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May 27, 2020

Ernesto Garcia Armendariz
Land View LLC
c/o Dan Kupferer, PLS
Land Development Consultants, Inc
3898 Maizeland Rd
Colorado Springs, CO 80909

RE: SH 94/Curtis Road
Traffic Impact Study
El Paso County, Colorado
LSC #204310

Dear Mr. Armendariz:

LSC Transportation Consultants, Inc. has prepared this traffic impact study for the proposed development planned to be located southeast of the intersection of State Highway (SH) 94/Curtis Road in El Paso County, Colorado. The planned land use is for residential, commercial, and trucking. This report has been prepared for submittal to El Paso County and the Colorado Department of Transportation (CDOT).

REPORT CONTENTS

The preparation of this report included the following:

- Inventory of the existing adjacent and nearby roadway system. This includes functional classifications, street widths, lane configurations, intersection traffic control, posted speed limits, pavement markings, intersection and access spacing, roadway and intersection alignments, auxiliary left- and right-turn lanes, intersection sight distances, etc.;
- A review of the proposed site land use and access locations;
- Morning and evening peak-hour traffic volumes at the intersection of SH 94/Curtis Road;
- Estimates of short- and long-term background traffic volumes and total traffic (site traffic plus background traffic). Forecasts include buildout of adjacent proposed developments;
- Estimates of the daily and peak-hour trip generation for the proposed land use;

- The estimated directional distribution of site-generated vehicle trips on the study area roadway system;
- Projections of peak-hour site-generated turning-movement traffic volumes at the study area intersections;
- Level of service (LOS) analysis at the study area intersections;
- Evaluation of the short-term and long-term projected intersection volumes to determine the potential need for any new auxiliary right-/left-turn lanes and/or the adequacy of existing lanes at the site access-point intersections and the other study area intersections; and
- Findings and recommendations.

PREVIOUS TRAFFIC STUDIES

In March 2018, a traffic study was completed by Gannett Fleming for Schriever Air Force Base: Traffic Study on Enoch and Irwin Road Entry Control Stations. LSC is not aware of any other recent traffic studies in the study area. In 2012 El Paso County completed the State Highway 94 Access Management Plan.

LAND USE AND ACCESS

Figure 1 shows the site location relative to the adjacent and nearby roadways. The site plan is shown in Figure 2.

Site Land Uses Proposed with the Rezone Application

The development is proposed to include 21 2.5-acre+ lots for single family homes, a 30-acre site to be zoned CS for **future** commercial use(s), and 5 acres of land for a trucking business.

Commercial Site (30 acres)

For purposes of this report, a conservative assumption (with respect to potential vehicle trip generation) of approximately 225,000 square feet of shopping center space for the 30-acre commercial site has been made by LSC. This could be considered the “highest and best use” for a CS-zoned parcel (assumes a floor area ratio [FAR] of about 0.18). However, it is more likely that only a minority portion would be developed as a shopping center with retail, restaurant/service businesses, or highway convenience uses. The majority of the 30-acres is likely to be developed with industrial, business park, or warehousing uses.

Trucking Business

The trucking business is relocating from another location. This location is anticipated to have up to 10 multi-unit trucks and 10 drivers. The facility will also have a small business office and a small

maintenance facility. The trucks are used to support construction projects. Truck drivers will travel to the site via their own passenger vehicles between 5:00 and 7:00 a.m. and depart in the company trucks to the job site(s). The employees return the company trucks to the site between 3:30 and 6:00 p.m. and then leave the site in their own vehicles.

Some hauling contracts are local with trucks parked at the site each night and dispatched to local job sites as needed during each work day. Other contracts are for projects out of the local area. With these “out-of-town” contracts, truck drivers travel out of the local area with the trucks for jobs that require them to remain away for several days (or longer) periods. The drivers and their trucks are often contracted for out-of-state or out-of-county jobs that require them to remain away for weeks or months at a time. This is most common during the summer construction season. During the winter, when there are fewer jobs, trucks may remain parked on site for several months. However, this analysis conservatively assumes all trucks leaving and returning to the site each day.

Development Phasing

This development would be phased. The trucking business would be the first to be developed, followed by the single-family subdivision. The commercial site may be the last to be developed. But portions of the 30-acres may be developed in the short term as well.

Access & Circulation

As shown in Figure 2, one access point to the adjacent Arterial roadway system is proposed: a full-movement access onto Curtis Road about 1,575 feet south of State Highway 94 (centerline spacing). A proposed public roadway extending east from this planned intersection would serve the trucking business, the 30-acre commercial site and the single-family lots. This public roadway is planned as a rural local roadway with 100 feet of ROW. Three or four residential lots would have direct access to the section of this roadway frontage shared with the non-residential land uses on the north side of the roadway. The preliminary access location for the proposed trucking business would be approximately 250 feet east of Curtis Road (centerline spacing). The access point(s) to the commercial site have not yet been determined.

