	140	630	70	Yes	Yes	No	Yes	175	Yes	No	315	No	No
7-8 AM	1190	282	215	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	120	Yes	Yes
8-9 AM	1045	258	194	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	145	Yes	Yes
9-10 AM	969	224	173	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	180	Yes	No
10-11 AM	1009	226	177	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	145	Yes	Yes
11-12 PM	1128	251	196	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	120	Yes	Yes
12-1 PM	1230	164	86	420	140	630	70	Yes	Yes	No	Yes	80	Yes	Yes	100	Yes	No
1-2 PM	1225	165	87	420	140	630	70	Yes	Yes	No	Yes	80	Yes	Yes	100	Yes	No
2-3 PM	1363	183	97	420	140	630	70	Yes	Yes	No	Yes	80	Yes	Yes	100	Yes	No
3-4 PM	1838	247	130	420	140	630	70	Yes	Yes	No	Yes	80	Yes	Yes	100	Yes	Yes
4-5 PM	2077	277	145	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	100	Yes	Yes
5-6 PM	2280	301	159	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	100	Yes	Yes
6-7 PM	1412	188	100	420	140	630	70	Yes	Yes	No	Yes	80	Yes	Yes	100	Yes	Yes
7-8 PM	908	119	63	420	140	630	70	No	Yes	No	No	80	Yes	No	180	No	No
8-9 PM	744	98	52	420	140	630	70	No	Yes	No	No	140	No	No	265	No	No
9-10 PM	572	77	41	420	140	630	70	No	No	No	No	230	No	No	370	No	No
10-11 PM	515	69	36	420	140	630	70	No	No	No	No	230	No	No	370	No	No
11-12 AM	205	28	15	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No
Numbers of Hours the Warrant is Met								13	15	7	13	14		12	12		8
Warrant Met?								Yes				Yes		Yes		Yes	
2040 Total Traffic ⁽⁴⁾																	
12-1 AM	147	29	35	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No
1-2 AM	60	13	14	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No
2-3 AM	71	20	19	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No
3-4 AM	66	15	16	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No
4-5 AM	293	61	70	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No
5-6 AM	593	137	146	420	140	630	70	No	No	Yes	No	230	No	No	370	No	No
6-7 AM	725	199	194	420	140	630	70	Yes	Yes	Yes	Yes	140	Yes	Yes	265	No	No
7-8 AM	1275	304	319	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	100	Yes	Yes
8-9 AM	1124	277	286	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	120	Yes	Yes
9-10 AM	1037	242	258	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	145	Yes	Yes
10-11 AM	1078	246	265	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	145	Yes	Yes
11-12 PM	1203	273	295	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	100	Yes	Yes
12-1 PM	1276	172	111	420	140	630	70	Yes	Yes	No	Yes	80	Yes	Yes	100	Yes	Yes
1-2 PM	1271	174	111	420	140	630	70	Yes	Yes	No	Yes	80	Yes	Yes	100	Yes	Yes
2-3 PM	1414	193	124	420	140	630	70	Yes	Yes	No	Yes	80	Yes	Yes	100	Yes	Yes
3-4 PM	1906	259	166	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	100	Yes	Yes
4-5 PM	2154	292	188	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	100	Yes	Yes
5-6 PM	2364	319	205	420	140	630	70	Yes	Yes	Yes	Yes	80	Yes	Yes	100	Yes	Yes
6-7 PM	1465	199	128	420	140	630	70	Yes	Yes	No	Yes	80	Yes	Yes	100	Yes	Yes
7-8 PM	942	126	83	420	140	630	70	No	Yes	No	Yes	80	Yes	Yes	180	No	No
8-9 PM	770	103	67	420	140	630	70	No	Yes	No	No	140	No	No	265	No	No
9-10 PM	593	81	53	420	140	630	70	No	No	No	No	230	No	No	370	No	No
10-11 PM	533	73	47	420	140	630	70	No	No	No	No	230	No	No	370	No	No
11-12 AM	213	29	19	420	140	630	70	No	No	No	No	Low Vol	No	No	Low Vol	No	No
Numbers of Hours the Warrant is Met								13	15	10	14	14		14	12		12
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
(4) Off peak traffic volumes are based on the 24-hour machine counts on Powhatan Road south of E. Alameda Avenue conducted by Counter Measures March 2022

Source: LSC Transportation Consultants, Inc.

Table 6 (1 of 2)
Recommended Improvements to Public Street Network
Harmony Phase 5
Aurora, CO
LSC #210910; August, 2022

Inter-section	No.		Intersection Location	Recommended Improvements by 2024 ⁽¹⁾	Responsibility	Recommended Improvements by 2040 ⁽¹⁾	Responsibility
			S. Powhaton Road	Construct east half of the ultimate cross section	Harmony Phase 5	Construct west half of the ultimate cross section	Others
			E. Exposition Avenue	Construct the north half between S. Powhaton Road and Monaghan Road	Harmony Phase 4	Construct west of S. Powhaton Road and east of Monaghan Road	Others
				Construct the south half between S. Powhaton Road and Trussville Road	Harmony Phase 5		
			E. Mississippi Avenue	Construct north half of the ultimate cross section between S. Powhaton Road and Trussville Road	Harmony Phase 5	Construct south half of the ultimate cross section between S. Powhaton Road and Trussville Road	Others
						Construct west of S. Powhaton Road and east of Trussville Road	Others
			Trussville Road	Construct between E. Exposition Avenue and E. Alameda Avenue	Harmony Phase 4	Construct south of E. Mississippi Avenue	Others
				Construct the west half between E. Mississippi Avenue and E. Exposition Avenue	Harmony Phase 5		
#1	S. Powhaton Road/ E. Exposition Avenue		WB LT - construct lane - 1 @ 250 feet and 120-foot transition taper		Harmony Phase 4	EB LT - construct lane - 1 @ 200 feet and 120-foot transition taper for each	Others
			NB RT - construct lane - 1 @ 275 feet and 160-foot transition taper		Harmony Phase 4	NB LT - construct lane - 1 @ 275 feet and 160-foot transition taper	Others
			SB LT - construct lane - 1 @ 275 feet and 160-foot transition taper		Harmony Phase 4	WB to NB RT Accel - construct lane - 1 @ 390 feet and 160-foot transition taper	Harmony (Future Phases)
						Traffic signaization when warranted	Harmony (Future Phases)/Others
#2	E. Exposition Avenue/ West Site Access		EB LT - construct lane 1 @ 200 feet and 120-foot transition taper		Harmony Phase 4		
			EB RT - construct lane 1 @ 200 feet and 120-foot transition taper		Harmony Phase 5		
			WB LT - construct lane - 1 @ 200 feet and 120-foot transition taper		Harmony Phase 5		
#3	E. Exposition Avenue/ East Site Access		EB LT - construct lane 1 @ 200 feet and 120-foot transition taper		Harmony Phase 4		
			EB RT - construct lane 1 @ 200 feet and 120-foot transition taper		Harmony Phase 5		
			WB LT - construct lane - 1 @ 200 feet and 120-foot transition taper		Harmony Phase 5		
#4	E. Exposition Avenue/ Trussville Road		Construct as modern one-lane roundabout		Harmony Phase 4		
#5	S. Powhaton Road/ Right-In/Right-Out Access		NB RT - construct lane - 1 @ 275 feet and 160-foot transition taper		Harmony Phase 5		
#6	Trussville Road/ Site Access		NB LT - construct lane 1 @ 200 feet and 100-foot transition taper (or stripe Trussville Road with a center two-way left-turn lane)		Harmony Phase 5	SB LT - construct lane 1 @ 200 feet and 100-foot transition taper (or stripe Trussville Road with a center two-way left-turn lane)	Others

(1) A transition taper of 13.5:1 was used for S. Powhaton Road and E. Mississippi Avenue based on a posted speed limit of 45 mph (160 feet). Dual left-turn lanes have transition taper lengths of 325 feet. An appropriate redirect taper for 45 mph is 45:1
A transition taper of 10:1 was used for Trussville Road and E. Exposition Avenue based on a posted speed limit of 35 mph (120 feet). An appropriate redirect taper for 35 mph is 20:1

Table 6 (2 of 2)
Recommended Improvements to Public Street Network
Harmony Phase 5
Aurora, CO
LSC #210910; August, 2022

Inter-section No.	Intersection Location	Recommended Improvements by 2024 ⁽¹⁾		Responsibility	Recommended Improvements by 2040 ⁽¹⁾		Responsibility
#7	S. Powhaton Road/ E. Mississippi Avenue	WB LT - construct lane - 1 @ 275 feet and 160-foot transition taper		Harmony Phase 4	EB LT - construct lane - 1 @ 275 feet and 160-foot transition taper		Others
		NB RT - construct lane - 1 @ 275 feet and 160-foot transition taper		Harmony Phase 4	EB RT - construct lane 1 @ 275 feet and 160-foot transition taper		Others
		SB LT - construct lane - 1 @ 275 feet and 160-foot transition taper		Harmony Phase 4	EB to SB RT Accel - construct lane - 1 @ 390 feet and 160-foot transition taper		Others
					WB RT - construct lane - 1 @ 275 feet and 160-foot transition taper		Applicant
					WB to NB RT Accel - construct lane - 1 @ 390 feet and 160-foot transition taper		Applicant
					NB LT - construct lane 1 @ 275 feet and 160-foot transition taper		Others
					SB RT - construct lane 1 @ 275 feet and 160-foot transition taper		Others
					Traffic signalization when warranted		Harmony (Future Phases)/Others
#8	E. Mississippi Avenue/ Site Access				EB LT - construct lane 1 @ 275 feet and 160-foot transition taper		Harmony Phase 5
					EB RT - construct lane 1 @ 275 feet and 160-foot transition taper		Others
					WB LT - construct lane - 1 @ 275 feet and 160-foot transition taper		Others
#9	E. Mississippi Avenue/ Trussville Road				Construct as modern two-lane roundabout		Harmony (Future Phases)/Others
#10	Trussville Road/ South Site Access	NB LT - construct lane 1 @ 200 feet and 100-foot transition taper (or stripe Trussville Road with a center two-way left-turn lane)		Harmony Phase 5	SB LT - construct lane 1 @ 200 feet and 100-foot transition taper (or stripe Trussville Road with a center two-way left-turn lane)		Others
#11	Trussville Road/ Middle Site Access	NB LT - construct lane 1 @ 200 feet and 100-foot transition taper (or stripe Trussville Road with a center two-way left-turn lane)		Harmony Phase 5	SB LT - construct lane 1 @ 200 feet and 100-foot transition taper (or stripe Trussville Road with a center two-way left-turn lane)		Others

(1) A transition taper of 13.5:1 was used for S. Powhaton Road and E. Mississippi Avenue based on a posted speed limit of 45 mph (160 feet). Dual left-turn lanes have transition taper lengths of 325 feet. An appropriate redirect taper for 45 mph is 45:1
A transition taper of 10:1 was used for Trussville Road and E. Exposition Avenue based on a posted speed limit of 35 mph (120 feet). An appropriate redirect taper for 35 mph is 20:1

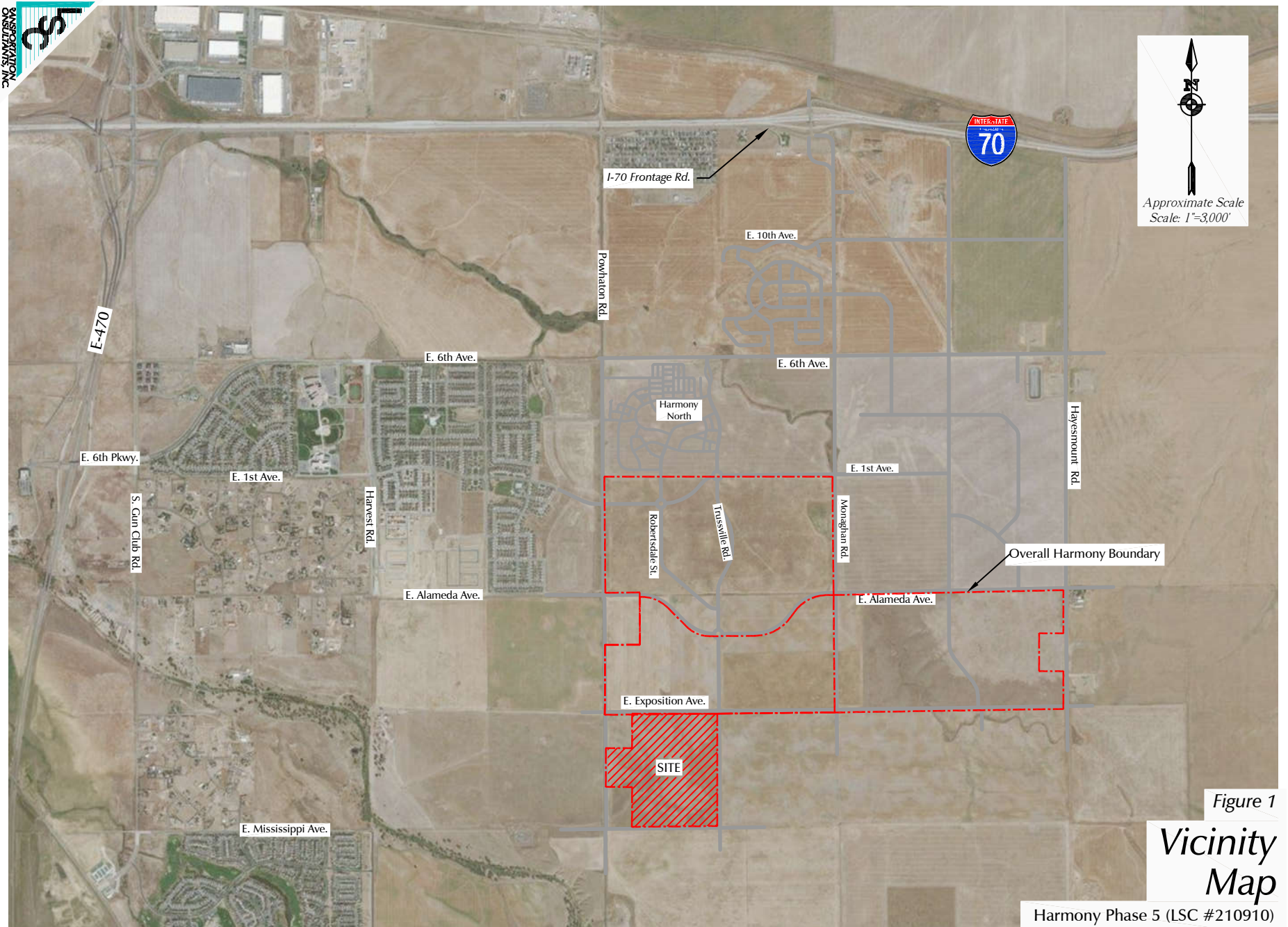


Figure 1

Vicinity Map

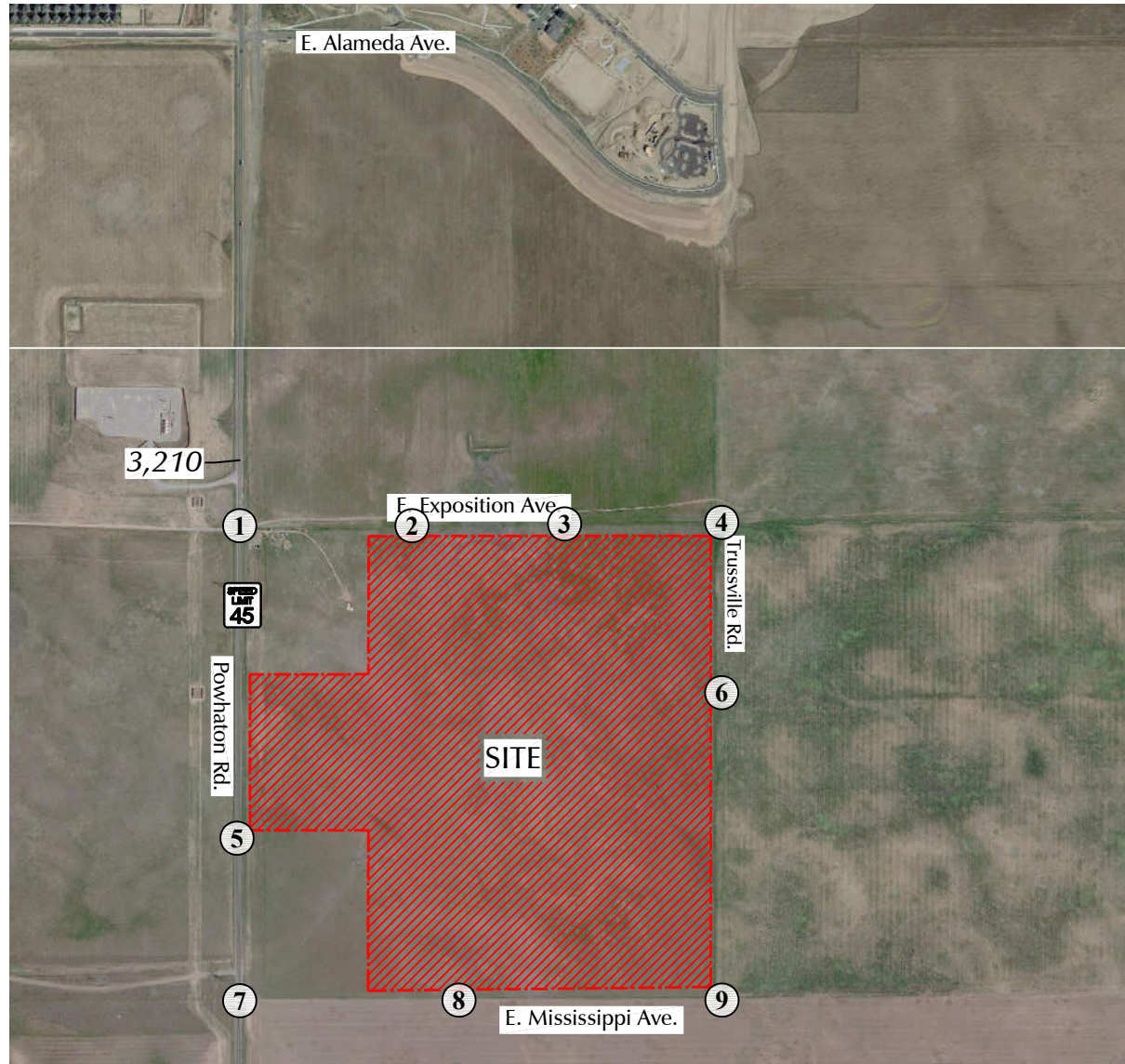
Harmony Phase 5 (LSC #210910)





Figure 2

Site Plan

Harmony Phase 5 (LSC #210910)



LEGEND:

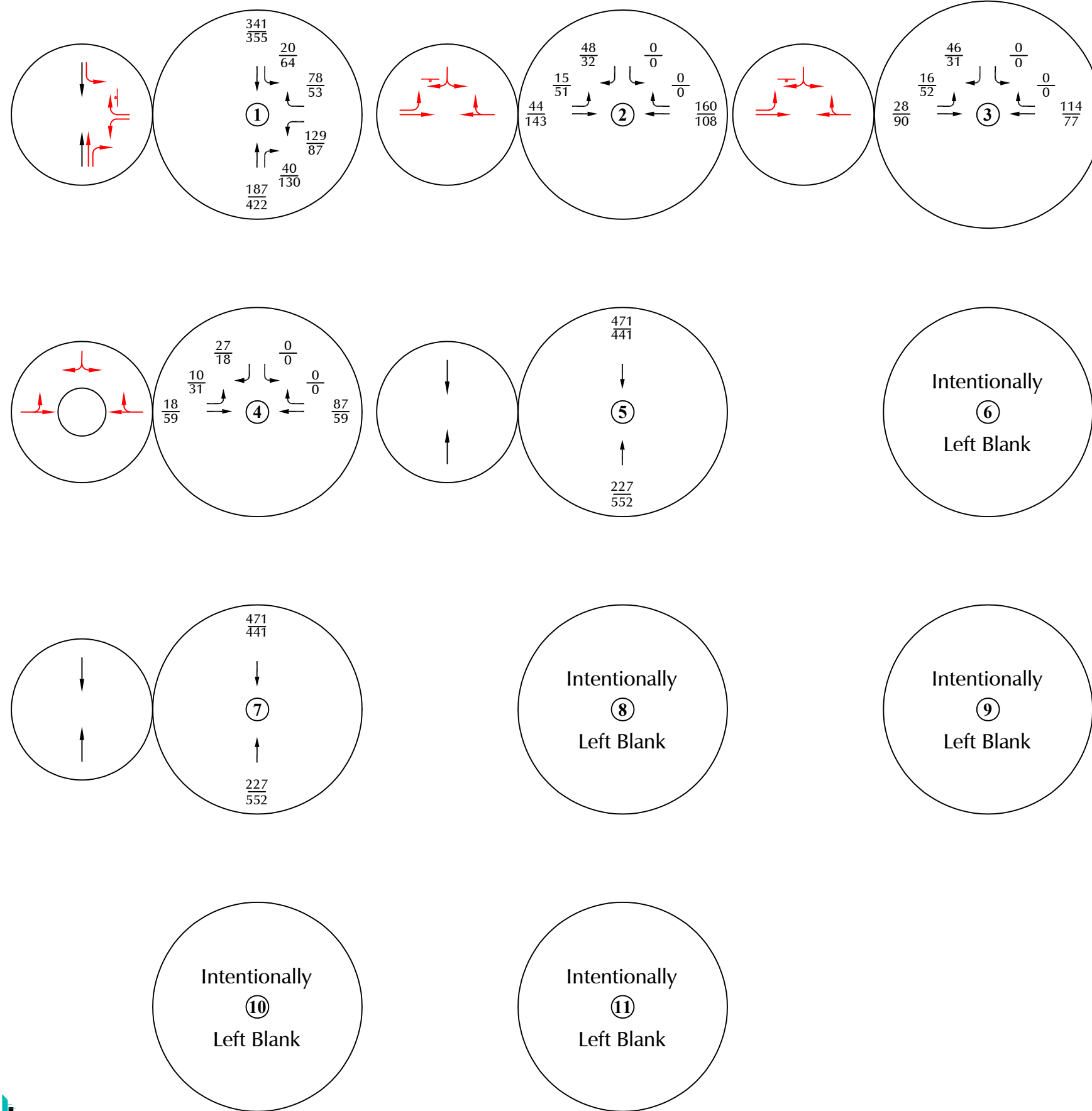
-  = Stop Sign
-  = Posted Speed Limit
- $\frac{26}{35}$ = AM Peak Hour Traffic / PM Peak Hour Traffic
- 1,000 = Average Daily Traffic

Approximate Scale
Scale: 1" = 1,000'

Figure 3

Existing Traffic, Lane Geometry and Traffic Control

Harmony Phase 5 (LSC #210910)



LEGEND:

- ↓ = Stop Sign
- ⬤ = Traffic Signal
- = Modern Roundabout
- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{35}{26}$ = PM Peak Hour Traffic
- 1,000 = Average Daily Traffic

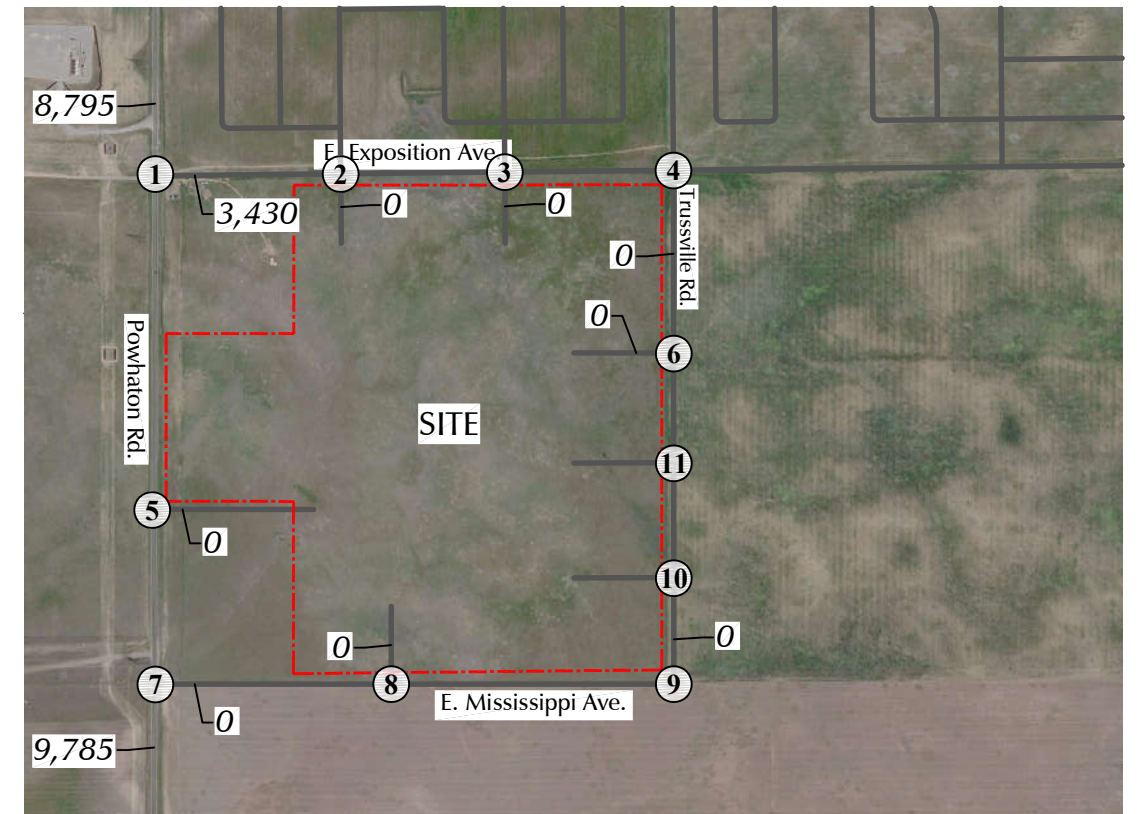
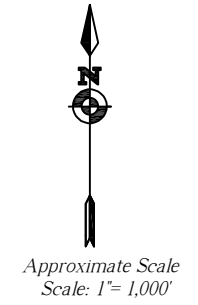
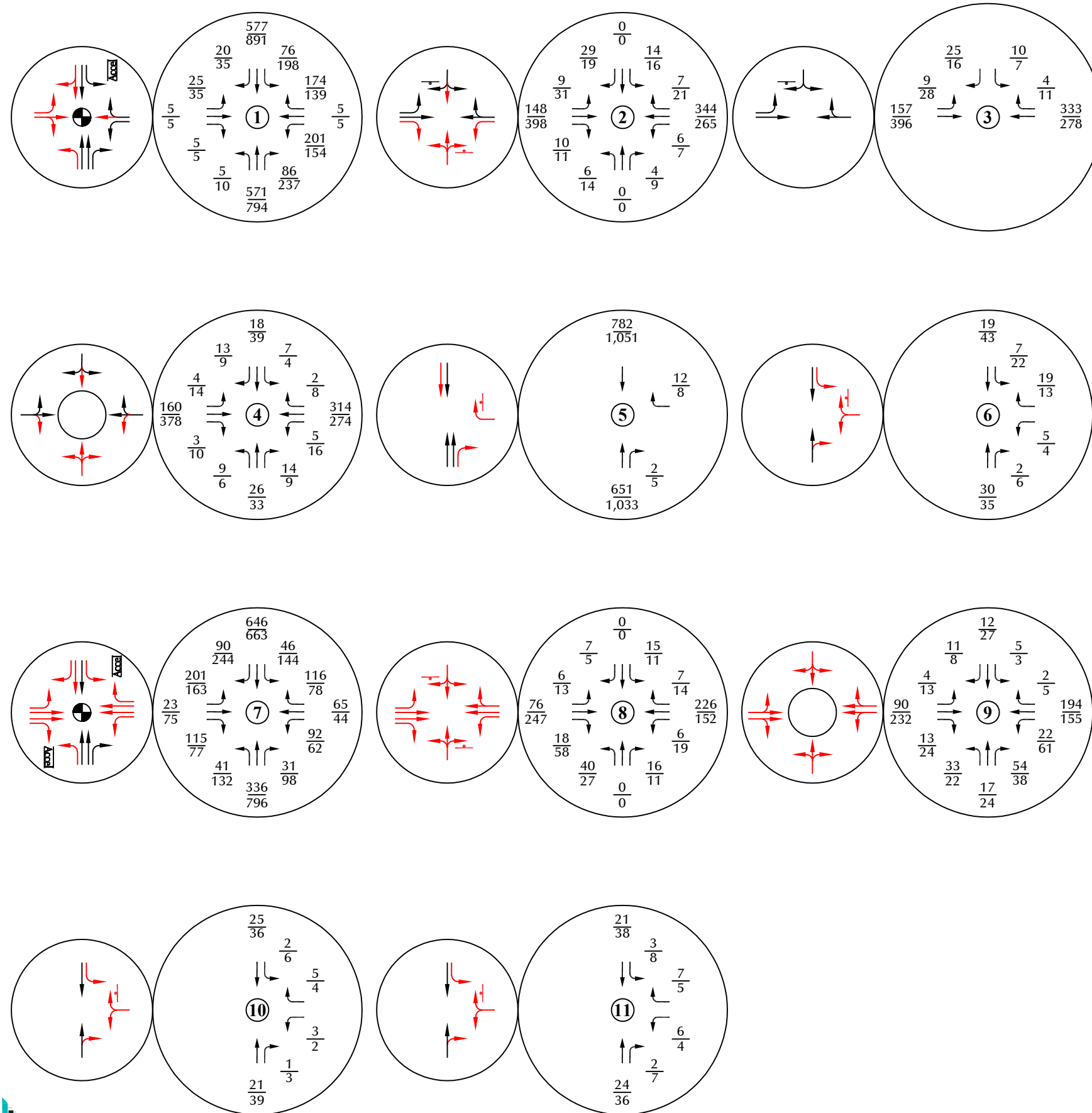
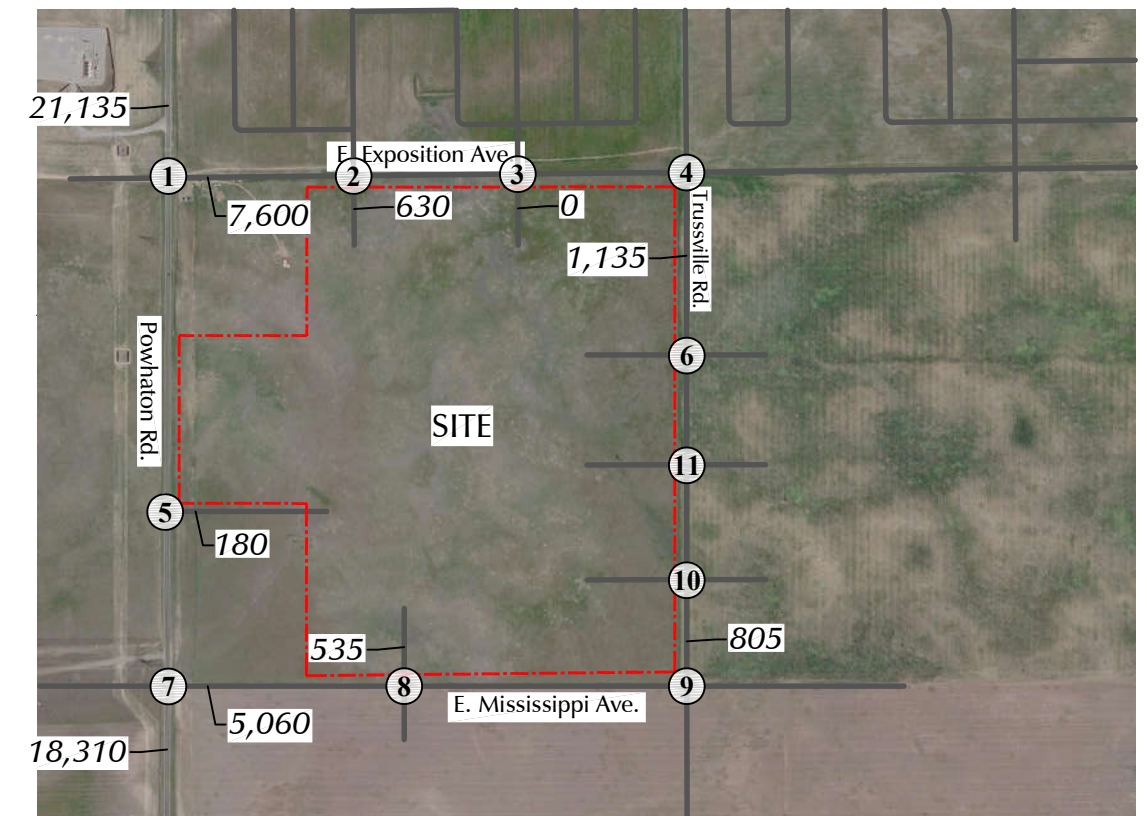
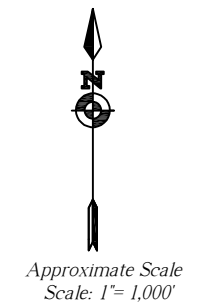