INTERSECTION SIGHT DISTANCE

The required intersection sight distance for the site access on Curtis Road (proposed public road connection to Curtis Road) is per AASHTO criteria for a 60-mph design speed roadway (AASHTO criteria has been used as Table 2-21 in ECM Section 2.3.6 G only shows sight distance for roadways up to a 50-mph design speed. The required sight distance is 665 feet for passenger vehicles and 1,015 feet for combination trucks. This intersection would be able to meet this criterion, provided the intersection line of sight “triangles” are kept free of site improvements (that would limit the line of sight needed to maintain ECM prescribed sight distance). Examples of site improvements include landscaping, monument signs, parking areas, berms, etc. Obstruction height to maintain passenger car line of sight is about 18 inches. Obstruction height

to maintain truck line of sight is higher as the truck “driver’s eye” is significantly higher than the “driver’s eye” for a two-passenger vehicle.

ROAD AND TRAFFIC CONDITIONS

Area Roads

Figure 1 shows the streets in the vicinity of the site. The streets adjacent to the site are identified below, followed by a brief description of each:

State Highway 94 is a two-lane roadway that extends east from US Highway (US Hwy) 24 to US Hwy 40. SH 94 is classified as a Principal Arterial (NR-A) and has a speed limit of 55 miles per hour (mph) adjacent to the site. The El Paso County Major Transportation Corridors Plan shows SH 94 as a four-lane road in 2040 from the US 24 to Slocum Road. The intersection of Curtis Road/SH 94 is signalized with auxiliary lanes for all turning movements.

Curtis Road is a two-lane roadway that extends from Bradley Road to Judge Orr Road. The roadway is classified as a Minor Arterial north of SH 94. To the south of SH 94, adjacent to the site, the roadway is classified as a Major Collector. The posted speed limit is 55 mph adjacent to the site. There is an access to Schriever Air Force Base, approximately two miles south of the site on Curtis Road. This results in the roadway having very directional travel during peak hours. The El Paso County Major Transportation Corridors Plan shows Curtis Road as having a classification of Minor Arterial adjacent to the site in the 2040 roadway plan. In the 2060 Corridor Preservation Plan, the Curtis Road is shown as a four-lane roadway.

Traffic Volumes

Due to the current COVID-19 pandemic, turning-movement counts could not be collected. Traffic counts were previously conducted in October 2017 in the *Traffic Study on Enoch and Irwin Road Entry Control Facilities*, March 2018 for Schriever Air Force. Figure 3 provides the 2017 traffic volumes at the intersection of SH 94/Curtis Road. Additionally, average daily traffic volumes for SH 94 and Curtis Road were available on CDOT’s Online Transportation Information System and MS2 websites.

Crash History

Three years of crash data were collected at the intersection of SH 94/Curtis Road. There were ten crashes during the study period. All crashes were property damage only. No correctable crash patterns were identified in the crashes recorded.

TRIP GENERATION

Estimates of the vehicle trips projected to be generated by the proposed development have been made using the nationally published trip-generation rates from *Trip Generation, 10th Edition, 2017* by the Institute of Transportation Engineers (ITE). There was no applicable ITE land use for the proposed trucking business. As a result, the trip generation for the trucking business was estimated, based on information provided regarding the usage of the site, including number of employees, number of trucks, and schedule.

Table 1, below, presents a summary of the estimated site trip generation on a typical weekday. The detailed trip-generation estimate for the development, including ITE rates for the proposed land use, is presented in Table 3.

Approximately 10,674 total vehicle trips are projected to enter and exit the site at the access point (“driveway trips”) on the average weekday during a 24-hour period. During the morning peak hour, approximately 176 vehicles would enter and 120 vehicles would exit the site. During the evening peak hour, approximately 496 vehicles would enter and 531 vehicles would exit the site.

The proposed development is projected to generate approximately 7,126 (new/non-pass-by or diverted) vehicle trips on the average weekday during a 24-hour period.

Table 1: Estimated External Site Vehicle-Trip Generation (Vehicles per Hour)

Analysis Period	Total Trips			Pass-by Trips			New Trips		
	In	Out	Total	In	Out	Total	In	Out	Total
A.M. Peak Hour	176	120	296	45	45	90	131	75	206
P.M. Peak Hour	496	531	1,027	168	168	336	328	363	691
Daily/24-Hour	5,337	5,337	10,674	1,774	1,774	3,548	3,063	3,063	7,126

Pass-by Trips

The trips generated by the site have also been aggregated by trip type to account for the pass-by phenomenon. A pass-by trip is one made by a motorist who would already be on an adjacent road regardless of the proposed development, but who stops in at the site while passing by. The pass-by motorist would then continue on his or her way to a final destination in the original direction. For purposes of this report, pass-by trips are trips by motorists already traveling through the intersection of SH 94/Curtis Road. Pass-by trips are shown in Table 3 and are based on *Trip Generation Handbook - An ITE Proposed Recommended Practice*, 3rd Edition, 2014 by ITE.