Figure 4
Year 2024 Background Traffic,
Lane Geometry and Traffic Control
Harmony Phase 5 (LSC #210910)

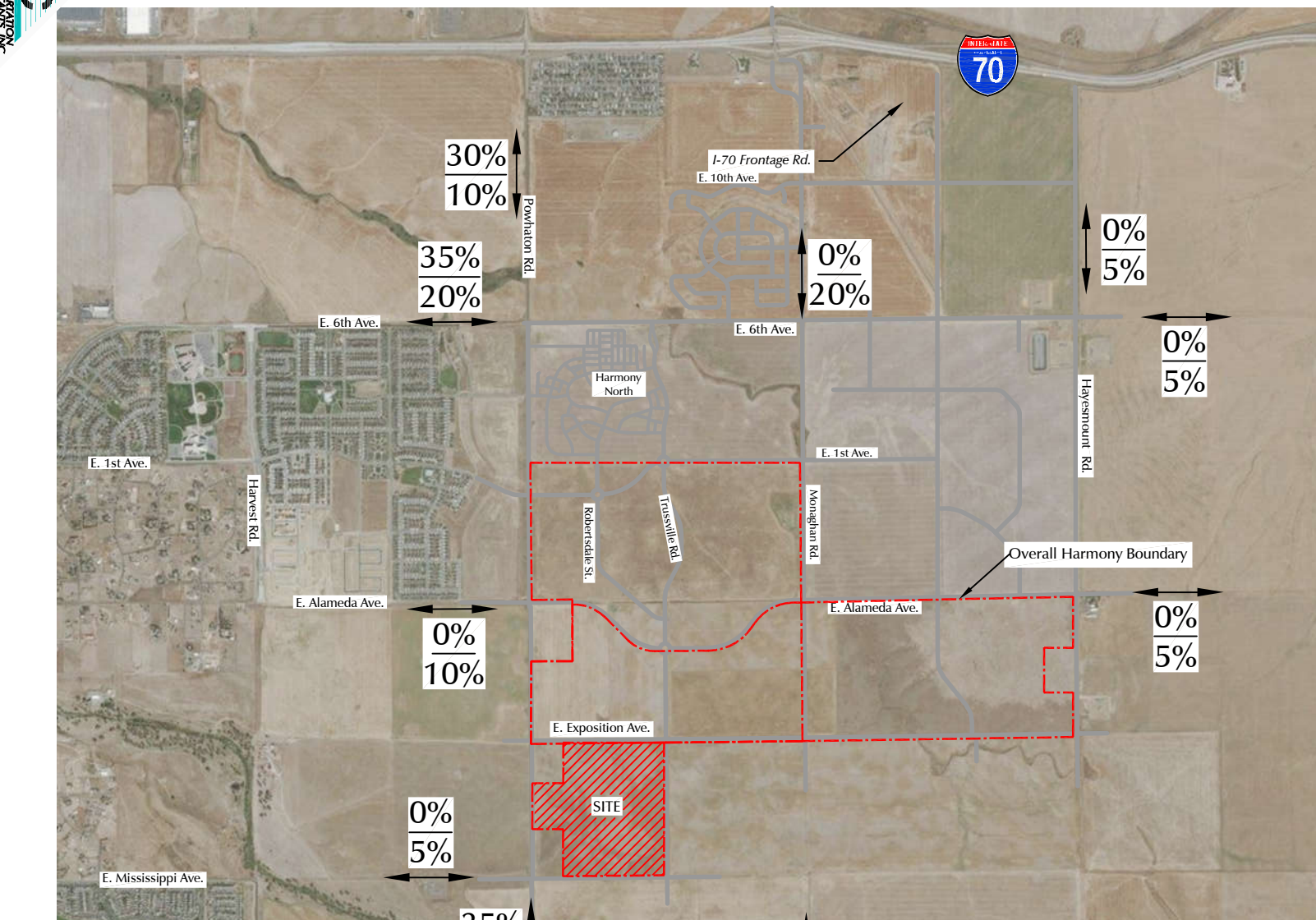


LEGEND:
 ↓ = Stop Sign
 ● = Traffic Signal
 ○ = Modern Roundabout
 $\frac{26}{35}$ = AM Peak Hour Traffic
 $\frac{35}{26}$ = PM Peak Hour Traffic
 1,000 = Average Daily Traffic



→ New Lane Assumed in the 2040 Background Scenario

Figure 5
 Year 2040 Background Traffic,
 Lane Geometry and Traffic Control
 Harmony Phase 5 (LSC #210910)



Approximate Scale
Scale: 1"=3,000'

LEGEND:

5%
5%

Year 2024 Percent Directional Distribution
Year 2040 Percent Directional Distribution

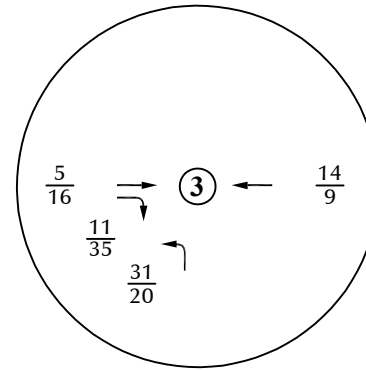
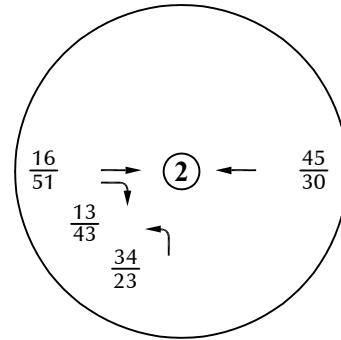
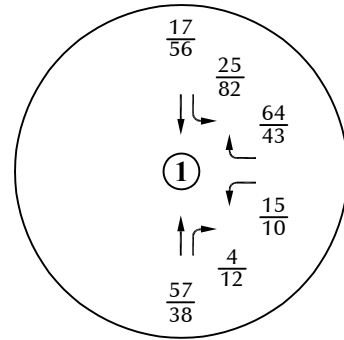
Directional Distribution of
Residential Site-Generated Traffic

Harmony Phase 5 (LSC #210910)

Figure 6



Harmony Phase 5 (LSC #210910)



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

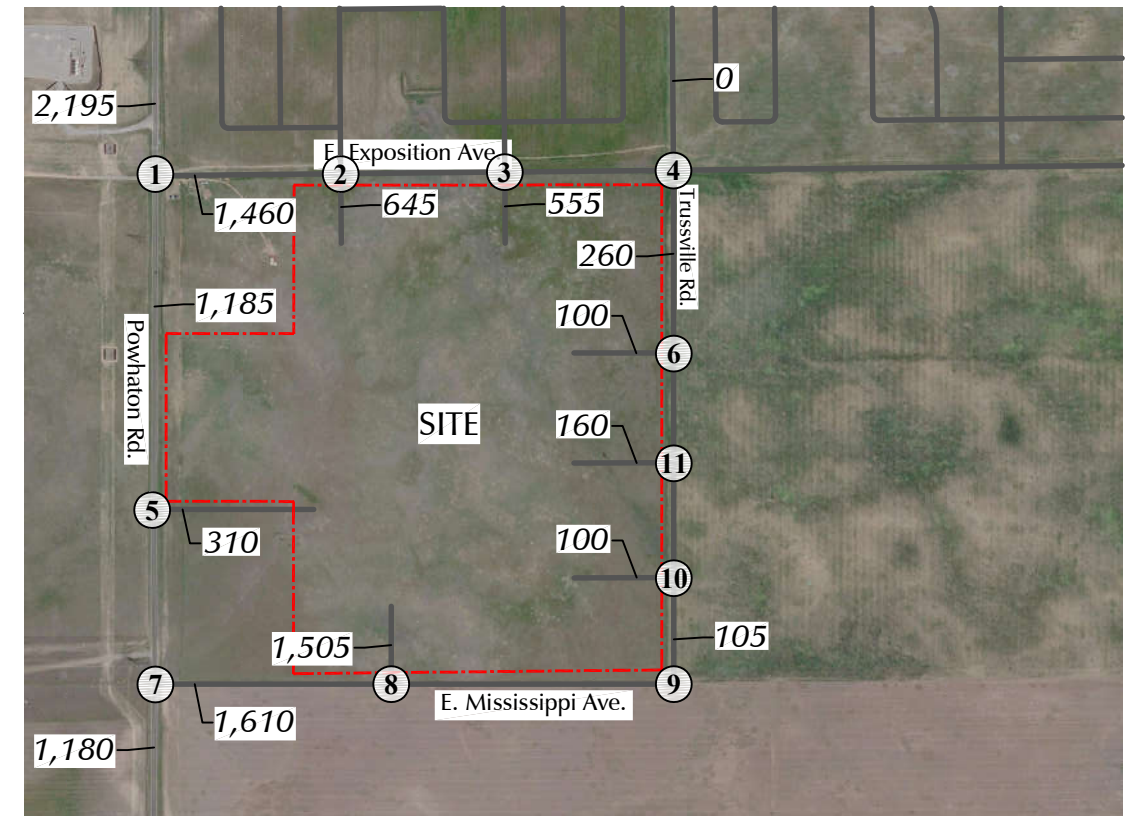
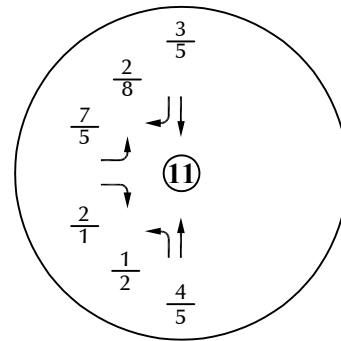
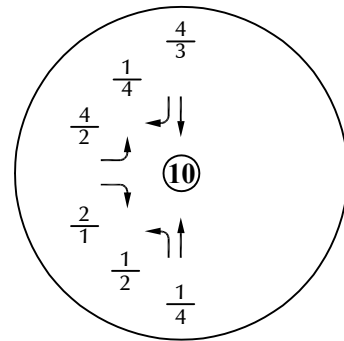
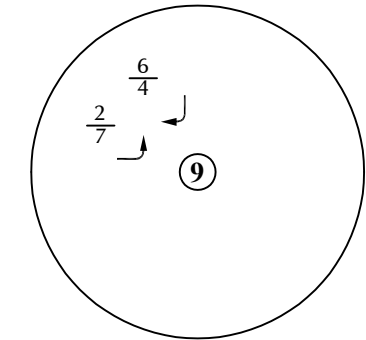
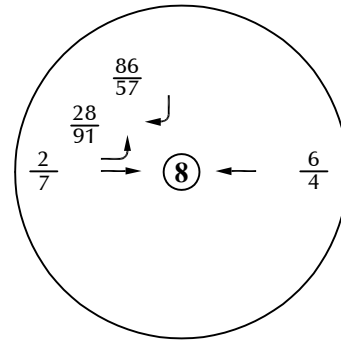
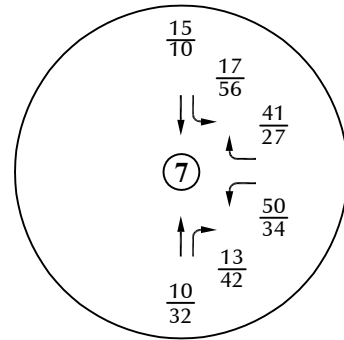
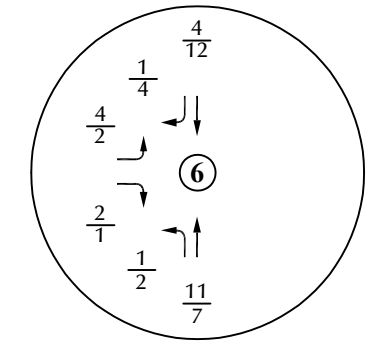
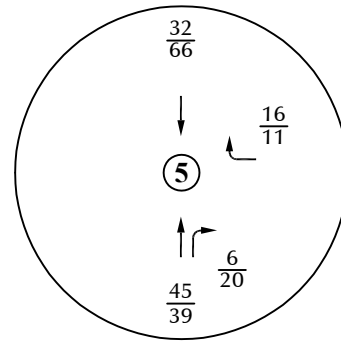
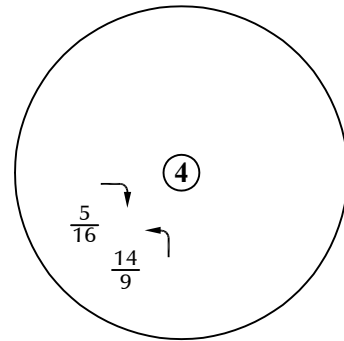
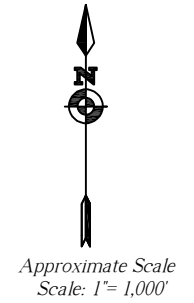
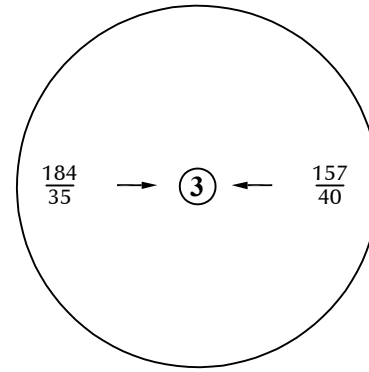
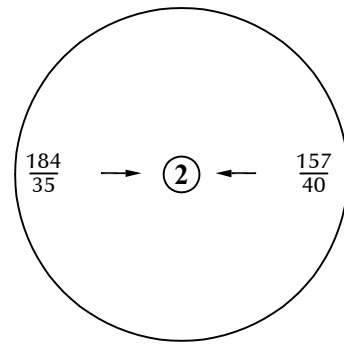
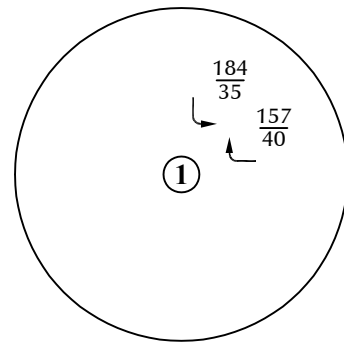


Figure 8
 Year 2024 Assignment of
 Residential Site-Generated Traffic
 Harmony Phase 5 (LSC #210910)



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

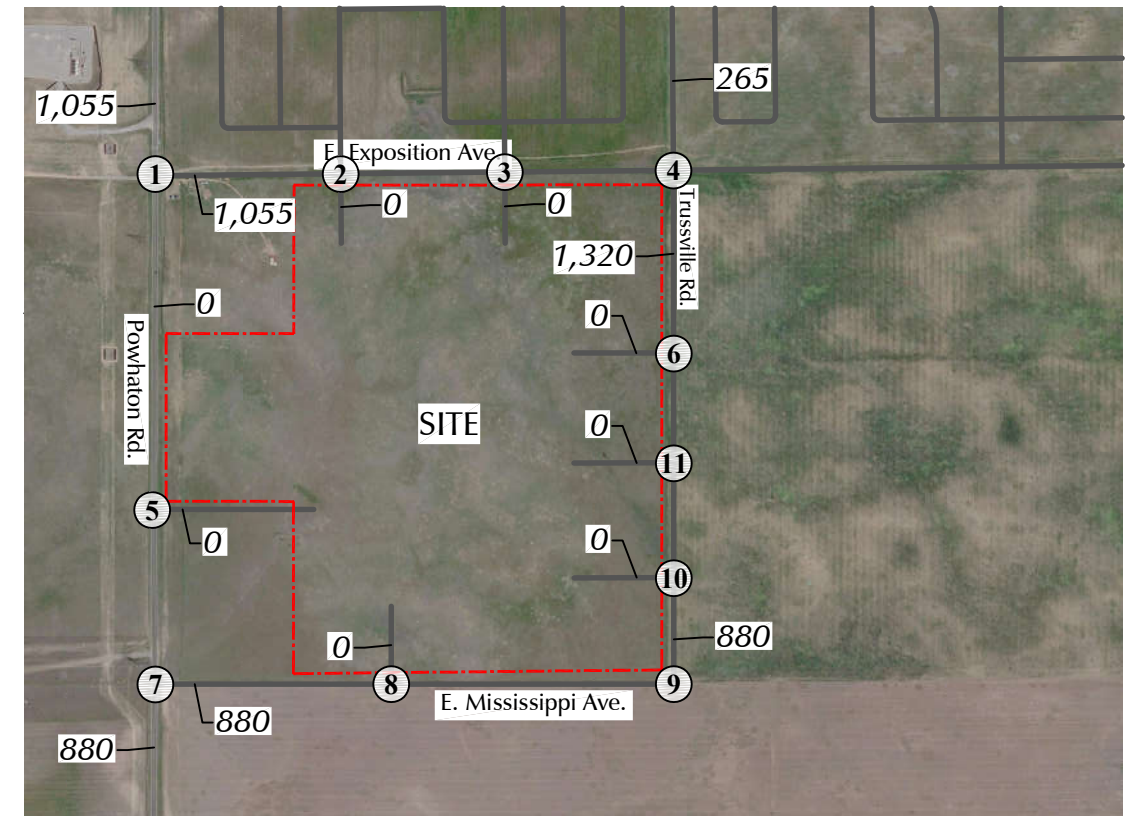
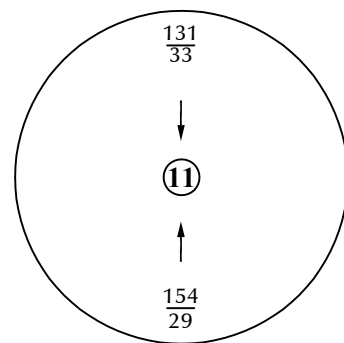
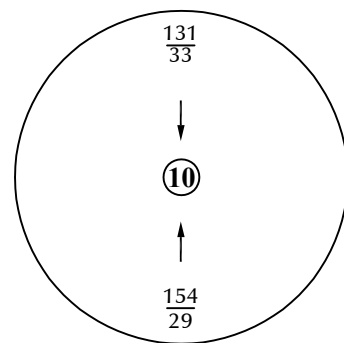
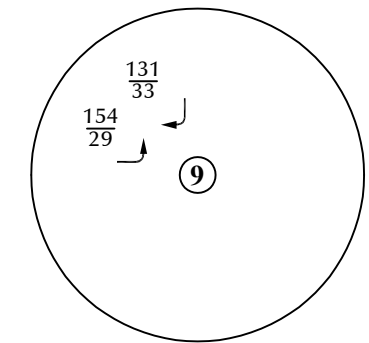
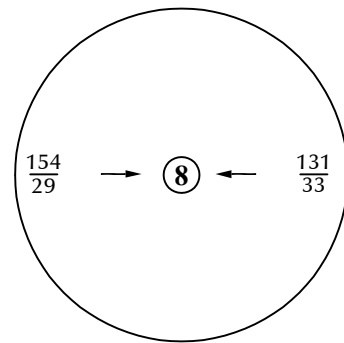
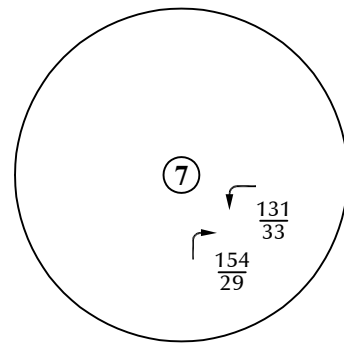
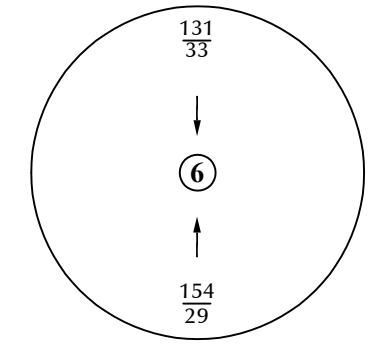
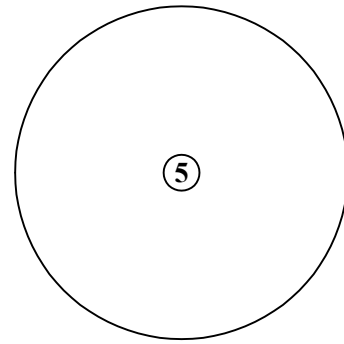
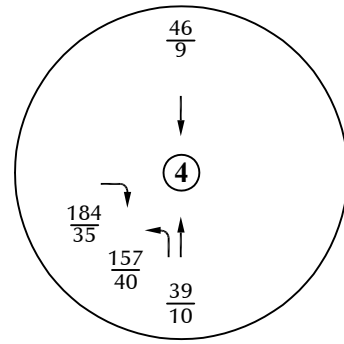
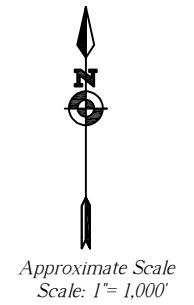
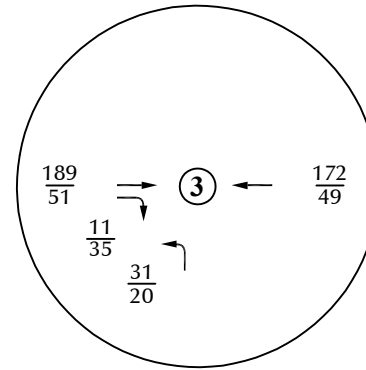
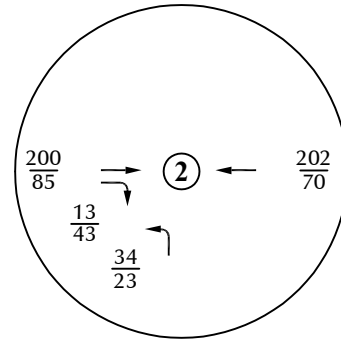
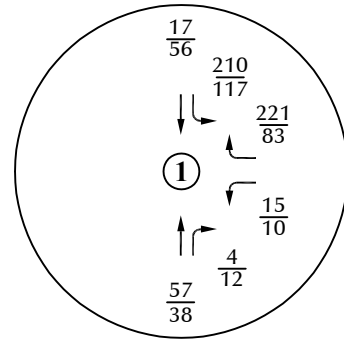


Figure 9
 Year 2024 Assignment of
 School Site-Generated Traffic
 Harmony Phase 5 (LSC #210910)