BACKGROUND TRAFFIC

Background volumes do not include projected traffic to be generated by the proposed development.

Short-Term Background Traffic Volumes

OTIS reports a 1.19 20-year growth factor east of Curtis Road and a 1.25 20-year growth factor west of Curtis Road; consider using the higher rate for a more conservative assessment of BG traffic.

Figure 4 shows the projected background traffic volumes. Volumes have been projected based on CDOT growth projections on SH 94 near Curtis Road. A 0.9 percent/year growth rate has been applied to the intersection.

Long-Term Background Traffic Volumes

Figure 5 shows the projected 20-year background traffic volumes for the year 2040. Similar to the short-term background traffic, CDOT's growth projections were used to forecast traffic. A growth rate of 0.9 percent/year was applied to the intersection.

TRIP DISTRIBUTION AND ASSIGNMENT

Trip Directional Distribution

Estimation of the directional distribution of site-generated vehicle trips to the study area roads and intersections is a necessary component in determining the site's traffic impacts. Figure 6 shows the directional distribution estimates for the proposed development. Estimates were based on the following factors: existing area development, the area roadway system, and the site's proposed land use.

Site-Generated Traffic

Site-generated traffic volumes at the study intersections have been calculated by applying the directional-distribution percentages estimated by LSC (from Figure 6) to the trip-generation estimates (from Table 1). Because it is anticipated that the trucking business will be constructed first, two phases of development have been assumed. Phase 1 is just the development of the trucking business. The buildout phase includes the remainder of the site, including the commercial and residential land uses.

Figure 6 shows the projected site-generated traffic volumes for phase 1 of the proposed development. Figure 7 provides the site-generated traffic for the buildout of the site. In addition, Figure 7 shows the pass-by trips at the study intersections.

Short-Term Total Traffic Volumes

Figure 8 shows the sum of the short-term background traffic volumes (from Figure 4) and the site-generated peak-hour traffic volumes for phase 1 (shown in Figure 6). These volumes represent the projected short-term total traffic following construction of phase 1. Figure 9 provides the projected short-term total traffic following construction of the entire development.

Long-Term Total Traffic Volumes

Figure 10 shows the projected 2040 phase 1 total traffic volumes, which are the sum of 2040 background traffic volumes (from Figure 5) plus the site-generated traffic volumes (from Figure 6). Figure 11 provides the 2040 total traffic volumes with the buildout of the site.

LEVEL OF SERVICE ANALYSIS

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection and is indicated on a scale from “A” to “F.” LOS A is indicative of little congestion or delay. LOS F indicates a high level of congestion or delay. Table 2 shows the level of service delay ranges for signalized and unsignalized intersections.

Table 2: Intersection Levels of Service Delay Ranges

Level of Service	Signalized Intersections	Unsignalized Intersections
	Average Control Delay (seconds per vehicle)	Average Control Delay (seconds per vehicle) ⁽¹⁾
A	10.0 sec or less	10.0 sec or less
B	10.1-20.0 sec	10.1-15.0 sec
C	20.1-35.0 sec	15.1-25.0 sec
D	35.1-55.0 sec	25.1-35.0 sec
E	55.1-80.0 sec	35.1-50.0 sec
F	80.1 sec or more	50.1 sec or more

(1) For unsignalized intersections if V/C ratio is greater than 1.0 the level of service is LOS F regardless of the projected average control delay per

The intersection of SH 94/Curtis Road and the site access point have been analyzed to determine the projected control delay and corresponding levels of service for turning movements. Figure 3 provides the existing levels of service. Figure 4 and Figure 5 provide the background levels of service for the short-term and long-term scenarios, respectively. Figure 8 through Figure 10 provide the levels of service of the short-term and long-term phase 1 and buildout total traffic scenarios.

SH 94/Curtis Road

The signalized intersection of SH 94/Curtis Road currently operates at LOS C during both peak hours, with all movements operating at LOS D or better. In the short-term background, the intersection will continue to operate at LOS C with all movements at LOS D or better. In the long-term background, it has been assumed that SH 94 has been widened to four-lanes as shown in the El Paso County Major Transportation Corridors Plan. With the widening, the intersection is projected to operate at LOS B, with all movements operating at LOS D or better.

In the short term, with the addition of both phase 1 and buildout of the proposed development, the intersection of SH 94/Curtis Road is expected to operate at LOS C or better, with all movements at LOS D or better. However, to maintain this level of service with the buildout of the site, the northbound left turn will need to be changed to protected/permissive.

In the long term, with the addition of the proposed development (both phase 1 and buildout), the intersection of SH 94/Curtis Road is expected to continue to operate at LOS C, with all movements at LOS D or better.

Site Accesses

In the short term with phase 1 developed, all turning movements at the site are projected to operate at LOS B or better. In this scenario a shared westbound left/right lane is adequate for acceptable traffic operations. With the buildout of the site, there will need to be separate westbound left- and right-turn lanes. With separate outbound turn lanes, all turning movements are expected to operate at LOS C or better during the morning peak hour. During the evening peak hour, the outbound right turn is projected to operate at LOS D, while the outbound left turn would operate at LOS F. The left-turn movement is expected to be at capacity, but the intersection would not meet signal warrants. A channelized T may help to improve the level of service for the westbound left-turn movement.

Similar to in the phase 1 short-term scenario, in long-term phase 1 scenario, all turning movements at the site are projected to operate at LOS B or better. In this scenario a shared westbound left/right lane is adequate for acceptable traffic operations.

Include peak hour warrant analyses for the Curtis Road Access

In the long term with the full buildout of the site, during the evening peak hour both outbound movements are projected to operate at LOS F and be over capacity. However, the intersection is expected to meet the peak-hour warrant. The peak-hour warrant is typically used for unusual cases where minor-street traffic suffers undue delay entering or exiting the site. Due to the presence of Schriever Air Force Base, traffic on Curtis Road has peak-hour factors between 12 and 15 percent and is highly directional, with approximately 85 percent of traffic in one direction during the peak hours. Due to the unusual traffic patterns, the peak-hour warrant for a traffic signal would apply and the intersection should be signalized in the long term. As a signalized intersection, the overall intersection would operate at LOS C or better during the peak hours.

AUXILIARY TURN LANES

As mentioned previously, there are existing deceleration lanes for all movements at the intersection of SH 94/Curtis Road. The turn lanes on SH 94 meet the State Highway Access Code criteria and will continue to do so in the long term. [↑] include the auxiliary lane requirements that would need to be met when SH 94 is widened.

At the site access, no auxiliary lanes are required in phase 1 or buildout, due to the classification of major collector. However, in the El Paso County Major Transportation Corridors Plan, the classification of Curtis Road is planned to be changed to Minor Arterial by 2040. Due to the low turning volumes, even with the minor arterial classification, no auxiliary lanes are required for phase 1. With the buildout of the site and the minor arterial classification, a southbound left-turn and northbound right-turn deceleration lane will be required per the ECM. Both the left- and right-turn lanes will be required to have a lane length of 290 feet with a 240-foot approach taper.

VEHICLE QUEUING

At the intersection of SH 94/Curtis Road, there are adequate existing turn lanes for all projected queueing. At the site access, the westbound lanes are projected to have a 95th percentile queue length of 175 feet. The distance between Curtis Road and the truck business access is planned to be 250 feet, which is adequate for the projected queueing.

PEDESTRIAN AND BICYCLE ACCOMMODATION

There are currently no sidewalks or multi-modal trails along SH 94 or Curtis Road adjacent to the site. In the El Paso County Major Transportation Corridors Plan, a bike route is planned along Curtis Road and a secondary regional trail is planned along SH 94.

COUNTY ROAD IMPROVEMENT FEE PROGRAM

Transportation Impact Fees

Per ECM Appendix B: *State what the current applicable Transportation Impact Fees are and what option the developer will be selecting for payment.*

The applicant intends to <<<< opt out of the PID options and will pay the full fee amount at the time of building permit. The current "full-fee" is \$3,830 per single family dwelling unit and \$4,958 per 1,000 square feet of commercial building floor area. The total fee amount for the proposed development is \$ _____.>>>>

Or

<<<join the 5 mil PID and pay the associated upfront fee amount at a rate of \$2,527 per single family dwelling unit and \$3,851 per 1,000 square feet. The total upfront fee under this option would be_____based on a planned development.>>>>

OR

<<ALSO A 10 mil option>>>

Reimbursable MTCP Improvements

There are no apparent reimbursable improvements programmed in the MTCP in the general vicinity of this site.

FINDINGS AND CONCLUSIONS

- Phase 1 of the development is expected to generate approximately 40 vehicle trips on the average weekday with approximately 16 trips occurring during the morning and evening peak hours.
- The buildout of the site is projected to generate approximately 10,674 vehicle trips on the average weekday. Approximately a third of this traffic is expected to be pass-by traffic.
- With buildout, approximately 176 vehicles would enter and 120 vehicles would exit the site during the morning peak hour. During the evening peak hour, approximately 496 vehicles would enter and 531 vehicles would exit the site at the access point.
- In both the short-term and long-term scenarios with phase 1 of the development constructed, no additional improvements will be required in the study area. The site access can have a shared left/right outbound lane at Curtis Road.
- The northbound left-turning movement at the intersection of SH 94/Curtis Road will need to have protected/permissive phasing in the short-term and long-term buildout scenarios.
- It is projected that the site access will meet the peak-hour signal warrant in the long-term buildout scenario and will require signalization. A Channelized-T may help to improve intersection operations prior to the intersection meeting signal warrants.
- The site access will require a northbound right and southbound left auxiliary lane in the buildout scenarios. ← Please provide queuing analyses to accompany auxiliary lane storage recommendations
- The 95th percentile queues at all study intersections are not projected to impact adjacent intersections.
- See Table 4 for a summary of recommended improvements.