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

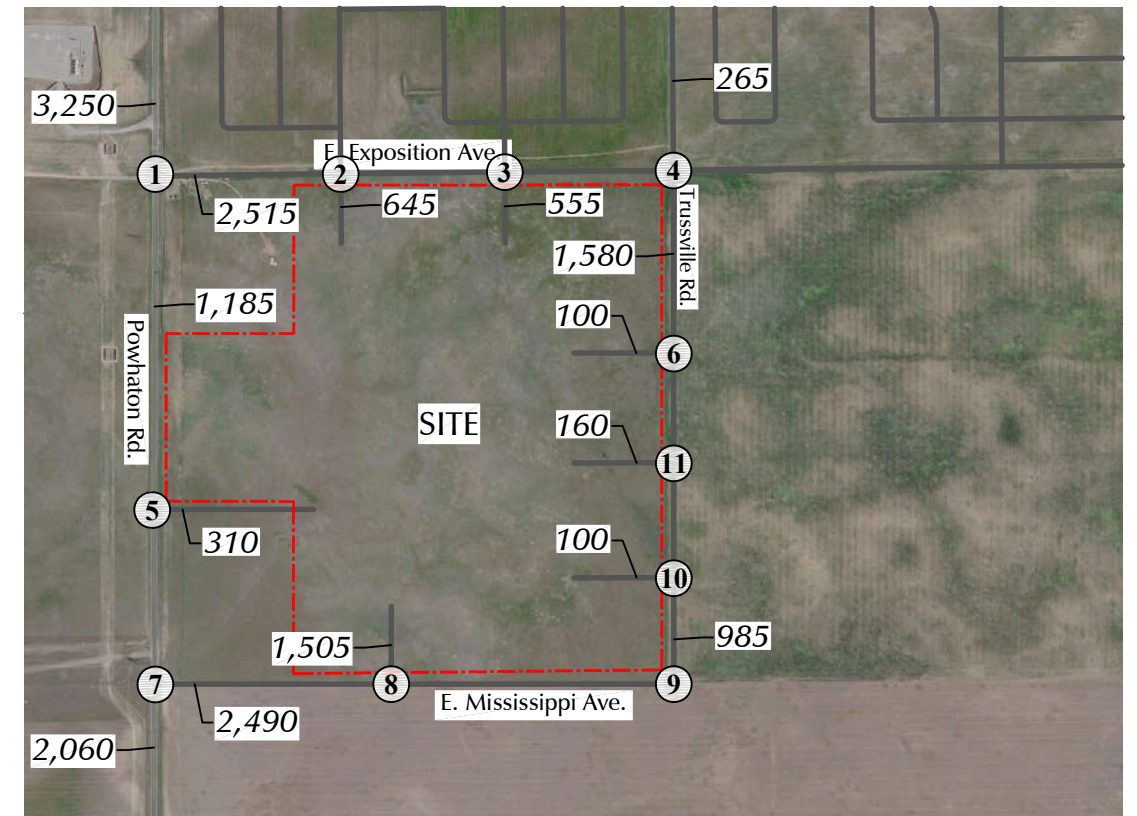
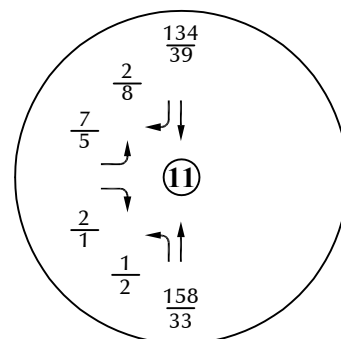
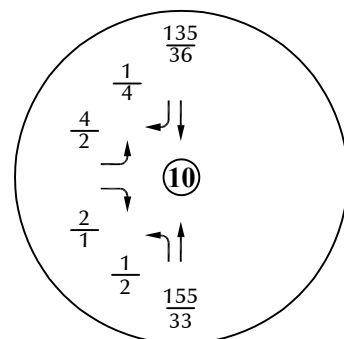
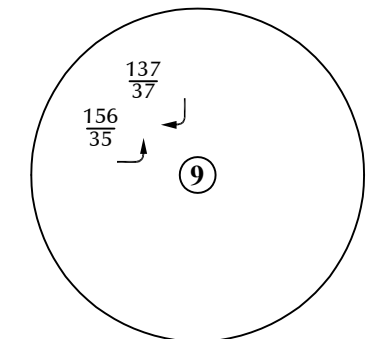
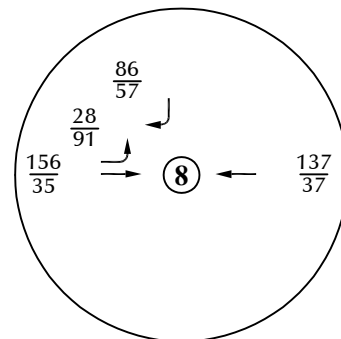
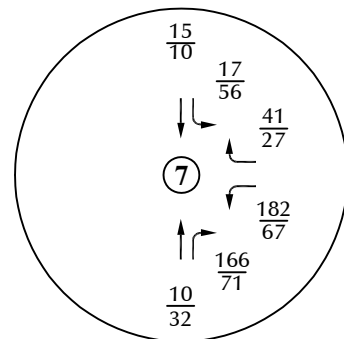
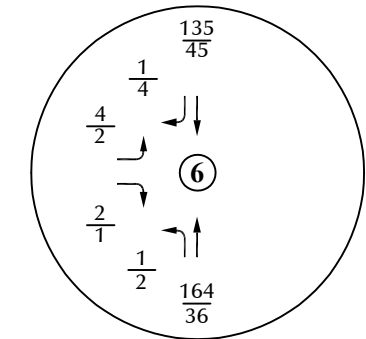
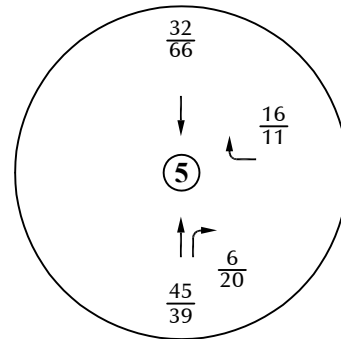
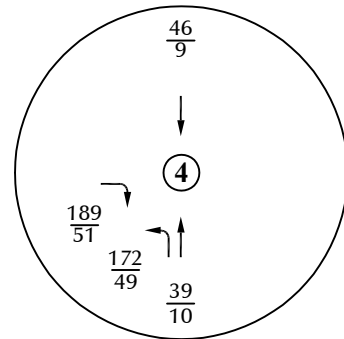
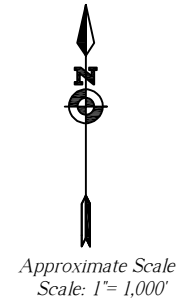
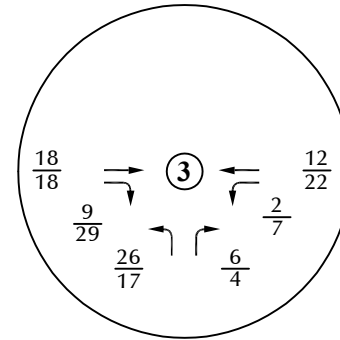
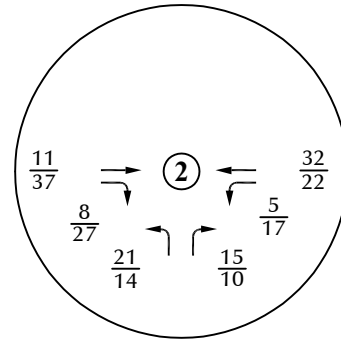
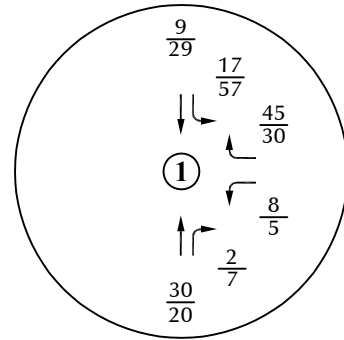


Figure 10
 Year 2024 Assignment of
 Total Site-Generated Traffic
 Harmony Phase 5 (LSC #210910)



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

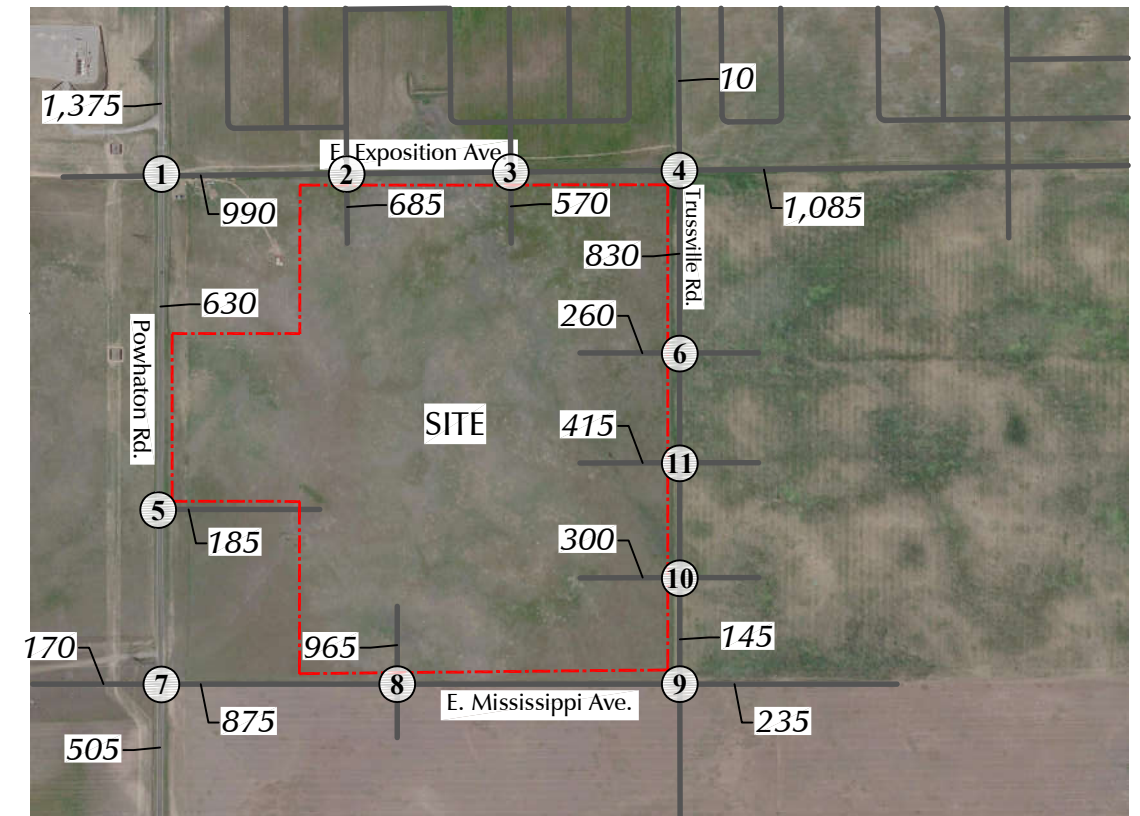
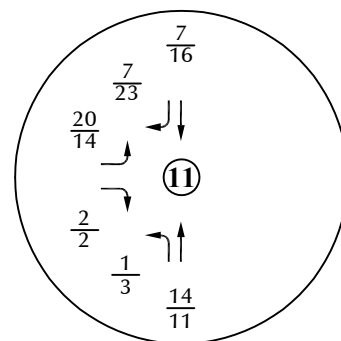
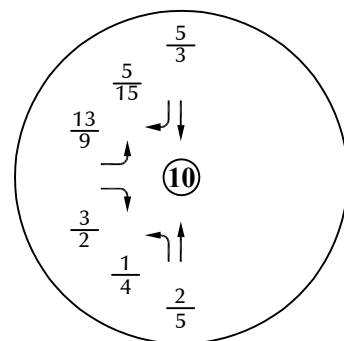
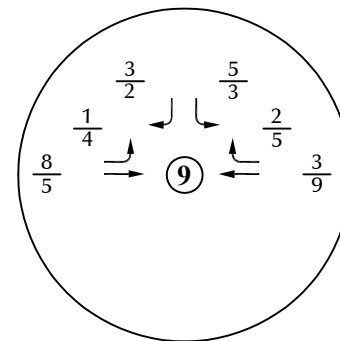
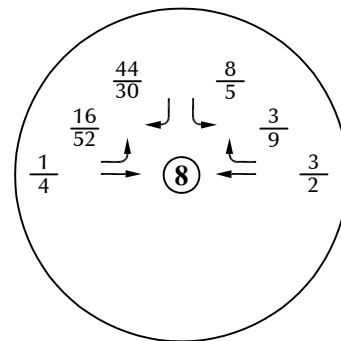
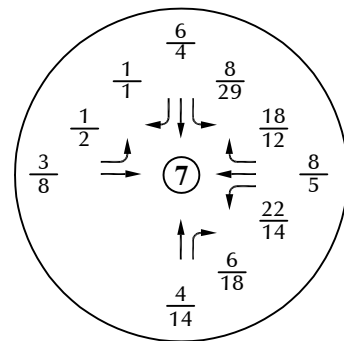
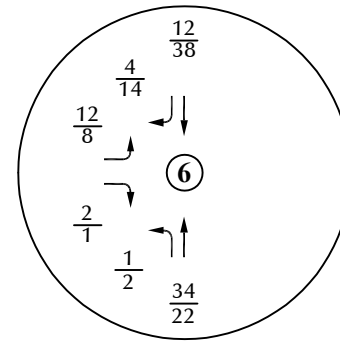
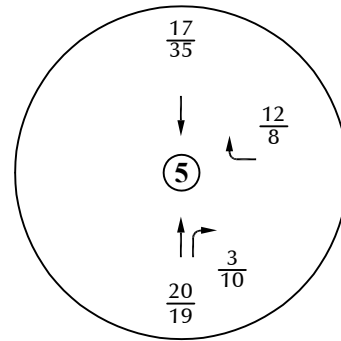
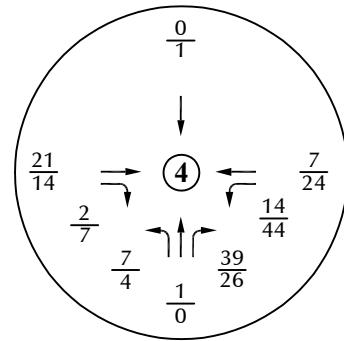
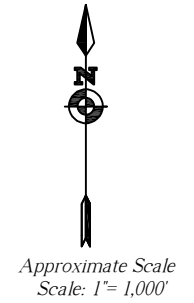
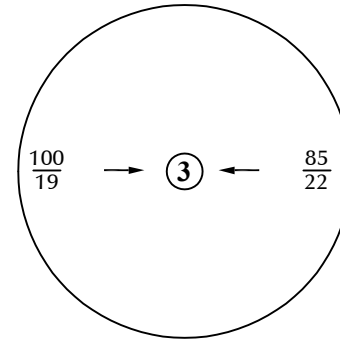
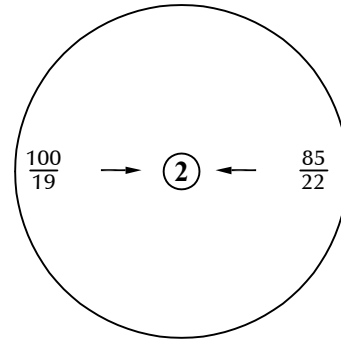
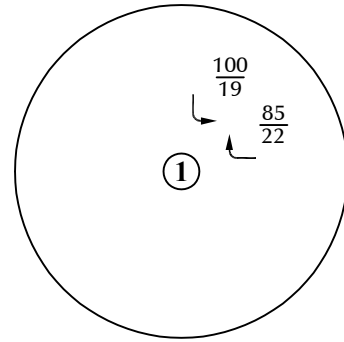


Figure 11
 Year 2040 Assignment of
 Residential Site-Generated Traffic
 Harmony Phase 5 (LSC #210910)



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

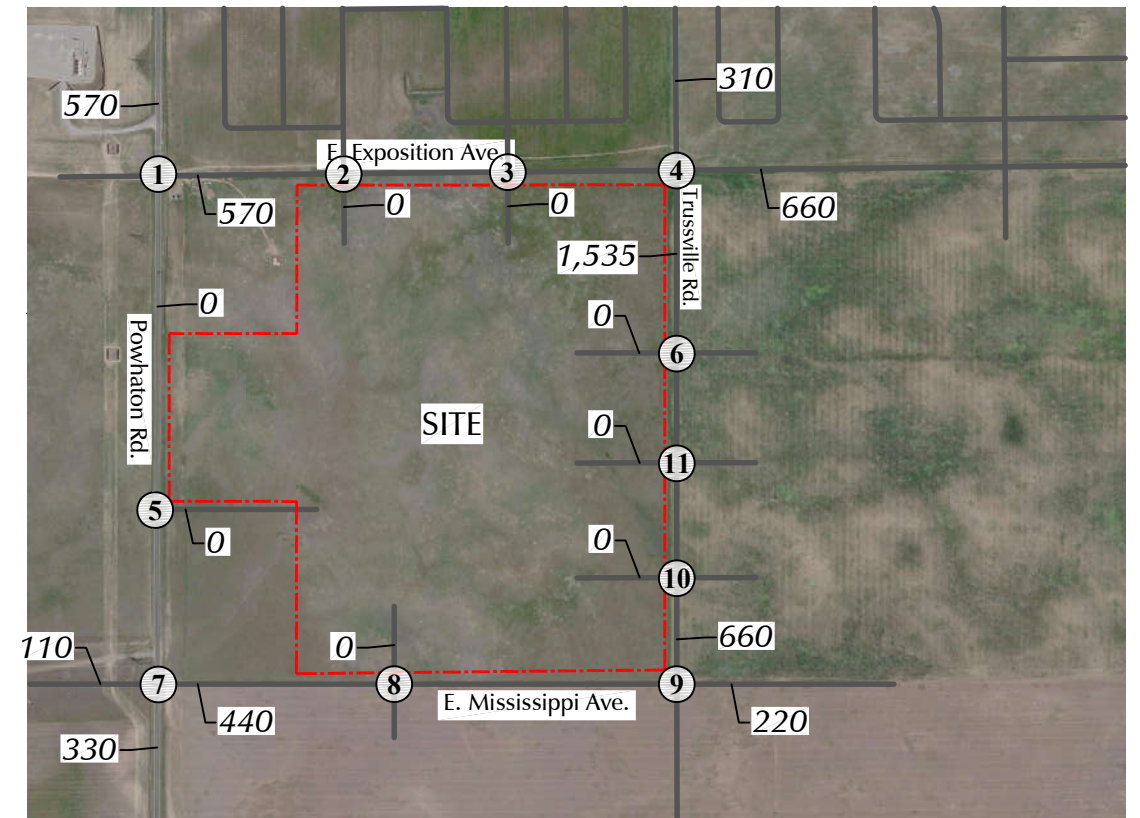
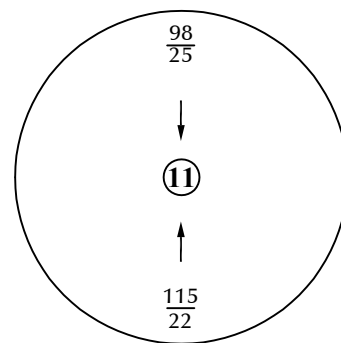
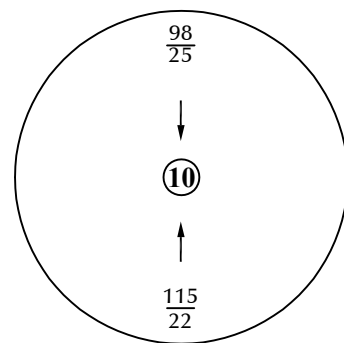
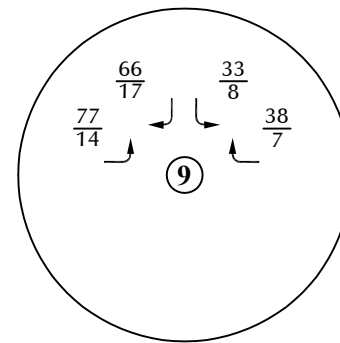
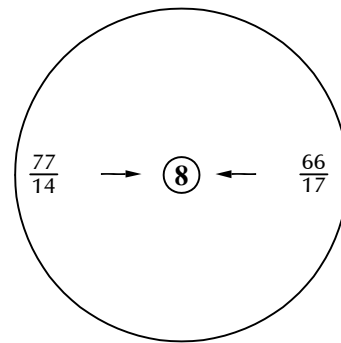
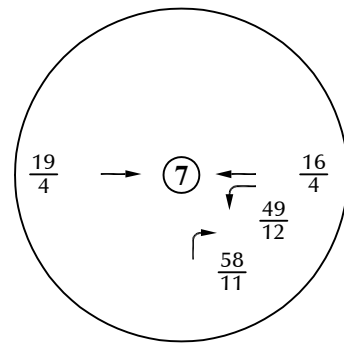
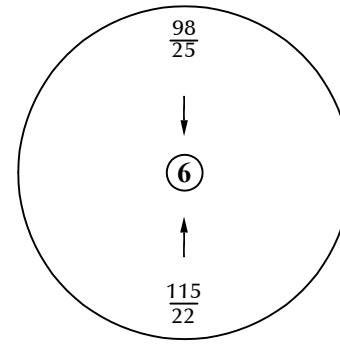
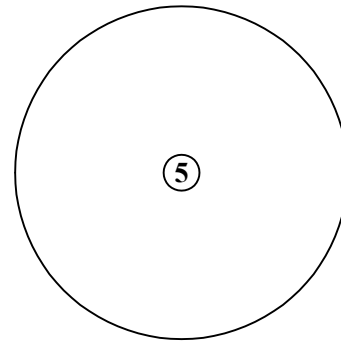
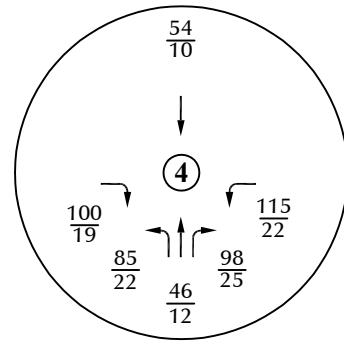
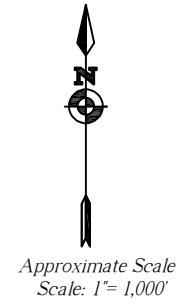
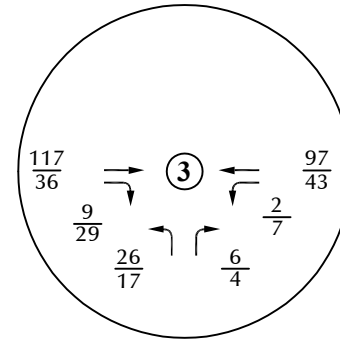
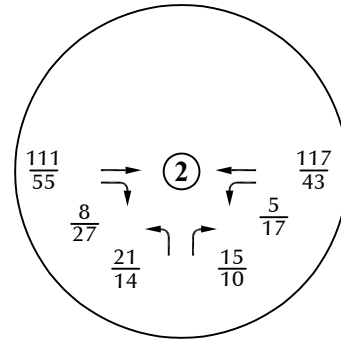
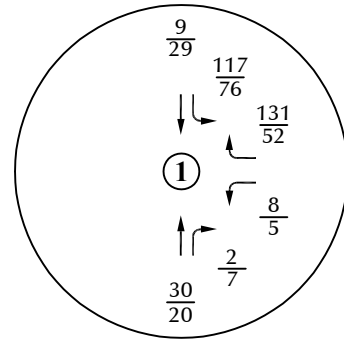


Figure 12
 Year 2040 Assignment of
 School Site-Generated Traffic
 Harmony Phase 5 (LSC #210910)



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

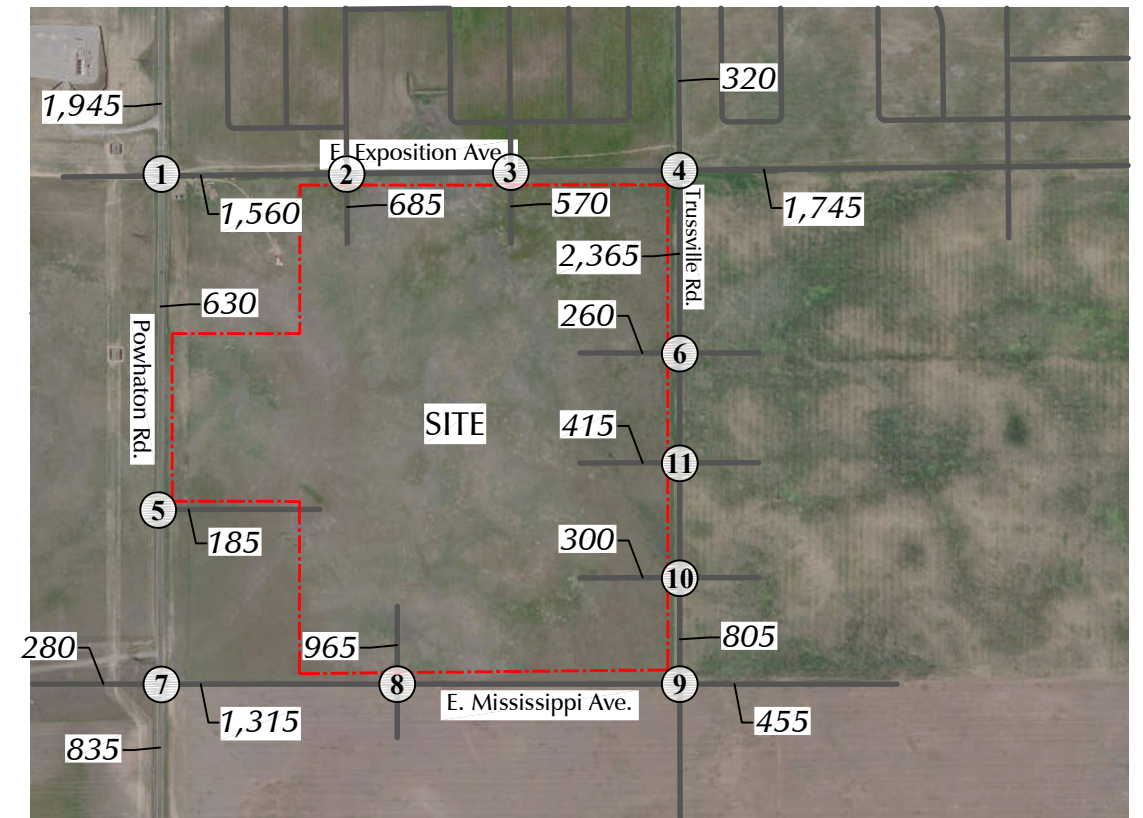
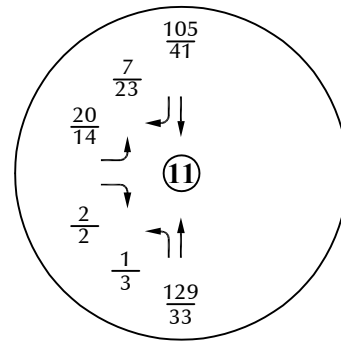
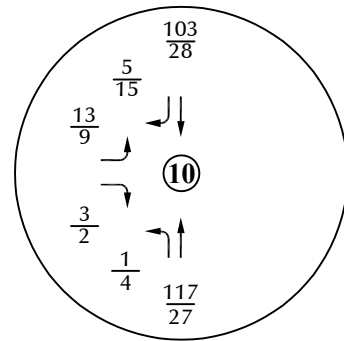
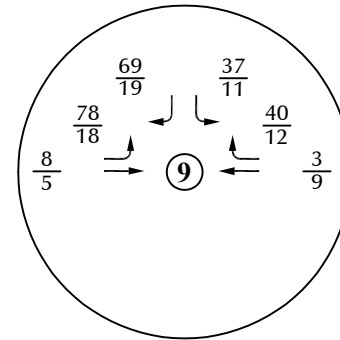
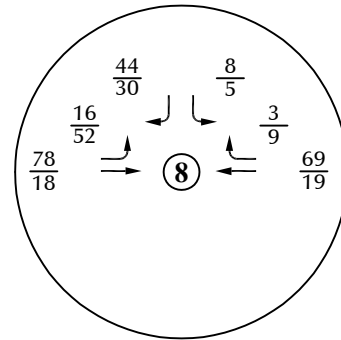
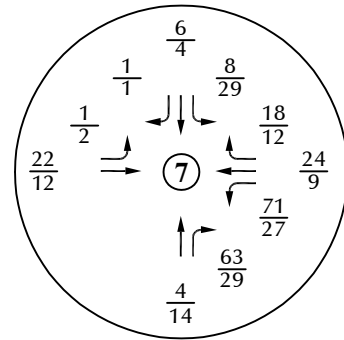
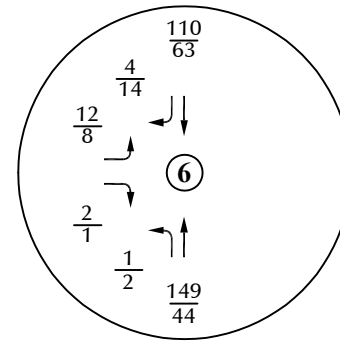
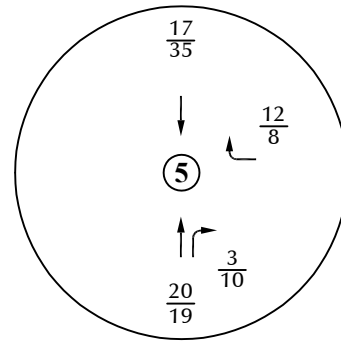
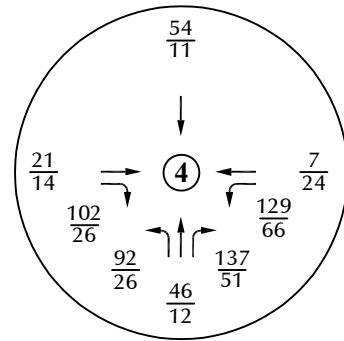
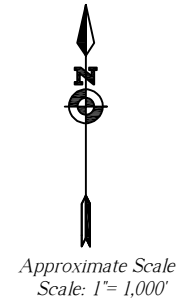
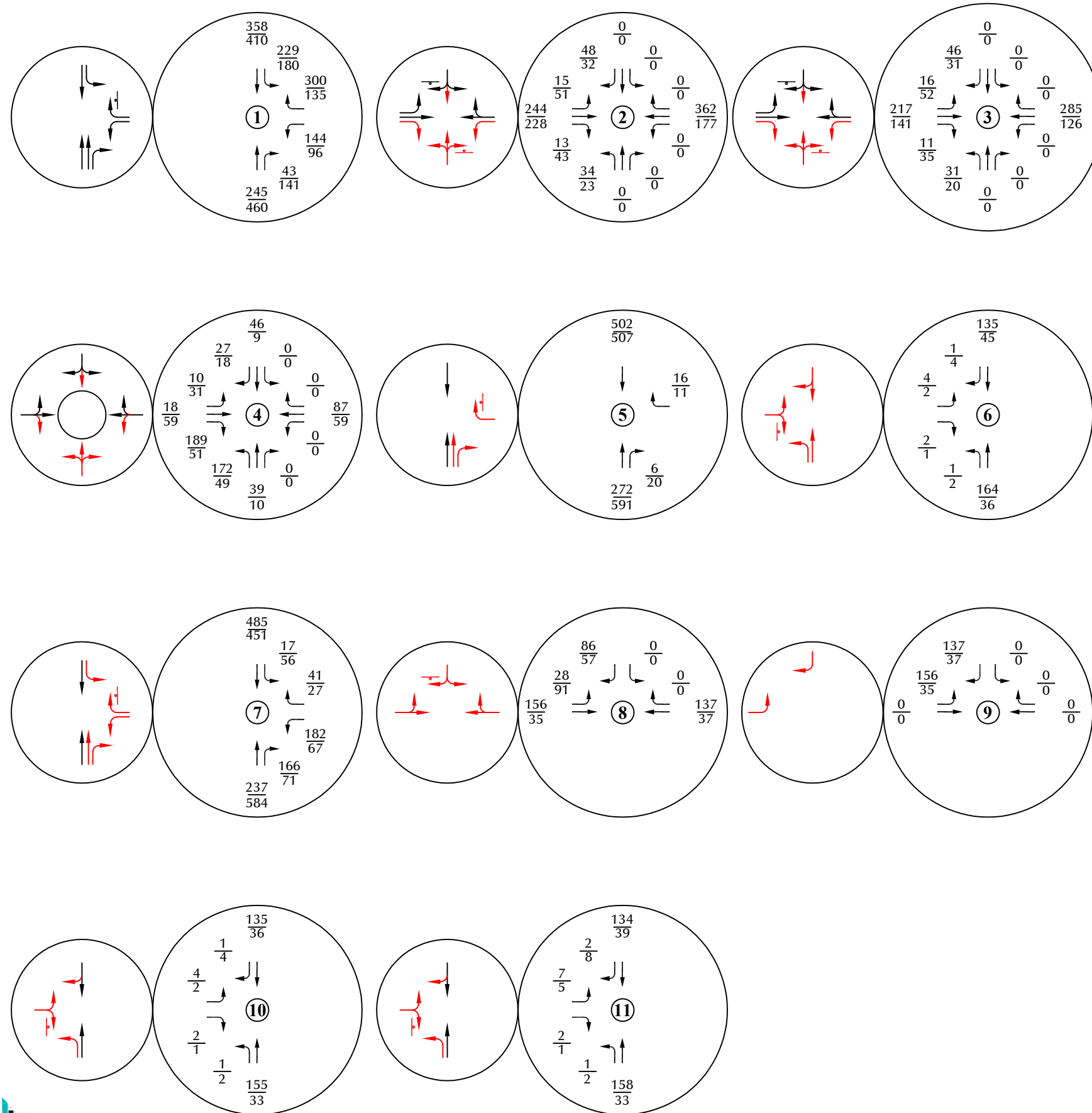


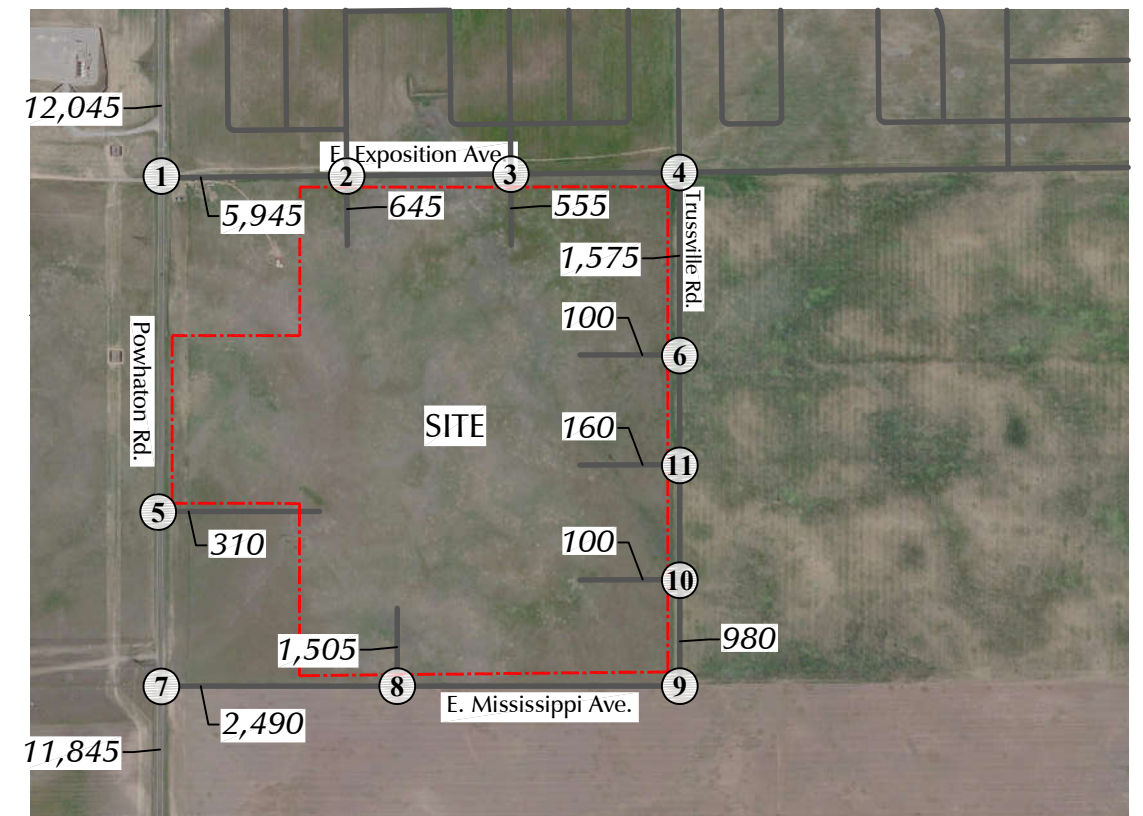
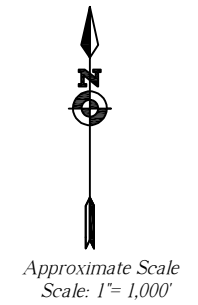
Figure 13

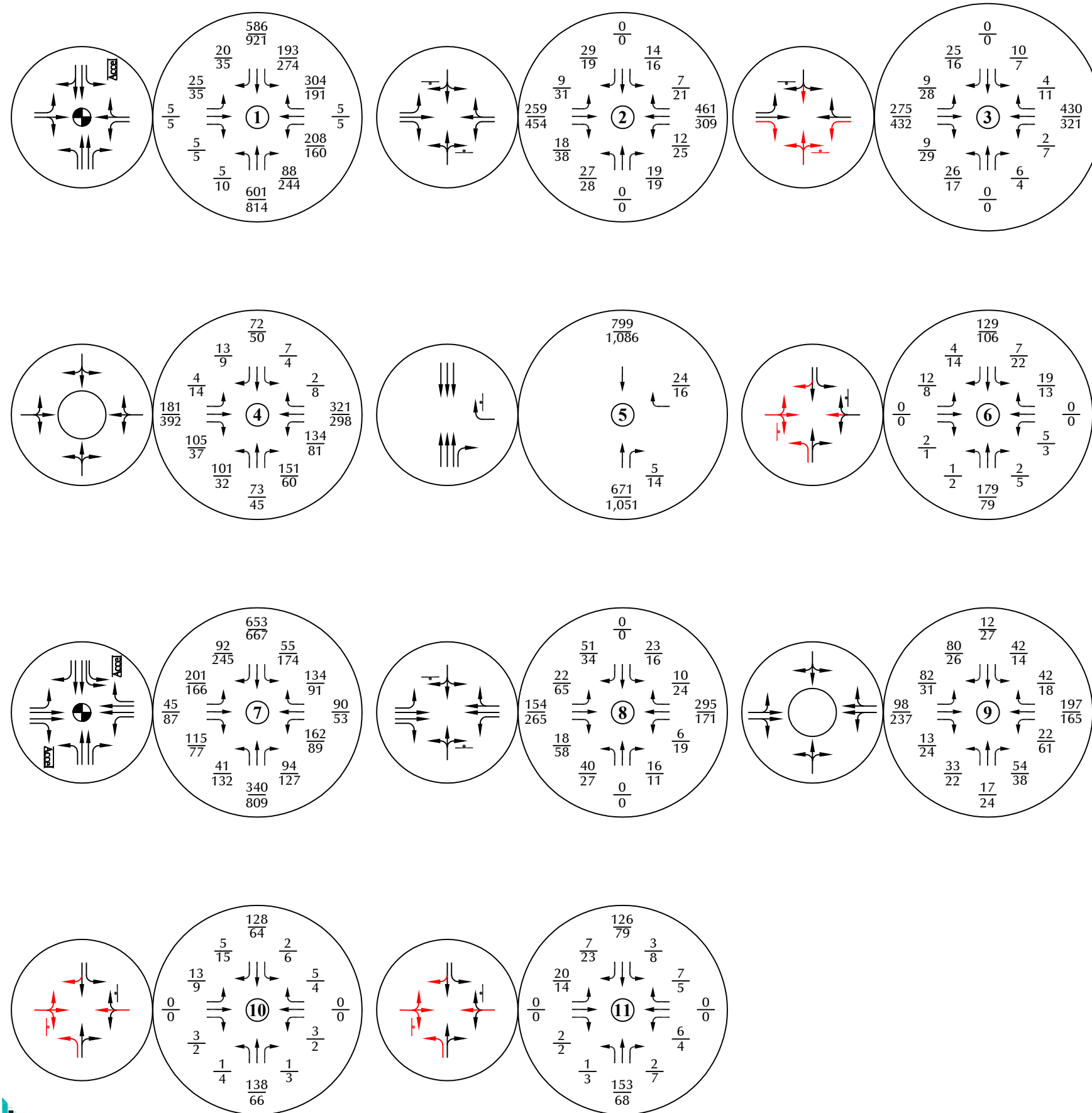
Year 2040 Assignment of Total Site-Generated Traffic

Harmony Phase 5 (LSC #210910)



LEGEND:
 ↓ = Stop Sign
 ● = Traffic Signal
 ○ = Modern Roundabout
 $\frac{26}{35}$ = AM Peak Hour Traffic
 $\frac{35}{26}$ = PM Peak Hour Traffic
 1,000 = Average Daily Traffic





LEGEND:

- ↓ = Stop Sign
- ⬤ = Traffic Signal
- = Modern Roundabout
- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{35}{26}$ = PM Peak Hour Traffic
- 1,000 = Average Daily Traffic

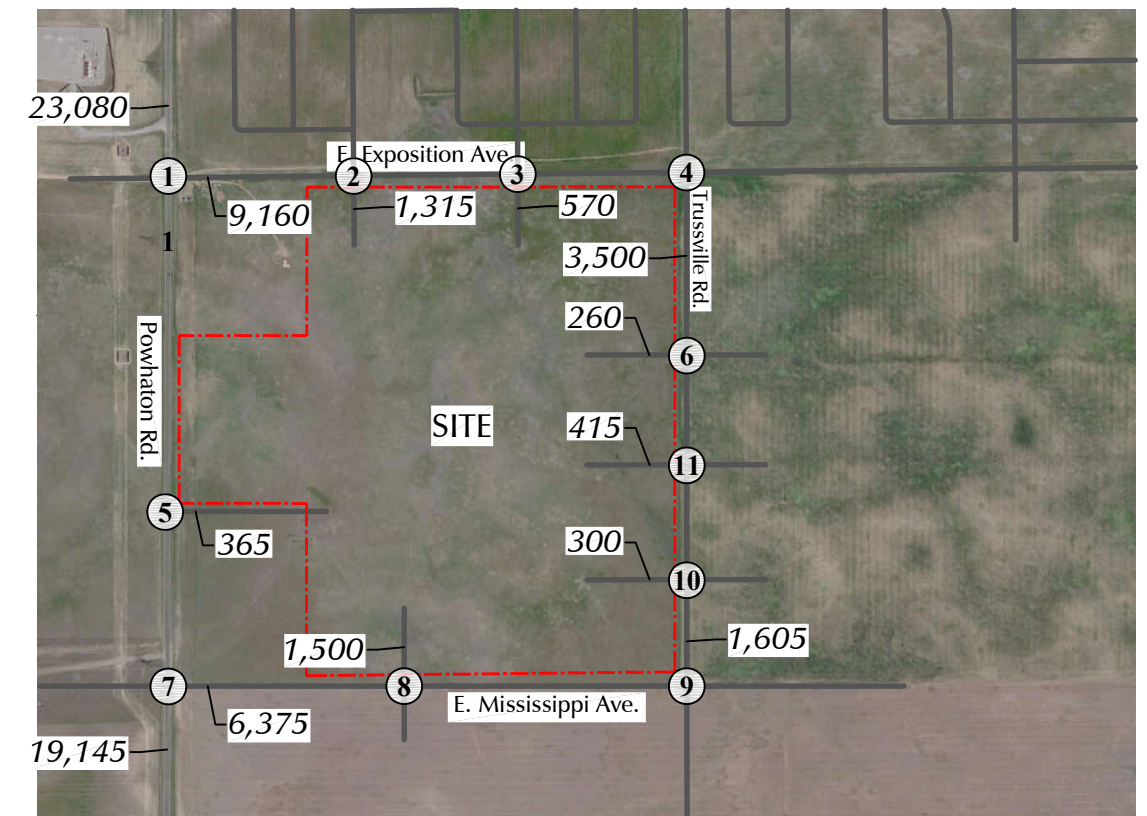
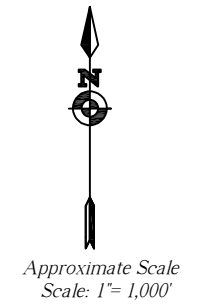
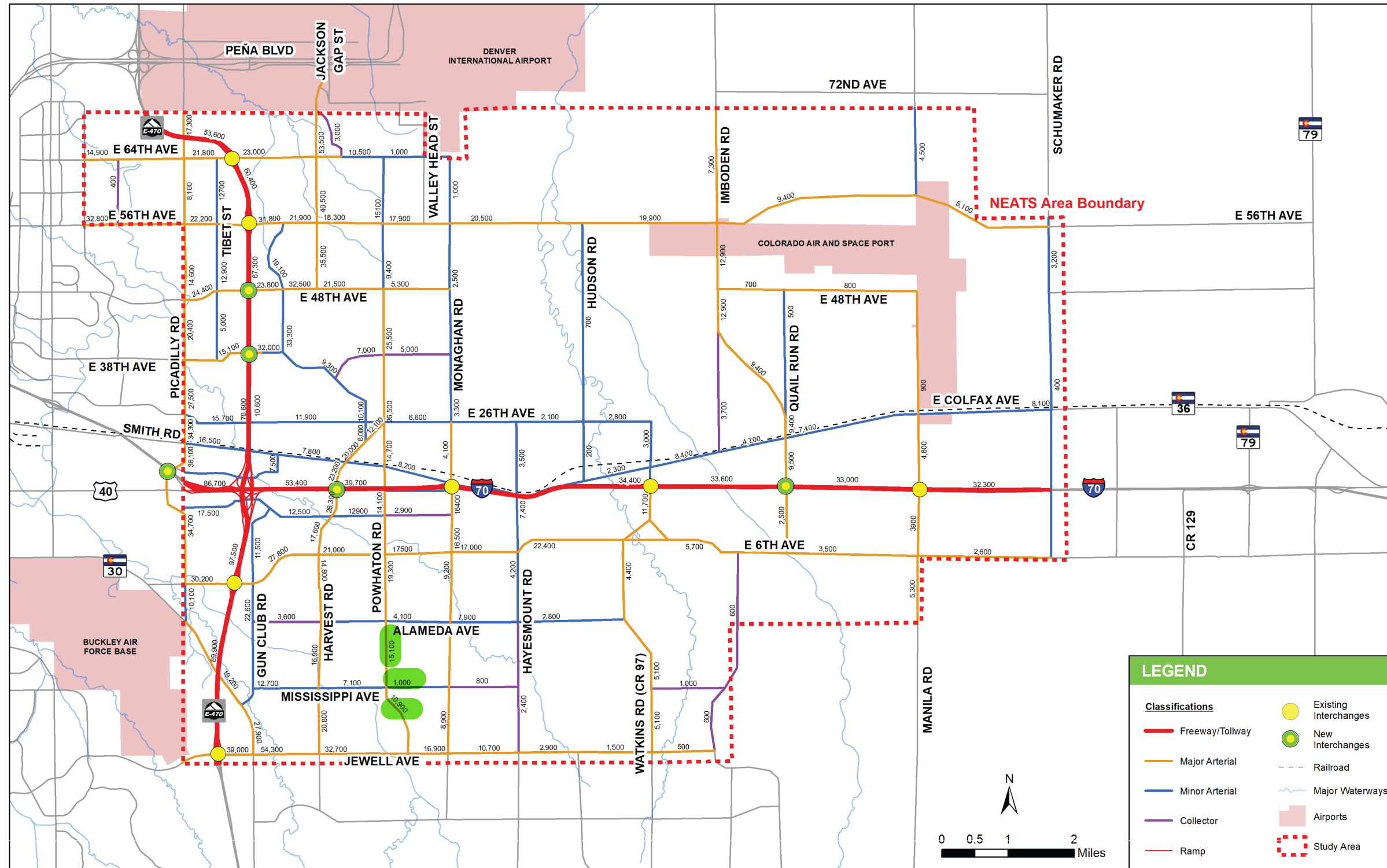


Figure 15
**Year 2040 Total Traffic,
 Lane Geometry and Traffic Control**
 Harmony Phase 5 (LSC #210910)

Key Pages from NEATS and Harmony Master TIA



Figure 11.
2040 Daily Traffic Volumes





LSC TRANSPORTATION CONSULTANTS, INC.

1889 York Street
Denver, CO 80206
(303) 333-1105
FAX (303) 333-1107
E-mail: lsc@lscdenver.com

March 9, 2017

Melcor/TC Aurora, LLC
c/o Mr. James Spehalski
Marathon Land Company
9750 W. Cambridge Place
Littleton, CO 80127

Re: Harmony
Traffic Impact Analysis
Aurora, CO
(LSC #140770)

Dear Mr. Spehalski:

In response to your request, LSC Transportation Consultants, Inc. has prepared this updated traffic impact analysis for the proposed Harmony development to reflect updated long range modeling results completed recently by Felsburg Holt & Ullevig (FHU). As shown on Figure 1, the site is located north of Mississippi Avenue, east of Powhatan Road, and west of Hayesmount and Monaghan Roads in Aurora, Colorado. This site was previously studied in the *Sandy Creek Traffic Impact Analysis* (TIA), December, 2012, by FHU, and the *Harmony TIA*, November, 2015 by LSC. This study updates the long-term projections based on the currently proposed land uses and roadway network currently surrounding the site.

REPORT CONTENTS

The report contains the following: the updated typical weekday site-generated traffic volume projections for the site; the assignment of the projected traffic volumes to the area roadways; the projected 2040 background and resulting total traffic volumes on the area roadways; the site's projected traffic impacts; and any recommended roadway improvements to mitigate the site's traffic impacts.

LAND USE AND ACCESS

The site is proposed to include about 2,700 single-family homes, about 310 townhomes, about 1,032 elementary school students and about 344 middle/junior high school students divided among two campuses, an 11,500 square-foot community center, a fire station, and a significant area of parks and open space. Figure 2 shows the conceptual site plan.

Table 1
ESTIMATED TRAFFIC GENERATION
Harmony
Aurora, CO
LSC #140770; March, 2017

Trip Generating Category	Quantity	Trip Generation Rates ⁽¹⁾					Primary Trips				
		Average Weekday	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out	Average Weekday	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
Planning Area 1											
Single-Family Detached Housing ⁽²⁾	45 DU ⁽³⁾	9.52	0.188	0.563	0.630	0.370	428	8	25	28	17
Planning Area 2											
Single-Family Detached Housing	393 DU	9.52	0.188	0.563	0.630	0.370	3,741	74	222	248	145
Planning Area 3											
Single-Family Detached Housing	595 DU	9.52	0.188	0.563	0.630	0.370	5,664	113	335	375	220
Planning Area 4											
Townhouses ⁽⁴⁾	120 DU	5.81	0.075	0.365	0.348	0.172	697	9	44	42	21
Planning Area 5											
Single-Family Detached Housing	70 DU	9.52	0.188	0.563	0.630	0.370	666	13	39	44	26
Planning Area 6											
Townhouses	115 DU	5.81	0.075	0.365	0.348	0.172	668	9	42	40	20
Planning Area 7											
Single-Family Detached Housing	130 DU	9.52	0.188	0.563	0.630	0.370	1,238	24	73	82	48
Planning Area 8											
Single-Family Detached Housing	42 DU	9.52	0.188	0.563	0.630	0.370	400	8	24	27	16
Planning Area 9											
Single-Family Detached Housing	50 DU	9.52	0.188	0.563	0.630	0.370	476	9	28	32	19
Planning Area 10											
Single-Family Detached Housing	260 DU	9.52	0.188	0.563	0.630	0.370	2,475	49	146	164	96
Planning Area 11											
Single-Family Detached Housing	66 DU	9.52	0.188	0.563	0.630	0.370	628	12	37	42	24
Planning Area 12											
Single-Family Detached Housing	314 DU	9.52	0.188	0.563	0.630	0.370	2,989	59	177	198	116
Planning Area 13											
Single-Family Detached Housing	195 DU	9.52	0.188	0.563	0.630	0.370	1,856	37	110	123	72
Planning Area 14											
Single-Family Detached Housing	195 DU	9.52	0.188	0.563	0.630	0.370	1,856	37	110	123	72
Planning Area 15											
Single-Family Detached Housing	345 DU	9.52	0.188	0.563	0.630	0.370	3,284	65	194	217	128
Planning Area 16											
Townhouses	75 DU	5.81	0.075	0.365	0.348	0.172	436	6	27	26	13
Planning Area 17											
Elementary School ⁽⁵⁾	516 Students	1.29	0.248	0.203	0.074	0.077	666	128	104	38	39
Middle School/Junior High ⁽⁶⁾	172 Students	1.62	0.297	0.243	0.078	0.082	279	51	42	13	14
Planning Area 18											
Elementary School	516 Students	1.29	0.248	0.203	0.074	0.077	666	128	104	38	39
Middle School/Junior High	172 Students	1.62	0.297	0.243	0.078	0.082	279	51	42	13	14
Planning Area 19											
Community Center ⁽⁷⁾	11.5 KSF ⁽⁸⁾	33.82	1.353	0.697	1.343	1.397	389	16	8	15	16
Planning Area 64											
Fire Station ⁽⁹⁾	1 Station						270	6	6	15	12
		Total					30,054	910	1,938	1,944	1,187

Notes:

- (1) Source: *Trip Generation*, Institute of Transportation Engineers, 9th Edition, 2012.
- (2) ITE Land Use #210 - Single Family Detached Housing - Average Rate
- (3) DU = Dwelling Unit
- (4) ITE Land Use #230 - Residential Condominium/Townhouses - Average Rate
- (5) ITE Land Use #520 - Elementary School - Average Rate
- (6) ITE Land Use #522 - Middle School/Junior High - Average Rate
- (7) ITE Land Use #495 - Recreational Community Center - Average Rate
- (8) KSF = 1,000 Square Feet
- (9) Based on traffic counts conducted by LSC at an existing fire station.