Table 4: Recommended Improvements

Item #	Location	Improvement	Timing
1	SH 94/Curtis Road	Northbound Left Phasing - Protected/Permissive	With full buildout of the site
2	Curtis Road/Site Access	Auxiliary Lanes - Northbound Right - Southbound Left	With full buildout of the site
3	Curtis Road/Site Access	Signal	When Warranted (Long-term)

Source: LSC Transportation Consultants, Inc.

* * * * *

Please contact me if you have any questions regarding this report.

Respectfully Submitted,

LSC TRANSPORTATION CONSULTANTS, INC.

By _____
Colleen Guillotte, P.E., PTOE, RSP
Project Manager

CRG:jas

Enclosures: Table 3
Figures 1-8
Level of Service Reports

SH 94/Curtis Road – CDOT Access Considerations: Based on the 2040 Long Term Background Conditions and 2040 Buildout Long Term Total Conditions graphics, the south leg of the intersection is project to experience a 25 percent increase in volume during the AM peak hour and a 175 percent increase during the PM peak hour.

- a. Is there an existing access permit for this location?
- b. Has CDOT requested an access permit application?
- c. Auxiliary Lane requirements?
 - i. Appears NBR accel lanes may be required in long-term and/or development
 - ii. WBL required storage?

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Tables and Figures

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Table 3: Detailed Trip Generation Estimate

Land Use Code	Land Use Description	Trip Generation Units	Trip Generation Rates ⁽¹⁾						Total Trips Generated						New External Trips Generated
			Average Weekday Traffic ⁽⁵⁾	Morning Peak Hour		Afternoon Peak Hour		Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour		Internal Trips	Pass-By Trips ⁽²⁾	Average Weekday Traffic
				In	Out	In	Out		In	Out	In	Out			
820	Shopping Center	225 KSF ⁽³⁾	46.38	0.73	0.45	2.11	2.29	10,435	164	100	475	515	0%	34%	6,887
	Truck Business	10 Trucks	4.00	0.80	0.80	0.80	0.80	40	8	8	8	8	0%	0%	40
210	Single Family	21 DU	9.44	0.19	0.56	0.62	0.37	198	4	12	13	8	0%	0%	198
Total Trip Generation Estimate								10,674	176	120	496	531			7,125
<p>Notes:</p> <p>(1) Source: "Trip Generation, 10th Edition, 2017" by the Institute of Transportation Engineers (ITE)</p> <p>(2) Source: "Trip Generation Handbook - An ITE Proposed Recommended Practice, Third Edition September 2017" by ITE</p> <p>(3) KSF = one thousand square feet of floor space, DU = dwelling unit</p>															
<p>Source: LSC Transportation Consultants, Inc.</p>															



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Figure 1

Vicinity Map

Highway 93 and Curtis Road (LSC #204310)