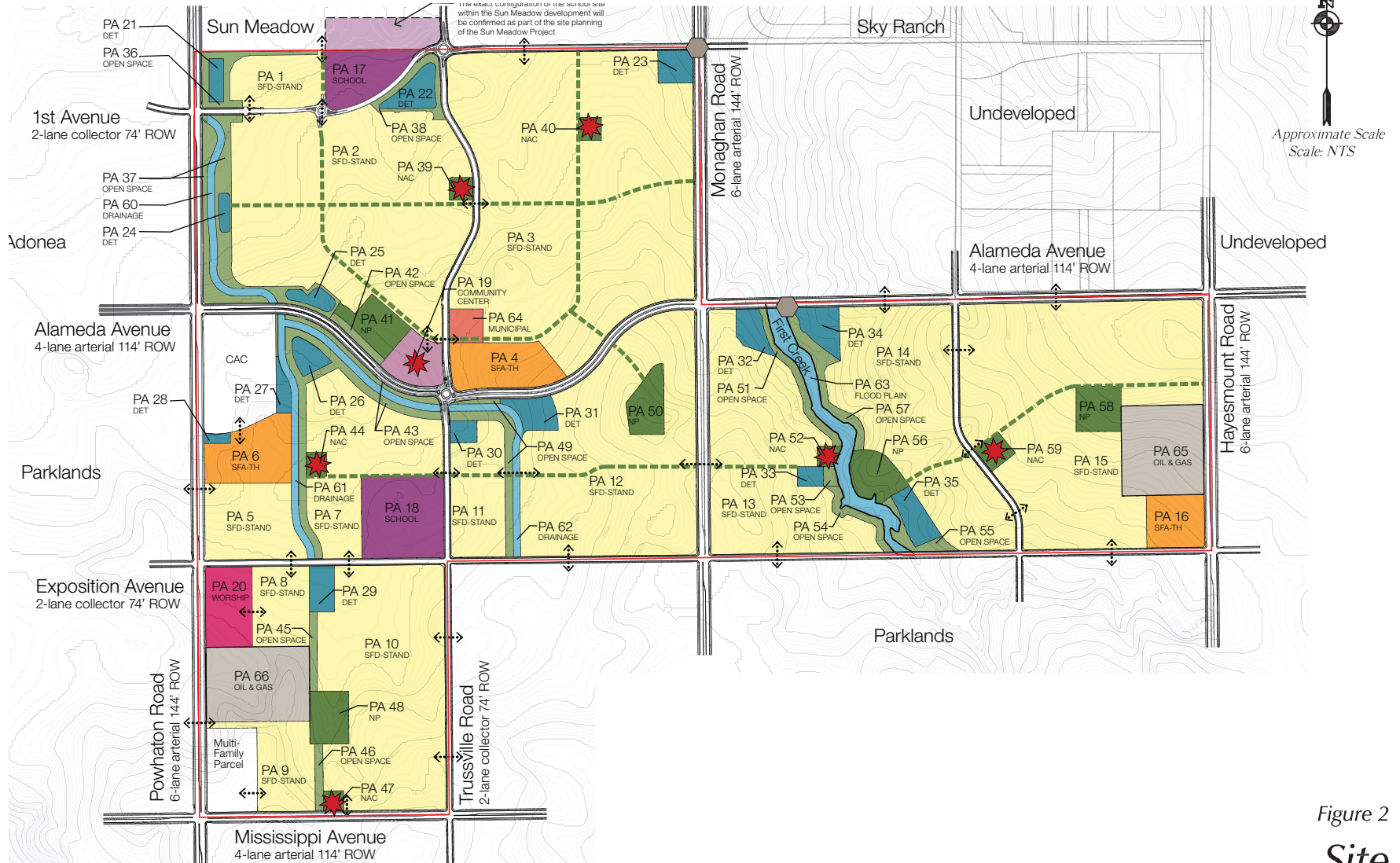


Figure 2

Site Plan

Harmony (LSC #140770)

Traffic Counts

Location: POWHATON RD S-O ALAMEDA AVE
City: AURORA
County: ARAPAHOE
Direction: NORTH/SOUTH

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

Site Code: 221405
Station ID: 221405

Start Time	15-Mar-22 Tue	NORTH	SOUTH							Total
12:00 AM		13	11							24
01:00		6	3							9
02:00		13	6							19
03:00		7	6							13
04:00		30	22							52
05:00		80	44							124
06:00		138	45							183
07:00		184	83							267
08:00		173	72							245
09:00		144	68							212
10:00		142	78							220
11:00		156	83							239
12:00 PM		162	94							256
01:00		193	90							283
02:00		186	105							291
03:00		250	141							391
04:00		273	162							435
05:00		292	198							490
06:00		185	120							305
07:00		112	73							185
08:00		88	60							148
09:00		82	46							128
10:00		70	47							117
11:00		32	14							46
Total		3011	1671							4682
Percent		64.3%	35.7%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	184	83	-	-	-	-	-	-	267
PM Peak	-	17:00	17:00	-	-	-	-	-	-	17:00
Vol.	-	292	198	-	-	-	-	-	-	490
Grand Total		3011	1671							4682
Percent		64.3%	35.7%							
ADT		ADT 4,682	AADT 4,682							

Location: S. POWHATON RD S-O ALAMEDA AVE
City: AURORA
County: ARAPAHOE
Direction: NORTH/SOUTH

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

Site Code: 222808
Station ID: 222808

Start Time	29-Mar-22 Tue	NORTH	SOUTH							Total
12:00 AM		6	13							19
01:00		3	5							8
02:00		7	4							11
03:00		4	5							9
04:00		15	24							39
05:00		40	43							83
06:00		69	41							110
07:00		92	89							181
08:00		87	75							162
09:00		72	74							146
10:00		71	79							150
11:00		78	89							167
12:00 PM		81	101							182
01:00		87	93							180
02:00		93	108							201
03:00		125	146							271
04:00		138	169							307
05:00		146	192							338
06:00		93	116							209
07:00		56	79							135
08:00		44	67							111
09:00		41	43							84
10:00		35	41							76
11:00		16	14							30
Total		1499	1710							3209
Percent		46.7%	53.3%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	92	89	-	-	-	-	-	-	181
PM Peak	-	17:00	17:00	-	-	-	-	-	-	17:00
Vol.	-	146	192	-	-	-	-	-	-	338
Grand Total		1499	1710							3209
Percent		46.7%	53.3%							
ADT		ADT 3,130	AADT 3,130							

Level of Service Definitions

LEVEL OF SERVICE DEFINITIONS

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

SIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

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

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 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

HCM 6th TWSC
1: NB Powhaton Rd & E. Exposition Ave




2024 Background Traffic
AM Peak Hour

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	0	20	0	0	187	78	0	205	40	0	0	0
Future Vol, veh/h	0	20	0	0	187	78	0	205	40	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
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	22	0	0	203	85	0	223	43	0	0	0

Major/Minor	Minor2		Minor1		Major1						
Conflicting Flow All	-	266	-	-	245	133	-	0	0		
Stage 1	-	0	-	-	245	-	-	-	-		
Stage 2	-	266	-	-	0	-	-	-	-		
Critical Hdwy	-	6.54	-	-	6.54	6.94	-	-	-		
Critical Hdwy Stg 1	-	-	-	-	5.54	-	-	-	-		
Critical Hdwy Stg 2	-	5.54	-	-	-	-	-	-	-		
Follow-up Hdwy	-	4.02	-	-	4.02	3.32	-	-	-		
Pot Cap-1 Maneuver	0	638	0	0	656	892	0	-	-		
Stage 1	0	-	0	0	702	-	0	-	-		
Stage 2	0	687	0	0	-	-	0	-	-		
Platoon blocked, %								-	-		
Mov Cap-1 Maneuver	-	638	-	-	656	892	-	-	-		
Mov Cap-2 Maneuver	-	638	-	-	656	-	-	-	-		
Stage 1	-	-	-	-	702	-	-	-	-		
Stage 2	-	687	-	-	-	-	-	-	-		





Approach	EB		WB		NB		
HCM Control Delay, s	10.8		11.9		0		
HCM LOS	B		B				

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	WBLn2
Capacity (veh/h)	-	-	638	656	892
HCM Lane V/C Ratio	-	-	0.034	0.31	0.095
HCM Control Delay (s)	-	-	10.8	12.9	9.5
HCM Lane LOS	-	-	B	B	A
HCM 95th %tile Q(veh)	-	-	0.1	1.3	0.3

Intersection						
Int Delay, s/veh	3.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	129	0	0	0	20	341
Future Vol, veh/h	129	0	0	0	20	341
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	16974	-	-	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	0	0	0	22	371
Major/Minor	Minor1	Major2				
Conflicting Flow All	415	-	0	0		
Stage 1	0	-	-	-		
Stage 2	415	-	-	-		
Critical Hdwy	6.42	-	4.12	-		
Critical Hdwy Stg 1	-	-	-	-		
Critical Hdwy Stg 2	5.42	-	-	-		
Follow-up Hdwy	3.518	-	2.218	-		
Pot Cap-1 Maneuver	594	0	-	-		
Stage 1	-	0	-	-		
Stage 2	666	0	-	-		
Platoon blocked, %						
Mov Cap-1 Maneuver	594	-	-	-		
Mov Cap-2 Maneuver	594	-	-	-		
Stage 1	-	-	-	-		
Stage 2	666	-	-	-		
Approach	WB	SB				
HCM Control Delay, s	12.9					
HCM LOS	B					
Minor Lane/Major Mvmt	WBLn1	SBL	SBT			
Capacity (veh/h)	594	-	-			
HCM Lane V/C Ratio	0.236	-	-			
HCM Control Delay (s)	12.9	-	-			
HCM Lane LOS	B	-	-			
HCM 95th %tile Q(veh)	0.9	-	-			

HCM 6th TWSC
2: E. Exposition Ave & Phase 4 West Access

2024 Background Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	44	160	0	0	48
Future Vol, veh/h	15	44	160	0	0	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	48	174	0	0	52





Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	174	0	0 254 174
Stage 1	-	-	- 174 -
Stage 2	-	-	- 80 -
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	1403	-	- 735 869
Stage 1	-	-	- 856 -
Stage 2	-	-	- 943 -
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1403	-	- 727 869
Mov Cap-2 Maneuver	-	-	- 727 -
Stage 1	-	-	- 847 -
Stage 2	-	-	- 943 -

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1403	-	-	-	869
HCM Lane V/C Ratio	0.012	-	-	-	0.06
HCM Control Delay (s)	7.6	-	-	-	9.4
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

HCM 6th TWSC
3: E. Exposition Ave & Phase 4 East Access

2024 Background Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	28	114	0	0	46
Future Vol, veh/h	16	28	114	0	0	46
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	30	124	0	0	50

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	124	0	0 188 124
Stage 1	-	-	- 124 -
Stage 2	-	-	- 64 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1463	-	- 801 927
Stage 1	-	-	- 902 -
Stage 2	-	-	- 959 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1463	-	- 791 927
Mov Cap-2 Maneuver	-	-	- 791 -
Stage 1	-	-	- 891 -
Stage 2	-	-	- 959 -

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1463	-	-	-	927
HCM Lane V/C Ratio	0.012	-	-	-	0.054
HCM Control Delay (s)	7.5	-	-	-	9.1
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection			
Intersection Delay, s/veh	3.2		
Intersection LOS	A		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	31	95	29
Demand Flow Rate, veh/h	31	97	30
Vehicles Circulating, veh/h	0	11	97
Vehicles Exiting, veh/h	127	20	11
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.8	3.3	3.2
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	31	97	30
Cap Entry Lane, veh/h	1380	1364	1250
Entry HV Adj Factor	0.987	0.980	0.967
Flow Entry, veh/h	31	95	29
Cap Entry, veh/h	1362	1338	1208
V/C Ratio	0.022	0.071	0.024
Control Delay, s/veh	2.8	3.3	3.2
LOS	A	A	A
95th %tile Queue, veh	0	0	0

HCM 6th TWSC
1: NB Powhaton Rd & E. Exposition Ave




2024 Background Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑	↑		↑↑				
Traffic Vol, veh/h	0	0	0	0	87	53	0	422	130	0	0	0
Future Vol, veh/h	0	0	0	0	87	53	0	422	130	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
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	0	0	0	95	58	0	459	141	0	0	0

Major/Minor	Minor2		Minor1		Major1					
Conflicting Flow All	-	600	-	-	530	300	-	0	0	
Stage 1	-	0	-	-	530	-	-	-	-	
Stage 2	-	600	-	-	0	-	-	-	-	
Critical Hdwy	-	6.54	-	-	6.54	6.94	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	5.54	-	-	-	-	
Critical Hdwy Stg 2	-	5.54	-	-	-	-	-	-	-	
Follow-up Hdwy	-	4.02	-	-	4.02	3.32	-	-	-	
Pot Cap-1 Maneuver	0	413	0	0	453	696	0	-	-	
Stage 1	0	-	0	0	525	-	0	-	-	
Stage 2	0	488	0	0	-	-	0	-	-	
Platoon blocked, %								-	-	
Mov Cap-1 Maneuver	-	413	-	-	453	696	-	-	-	
Mov Cap-2 Maneuver	-	413	-	-	453	-	-	-	-	
Stage 1	-	-	-	-	525	-	-	-	-	
Stage 2	-	488	-	-	-	-	-	-	-	

Approach	EB	WB	NB
HCM Control Delay, s	0	13.3	0
HCM LOS	A	B	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1WBLn2
Capacity (veh/h)	-	-	453 696
HCM Lane V/C Ratio	-	-	0.209 0.083
HCM Control Delay (s)	-	-	0 15 10.6
HCM Lane LOS	-	-	A C B
HCM 95th %tile Q(veh)	-	-	0.8 0.3

Intersection						
Int Delay, s/veh	2.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	87	0	0	0	64	355
Future Vol, veh/h	87	0	0	0	64	355
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	16974	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	95	0	0	0	70	386





Major/Minor	Minor1	Major2	
Conflicting Flow All	526	-	0
Stage 1	0	-	-
Stage 2	526	-	-
Critical Hdwy	6.42	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	-	2.218
Pot Cap-1 Maneuver	512	0	-
Stage 1	-	0	-
Stage 2	593	0	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	512	-	-
Mov Cap-2 Maneuver	512	-	-
Stage 1	-	-	-
Stage 2	593	-	-

Approach	WB	SB
HCM Control Delay, s	13.6	
HCM LOS	B	

Minor Lane/Major Mvmt	WBLn1	SBL	SBT
Capacity (veh/h)	512	-	-
HCM Lane V/C Ratio	0.185	-	-
HCM Control Delay (s)	13.6	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.7	-	-

HCM 6th TWSC
2: E. Exposition Ave & Phase 4 West Access

2024 Background Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	51	143	108	0	0	32
Future Vol, veh/h	51	143	108	0	0	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	55	155	117	0	0	35





Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	117	0	0 382 117
Stage 1	-	-	- 117 -
Stage 2	-	-	- 265 -
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	1471	-	- 620 935
Stage 1	-	-	- 908 -
Stage 2	-	-	- 779 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1471	-	- 597 935
Mov Cap-2 Maneuver	-	-	- 597 -
Stage 1	-	-	- 874 -
Stage 2	-	-	- 779 -

Approach	EB	WB	SB
HCM Control Delay, s	2	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1471	-	-	-	935
HCM Lane V/C Ratio	0.038	-	-	-	0.037
HCM Control Delay (s)	7.5	-	-	-	9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

HCM 6th TWSC
3: E. Exposition Ave & Phase 4 East Access

2024 Background Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	52	90	77	0	0	31
Future Vol, veh/h	52	90	77	0	0	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	57	98	84	0	0	34

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	84	0	0	296	84
Stage 1	-	-	-	84	-
Stage 2	-	-	-	212	-
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	1513	-	-	695	975
Stage 1	-	-	-	939	-
Stage 2	-	-	-	823	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1513	-	-	669	975
Mov Cap-2 Maneuver	-	-	-	669	-
Stage 1	-	-	-	903	-
Stage 2	-	-	-	823	-

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1513	-	-	-	975
HCM Lane V/C Ratio	0.037	-	-	-	0.035
HCM Control Delay (s)	7.5	-	-	-	8.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Intersection			
Intersection Delay, s/veh	3.2		
Intersection LOS	A		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	98	64	20
Demand Flow Rate, veh/h	100	65	20
Vehicles Circulating, veh/h	0	35	65
Vehicles Exiting, veh/h	85	65	35
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.2	3.1	2.9
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	100	65	20
Cap Entry Lane, veh/h	1380	1331	1291
Entry HV Adj Factor	0.977	0.980	1.000
Flow Entry, veh/h	98	64	20
Cap Entry, veh/h	1348	1305	1291
V/C Ratio	0.072	0.049	0.015
Control Delay, s/veh	3.2	3.1	2.9
LOS	A	A	A
95th %tile Queue, veh	0	0	0

HCM 6th TWSC
1: NB Powhaton Rd & E. Exposition Ave

2024 Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	9.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑	↑		↑↑				
Traffic Vol, veh/h	0	229	0	0	144	300	0	245	43	0	0	0
Future Vol, veh/h	0	229	0	0	144	300	0	245	43	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
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	249	0	0	157	326	0	266	47	0	0	0




Major/Minor	Minor2		Minor1		Major1					
Conflicting Flow All	-	313	-	-	290	157	-	0	0	
Stage 1	-	0	-	-	290	-	-	-	-	
Stage 2	-	313	-	-	0	-	-	-	-	
Critical Hdwy	-	6.54	-	-	6.54	6.94	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	5.54	-	-	-	-	
Critical Hdwy Stg 2	-	5.54	-	-	-	-	-	-	-	
Follow-up Hdwy	-	4.02	-	-	4.02	3.32	-	-	-	
Pot Cap-1 Maneuver	0	601	0	0	619	861	0	-	-	
Stage 1	0	-	0	0	671	-	0	-	-	
Stage 2	0	656	0	0	-	-	0	-	-	
Platoon blocked, %								-	-	
Mov Cap-1 Maneuver	-	601	-	-	619	861	-	-	-	
Mov Cap-2 Maneuver	-	601	-	-	619	-	-	-	-	
Stage 1	-	-	-	-	671	-	-	-	-	
Stage 2	-	656	-	-	-	-	-	-	-	

Approach	EB	WB	NB
HCM Control Delay, s	15.2	12.1	0
HCM LOS	C	B	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1WBLn2
Capacity (veh/h)	-	-	601 619 861
HCM Lane V/C Ratio	-	-	0.414 0.253 0.379
HCM Control Delay (s)	-	-	15.2 12.8 11.7
HCM Lane LOS	-	-	C B B
HCM 95th %tile Q(veh)	-	-	2 1 1.8

HCM 6th TWSC
101: E. Exposition Ave & SB Powhatan Rd








2024 Total Traffic
AM Peak Hour








Intersection						
Int Delay, s/veh	5.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	144	0	0	0	229	358
Future Vol, veh/h	144	0	0	0	229	358
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	16974	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	157	0	0	0	249	389

Major/Minor	Minor1	Major2
Conflicting Flow All	887	0
Stage 1	0	-
Stage 2	887	-
Critical Hdwy	6.42	4.12
Critical Hdwy Stg 1	-	-
Critical Hdwy Stg 2	5.42	-
Follow-up Hdwy	3.518	2.218
Pot Cap-1 Maneuver	315	0
Stage 1	-	0
Stage 2	402	0
Platoon blocked, %		-
Mov Cap-1 Maneuver	315	-
Mov Cap-2 Maneuver	315	-
Stage 1	-	-
Stage 2	402	-

Approach	WB	SB
HCM Control Delay, s	27.2	
HCM LOS	D	

Minor Lane/Major Mvmt	WBLn1	SBL	SBT
Capacity (veh/h)	315	-	-
HCM Lane V/C Ratio	0.497	-	-
HCM Control Delay (s)	27.2	-	-
HCM Lane LOS	D	-	-
HCM 95th %tile Q(veh)	2.6	-	-

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	244	13	0	362	0	34	0	0	0	0	48
Future Vol, veh/h	15	244	13	0	362	0	34	0	0	0	0	48
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	265	14	0	393	0	37	0	0	0	0	52
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	393	0	0	279	0	0	716	690	265	697	704	393
Stage 1	-	-	-	-	-	-	297	297	-	393	393	-
Stage 2	-	-	-	-	-	-	419	393	-	304	311	-
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	1166	-	-	1284	-	-	345	368	774	356	361	656
Stage 1	-	-	-	-	-	-	712	668	-	632	606	-
Stage 2	-	-	-	-	-	-	612	606	-	705	658	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1166	-	-	1284	-	-	314	363	774	352	356	656
Mov Cap-2 Maneuver	-	-	-	-	-	-	314	363	-	352	356	-
Stage 1	-	-	-	-	-	-	702	659	-	623	606	-
Stage 2	-	-	-	-	-	-	563	606	-	695	649	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0			18			11		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	314	1166	-	-	1284	-	-	656				
HCM Lane V/C Ratio	0.118	0.014	-	-	-	-	-	0.08				
HCM Control Delay (s)	18	8.1	-	-	0	-	-	11				
HCM Lane LOS	C	A	-	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.3				

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	217	11	0	285	0	31	0	0	0	0	46
Future Vol, veh/h	16	217	11	0	285	0	31	0	0	0	0	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	236	12	0	310	0	34	0	0	0	0	50
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	310	0	0	248	0	0	605	580	236	586	592	310
Stage 1	-	-	-	-	-	-	270	270	-	310	310	-
Stage 2	-	-	-	-	-	-	335	310	-	276	282	-
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	1250	-	-	1318	-	-	410	426	803	422	419	730
Stage 1	-	-	-	-	-	-	736	686	-	700	659	-
Stage 2	-	-	-	-	-	-	679	659	-	730	678	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1250	-	-	1318	-	-	378	420	803	418	413	730
Mov Cap-2 Maneuver	-	-	-	-	-	-	378	420	-	418	413	-
Stage 1	-	-	-	-	-	-	726	676	-	690	659	-
Stage 2	-	-	-	-	-	-	632	659	-	720	669	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			0			15.5			10.3		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	378	1250	-	-	1318	-	-	730				
HCM Lane V/C Ratio	0.089	0.014	-	-	-	-	-	0.068				
HCM Control Delay (s)	15.5	7.9	-	-	0	-	-	10.3				
HCM Lane LOS	C	A	-	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2				




HCM 6th Roundabout
4: Trussville Rd & E. Exposition Ave

2024 Total Traffic
AM Peak Hour

Intersection				
Intersection Delay, s/veh	4.3			
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	236	95	229	79
Demand Flow Rate, veh/h	240	97	234	81
Vehicles Circulating, veh/h	51	245	31	288
Vehicles Exiting, veh/h	318	20	260	54
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.3	4.2	4.2	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	240	97	234	81
Cap Entry Lane, veh/h	1310	1075	1337	1029
Entry HV Adj Factor	0.982	0.980	0.979	0.975
Flow Entry, veh/h	236	95	229	79
Cap Entry, veh/h	1286	1054	1309	1003
V/C Ratio	0.183	0.090	0.175	0.079
Control Delay, s/veh	4.3	4.2	4.2	4.3
LOS	A	A	A	A
95th %tile Queue, veh	1	0	1	0

HCM 6th TWSC
5: NB Powhaton Rd & RIRO Access

2024 Total Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	16	272	6	0	502
Future Vol, veh/h	0	16	272	6	0	502
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	-	-	16979
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	17	296	7	0	546






Major/Minor	Minor1	Major1
Conflicting Flow All	- 148	0 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	0 872	- -
Stage 1	0 -	- -
Stage 2	0 -	- -
Platoon blocked, %		- -
Mov Cap-1 Maneuver	- 872	- -
Mov Cap-2 Maneuver	- -	- -
Stage 1	- -	- -
Stage 2	- -	- -

Approach	WB	NB
HCM Control Delay, s	9.2	0
HCM LOS	A	

Minor Lane/Major Mvmt	NBT	NBRWBLn1
Capacity (veh/h)	- -	872
HCM Lane V/C Ratio	- -	0.02
HCM Control Delay (s)	- -	9.2
HCM Lane LOS	- -	A
HCM 95th %tile Q(veh)	- -	0.1

HCM 6th TWSC
6: Trussville Rd & North Site Access

2024 Total Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	2	1	164	135	1
Future Vol, veh/h	4	2	1	164	135	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	2	1	178	147	1

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	328	148	148	0	-	0
Stage 1	148	-	-	-	-	-
Stage 2	180	-	-	-	-	-
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	666	899	1434	-	-	-
Stage 1	880	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	665	899	1434	-	-	-
Mov Cap-2 Maneuver	698	-	-	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	851	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1434	-	754	-	-
HCM Lane V/C Ratio	0.001	-	0.009	-	-
HCM Control Delay (s)	7.5	-	9.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCM 6th TWSC
7: NB Powhaton Rd & E. Mississippi Ave

2024 Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑	↑		↑↑	↑			
Traffic Vol, veh/h	0	17	0	0	182	41	0	237	166	0	0	0
Future Vol, veh/h	0	17	0	0	182	41	0	237	166	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	205	-	-	205	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
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	18	0	0	198	45	0	258	180	0	0	0




Major/Minor	Minor2		Minor1		Major1					
Conflicting Flow All	-	438	-	-	258	129	-	0	0	
Stage 1	-	0	-	-	258	-	-	-	-	
Stage 2	-	438	-	-	0	-	-	-	-	
Critical Hdwy	-	6.54	-	-	6.54	6.94	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	5.54	-	-	-	-	
Critical Hdwy Stg 2	-	5.54	-	-	-	-	-	-	-	
Follow-up Hdwy	-	4.02	-	-	4.02	3.32	-	-	-	
Pot Cap-1 Maneuver	0	511	0	0	645	897	0	-	-	
Stage 1	0	-	0	0	693	-	0	-	-	
Stage 2	0	577	0	0	-	-	0	-	-	
Platoon blocked, %								-	-	
Mov Cap-1 Maneuver	-	511	-	-	645	897	-	-	-	
Mov Cap-2 Maneuver	-	511	-	-	645	-	-	-	-	
Stage 1	-	-	-	-	693	-	-	-	-	
Stage 2	-	577	-	-	-	-	-	-	-	

Approach	EB		WB		NB	
HCM Control Delay, s	12.3		12.3		0	
HCM LOS	B		B			

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1WBLn2		
Capacity (veh/h)	-	-	511	645	897
HCM Lane V/C Ratio	-	-	0.036	0.307	0.05
HCM Control Delay (s)	-	-	12.3	13	9.2
HCM Lane LOS	-	-	B	B	A
HCM 95th %tile Q(veh)	-	-	0.1	1.3	0.2

HCM 6th TWSC
107: SB Powhaton Rd & E. Mississippi Ave

2024 Total Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	4.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	182	0	0	0	17	485
Future Vol, veh/h	182	0	0	0	17	485
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	-	-	-	300	-
Veh in Median Storage, #	0	-	16974	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	198	0	0	0	18	527




Major/Minor	Minor1	Major2
Conflicting Flow All	563	0
Stage 1	0	-
Stage 2	563	-
Critical Hdwy	6.42	4.12
Critical Hdwy Stg 1	-	-
Critical Hdwy Stg 2	5.42	-
Follow-up Hdwy	3.518	2.218
Pot Cap-1 Maneuver	487	-
Stage 1	-	0
Stage 2	570	0
Platoon blocked, %		-
Mov Cap-1 Maneuver	487	-
Mov Cap-2 Maneuver	487	-
Stage 1	-	-
Stage 2	570	-

Approach	WB	SB
HCM Control Delay, s	17.4	
HCM LOS	C	

Minor Lane/Major Mvmt	WBLn1	SBL	SBT
Capacity (veh/h)	487	-	-
HCM Lane V/C Ratio	0.406	-	-
HCM Control Delay (s)	17.4	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	1.9	-	-






HCM 6th TWSC
8: E. Mississippi Ave & Phase 5 Access

2024 Total Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	2.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	156	137	0	0	86
Future Vol, veh/h	28	156	137	0	0	86
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	30	170	149	0	0	93
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	149	0	-	0	379	149
Stage 1	-	-	-	-	149	-
Stage 2	-	-	-	-	230	-
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	1432	-	-	-	623	898
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	808	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1432	-	-	-	609	898
Mov Cap-2 Maneuver	-	-	-	-	609	-
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	808	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.2	0		9.5		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1432	-	-	-	898	
HCM Lane V/C Ratio	0.021	-	-	-	0.104	
HCM Control Delay (s)	7.6	0	-	-	9.5	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3	

HCM 6th TWSC
10: Trussville Rd & South Site Access

2024 Total Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	2	1	155	135	1
Future Vol, veh/h	4	2	1	155	135	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	2	1	168	147	1





Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	318	148	148	0	-	0
Stage 1	148	-	-	-	-	-
Stage 2	170	-	-	-	-	-
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	675	899	1434	-	-	-
Stage 1	880	-	-	-	-	-
Stage 2	860	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	674	899	1434	-	-	-
Mov Cap-2 Maneuver	704	-	-	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	860	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1434	-	759	-	-
HCM Lane V/C Ratio	0.001	-	0.009	-	-
HCM Control Delay (s)	7.5	-	9.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCM 6th TWSC
11: Trussville Rd & Middle Site Access

2024 Total Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	2	1	158	134	2
Future Vol, veh/h	7	2	1	158	134	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	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	2	1	172	146	2

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	321	147	148	0	-	0
Stage 1	147	-	-	-	-	-
Stage 2	174	-	-	-	-	-
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	673	900	1434	-	-	-
Stage 1	880	-	-	-	-	-
Stage 2	856	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	672	900	1434	-	-	-
Mov Cap-2 Maneuver	702	-	-	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	856	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1434	-	738	-	-
HCM Lane V/C Ratio	0.001	-	0.013	-	-
HCM Control Delay (s)	7.5	-	9.9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCM 6th TWSC
1: NB Powhaton Rd & E. Exposition Ave

2024 Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	7.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑	↑		↑↑				
Traffic Vol, veh/h	0	180	0	0	96	135	0	460	141	0	0	0
Future Vol, veh/h	0	180	0	0	96	135	0	460	141	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
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	196	0	0	104	147	0	500	153	0	0	0




Major/Minor	Minor2		Minor1		Major1					
Conflicting Flow All	-	653	-	-	577	327	-	0	0	
Stage 1	-	0	-	-	577	-	-	-	-	
Stage 2	-	653	-	-	0	-	-	-	-	
Critical Hdwy	-	6.54	-	-	6.54	6.94	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	5.54	-	-	-	-	
Critical Hdwy Stg 2	-	5.54	-	-	-	-	-	-	-	
Follow-up Hdwy	-	4.02	-	-	4.02	3.32	-	-	-	
Pot Cap-1 Maneuver	0	385	0	0	426	669	0	-	-	
Stage 1	0	-	0	0	500	-	0	-	-	
Stage 2	0	462	0	0	-	-	0	-	-	
Platoon blocked, %								-	-	
Mov Cap-1 Maneuver	-	385	-	-	426	669	-	-	-	
Mov Cap-2 Maneuver	-	385	-	-	426	-	-	-	-	
Stage 1	-	-	-	-	500	-	-	-	-	
Stage 2	-	462	-	-	-	-	-	-	-	








Approach	EB		WB		NB	
HCM Control Delay, s	23.6		13.7		0	
HCM LOS	C		B			








Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1WBLn2		
Capacity (veh/h)	-	-	385	426	669
HCM Lane V/C Ratio	-	-	0.508	0.245	0.219
HCM Control Delay (s)	-	-	23.6	16.2	11.9
HCM Lane LOS	-	-	C	C	B
HCM 95th %tile Q(veh)	-	-	2.8	1	0.8

HCM 6th TWSC
101: E. Exposition Ave & SB Powhaton Rd

2024 Total Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	96	0	0	0	180	410
Future Vol, veh/h	96	0	0	0	180	410
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	16974	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	104	0	0	0	196	446
Major/Minor	Minor1		Major2			
Conflicting Flow All	838	-			0	0
Stage 1	0	-			-	-
Stage 2	838	-			-	-
Critical Hdwy	6.42	-			4.12	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	5.42	-			-	-
Follow-up Hdwy	3.518	-			2.218	-
Pot Cap-1 Maneuver	336	0			-	-
Stage 1	-	0			-	-
Stage 2	424	0			-	-
Platoon blocked, %						-
Mov Cap-1 Maneuver	336	-			-	-
Mov Cap-2 Maneuver	336	-			-	-
Stage 1	-	-			-	-
Stage 2	424	-			-	-
Approach	WB		SB			
HCM Control Delay, s	20.5					
HCM LOS	C					
Minor Lane/Major Mvmt	WBLn1	SBL	SBT			
Capacity (veh/h)	336	-	-			
HCM Lane V/C Ratio	0.311	-	-			
HCM Control Delay (s)	20.5	-	-			
HCM Lane LOS	C	-	-			
HCM 95th %tile Q(veh)	1.3	-	-			