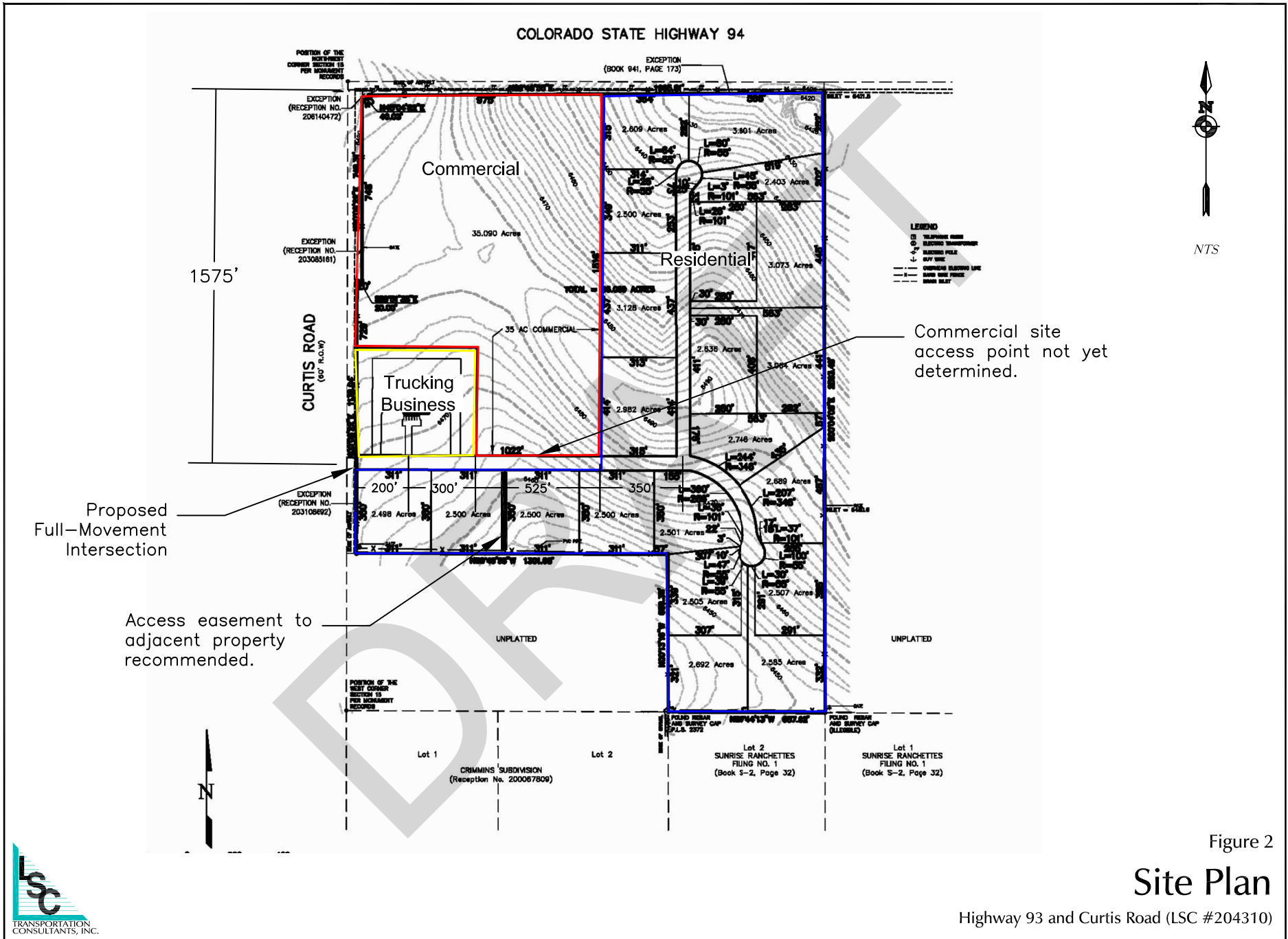


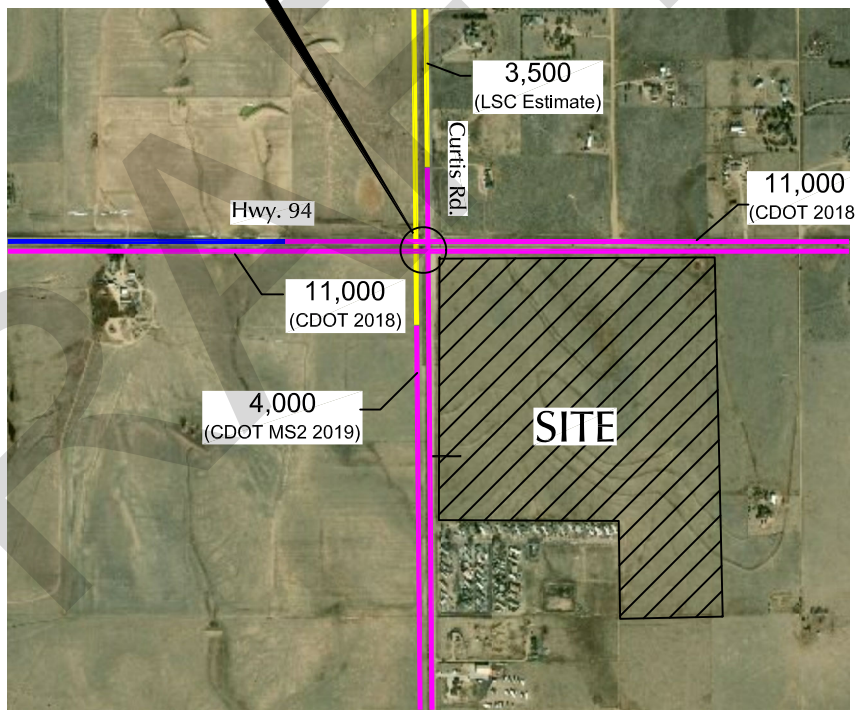
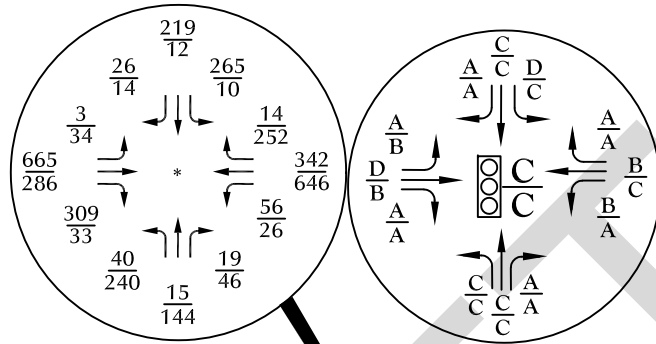
Figure 2

Site Plan

Highway 93 and Curtis Road (LSC #204310)



*Due to COVID-19 Pandemic, new turning counts were not recorded. Counts from Traffic Study on Enoch and Irwin Road Entry Control Facilities report. Counts were completed in October 2017.