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	51	228	43	0	177	0	23	0	0	0	0	32
Future Vol, veh/h	51	228	43	0	177	0	23	0	0	0	0	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	55	248	47	0	192	0	25	0	0	0	0	35
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	192	0	0	295	0	0	568	550	248	574	597	192
Stage 1	-	-	-	-	-	-	358	358	-	192	192	-
Stage 2	-	-	-	-	-	-	210	192	-	382	405	-
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	1381	-	-	1266	-	-	434	443	791	430	416	850
Stage 1	-	-	-	-	-	-	660	628	-	810	742	-
Stage 2	-	-	-	-	-	-	792	742	-	640	598	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1381	-	-	1266	-	-	404	425	791	417	399	850
Mov Cap-2 Maneuver	-	-	-	-	-	-	404	425	-	417	399	-
Stage 1	-	-	-	-	-	-	634	603	-	778	742	-
Stage 2	-	-	-	-	-	-	760	742	-	615	574	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.2			0			14.5			9.4		
HCM LOS							B			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	404	1381	-	-	1266	-	-	850				
HCM Lane V/C Ratio	0.062	0.04	-	-	-	-	-	0.041				
HCM Control Delay (s)	14.5	7.7	-	-	0	-	-	9.4				
HCM Lane LOS	B	A	-	-	A	-	-	A				
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.1				

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	141	35	0	126	0	20	0	0	0	0	31
Future Vol, veh/h	52	141	35	0	126	0	20	0	0	0	0	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	57	153	38	0	137	0	22	0	0	0	0	34
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	137	0	0	191	0	0	421	404	153	423	442	137
Stage 1	-	-	-	-	-	-	267	267	-	137	137	-
Stage 2	-	-	-	-	-	-	154	137	-	286	305	-
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	1447	-	-	1383	-	-	543	536	893	541	510	911
Stage 1	-	-	-	-	-	-	738	688	-	866	783	-
Stage 2	-	-	-	-	-	-	848	783	-	721	662	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1447	-	-	1383	-	-	507	515	893	525	490	911
Mov Cap-2 Maneuver	-	-	-	-	-	-	507	515	-	525	490	-
Stage 1	-	-	-	-	-	-	709	661	-	832	783	-
Stage 2	-	-	-	-	-	-	817	783	-	693	636	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.7			0			12.4			9.1		
HCM LOS							B			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	507	1447	-	-	1383	-	-	911				
HCM Lane V/C Ratio	0.043	0.039	-	-	-	-	-	0.037				
HCM Control Delay (s)	12.4	7.6	-	-	0	-	-	9.1				
HCM Lane LOS	B	A	-	-	A	-	-	A				
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1				




HCM 6th Roundabout
4: Trussville Rd & E. Exposition Ave

2024 Total Traffic
PM Peak Hour

Intersection				
Intersection Delay, s/veh	3.5			
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	153	64	64	30
Demand Flow Rate, veh/h	156	65	65	30
Vehicles Circulating, veh/h	10	100	100	119
Vehicles Exiting, veh/h	139	65	66	46
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.6	3.4	3.4	3.2
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	156	65	65	30
Cap Entry Lane, veh/h	1366	1246	1246	1222
Entry HV Adj Factor	0.979	0.980	0.981	0.993
Flow Entry, veh/h	153	64	64	30
Cap Entry, veh/h	1337	1222	1223	1214
V/C Ratio	0.114	0.052	0.052	0.025
Control Delay, s/veh	3.6	3.4	3.4	3.2
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0






HCM 6th TWSC
5: NB Powhaton Rd & RIRO Access

2024 Total Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	11	591	20	0	507
Future Vol, veh/h	0	11	591	20	0	507
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	-	-	16979
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	12	642	22	0	551
Major/Minor	Minor1		Major1			
Conflicting Flow All	-	321	0	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	675	-	-		
Stage 1	0	-	-	-		
Stage 2	0	-	-	-		
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	-	675	-	-		
Mov Cap-2 Maneuver	-	-	-	-		
Stage 1	-	-	-	-		
Stage 2	-	-	-	-		
Approach	WB		NB			
HCM Control Delay, s	10.4		0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT		NBRWBLn1			
Capacity (veh/h)	-		-		675	
HCM Lane V/C Ratio	-		-		0.018	
HCM Control Delay (s)	-		-		10.4	
HCM Lane LOS	-		-		B	
HCM 95th %tile Q(veh)	-		-		0.1	

HCM 6th TWSC
6: Trussville Rd & North Site Access

2024 Total Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	1	2	36	45	4
Future Vol, veh/h	2	1	2	36	45	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	-
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	1	2	39	49	4

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	94	51	53	0	-	0
Stage 1	51	-	-	-	-	-
Stage 2	43	-	-	-	-	-
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	906	1017	1553	-	-	-
Stage 1	971	-	-	-	-	-
Stage 2	979	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	905	1017	1553	-	-	-
Mov Cap-2 Maneuver	858	-	-	-	-	-
Stage 1	970	-	-	-	-	-
Stage 2	979	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1553	-	905	-	-
HCM Lane V/C Ratio	0.001	-	0.004	-	-
HCM Control Delay (s)	7.3	-	9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCM 6th TWSC
7: NB Powhaton Rd & E. Mississippi Ave




2024 Total Traffic
PM 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	0	56	0	0	67	27	0	584	71	0	0	0
Future Vol, veh/h	0	56	0	0	67	27	0	584	71	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	205	-	-	205	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
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	61	0	0	73	29	0	635	77	0	0	0

Major/Minor	Minor2		Minor1		Major1					
Conflicting Flow All	-	712	-	-	635	318	-	0	0	
Stage 1	-	0	-	-	635	-	-	-	-	
Stage 2	-	712	-	-	0	-	-	-	-	
Critical Hdwy	-	6.54	-	-	6.54	6.94	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	5.54	-	-	-	-	
Critical Hdwy Stg 2	-	5.54	-	-	-	-	-	-	-	
Follow-up Hdwy	-	4.02	-	-	4.02	3.32	-	-	-	
Pot Cap-1 Maneuver	0	356	0	0	394	678	0	-	-	
Stage 1	0	-	0	0	471	-	0	-	-	
Stage 2	0	434	0	0	-	-	0	-	-	
Platoon blocked, %								-	-	
Mov Cap-1 Maneuver	-	356	-	-	394	678	-	-	-	
Mov Cap-2 Maneuver	-	356	-	-	394	-	-	-	-	
Stage 1	-	-	-	-	471	-	-	-	-	
Stage 2	-	434	-	-	-	-	-	-	-	

Approach	EB		WB		NB	
HCM Control Delay, s	17.2		14.6		0	
HCM LOS	C		B			

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1WBLn2		
Capacity (veh/h)	-	-	356	394	678
HCM Lane V/C Ratio	-	-	0.171	0.185	0.043
HCM Control Delay (s)	-	-	17.2	16.2	10.6
HCM Lane LOS	-	-	C	C	B
HCM 95th %tile Q(veh)	-	-	0.6	0.7	0.1

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	67	0	0	0	56	451
Future Vol, veh/h	67	0	0	0	56	451
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	-	-	-	300	-
Veh in Median Storage, #	0	-	16974	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	73	0	0	0	61	490




Major/Minor	Minor1	Major2
Conflicting Flow All	612	0
Stage 1	0	-
Stage 2	612	-
Critical Hdwy	6.42	4.12
Critical Hdwy Stg 1	-	-
Critical Hdwy Stg 2	5.42	-
Follow-up Hdwy	3.518	2.218
Pot Cap-1 Maneuver	456	-
Stage 1	-	-
Stage 2	541	-
Platoon blocked, %		-
Mov Cap-1 Maneuver	456	-
Mov Cap-2 Maneuver	456	-
Stage 1	-	-
Stage 2	541	-

Approach	WB	SB
HCM Control Delay, s	14.4	
HCM LOS	B	

Minor Lane/Major Mvmt	WBLn1	SBL	SBT
Capacity (veh/h)	456	-	-
HCM Lane V/C Ratio	0.16	-	-
HCM Control Delay (s)	14.4	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.6	-	-

HCM 6th TWSC
8: E. Mississippi Ave & Phase 5 Access

2024 Total Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	5.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	91	35	37	0	0	57
Future Vol, veh/h	91	35	37	0	0	57
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	99	38	40	0	0	62





Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	40	0	-	0	276
Stage 1	-	-	-	-	40
Stage 2	-	-	-	-	236
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	1570	-	-	-	714
Stage 1	-	-	-	-	982
Stage 2	-	-	-	-	803
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1570	-	-	-	668
Mov Cap-2 Maneuver	-	-	-	-	668
Stage 1	-	-	-	-	919
Stage 2	-	-	-	-	803

Approach	EB	WB	SB
HCM Control Delay, s	5.4	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1570	-	-	-	1031
HCM Lane V/C Ratio	0.063	-	-	-	0.06
HCM Control Delay (s)	7.4	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

HCM 6th TWSC
10: Trussville Rd & South Site Access

2024 Total Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	1	2	33	36	4
Future Vol, veh/h	2	1	2	33	36	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
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	1	2	36	39	4





Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	81	41	43	0	-	0
Stage 1	41	-	-	-	-	-
Stage 2	40	-	-	-	-	-
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	921	1030	1566	-	-	-
Stage 1	981	-	-	-	-	-
Stage 2	982	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	920	1030	1566	-	-	-
Mov Cap-2 Maneuver	868	-	-	-	-	-
Stage 1	980	-	-	-	-	-
Stage 2	982	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1566	-	916	-	-
HCM Lane V/C Ratio	0.001	-	0.004	-	-
HCM Control Delay (s)	7.3	-	8.9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCM 6th TWSC
11: Trussville Rd & Middle Site Access

2024 Total Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1	2	33	39	8
Future Vol, veh/h	5	1	2	33	39	8
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	-	100	-	-	-
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	1	2	36	42	9



















Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	87	47	51	0	-	0
Stage 1	47	-	-	-	-	-
Stage 2	40	-	-	-	-	-
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	914	1022	1555	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	982	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	913	1022	1555	-	-	-
Mov Cap-2 Maneuver	863	-	-	-	-	-
Stage 1	974	-	-	-	-	-
Stage 2	982	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1555	-	886	-	-
HCM Lane V/C Ratio	0.001	-	0.007	-	-
HCM Control Delay (s)	7.3	-	9.1	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Timings
1: Powhatan Rd & E. Exposition Ave

2040 Background Traffic
AM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	25	5	201	5	5	571	86	76	577
Future Volume (vph)	25	5	201	5	5	571	86	76	577
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	10.0	23.0	10.0	24.0	24.0	10.0	24.0
Total Split (s)	12.0	40.0	12.0	40.0	12.0	56.0	56.0	12.0	56.0
Total Split (%)	10.0%	33.3%	10.0%	33.3%	10.0%	46.7%	46.7%	10.0%	46.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0
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	6.0	6.0	5.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	Max	None	Max
Act Effect Green (s)	8.5	6.9	11.6	8.2	56.1	50.8	50.8	60.1	57.9
Actuated g/C Ratio	0.10	0.08	0.14	0.10	0.67	0.61	0.61	0.72	0.69
v/c Ratio	0.14	0.07	0.93	0.59	0.01	0.28	0.09	0.13	0.26
Control Delay	35.2	30.5	82.0	14.9	5.4	9.9	2.0	5.2	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	30.5	82.0	14.9	5.4	9.9	2.0	5.2	6.8
LOS	D	C	F	B	A	A	A	A	A
Approach Delay		33.9		50.5		8.8			6.6
Approach LOS		C		D		A			A

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 83.4

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 17.5









Intersection LOS: B

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 1: Powhatan Rd & E. Exposition Ave








			
Ø1	Ø2	Ø3	Ø4
12 s	56 s	12 s	40 s
			
Ø5	Ø6	Ø7	Ø8
12 s	56 s	12 s	40 s

HCM 6th Signalized Intersection Summary

1: Powhatan Rd & E. Exposition 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	5	5	201	5	174	5	571	86	76	577	20
Future Volume (veh/h)	25	5	5	201	5	174	5	571	86	76	577	20
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	5	5	212	5	183	5	601	91	80	607	21
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	166	84	84	345	6	229	492	1947	869	506	2064	71
Arrive On Green	0.03	0.10	0.10	0.08	0.15	0.15	0.01	0.55	0.55	0.05	0.59	0.59
Sat Flow, veh/h	1781	858	858	1781	42	1549	1781	3554	1585	1781	3504	121
Grp Volume(v), veh/h	26	0	10	212	0	188	5	601	91	80	308	320
Grp Sat Flow(s),veh/h/ln	1781	0	1716	1781	0	1592	1781	1777	1585	1781	1777	1849
Q Serve(g_s), s	1.2	0.0	0.5	7.0	0.0	10.4	0.1	8.4	2.5	1.7	7.8	7.9
Cycle Q Clear(g_c), s	1.2	0.0	0.5	7.0	0.0	10.4	0.1	8.4	2.5	1.7	7.8	7.9
Prop In Lane	1.00		0.50	1.00		0.97	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	166	0	167	345	0	235	492	1947	869	506	1047	1089
V/C Ratio(X)	0.16	0.00	0.06	0.61	0.00	0.80	0.01	0.31	0.10	0.16	0.29	0.29
Avail Cap(c_a), veh/h	256	0	658	345	0	610	617	1947	869	558	1047	1089
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.7	0.0	37.4	34.6	0.0	37.6	9.2	11.2	9.9	8.0	9.3	9.3
Incr Delay (d2), s/veh	0.4	0.0	0.1	3.2	0.0	6.2	0.0	0.4	0.2	0.1	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.2	4.6	0.0	4.3	0.0	3.0	0.9	0.6	2.7	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.1	0.0	37.5	37.8	0.0	43.7	9.2	11.6	10.1	8.2	10.0	10.0
LnGrp LOS	D	A	D	D	A	D	A	B	B	A	B	B
Approach Vol, veh/h		36			400			697			708	
Approach Delay, s/veh		36.5			40.6			11.4			9.8	
Approach LOS		D			D			B			A	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.3	56.0	12.0	13.9	5.6	59.7	7.4	18.5				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	50.0	7.0	35.0	7.0	50.0	7.0	35.0				
Max Q Clear Time (g_c+I1), s	3.7	10.4	9.0	2.5	2.1	9.9	3.2	12.4				
Green Ext Time (p_c), s	0.0	4.4	0.0	0.0	0.0	3.7	0.0	1.1				
Intersection Summary												
HCM 6th Ctrl Delay				17.6								
HCM 6th LOS				B								

Intersection												
Int Delay, s/veh	1.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	148	10	6	344	7	6	0	4	14	0	29
Future Vol, veh/h	9	148	10	6	344	7	6	0	4	14	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	156	11	6	362	7	6	0	4	15	0	31
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	369	0	0	167	0	0	567	555	156	560	563	366
Stage 1	-	-	-	-	-	-	174	174	-	378	378	-
Stage 2	-	-	-	-	-	-	393	381	-	182	185	-
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	1190	-	-	1411	-	-	434	440	890	439	435	679
Stage 1	-	-	-	-	-	-	828	755	-	644	615	-
Stage 2	-	-	-	-	-	-	632	613	-	820	747	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1190	-	-	1411	-	-	411	435	890	433	430	679
Mov Cap-2 Maneuver	-	-	-	-	-	-	411	435	-	433	430	-
Stage 1	-	-	-	-	-	-	821	749	-	639	613	-
Stage 2	-	-	-	-	-	-	601	611	-	810	741	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0.1			12			11.8		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	524	1190	-	-	1411	-	-	573				
HCM Lane V/C Ratio	0.02	0.008	-	-	0.004	-	-	0.079				
HCM Control Delay (s)	12	8	-	-	7.6	-	-	11.8				
HCM Lane LOS	B	A	-	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.3				

HCM 6th TWSC
3: E. Exposition Ave & Phase 4 East Access

2040 Background Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	157	333	4	10	25
Future Vol, veh/h	9	157	333	4	10	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	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	9	165	351	4	11	26

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	355	0	0
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	1204	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1204	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	11.1
HCM LOS	B		

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1204	-	-	-	623
HCM Lane V/C Ratio	0.008	-	-	-	0.059
HCM Control Delay (s)	8	-	-	-	11.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

HCM 6th Roundabout
4: Trussville Rd & E. Exposition Ave





2040 Background Traffic
AM Peak Hour

Intersection				
Intersection Delay, s/veh	4.5			
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	175	338	51	40
Demand Flow Rate, veh/h	178	345	52	40
Vehicles Circulating, veh/h	31	41	182	352
Vehicles Exiting, veh/h	361	193	27	34
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.8	5.1	3.6	4.1
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	178	345	52	40
Cap Entry Lane, veh/h	1337	1323	1146	964
Entry HV Adj Factor	0.981	0.981	0.989	0.991
Flow Entry, veh/h	175	338	51	40
Cap Entry, veh/h	1312	1298	1134	955
V/C Ratio	0.133	0.261	0.045	0.042
Control Delay, s/veh	3.8	5.1	3.6	4.1
LOS	A	A	A	A
95th %tile Queue, veh	0	1	0	0

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗↗	↗		↗↗
Traffic Vol, veh/h	0	12	651	2	0	782
Future Vol, veh/h	0	12	651	2	0	782
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	13	685	2	0	823
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	343	0	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	653	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	653	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.6	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBT		
Capacity (veh/h)	-	653		-		
HCM Lane V/C Ratio	-	0.019		-		
HCM Control Delay (s)	-	10.6		-		
HCM Lane LOS	-	B		-		
HCM 95th %tile Q(veh)	-	0.1		-		

HCM 6th TWSC
6: Trussville Rd & Future North Access

2040 Background Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	19	30	2	7	19
Future Vol, veh/h	5	19	30	2	7	19
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	-	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	20	32	2	7	20

























Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	67	33	0	0	34
Stage 1	33	-	-	-	-
Stage 2	34	-	-	-	-
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	938	1041	-	-	1578
Stage 1	989	-	-	-	-
Stage 2	988	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	934	1041	-	-	1578
Mov Cap-2 Maneuver	876	-	-	-	-
Stage 1	989	-	-	-	-
Stage 2	984	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1002	1578
HCM Lane V/C Ratio	-	-	0.025	0.005
HCM Control Delay (s)	-	-	8.7	7.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Timings
7: Powhatan Rd & E. Mississippi 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)	201	23	115	92	65	116	41	336	31	46	646	90
Future Volume (vph)	201	23	115	92	65	116	41	336	31	46	646	90
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	17.0	30.0		17.0	30.0		12.0	61.0	61.0	12.0	61.0	61.0
Total Split (%)	14.2%	25.0%		14.2%	25.0%		10.0%	50.8%	50.8%	10.0%	50.8%	50.8%
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		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Act Effect Green (s)	15.1	8.2	97.7	18.6	7.4	97.7	62.2	57.3	57.3	63.3	59.5	59.5
Actuated g/C Ratio	0.15	0.08	1.00	0.19	0.08	1.00	0.64	0.59	0.59	0.65	0.61	0.61
v/c Ratio	0.82	0.08	0.08	0.31	0.26	0.08	0.09	0.17	0.03	0.07	0.32	0.09
Control Delay	64.1	44.8	0.1	34.4	47.1	0.1	6.7	11.1	0.1	6.6	11.4	2.0
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	64.1	44.8	0.1	34.4	47.1	0.1	6.7	11.1	0.1	6.6	11.4	2.0
LOS	E	D	A	C	D	A	A	B	A	A	B	A
Approach Delay		41.1			22.8			9.8			10.1	
Approach LOS		D			C			A			B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 97.7

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 17.8

Intersection LOS: B

Intersection Capacity Utilization 52.3%

ICU Level of Service A

Analysis Period (min) 15

























Splits and Phases: 7: Powhatan Rd & E. Mississippi Ave

					
Ø1	Ø2	Ø3	Ø4	Ø5	Ø6
12 s	61 s	17 s	30 s	12 s	61 s
					
Ø7	Ø8	Ø9	Ø10	Ø11	Ø12
12 s	61 s	17 s	30 s	12 s	61 s

HCM 6th Signalized Intersection Summary

7: Powhatan Rd & E. Mississippi 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)	201	23	115	92	65	116	41	336	31	46	646	90
Future Volume (veh/h)	201	23	115	92	65	116	41	336	31	46	646	90
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	212	24	0	97	68	0	43	354	33	48	680	95
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	340	386		265	183		474	2060	919	673	2068	922
Arrive On Green	0.12	0.11	0.00	0.07	0.05	0.00	0.04	0.58	0.58	0.04	0.58	0.58
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	212	24	0	97	68	0	43	354	33	48	680	95
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	10.5	0.6	0.0	4.9	1.8	0.0	0.9	4.5	0.9	1.0	9.6	2.6
Cycle Q Clear(g_c), s	10.5	0.6	0.0	4.9	1.8	0.0	0.9	4.5	0.9	1.0	9.6	2.6
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	340	386		265	183		474	2060	919	673	2068	922
V/C Ratio(X)	0.62	0.06		0.37	0.37		0.09	0.17	0.04	0.07	0.33	0.10
Avail Cap(c_a), veh/h	340	920		367	920		540	2060	919	735	2068	922
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.5	38.6	0.0	39.7	44.3	0.0	7.8	9.5	8.7	7.4	10.4	9.0
Incr Delay (d2), s/veh	3.5	0.1	0.0	0.8	1.3	0.0	0.1	0.2	0.1	0.0	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.2	0.0	2.1	0.8	0.0	0.3	1.6	0.3	0.3	3.3	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.0	38.7	0.0	40.5	45.6	0.0	7.9	9.7	8.8	7.4	10.9	9.2
LnGrp LOS	D	D		D	D		A	A	A	A	B	A
Approach Vol, veh/h		236	A		165	A		430			823	
Approach Delay, s/veh		39.0			42.6			9.4			10.5	
Approach LOS		D			D			A			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.6	61.0	11.5	15.5	8.4	61.2	17.0	10.0				
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	7.0	56.0	12.0	25.0	7.0	56.0	12.0	25.0				
Max Q Clear Time (g_c+l1), s	3.0	6.5	6.9	2.6	2.9	11.6	12.5	3.8				
Green Ext Time (p_c), s	0.0	2.4	0.1	0.1	0.0	5.1	0.0	0.3				

Intersection Summary









HCM 6th Ctrl Delay 17.5
HCM 6th LOS B

Notes

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

HCM 6th TWSC
8: Future Access/Phase 5 Access & E. Mississippi Ave

2040 Background Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	76	18	6	226	7	40	0	16	15	0	7
Future Vol, veh/h	6	76	18	6	226	7	40	0	16	15	0	7
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	205	-	200	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	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	6	80	19	6	238	7	42	0	17	16	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	245	0	0	99	0	0	223	349	40	306	365	123
Stage 1	-	-	-	-	-	-	92	92	-	254	254	-
Stage 2	-	-	-	-	-	-	131	257	-	52	111	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1318	-	-	1492	-	-	714	574	1022	623	562	905
Stage 1	-	-	-	-	-	-	905	818	-	728	696	-
Stage 2	-	-	-	-	-	-	859	694	-	954	803	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1318	-	-	1492	-	-	703	569	1022	609	557	905
Mov Cap-2 Maneuver	-	-	-	-	-	-	716	591	-	609	557	-
Stage 1	-	-	-	-	-	-	900	814	-	724	693	-
Stage 2	-	-	-	-	-	-	849	691	-	934	799	-





Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			0.2			10			10.5		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	783	1318	-	-	1492	-	-	680
HCM Lane V/C Ratio	0.075	0.005	-	-	0.004	-	-	0.034
HCM Control Delay (s)	10	7.7	-	-	7.4	-	-	10.5
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Intersection						
Intersection Delay, s/veh	3.4					
Intersection LOS	A					
Approach	EB		WB		NB	SB
Entry Lanes	2		2		1	1
Conflicting Circle Lanes	2		2		2	2
Adj Approach Flow, veh/h	116		236		110	30
Demand Flow Rate, veh/h	118		240		112	30
Vehicles Circulating, veh/h	41		58		109	274
Vehicles Exiting, veh/h	263		163		50	24
Ped Vol Crossing Leg, #/h	0		0		0	0
Ped Cap Adj	1.000		1.000		1.000	1.000
Approach Delay, s/veh	3.1		3.5		3.5	3.4
Approach LOS	A		A		A	A
Lane	Left	Right	Left	Right	Left	Left
Designated Moves	LT	TR	LT	TR	LTR	LTR
Assumed Moves	LT	TR	LT	TR	LTR	LTR
RT Channelized						
Lane Util	0.466	0.534	0.471	0.529	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
Entry Flow, veh/h	55	63	113	127	112	30
Cap Entry Lane, veh/h	1300	1371	1280	1352	1294	1125
Entry HV Adj Factor	0.992	0.976	0.981	0.984	0.979	0.992
Flow Entry, veh/h	55	62	111	125	110	30
Cap Entry, veh/h	1289	1339	1255	1330	1267	1115
V/C Ratio	0.042	0.046	0.088	0.094	0.087	0.027
Control Delay, s/veh	3.1	3.0	3.6	3.5	3.5	3.4
LOS	A	A	A	A	A	A
95th %tile Queue, veh	0	0	0	0	0	0

HCM 6th TWSC
10: Trussville Rd & Future South Access

2040 Background Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	5	21	1	2	25
Future Vol, veh/h	3	5	21	1	2	25
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	-	-	-	100	-
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	5	22	1	2	26





Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	53	23	0
Stage 1	23	-	-
Stage 2	30	-	-
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	955	1054	-
Stage 1	1000	-	-
Stage 2	993	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	954	1054	-
Mov Cap-2 Maneuver	890	-	-
Stage 1	1000	-	-
Stage 2	992	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	986	1592
HCM Lane V/C Ratio	-	-	0.009	0.001
HCM Control Delay (s)	-	-	8.7	7.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 6th TWSC
11: Trussville Rd & Future Middle Access

2040 Background Traffic
AM Peak Hour

Intersection						
Int Delay, s/veh	2.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	7	24	2	3	21
Future Vol, veh/h	6	7	24	2	3	21
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	-	-	-	10	-
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	6	7	25	2	3	22



















Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	54	26	0	0	27
Stage 1	26	-	-	-	-
Stage 2	28	-	-	-	-
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	954	1050	-	-	1587
Stage 1	997	-	-	-	-
Stage 2	995	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	952	1050	-	-	1587
Mov Cap-2 Maneuver	889	-	-	-	-
Stage 1	997	-	-	-	-
Stage 2	993	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	0.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	969	1587
HCM Lane V/C Ratio	-	-	0.014	0.002
HCM Control Delay (s)	-	-	8.8	7.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Timings
1: Powhaton Rd & E. Exposition Ave

2040 Background Traffic
PM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	35	5	154	5	10	794	237	198	891
Future Volume (vph)	35	5	154	5	10	794	237	198	891
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	10.0	23.0	10.0	24.0	24.0	10.0	24.0
Total Split (s)	12.0	33.0	12.0	33.0	12.0	63.0	63.0	12.0	63.0
Total Split (%)	10.0%	27.5%	10.0%	27.5%	10.0%	52.5%	52.5%	10.0%	52.5%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0
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	6.0	6.0	5.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	Max	None	Max
Act Effect Green (s)	8.7	6.9	13.8	7.9	64.0	57.3	57.3	69.5	67.2
Actuated g/C Ratio	0.09	0.07	0.15	0.08	0.67	0.60	0.60	0.73	0.71
v/c Ratio	0.23	0.08	0.68	0.57	0.03	0.39	0.24	0.45	0.39
Control Delay	41.7	33.8	52.3	17.2	5.3	11.4	2.0	7.9	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	33.8	52.3	17.2	5.3	11.4	2.0	7.9	7.8
LOS	D	C	D	B	A	B	A	A	A
Approach Delay		40.0		35.4		9.2			7.8
Approach LOS		D		D		A			A