LEGEND:



= Traffic Signal

$\frac{XX}{XX}$ =

AM Weekday Peak-Hour Traffic (vehicles per hour)

PM Weekday Peak-Hour Traffic (vehicles per hour)

XXX = Average Weekday Traffic (vehicles per day)

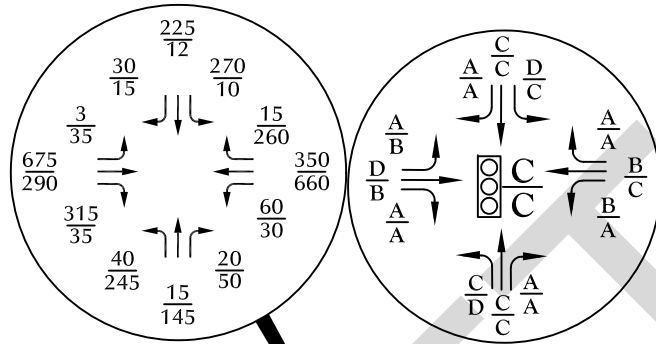
- 45 mph

- 55 mph

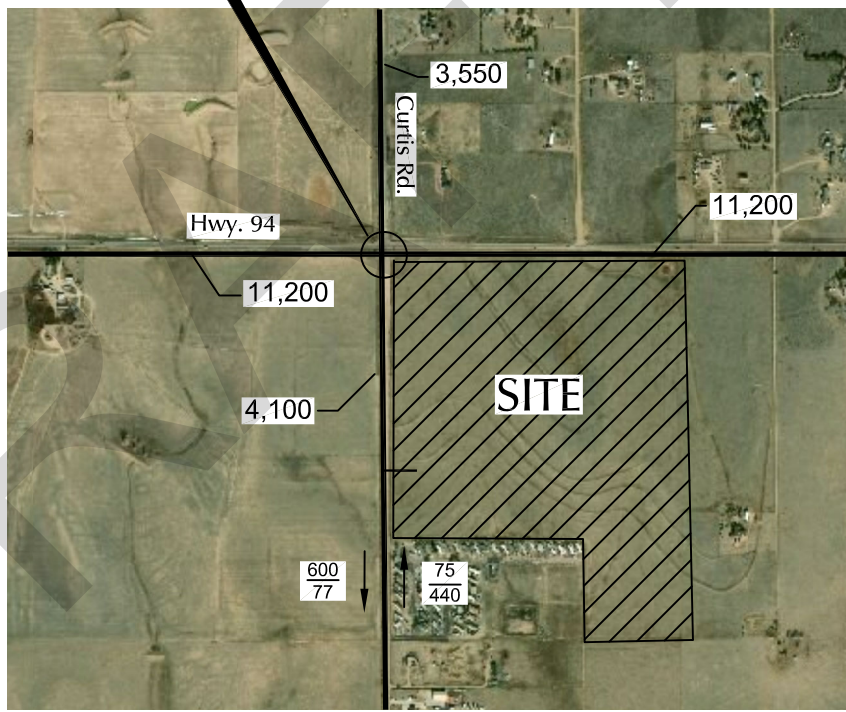
- 65 mph



Figure 3
Existing Conditions
 Highway 93 and Curtis Road (LSC #204310)



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LEGEND:

= Traffic Signal

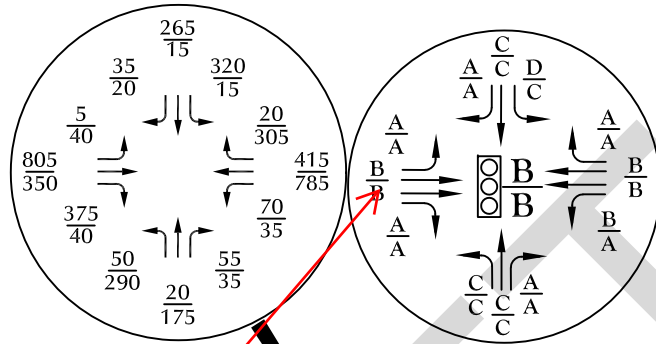
$\frac{XX}{XX}$ = $\frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}}$

XXX = Average Weekday Traffic (vehicles per day)