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 95

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 12.2

Intersection LOS: B

Intersection Capacity Utilization 63.4%

ICU Level of Service B

Analysis Period (min) 15























Splits and Phases: 1: Powhaton Rd & E. Exposition Ave








			
Ø1	Ø2	Ø3	Ø4
12 s	63 s	12 s	33 s
			
Ø5	Ø6	Ø7	Ø8
12 s	63 s	12 s	33 s

HCM 6th Signalized Intersection Summary

1: Powhatan Rd & E. Exposition 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)	35	5	5	154	5	139	10	794	237	198	891	35
Future Volume (veh/h)	35	5	5	154	5	139	10	794	237	198	891	35
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	37	5	5	162	5	146	11	836	249	208	938	37
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	163	70	70	304	6	184	376	2033	907	418	2176	86
Arrive On Green	0.03	0.08	0.08	0.07	0.12	0.12	0.01	0.57	0.57	0.07	0.62	0.62
Sat Flow, veh/h	1781	858	858	1781	53	1540	1781	3554	1585	1781	3485	137
Grp Volume(v), veh/h	37	0	10	162	0	151	11	836	249	208	478	497
Grp Sat Flow(s),veh/h/ln	1781	0	1716	1781	0	1593	1781	1777	1585	1781	1777	1846
Q Serve(g_s), s	1.9	0.0	0.5	7.0	0.0	9.2	0.3	13.1	7.9	4.5	13.8	13.8
Cycle Q Clear(g_c), s	1.9	0.0	0.5	7.0	0.0	9.2	0.3	13.1	7.9	4.5	13.8	13.8
Prop In Lane	1.00		0.50	1.00		0.97	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	163	0	140	304	0	190	376	2033	907	418	1109	1152
V/C Ratio(X)	0.23	0.00	0.07	0.53	0.00	0.79	0.03	0.41	0.27	0.50	0.43	0.43
Avail Cap(c_a), veh/h	231	0	482	304	0	448	478	2033	907	426	1109	1152
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.1	0.0	42.3	38.9	0.0	42.7	9.0	11.9	10.8	8.5	9.6	9.6
Incr Delay (d2), s/veh	0.7	0.0	0.2	1.8	0.0	7.3	0.0	0.6	0.7	0.9	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.2	3.8	0.0	3.9	0.1	4.7	2.8	1.5	4.8	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.8	0.0	42.5	40.7	0.0	49.9	9.0	12.5	11.6	9.4	10.8	10.8
LnGrp LOS	D	A	D	D	A	D	A	B	B	A	B	B
Approach Vol, veh/h		47			313			1096			1183	
Approach Delay, s/veh		41.2			45.2			12.3			10.6	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.5	63.0	12.0	13.1	6.3	68.2	8.2	16.9				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	57.0	7.0	28.0	7.0	57.0	7.0	28.0				
Max Q Clear Time (g_c+I1), s	6.5	15.1	9.0	2.5	2.3	15.8	3.9	11.2				
Green Ext Time (p_c), s	0.0	7.3	0.0	0.0	0.0	6.6	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay			15.9									
HCM 6th LOS			B									

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	398	11	7	265	21	14	0	9	16	0	19
Future Vol, veh/h	31	398	11	7	265	21	14	0	9	16	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	419	12	7	279	22	15	0	9	17	0	20





Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	301	0	0	431	0	0	799	800	419	800	801	290
Stage 1	-	-	-	-	-	-	485	485	-	304	304	-
Stage 2	-	-	-	-	-	-	314	315	-	496	497	-
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	1260	-	-	1129	-	-	304	318	634	303	318	749
Stage 1	-	-	-	-	-	-	563	552	-	705	663	-
Stage 2	-	-	-	-	-	-	697	656	-	556	545	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1260	-	-	1129	-	-	288	308	634	291	308	749
Mov Cap-2 Maneuver	-	-	-	-	-	-	288	308	-	291	308	-
Stage 1	-	-	-	-	-	-	548	538	-	687	659	-
Stage 2	-	-	-	-	-	-	674	652	-	533	531	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.2	15.5	14
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	366	1260	-	-	1129	-	-	436
HCM Lane V/C Ratio	0.066	0.026	-	-	0.007	-	-	0.085
HCM Control Delay (s)	15.5	7.9	-	-	8.2	-	-	14
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.3

HCM 6th TWSC
3: E. Exposition Ave & Phase 4 East Access

2040 Background Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	396	278	11	7	16
Future Vol, veh/h	28	396	278	11	7	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	150	-	-	-	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	29	417	293	12	7	17
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	305	0	-	0	774	299
Stage 1	-	-	-	-	299	-
Stage 2	-	-	-	-	475	-
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	1256	-	-	-	367	741
Stage 1	-	-	-	-	752	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1256	-	-	-	359	741
Mov Cap-2 Maneuver	-	-	-	-	359	-
Stage 1	-	-	-	-	735	-
Stage 2	-	-	-	-	626	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.5	0		11.7		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1256	-	-	-	560	
HCM Lane V/C Ratio	0.023	-	-	-	0.043	
HCM Control Delay (s)	7.9	-	-	-	11.7	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	

HCM 6th Roundabout
4: Trussville Rd & E. Exposition Ave





2040 Background Traffic
PM Peak Hour

Intersection				
Intersection Delay, s/veh	5.4			
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	424	313	50	54
Demand Flow Rate, veh/h	432	319	51	55
Vehicles Circulating, veh/h	63	57	425	317
Vehicles Exiting, veh/h	309	419	70	59
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.9	5.0	4.6	4.1
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	432	319	51	55
Cap Entry Lane, veh/h	1294	1302	895	999
Entry HV Adj Factor	0.982	0.982	0.986	0.985
Flow Entry, veh/h	424	313	50	54
Cap Entry, veh/h	1270	1278	882	984
V/C Ratio	0.334	0.245	0.057	0.055
Control Delay, s/veh	5.9	5.0	4.6	4.1
LOS	A	A	A	A
95th %tile Queue, veh	1	1	0	0

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗↗	↗		↗↗
Traffic Vol, veh/h	0	8	1033	5	0	1051
Future Vol, veh/h	0	8	1033	5	0	1051
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	8	1087	5	0	1106
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	544	0	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	483	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	483	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12.6	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBT		
Capacity (veh/h)	-	- 483		-		
HCM Lane V/C Ratio	-	- 0.017		-		
HCM Control Delay (s)	-	- 12.6		-		
HCM Lane LOS	-	- B		-		
HCM 95th %tile Q(veh)	-	- 0.1		-		

HCM 6th TWSC
6: Trussville Rd & Future North Access

2040 Background Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	13	35	5	22	43
Future Vol, veh/h	3	13	35	5	22	43
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	-	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	14	37	5	23	45

























Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	131	40	0
Stage 1	40	-	-
Stage 2	91	-	-
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	863	1031	-
Stage 1	982	-	-
Stage 2	933	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	850	1031	-
Mov Cap-2 Maneuver	817	-	-
Stage 1	982	-	-
Stage 2	919	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	2.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	983	1567
HCM Lane V/C Ratio	-	-	0.017	0.015
HCM Control Delay (s)	-	-	8.7	7.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Timings
7: Powhatan Rd & E. Mississippi 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)	163	75	77	62	44	78	132	796	98	144	663	244
Future Volume (vph)	163	75	77	62	44	78	132	796	98	144	663	244
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	15.0	30.0		15.0	30.0		12.0	63.0	63.0	12.0	63.0	63.0
Total Split (%)	12.5%	25.0%		12.5%	25.0%		10.0%	52.5%	52.5%	10.0%	52.5%	52.5%
Yellow Time (s)	3.0	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		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Act Effect Green (s)	16.7	8.9	99.8	14.1	7.1	99.8	65.0	58.2	58.2	65.1	58.2	58.2
Actuated g/C Ratio	0.17	0.09	1.00	0.14	0.07	1.00	0.65	0.58	0.58	0.65	0.58	0.58
v/c Ratio	0.73	0.25	0.05	0.29	0.18	0.05	0.28	0.41	0.11	0.35	0.34	0.25
Control Delay	54.5	46.2	0.1	36.2	46.2	0.1	7.2	12.8	2.2	8.1	12.0	2.1
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	54.5	46.2	0.1	36.2	46.2	0.1	7.2	12.8	2.2	8.1	12.0	2.1
LOS	D	D	A	D	D	A	A	B	A	A	B	A
Approach Delay		39.2			23.2			11.0			9.2	
Approach LOS		D			C			B			A	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 99.8

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 14.6

Intersection LOS: B

Intersection Capacity Utilization 58.2%

ICU Level of Service B

Analysis Period (min) 15





























Splits and Phases: 7: Powhatan Rd & E. Mississippi Ave

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

HCM 6th Signalized Intersection Summary

7: Powhatan Rd & E. Mississippi 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)	163	75	77	62	44	78	132	796	98	144	663	244
Future Volume (veh/h)	163	75	77	62	44	78	132	796	98	144	663	244
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	172	79	0	65	46	0	139	838	103	152	698	257
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	307	380		221	180		453	2099	936	445	2110	941
Arrive On Green	0.10	0.11	0.00	0.05	0.05	0.00	0.05	0.59	0.59	0.05	0.59	0.59
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	172	79	0	65	46	0	139	838	103	152	698	257
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	8.7	2.0	0.0	3.4	1.2	0.0	3.0	12.4	2.8	3.3	9.8	7.7
Cycle Q Clear(g_c), s	8.7	2.0	0.0	3.4	1.2	0.0	3.0	12.4	2.8	3.3	9.8	7.7
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	307	380		221	180		453	2099	936	445	2110	941
V/C Ratio(X)	0.56	0.21		0.29	0.26		0.31	0.40	0.11	0.34	0.33	0.27
Avail Cap(c_a), veh/h	307	905		322	905		491	2099	936	477	2110	941
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.3	40.1	0.0	41.6	44.8	0.0	7.5	10.8	8.8	7.9	10.1	9.7
Incr Delay (d2), s/veh	2.3	0.3	0.0	0.7	0.7	0.0	0.4	0.6	0.2	0.5	0.4	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.9	0.0	1.5	0.5	0.0	1.0	4.3	0.9	1.1	3.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.6	40.3	0.0	42.4	45.6	0.0	7.8	11.3	9.0	8.3	10.5	10.4
LnGrp LOS	D	D		D	D		A	B	A	A	B	B
Approach Vol, veh/h		251	A		111	A		1080			1107	
Approach Delay, s/veh		39.8			43.7			10.7			10.2	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.2	63.0	9.5	15.5	9.9	63.3	15.0	10.0				
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	7.0	58.0	10.0	25.0	7.0	58.0	10.0	25.0				
Max Q Clear Time (g_c+I1), s	5.3	14.4	5.4	4.0	5.0	11.8	10.7	3.2				
Green Ext Time (p_c), s	0.1	6.6	0.0	0.3	0.1	6.0	0.0	0.2				

Intersection Summary








HCM 6th Ctrl Delay	14.8
HCM 6th LOS	B

Notes

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

HCM 6th TWSC
8: Future Access/Phase 5 Access & E. Mississippi Ave

2040 Background Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	247	58	19	152	14	27	0	11	11	0	5
Future Vol, veh/h	13	247	58	19	152	14	27	0	11	11	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	205	-	200	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	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	14	260	61	20	160	15	28	0	12	12	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	175	0	0	321	0	0	408	503	130	366	557	88
Stage 1	-	-	-	-	-	-	288	288	-	208	208	-
Stage 2	-	-	-	-	-	-	120	215	-	158	349	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1399	-	-	1236	-	-	528	469	896	565	437	953
Stage 1	-	-	-	-	-	-	695	672	-	775	729	-
Stage 2	-	-	-	-	-	-	872	724	-	828	632	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1399	-	-	1236	-	-	515	457	896	546	426	953
Mov Cap-2 Maneuver	-	-	-	-	-	-	573	519	-	546	426	-
Stage 1	-	-	-	-	-	-	688	665	-	767	717	-
Stage 2	-	-	-	-	-	-	853	712	-	809	626	-





Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.8			11			10.9		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	640	1399	-	-	1236	-	-	630
HCM Lane V/C Ratio	0.063	0.01	-	-	0.016	-	-	0.027
HCM Control Delay (s)	11	7.6	-	-	8	-	-	10.9
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Intersection						
Intersection Delay, s/veh	3.7					
Intersection LOS	A					
Approach	EB		WB		NB	SB
Entry Lanes	2		2		1	1
Conflicting Circle Lanes	2		2		2	2
Adj Approach Flow, veh/h	291		237		88	40
Demand Flow Rate, veh/h	297		241		90	41
Vehicles Circulating, veh/h	97		62		274	259
Vehicles Exiting, veh/h	203		301		119	44
Ped Vol Crossing Leg, #/h	0		0		0	0
Ped Cap Adj	1.000		1.000		1.000	1.000
Approach Delay, s/veh	3.9		3.5		3.9	3.5
Approach LOS	A		A		A	A
Lane	Left	Right	Left	Right	Left	Left
Designated Moves	LT	TR	LT	TR	LTR	LTR
Assumed Moves	LT	TR	LT	TR	LTR	LTR
RT Channelized						
Lane Util	0.471	0.529	0.469	0.531	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
Entry Flow, veh/h	140	157	113	128	90	41
Cap Entry Lane, veh/h	1235	1308	1275	1347	1125	1139
Entry HV Adj Factor	0.977	0.982	0.984	0.980	0.983	0.986
Flow Entry, veh/h	137	154	111	125	88	40
Cap Entry, veh/h	1206	1284	1255	1320	1106	1124
V/C Ratio	0.113	0.120	0.089	0.095	0.080	0.036
Control Delay, s/veh	3.9	3.8	3.6	3.5	3.9	3.5
LOS	A	A	A	A	A	A
95th %tile Queue, veh	0	0	0	0	0	0

HCM 6th TWSC
10: Trussville Rd & Future South Access

2040 Background Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	4	39	3	6	36
Future Vol, veh/h	2	4	39	3	6	36
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	-	-	-	100	-
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	2	4	41	3	6	38





Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	93	43	0
Stage 1	43	-	-
Stage 2	50	-	-
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	907	1027	-
Stage 1	979	-	-
Stage 2	972	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	903	1027	-
Mov Cap-2 Maneuver	856	-	-
Stage 1	979	-	-
Stage 2	968	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	963	1564
HCM Lane V/C Ratio	-	-	0.007	0.004
HCM Control Delay (s)	-	-	8.8	7.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 6th TWSC
11: Trussville Rd & Future Middle Access

2040 Background Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	5	36	7	8	38
Future Vol, veh/h	4	5	36	7	8	38
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	-	-	-	10	-
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	4	5	38	7	8	40



















Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	98	42	0
Stage 1	42	-	-
Stage 2	56	-	-
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	901	1029	-
Stage 1	980	-	-
Stage 2	967	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	896	1029	-
Mov Cap-2 Maneuver	852	-	-
Stage 1	980	-	-
Stage 2	962	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	1.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	942	1563
HCM Lane V/C Ratio	-	-	0.01	0.005
HCM Control Delay (s)	-	-	8.9	7.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Timings
1: Powhatan Rd & E. Exposition Ave

2040 Total Traffic
AM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	25	5	208	5	5	601	88	193	586
Future Volume (vph)	25	5	208	5	5	601	88	193	586
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	10.0	23.0	10.0	24.0	24.0	10.0	24.0
Total Split (s)	12.0	40.0	12.0	40.0	12.0	56.0	56.0	12.0	56.0
Total Split (%)	10.0%	33.3%	10.0%	33.3%	10.0%	46.7%	46.7%	10.0%	46.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0
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	6.0	6.0	5.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	Max	None	Max
Act Effect Green (s)	9.1	7.5	12.4	9.0	57.1	50.5	50.5	62.8	60.6
Actuated g/C Ratio	0.10	0.09	0.14	0.10	0.66	0.58	0.58	0.72	0.70
v/c Ratio	0.14	0.07	0.96	0.72	0.01	0.31	0.10	0.36	0.26
Control Delay	34.9	29.8	88.4	14.9	6.0	11.1	2.2	7.0	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	29.8	88.4	14.9	6.0	11.1	2.2	7.0	7.2
LOS	C	C	F	B	A	B	A	A	A
Approach Delay		33.5		44.5		10.0			7.2
Approach LOS		C		D		A			A

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 86.9

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 18.0









Intersection LOS: B

Intersection Capacity Utilization 61.4%

ICU Level of Service B

Analysis Period (min) 15























Splits and Phases: 1: Powhatan Rd & E. Exposition Ave








			
Ø1	Ø2	Ø3	Ø4
12 s	56 s	12 s	40 s
			
Ø5	Ø6	Ø7	Ø8
12 s	56 s	12 s	40 s








HCM 6th Signalized Intersection Summary

1: Powhatan Rd & E. Exposition 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)	25	5	5	208	5	304	5	601	88	193	586	20
Future Volume (veh/h)	25	5	5	208	5	304	5	601	88	193	586	20
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	5	5	219	5	320	5	633	93	203	617	21
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	150	163	163	448	6	363	426	1692	755	451	1881	64
Arrive On Green	0.03	0.19	0.19	0.07	0.23	0.23	0.01	0.48	0.48	0.07	0.54	0.54
Sat Flow, veh/h	1781	858	858	1781	24	1564	1781	3554	1585	1781	3506	119
Grp Volume(v), veh/h	26	0	10	219	0	325	5	633	93	203	312	326
Grp Sat Flow(s),veh/h/ln	1781	0	1716	1781	0	1589	1781	1777	1585	1781	1777	1849
Q Serve(g_s), s	1.2	0.0	0.5	7.0	0.0	20.7	0.2	11.9	3.4	5.9	10.4	10.4
Cycle Q Clear(g_c), s	1.2	0.0	0.5	7.0	0.0	20.7	0.2	11.9	3.4	5.9	10.4	10.4
Prop In Lane	1.00		0.50	1.00		0.98	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	150	0	327	448	0	368	426	1692	755	451	953	992
V/C Ratio(X)	0.17	0.00	0.03	0.49	0.00	0.88	0.01	0.37	0.12	0.45	0.33	0.33
Avail Cap(c_a), veh/h	224	0	572	448	0	530	533	1692	755	451	953	992
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.1	0.0	34.6	32.6	0.0	38.9	14.2	17.5	15.3	12.7	13.7	13.7
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.8	0.0	11.8	0.0	0.6	0.3	0.7	0.9	0.9
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	0.0	0.2	4.8	0.0	9.1	0.1	4.7	1.3	2.2	4.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.6	0.0	34.6	33.5	0.0	50.8	14.2	18.2	15.6	13.4	14.6	14.6
LnGrp LOS	C	A	C	C	A	D	B	B	B	B	B	B
Approach Vol, veh/h		36			544			731			841	
Approach Delay, s/veh		34.6			43.8			17.8			14.3	
Approach LOS		C			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	56.0	12.0	25.0	5.7	62.3	7.7	29.3				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	50.0	7.0	35.0	7.0	50.0	7.0	35.0				
Max Q Clear Time (g_c+I1), s	7.9	13.9	9.0	2.5	2.2	12.4	3.2	22.7				
Green Ext Time (p_c), s	0.0	4.6	0.0	0.0	0.0	3.8	0.0	1.6				
Intersection Summary												
HCM 6th Ctrl Delay			23.3									
HCM 6th LOS			C									

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	259	18	12	461	7	27	0	19	14	0	29
Future Vol, veh/h	9	259	18	12	461	7	27	0	19	14	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	273	19	13	485	7	28	0	20	15	0	31
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	492	0	0	292	0	0	821	809	273	826	825	489
Stage 1	-	-	-	-	-	-	291	291	-	515	515	-
Stage 2	-	-	-	-	-	-	530	518	-	311	310	-
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	1071	-	-	1270	-	-	293	314	766	291	308	579
Stage 1	-	-	-	-	-	-	717	672	-	543	535	-
Stage 2	-	-	-	-	-	-	533	533	-	699	659	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1071	-	-	1270	-	-	274	308	766	279	302	579
Mov Cap-2 Maneuver	-	-	-	-	-	-	274	308	-	279	302	-
Stage 1	-	-	-	-	-	-	711	667	-	539	530	-
Stage 2	-	-	-	-	-	-	500	528	-	675	654	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.2			16.1			14.4		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	373	1071	-	-	1270	-	-	429				
HCM Lane V/C Ratio	0.13	0.009	-	-	0.01	-	-	0.106				
HCM Control Delay (s)	16.1	8.4	-	-	7.9	-	-	14.4				
HCM Lane LOS	C	A	-	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.4				

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	275	9	2	430	4	26	0	6	10	0	25
Future Vol, veh/h	9	275	9	2	430	4	26	0	6	10	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	289	9	2	453	4	27	0	6	11	0	26
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	457	0	0	298	0	0	779	768	289	774	775	455
Stage 1	-	-	-	-	-	-	307	307	-	459	459	-
Stage 2	-	-	-	-	-	-	472	461	-	315	316	-
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	1104	-	-	1263	-	-	313	332	750	316	329	605
Stage 1	-	-	-	-	-	-	703	661	-	582	566	-
Stage 2	-	-	-	-	-	-	573	565	-	696	655	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1104	-	-	1263	-	-	297	329	750	311	326	605
Mov Cap-2 Maneuver	-	-	-	-	-	-	297	329	-	311	326	-
Stage 1	-	-	-	-	-	-	697	656	-	577	565	-
Stage 2	-	-	-	-	-	-	547	564	-	685	650	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0			16.9			13.2		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	335	1104	-	-	1263	-	-	476				
HCM Lane V/C Ratio	0.101	0.009	-	-	0.002	-	-	0.077				
HCM Control Delay (s)	16.9	8.3	-	-	7.9	-	-	13.2				
HCM Lane LOS	C	A	-	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.3				

HCM 6th Roundabout
4: Trussville Rd & E. Exposition Ave

2040 Total Traffic
AM Peak Hour

Intersection				
Intersection Delay, s/veh	6.9			
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	306	481	342	97
Demand Flow Rate, veh/h	312	491	349	99
Vehicles Circulating, veh/h	229	191	206	597
Vehicles Exiting, veh/h	467	364	335	85
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.1	7.8	6.3	6.3
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	312	491	349	99
Cap Entry Lane, veh/h	1092	1136	1118	751
Entry HV Adj Factor	0.981	0.980	0.981	0.985
Flow Entry, veh/h	306	481	342	97
Cap Entry, veh/h	1072	1113	1097	739
V/C Ratio	0.286	0.432	0.312	0.132
Control Delay, s/veh	6.1	7.8	6.3	6.3
LOS	A	A	A	A
95th %tile Queue, veh	1	2	1	0

HCM 6th TWSC
5: Powhaton Rd & RIRO Access

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	24	671	5	0	799
Future Vol, veh/h	0	24	671	5	0	799
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	25	706	5	0	841
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	353	0	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	643	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	643	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.8	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBT		
Capacity (veh/h)	-	643		-		
HCM Lane V/C Ratio	-	0.039		-		
HCM Control Delay (s)	-	10.8		-		
HCM Lane LOS	-	B		-		
HCM 95th %tile Q(veh)	-	0.1		-		

HCM 6th TWSC
6: Trussville Rd & North Site Access/Future Access

2040 Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	12	0	2	5	0	19	1	179	2	7	129	4
Future Vol, veh/h	12	0	2	5	0	19	1	179	2	7	129	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	200	-	-
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	13	0	2	5	0	20	1	188	2	7	136	4

























Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	353	344	138	344	345	189	140	0	0	190	0	0
Stage 1	152	152	-	191	191	-	-	-	-	-	-	-
Stage 2	201	192	-	153	154	-	-	-	-	-	-	-
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	602	579	910	610	578	853	1443	-	-	1384	-	-
Stage 1	850	772	-	811	742	-	-	-	-	-	-	-
Stage 2	801	742	-	849	770	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	585	576	910	606	575	853	1443	-	-	1384	-	-
Mov Cap-2 Maneuver	585	576	-	606	575	-	-	-	-	-	-	-
Stage 1	849	768	-	810	741	-	-	-	-	-	-	-
Stage 2	782	741	-	843	766	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11		9.7		0		0.4	
HCM LOS	B		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1443	-	-	616 786	1384	-	-
HCM Lane V/C Ratio	0.001	-	-	0.024 0.032	0.005	-	-
HCM Control Delay (s)	7.5	-	-	11 9.7	7.6	-	-
HCM Lane LOS	A	-	-	B A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1 0.1	0	-	-

Timings
7: Powhatan Rd & E. Mississippi 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)	201	45	115	162	90	134	41	340	94	55	653	92
Future Volume (vph)	201	45	115	162	90	134	41	340	94	55	653	92
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	17.0	30.0		17.0	30.0		12.0	61.0	61.0	12.0	61.0	61.0
Total Split (%)	14.2%	25.0%		14.2%	25.0%		10.0%	50.8%	50.8%	10.0%	50.8%	50.8%
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		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Act Effect Green (s)	18.4	8.0	98.0	18.3	8.1	98.0	61.7	56.8	56.8	62.9	59.1	59.1
Actuated g/C Ratio	0.19	0.08	1.00	0.19	0.08	1.00	0.63	0.58	0.58	0.64	0.60	0.60
v/c Ratio	0.71	0.16	0.08	0.56	0.32	0.09	0.09	0.17	0.10	0.09	0.32	0.10
Control Delay	47.7	45.3	0.1	40.6	47.6	0.1	7.0	11.5	2.3	6.9	11.8	2.2
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	47.7	45.3	0.1	40.6	47.6	0.1	7.0	11.5	2.3	6.9	11.8	2.2
LOS	D	D	A	D	D	A	A	B	A	A	B	A
Approach Delay		32.2			28.2			9.3			10.4	
Approach LOS		C			C			A			B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 98

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 17.4


Intersection LOS: B

Intersection Capacity Utilization 52.5%

ICU Level of Service A

Analysis Period (min) 15

























Splits and Phases: 7: Powhatan Rd & E. Mississippi Ave

			
Ø1	Ø2	Ø3	Ø4
12 s	61 s	17 s	30 s
			
Ø5	Ø6	Ø7	Ø8
12 s	61 s	17 s	30 s

HCM 6th Signalized Intersection Summary

7: Powhatan Rd & E. Mississippi 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)	201	45	115	162	90	134	41	340	94	55	653	92			
Future Volume (veh/h)	201	45	115	162	90	134	41	340	94	55	653	92			
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	212	47	0	171	95	0	43	358	99	58	687	97			
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	328	235		339	183		471	2053	916	642	2072	924			
Arrive On Green	0.12	0.07	0.00	0.11	0.05	0.00	0.04	0.58	0.58	0.04	0.58	0.58			
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585			
Grp Volume(v), veh/h	212	47	0	171	95	0	43	358	99	58	687	97			
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585			
Q Serve(g_s), s	10.8	1.2	0.0	8.6	2.5	0.0	0.9	4.6	2.7	1.2	9.7	2.6			
Cycle Q Clear(g_c), s	10.8	1.2	0.0	8.6	2.5	0.0	0.9	4.6	2.7	1.2	9.7	2.6			
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	328	235		339	183		471	2053	916	642	2072	924			
V/C Ratio(X)	0.65	0.20		0.50	0.52		0.09	0.17	0.11	0.09	0.33	0.10			
Avail Cap(c_a), veh/h	328	916		365	916		536	2053	916	698	2072	924			
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	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	37.5	42.8	0.0	37.8	44.8	0.0	7.9	9.6	9.2	7.4	10.4	9.0			
Incr Delay (d2), s/veh	4.4	0.4	0.0	1.2	2.3	0.0	0.1	0.2	0.2	0.1	0.4	0.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.9	0.5	0.0	3.7	1.1	0.0	0.3	1.6	0.9	0.4	3.4	0.8			
Unsig. Movement Delay, s/veh															
LnGrp Delay(d),s/veh	41.8	43.3	0.0	38.9	47.1	0.0	8.0	9.8	9.5	7.5	10.9	9.2			
LnGrp LOS	D	D		D	D		A	A	A	A	B	A			
Approach Vol, veh/h	259			A			266			A					
Approach Delay, s/veh	42.1						41.8			9.6					
Approach LOS	D						D			A					
Timer - Assigned Phs	1	2	3	4	5	6	7	8							
Phs Duration (G+Y+Rc), s	9.0	61.0	15.6	11.4	8.4	61.5	17.0	10.0							
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	7.0	56.0	12.0	25.0	7.0	56.0	12.0	25.0							
Max Q Clear Time (g_c+I1), s	3.2	6.6	10.6	3.2	2.9	11.7	12.8	4.5							
Green Ext Time (p_c), s	0.0	2.6	0.1	0.2	0.0	5.2	0.0	0.4							

Intersection Summary








HCM 6th Ctrl Delay	19.1
HCM 6th LOS	B

Notes

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

HCM 6th TWSC
8: Future Access/Phase 5 Access & E. Mississippi Ave

2040 Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	154	18	6	295	10	40	0	16	23	0	51
Future Vol, veh/h	22	154	18	6	295	10	40	0	16	23	0	51
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	205	-	200	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	162	19	6	311	11	42	0	17	24	0	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	322	0	0	181	0	0	376	542	81	456	556	161
Stage 1	-	-	-	-	-	-	208	208	-	329	329	-
Stage 2	-	-	-	-	-	-	168	334	-	127	227	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1235	-	-	1392	-	-	556	446	963	488	438	855
Stage 1	-	-	-	-	-	-	775	729	-	658	645	-
Stage 2	-	-	-	-	-	-	817	642	-	863	715	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1235	-	-	1392	-	-	512	436	963	471	428	855
Mov Cap-2 Maneuver	-	-	-	-	-	-	576	498	-	471	428	-
Stage 1	-	-	-	-	-	-	760	715	-	645	642	-
Stage 2	-	-	-	-	-	-	762	639	-	832	701	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.9			0.1			11.1			11		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	651	1235	-	-	1392	-	-	682
HCM Lane V/C Ratio	0.091	0.019	-	-	0.005	-	-	0.114
HCM Control Delay (s)	11.1	8	-	-	7.6	-	-	11
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4

HCM 6th Roundabout
9: E. Mississippi Ave & Trussville Rd

2040 Total Traffic
AM Peak Hour

Intersection						
Intersection Delay, s/veh	4.0					
Intersection LOS	A					
Approach	EB		WB		NB	
Entry Lanes	2		2		1	
Conflicting Circle Lanes	2		2		2	
Adj Approach Flow, veh/h	210		283		110	
Demand Flow Rate, veh/h	214		288		112	
Vehicles Circulating, veh/h	83		145		247	
Vehicles Exiting, veh/h	343		214		50	
Ped Vol Crossing Leg, #/h	0		0		0	
Ped Cap Adj	1.000		1.000		1.000	
Approach Delay, s/veh	3.5		4.0		4.0	
Approach LOS	A		A		A	
Lane	Left	Right	Left	Right	Left	Left
Designated Moves	LT	TR	LT	TR	LTR	LTR
Assumed Moves	LT	TR	LT	TR	LTR	LTR
RT Channelized						
Lane Util	0.472	0.528	0.469	0.531	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
Entry Flow, veh/h	101	113	135	153	112	149
Cap Entry Lane, veh/h	1251	1323	1181	1255	1151	1122
Entry HV Adj Factor	0.977	0.984	0.984	0.979	0.979	0.978
Flow Entry, veh/h	99	111	133	150	110	146
Cap Entry, veh/h	1221	1303	1163	1230	1127	1098
V/C Ratio	0.081	0.085	0.114	0.122	0.097	0.133
Control Delay, s/veh	3.6	3.4	4.1	3.9	4.0	4.4
LOS	A	A	A	A	A	A
95th %tile Queue, veh	0	0	0	0	0	0

HCM 6th TWSC
10: Trussville Rd & South Site Access/Future Access

2040 Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Vol, veh/h	13	0	3	3	0	5	1	138	1	2	128	5
Future Vol, veh/h	13	0	3	3	0	5	1	138	1	2	128	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
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	14	0	3	3	0	5	1	145	1	2	135	5

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	292	290	138	291	292	146	140	0	0	146	0	0
Stage 1	142	142	-	148	148	-	-	-	-	-	-	-
Stage 2	150	148	-	143	144	-	-	-	-	-	-	-
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	660	620	910	661	619	901	1443	-	-	1436	-	-
Stage 1	861	779	-	855	775	-	-	-	-	-	-	-
Stage 2	853	775	-	860	778	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	655	619	910	658	618	901	1443	-	-	1436	-	-
Mov Cap-2 Maneuver	655	619	-	658	618	-	-	-	-	-	-	-
Stage 1	860	778	-	854	774	-	-	-	-	-	-	-
Stage 2	847	774	-	856	777	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.3		9.6		0.1		0.1	
HCM LOS	B		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1443	-	-	691	791	1436	-
HCM Lane V/C Ratio	0.001	-	-	0.024	0.011	0.001	-
HCM Control Delay (s)	7.5	-	-	10.3	9.6	7.5	-
HCM Lane LOS	A	-	-	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-



















HCM 6th TWSC
11: Trussville Rd & Middle Site Access/Future Access

2040 Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↱	↰		↱	↰	
Traffic Vol, veh/h	20	0	2	6	0	7	1	153	2	3	126	7
Future Vol, veh/h	20	0	2	6	0	7	1	153	2	3	126	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	-	-	-	-	-	-	10	-	-	10	-	-
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	0	2	6	0	7	1	161	2	3	133	7
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	311	308	137	308	310	162	140	0	0	163	0	0
Stage 1	143	143	-	164	164	-	-	-	-	-	-	-
Stage 2	168	165	-	144	146	-	-	-	-	-	-	-
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	642	606	911	644	605	883	1443	-	-	1416	-	-
Stage 1	860	779	-	838	762	-	-	-	-	-	-	-
Stage 2	834	762	-	859	776	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	636	604	911	641	603	883	1443	-	-	1416	-	-
Mov Cap-2 Maneuver	636	604	-	641	603	-	-	-	-	-	-	-
Stage 1	859	777	-	837	761	-	-	-	-	-	-	-
Stage 2	826	761	-	855	774	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.7		9.9		0		0.2					
HCM LOS	B		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1443	-	-	654	752	1416	-	-				
HCM Lane V/C Ratio	0.001	-	-	0.035	0.018	0.002	-	-				
HCM Control Delay (s)	7.5	-	-	10.7	9.9	7.5	-	-				
HCM Lane LOS	A	-	-	B	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-				

Timings
1: Powhatan Rd & E. Exposition Ave

2040 Total Traffic
PM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	35	5	160	5	10	814	244	274	921
Future Volume (vph)	35	5	160	5	10	814	244	274	921
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	10.0	23.0	10.0	24.0	24.0	10.0	24.0
Total Split (s)	12.0	33.0	12.0	33.0	12.0	63.0	63.0	12.0	63.0
Total Split (%)	10.0%	27.5%	10.0%	27.5%	10.0%	52.5%	52.5%	10.0%	52.5%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0
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	6.0	6.0	5.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	Max	None	Max
Act Effect Green (s)	9.0	7.1	14.2	8.3	64.1	57.4	57.4	69.7	67.4
Actuated g/C Ratio	0.09	0.07	0.15	0.09	0.67	0.60	0.60	0.73	0.71
v/c Ratio	0.22	0.08	0.69	0.64	0.03	0.40	0.24	0.63	0.41
Control Delay	41.4	33.5	53.2	16.7	5.6	11.8	2.1	13.7	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.4	33.5	53.2	16.7	5.6	11.8	2.1	13.7	8.2
LOS	D	C	D	B	A	B	A	B	A
Approach Delay		39.7		33.1		9.5			9.4
Approach LOS		D		C		A			A

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 95.6

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 13.1





Intersection LOS: B

Intersection Capacity Utilization 71.4%

ICU Level of Service C

Analysis Period (min) 15






















Splits and Phases: 1: Powhatan Rd & E. Exposition Ave








			
Ø1	Ø2	Ø3	Ø4
12 s	63 s	12 s	33 s
			
Ø5	Ø6	Ø7	Ø8
12 s	63 s	12 s	33 s

HCM 6th Signalized Intersection Summary

1: Powhatan Rd & E. Exposition 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)	35	5	5	160	5	191	10	814	244	274	921	35
Future Volume (veh/h)	35	5	5	160	5	191	10	814	244	274	921	35
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	37	5	5	168	5	201	11	857	257	288	969	37
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	158	102	102	347	6	239	342	1941	866	392	2095	80
Arrive On Green	0.03	0.12	0.12	0.07	0.15	0.15	0.01	0.55	0.55	0.07	0.60	0.60
Sat Flow, veh/h	1781	858	858	1781	39	1552	1781	3554	1585	1781	3490	133
Grp Volume(v), veh/h	37	0	10	168	0	206	11	857	257	288	493	513
Grp Sat Flow(s),veh/h/ln	1781	0	1716	1781	0	1591	1781	1777	1585	1781	1777	1846
Q Serve(g_s), s	1.9	0.0	0.5	7.0	0.0	13.1	0.3	15.0	9.2	7.0	16.0	16.0
Cycle Q Clear(g_c), s	1.9	0.0	0.5	7.0	0.0	13.1	0.3	15.0	9.2	7.0	16.0	16.0
Prop In Lane	1.00		0.50	1.00		0.98	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	158	0	203	347	0	245	342	1941	866	392	1067	1108
V/C Ratio(X)	0.23	0.00	0.05	0.48	0.00	0.84	0.03	0.44	0.30	0.73	0.46	0.46
Avail Cap(c_a), veh/h	221	0	460	347	0	427	439	1941	866	392	1067	1108
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.9	0.0	40.8	37.9	0.0	42.9	10.7	14.2	12.8	12.4	11.5	11.5
Incr Delay (d2), s/veh	0.7	0.0	0.1	1.0	0.0	7.6	0.0	0.7	0.9	7.0	1.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.2	3.9	0.0	5.6	0.1	5.6	3.3	3.2	5.9	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.7	0.0	40.9	38.9	0.0	50.5	10.8	14.9	13.7	19.5	13.0	12.9
LnGrp LOS	D	A	D	D	A	D	B	B	B	B	B	B
Approach Vol, veh/h	47			374			1125			1294		
Approach Delay, s/veh	40.0			45.3			14.6			14.4		
Approach LOS	D			D			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	63.0	12.0	17.3	6.4	68.6	8.3	21.1				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	57.0	7.0	28.0	7.0	57.0	7.0	28.0				
Max Q Clear Time (g_c+I1), s	9.0	17.0	9.0	2.5	2.3	18.0	3.9	15.1				
Green Ext Time (p_c), s	0.0	7.5	0.0	0.0	0.0	6.9	0.0	0.9				
Intersection Summary												
HCM 6th Ctrl Delay	19.0											
HCM 6th LOS	B											

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	31	454	38	25	309	21	28	0	19	16	0	19
Future Vol, veh/h	31	454	38	25	309	21	28	0	19	16	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	478	40	26	325	22	29	0	20	17	0	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	347	0	0	518	0	0	942	943	478	962	972	336
Stage 1	-	-	-	-	-	-	544	544	-	388	388	-
Stage 2	-	-	-	-	-	-	398	399	-	574	584	-
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	1212	-	-	1048	-	-	243	263	587	235	252	706
Stage 1	-	-	-	-	-	-	523	519	-	636	609	-
Stage 2	-	-	-	-	-	-	628	602	-	504	498	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1212	-	-	1048	-	-	227	250	587	218	239	706
Mov Cap-2 Maneuver	-	-	-	-	-	-	227	250	-	218	239	-
Stage 1	-	-	-	-	-	-	509	505	-	619	594	-
Stage 2	-	-	-	-	-	-	595	587	-	474	485	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.6	19.2	16.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	302	1212	-	-	1048	-	-	349
HCM Lane V/C Ratio	0.164	0.027	-	-	0.025	-	-	0.106
HCM Control Delay (s)	19.2	8.1	-	-	8.5	-	-	16.5
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.1	-	-	0.4

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	432	29	7	321	11	17	0	4	7	0	16
Future Vol, veh/h	28	432	29	7	321	11	17	0	4	7	0	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	455	31	7	338	12	18	0	4	7	0	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	350	0	0	486	0	0	880	877	455	889	902	344
Stage 1	-	-	-	-	-	-	513	513	-	358	358	-
Stage 2	-	-	-	-	-	-	367	364	-	531	544	-
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	1209	-	-	1077	-	-	268	287	605	264	277	699
Stage 1	-	-	-	-	-	-	544	536	-	660	628	-
Stage 2	-	-	-	-	-	-	653	624	-	532	519	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1209	-	-	1077	-	-	255	278	605	256	269	699
Mov Cap-2 Maneuver	-	-	-	-	-	-	255	278	-	256	269	-
Stage 1	-	-	-	-	-	-	531	523	-	644	624	-
Stage 2	-	-	-	-	-	-	633	620	-	516	507	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			0.2			18.6			13.3		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	287	1209	-	-	1077	-	-	458
HCM Lane V/C Ratio	0.077	0.024	-	-	0.007	-	-	0.053
HCM Control Delay (s)	18.6	8.1	-	-	8.4	-	-	13.3
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.2

HCM 6th Roundabout
4: Trussville Rd & E. Exposition Ave

2040 Total Traffic
PM Peak Hour

Intersection				
Intersection Delay, s/veh	6.4			
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	467	407	144	66
Demand Flow Rate, veh/h	476	415	147	67
Vehicles Circulating, veh/h	145	98	440	442
Vehicles Exiting, veh/h	364	489	181	71
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.1	6.1	5.8	4.9
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	476	415	147	67
Cap Entry Lane, veh/h	1190	1249	881	879
Entry HV Adj Factor	0.981	0.980	0.980	0.984
Flow Entry, veh/h	467	407	144	66
Cap Entry, veh/h	1167	1224	863	865
V/C Ratio	0.400	0.332	0.167	0.076
Control Delay, s/veh	7.1	6.1	5.8	4.9
LOS	A	A	A	A
95th %tile Queue, veh	2	1	1	0

HCM 6th TWSC
5: Powhaton Rd & RIRO Access

2040 Total Traffic
PM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗↗	↗		↗↗
Traffic Vol, veh/h	0	16	1051	14	0	1086
Future Vol, veh/h	0	16	1051	14	0	1086
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	17	1106	15	0	1143
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	553	0	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	477	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	477	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12.8	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBT		
Capacity (veh/h)	-	477		-		
HCM Lane V/C Ratio	-	0.035		-		
HCM Control Delay (s)	-	12.8		-		
HCM Lane LOS	-	B		-		
HCM 95th %tile Q(veh)	-	0.1		-		

























HCM 6th TWSC
6: Trussville Rd & North Site Access/Future Access

2040 Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↔	↔		↔	↔	
Traffic Vol, veh/h	8	0	1	3	0	13	2	79	5	22	106	14
Future Vol, veh/h	8	0	1	3	0	13	2	79	5	22	106	14
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	-	-	-	-	-	-	200	-	-	200	-	-
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	8	0	1	3	0	14	2	83	5	23	112	15
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	263	258	120	256	263	86	127	0	0	88	0	0
Stage 1	166	166	-	90	90	-	-	-	-	-	-	-
Stage 2	97	92	-	166	173	-	-	-	-	-	-	-
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	690	646	931	697	642	973	1459	-	-	1508	-	-
Stage 1	836	761	-	917	820	-	-	-	-	-	-	-
Stage 2	910	819	-	836	756	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	671	636	931	687	632	973	1459	-	-	1508	-	-
Mov Cap-2 Maneuver	671	636	-	687	632	-	-	-	-	-	-	-
Stage 1	835	750	-	916	819	-	-	-	-	-	-	-
Stage 2	896	818	-	822	745	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.3		9.1		0.2		1.2					
HCM LOS	B		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1459	-	-	692	903	1508	-	-				
HCM Lane V/C Ratio	0.001	-	-	0.014	0.019	0.015	-	-				
HCM Control Delay (s)	7.5	-	-	10.3	9.1	7.4	-	-				
HCM Lane LOS	A	-	-	B	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-				

Timings
7: Powhatan Rd & E. Mississippi 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)	166	87	77	89	53	91	132	809	127	174	667	245
Future Volume (vph)	166	87	77	89	53	91	132	809	127	174	667	245
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0		10.0	23.0		10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	15.0	30.0		15.0	30.0		12.0	63.0	63.0	12.0	63.0	63.0
Total Split (%)	12.5%	25.0%		12.5%	25.0%		10.0%	52.5%	52.5%	10.0%	52.5%	52.5%
Yellow Time (s)	3.0	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		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Act Effect Green (s)	16.7	8.9	100.4	15.4	7.7	100.4	65.0	58.2	58.2	65.2	58.3	58.3
Actuated g/C Ratio	0.17	0.09	1.00	0.15	0.08	1.00	0.65	0.58	0.58	0.65	0.58	0.58
v/c Ratio	0.73	0.29	0.05	0.39	0.21	0.06	0.28	0.42	0.14	0.43	0.34	0.25
Control Delay	53.9	46.9	0.1	38.2	46.2	0.1	7.4	13.2	2.3	9.4	12.3	2.1
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	53.9	46.9	0.1	38.2	46.2	0.1	7.4	13.2	2.3	9.4	12.3	2.1
LOS	D	D	A	D	D	A	A	B	A	A	B	A
Approach Delay		39.5			25.2			11.2			9.5	
Approach LOS		D			C			B			A	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 100.4

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 15.2

Intersection LOS: B

Intersection Capacity Utilization 60.4%

ICU Level of Service B

Analysis Period (min) 15

























Splits and Phases: 7: Powhatan Rd & E. Mississippi Ave

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

HCM 6th Signalized Intersection Summary

7: Powhatan Rd & E. Mississippi 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)	166	87	77	89	53	91	132	809	127	174	667	245
Future Volume (veh/h)	166	87	77	89	53	91	132	809	127	174	667	245
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	175	92	0	94	56	0	139	852	134	183	702	258
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	300	308		254	179		453	2082	929	441	2118	945
Arrive On Green	0.10	0.09	0.00	0.06	0.05	0.00	0.05	0.59	0.59	0.06	0.60	0.60
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	175	92	0	94	56	0	139	852	134	183	702	258
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	9.1	2.4	0.0	4.9	1.5	0.0	3.0	12.9	3.8	4.0	9.8	7.8
Cycle Q Clear(g_c), s	9.1	2.4	0.0	4.9	1.5	0.0	3.0	12.9	3.8	4.0	9.8	7.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	300	308		254	179		453	2082	929	441	2118	945
V/C Ratio(X)	0.58	0.30		0.37	0.31		0.31	0.41	0.14	0.42	0.33	0.27
Avail Cap(c_a), veh/h	300	897		318	897		489	2082	929	458	2118	945
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	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.0	42.4	0.0	40.9	45.4	0.0	7.6	11.2	9.3	8.1	10.1	9.6
Incr Delay (d2), s/veh	2.9	0.5	0.0	0.9	1.0	0.0	0.4	0.6	0.3	0.6	0.4	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	1.0	0.0	2.1	0.7	0.0	1.0	4.6	1.2	1.3	3.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.9	42.9	0.0	41.8	46.3	0.0	8.0	11.8	9.6	8.8	10.5	10.4
LnGrp LOS	D	D		D	D		A	B	A	A	B	B
Approach Vol, veh/h		267	A		150	A		1125			1143	
Approach Delay, s/veh		42.2			43.5			11.0			10.2	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	63.0	11.4	13.6	10.0	64.0	15.0	10.0				
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	7.0	58.0	10.0	25.0	7.0	58.0	10.0	25.0				
Max Q Clear Time (g_c+I1), s	6.0	14.9	6.9	4.4	5.0	11.8	11.1	3.5				
Green Ext Time (p_c), s	0.0	6.9	0.0	0.4	0.1	6.0	0.0	0.2				

Intersection Summary








HCM 6th Ctrl Delay 15.6
HCM 6th LOS B

Notes

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

HCM 6th TWSC
8: Future Access/Phase 5 Access & E. Mississippi Ave

2040 Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	265	58	19	171	24	27	0	11	16	0	34
Future Vol, veh/h	65	265	58	19	171	24	27	0	11	16	0	34
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	205	-	200	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	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	68	279	61	20	180	25	28	0	12	17	0	36

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	205	0	0	340	0	0	545	660	140	509	709	103
Stage 1	-	-	-	-	-	-	415	415	-	233	233	-
Stage 2	-	-	-	-	-	-	130	245	-	276	476	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1364	-	-	1216	-	-	421	382	882	447	358	932
Stage 1	-	-	-	-	-	-	585	591	-	749	711	-
Stage 2	-	-	-	-	-	-	860	702	-	707	555	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1364	-	-	1216	-	-	384	357	882	419	335	932
Mov Cap-2 Maneuver	-	-	-	-	-	-	457	431	-	419	335	-
Stage 1	-	-	-	-	-	-	556	561	-	712	700	-
Stage 2	-	-	-	-	-	-	813	691	-	663	527	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.3			0.7			12.3			10.8		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	531	1364	-	-	1216	-	-	670
HCM Lane V/C Ratio	0.075	0.05	-	-	0.016	-	-	0.079
HCM Control Delay (s)	12.3	7.8	-	-	8	-	-	10.8
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.2	-	-	0.1	-	-	0.3

Intersection						
Intersection Delay, s/veh	3.9					
Intersection LOS	A					
Approach	EB		WB		NB	SB
Entry Lanes	2		2		1	1
Conflicting Circle Lanes	2		2		2	2
Adj Approach Flow, veh/h	317		263		88	71
Demand Flow Rate, veh/h	324		268		90	73
Vehicles Circulating, veh/h	109		83		313	271
Vehicles Exiting, veh/h	235		319		119	80
Ped Vol Crossing Leg, #/h	0		0		0	0
Ped Cap Adj	1.000		1.000		1.000	1.000
Approach Delay, s/veh	4.0		3.7		4.1	3.8
Approach LOS	A		A		A	A
Lane	Left	Right	Left	Right	Left	Left
Designated Moves	LT	TR	LT	TR	LTR	LTR
Assumed Moves	LT	TR	LT	TR	LTR	LTR
RT Channelized						
Lane Util	0.469	0.531	0.470	0.530	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
Entry Flow, veh/h	152	172	126	142	90	73
Cap Entry Lane, veh/h	1221	1294	1251	1323	1088	1128
Entry HV Adj Factor	0.980	0.976	0.983	0.983	0.983	0.979
Flow Entry, veh/h	149	168	124	140	88	71
Cap Entry, veh/h	1196	1264	1229	1301	1070	1104
V/C Ratio	0.124	0.133	0.101	0.107	0.083	0.065
Control Delay, s/veh	4.1	3.9	3.8	3.6	4.1	3.8
LOS	A	A	A	A	A	A
95th %tile Queue, veh	0	0	0	0	0	0

HCM 6th TWSC
10: Trussville Rd & South Site Access/Future Access

2040 Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	1.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↖		↗	↖	
Traffic Vol, veh/h	9	0	2	2	0	4	4	66	3	6	64	15
Future Vol, veh/h	9	0	2	2	0	4	4	66	3	6	64	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	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	2	2	0	4	4	69	3	6	67	16
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	168	167	75	167	174	71	83	0	0	72	0	0
Stage 1	87	87	-	79	79	-	-	-	-	-	-	-
Stage 2	81	80	-	88	95	-	-	-	-	-	-	-
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	796	726	986	797	719	991	1514	-	-	1528	-	-
Stage 1	921	823	-	930	829	-	-	-	-	-	-	-
Stage 2	927	828	-	920	816	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	789	721	986	791	714	991	1514	-	-	1528	-	-
Mov Cap-2 Maneuver	789	721	-	791	714	-	-	-	-	-	-	-
Stage 1	918	820	-	927	827	-	-	-	-	-	-	-
Stage 2	921	826	-	914	813	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	9.5		9		0.4		0.5					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1514	-	-	819	914	1528	-	-				
HCM Lane V/C Ratio	0.003	-	-	0.014	0.007	0.004	-	-				
HCM Control Delay (s)	7.4	-	-	9.5	9	7.4	-	-				
HCM Lane LOS	A	-	-	A	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-				

HCM 6th TWSC
11: Trussville Rd & Middle Site Access/Future Access

2040 Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	14	0	2	4	0	5	3	68	7	8	79	23
Future Vol, veh/h	14	0	2	4	0	5	3	68	7	8	79	23
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	-	-	-	-	-	-	10	-	-	10	-	-
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	15	0	2	4	0	5	3	72	7	8	83	24

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	195	196	95	194	205	76	107	0	0	79	0	0
Stage 1	111	111	-	82	82	-	-	-	-	-	-	-
Stage 2	84	85	-	112	123	-	-	-	-	-	-	-
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	764	699	962	765	691	985	1484	-	-	1519	-	-
Stage 1	894	804	-	926	827	-	-	-	-	-	-	-
Stage 2	924	824	-	893	794	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	756	694	962	759	686	985	1484	-	-	1519	-	-
Mov Cap-2 Maneuver	756	694	-	759	686	-	-	-	-	-	-	-
Stage 1	892	800	-	924	825	-	-	-	-	-	-	-
Stage 2	917	822	-	886	790	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	9.7		9.2		0.3		0.5	
HCM LOS	A		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1484	-	-	777 870	1519	-	-
HCM Lane V/C Ratio	0.002	-	-	0.022 0.011	0.006	-	-
HCM Control Delay (s)	7.4	-	-	9.7 9.2	7.4	-	-
HCM Lane LOS	A	-	-	A A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1 0	0	-	-

Queuing Reports

Queues

1: Powhatan Rd & E. Exposition Ave

2040 Total Traffic

AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	26	10	219	325	5	633	93	203	638
v/c Ratio	0.14	0.07	0.96	0.72	0.01	0.31	0.10	0.36	0.26
Control Delay	34.9	29.8	88.4	14.9	6.0	11.1	2.2	7.0	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	29.8	88.4	14.9	6.0	11.1	2.2	7.0	7.2
Queue Length 50th (ft)	12	2	~150	2	1	67	0	18	34
Queue Length 95th (ft)	33	18	#232	83	5	166	19	82	163
Internal Link Dist (ft)		899		787		1570			1188
Turn Bay Length (ft)	350		250		350		250	250	
Base Capacity (vph)	201	703	228	835	596	2055	965	568	2457
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.01	0.96	0.39	0.01	0.31	0.10	0.36	0.26

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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













Queue shown is maximum after two cycles.

Queues

7: Powhatan Rd & E. Mississippi 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)	212	47	121	171	95	141	43	358	99	58	687	97
v/c Ratio	0.71	0.16	0.08	0.56	0.32	0.09	0.09	0.17	0.10	0.09	0.32	0.10
Control Delay	47.7	45.3	0.1	40.6	47.6	0.1	7.0	11.5	2.3	6.9	11.8	2.2
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	47.7	45.3	0.1	40.6	47.6	0.1	7.0	11.5	2.3	6.9	11.8	2.2
Queue Length 50th (ft)	120	15	0	94	31	0	9	58	0	12	125	0
Queue Length 95th (ft)	193	34	0	157	57	0	22	88	21	27	175	20
Internal Link Dist (ft)	640			1077			647			894		
Turn Bay Length (ft)	200		200	200		205	200		205	200		200
Base Capacity (vph)	306	915	1583	310	915	1583	505	2050	963	686	2132	997
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	0.69	0.05	0.08	0.55	0.10	0.09	0.09	0.17	0.10	0.08	0.32	0.10
Intersection Summary												

Queues

1: Powhatan Rd & E. Exposition Ave

2040 Total Traffic

PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	37	10	168	206	11	857	257	288	1006
v/c Ratio	0.22	0.08	0.69	0.64	0.03	0.40	0.24	0.63	0.41
Control Delay	41.4	33.5	53.2	16.7	5.6	11.8	2.1	13.7	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.4	33.5	53.2	16.7	5.6	11.8	2.1	13.7	8.2
Queue Length 50th (ft)	22	3	95	3	2	144	0	52	116
Queue Length 95th (ft)	46	19	#175	71	8	223	36	#117	267
Internal Link Dist (ft)		899		787		1570			1188
Turn Bay Length (ft)	350		250		350		250	250	
Base Capacity (vph)	177	511	243	610	437	2123	1052	454	2482
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.02	0.69	0.34	0.03	0.40	0.24	0.63	0.41

Intersection Summary

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













Queue shown is maximum after two cycles.

Queues

2040 Total Traffic

7: Powhatan Rd & E. Mississippi Ave

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	175	92	81	94	56	96	139	852	134	183	702	258
v/c Ratio	0.73	0.29	0.05	0.39	0.21	0.06	0.28	0.42	0.14	0.43	0.34	0.25
Control Delay	53.9	46.9	0.1	38.2	46.2	0.1	7.4	13.2	2.3	9.4	12.3	2.1
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	53.9	46.9	0.1	38.2	46.2	0.1	7.4	13.2	2.3	9.4	12.3	2.1
Queue Length 50th (ft)	100	30	0	51	18	0	28	159	0	38	124	0
Queue Length 95th (ft)	#174	56	0	95	38	0	53	214	26	68	170	35
Internal Link Dist (ft)	640			1077			647			894		
Turn Bay Length (ft)	200		200	200		205	200		205	200		200
Base Capacity (vph)	242	884	1583	259	884	1583	496	2051	973	424	2054	1026
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	0.72	0.10	0.05	0.36	0.06	0.06	0.28	0.42	0.14	0.43	0.34	0.25

Intersection Summary

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

Queue shown is maximum after two cycles.