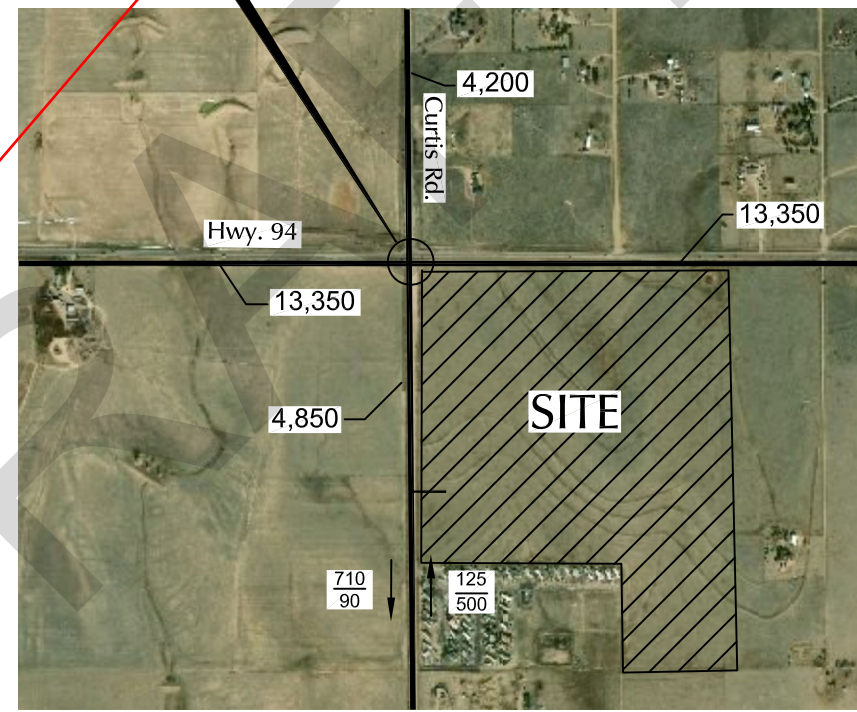


Figure 4 Short-Term Background Conditions

Highway 93 and Curtis Road (LSC #204310)



Please verify AM LOS after clarifying the volumes relative to what is reported in the LOS Reports. These volumes appear to correspond to the Short Term Background conditions report, if Long Term - EBT should be LOS C.



LEGEND:

= Traffic Signal

$\frac{XX}{XX}$ = AM Weekday Peak-Hour Traffic (vehicles per hour)
 $\frac{XX}{XX}$ = PM Weekday Peak-Hour Traffic (vehicles per hour)

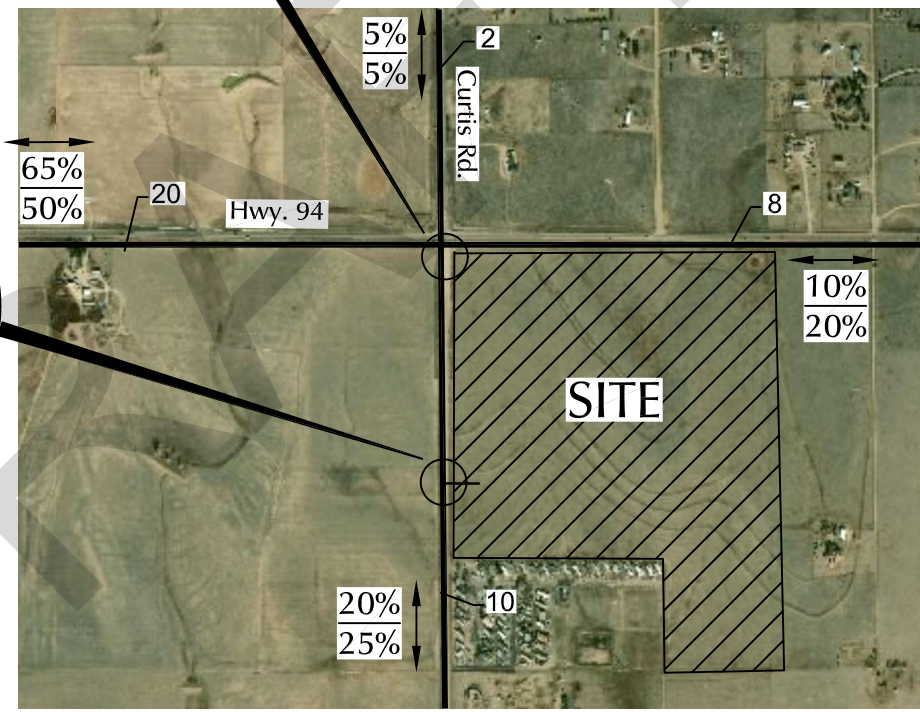
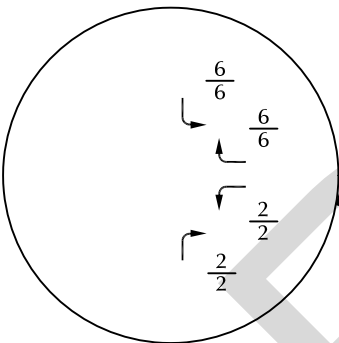
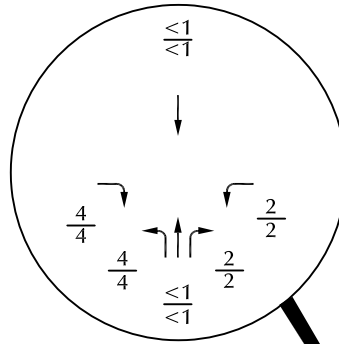
XXX = Average Weekday Traffic (vehicles per day)



Long-Term (2040) Background Conditions

Highway 93 and Curtis Road (LSC #204310)

Figure 5



LEGEND:

$$\frac{XX}{XX} = \frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}}$$

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

XXX = Average Weekday Traffic (vehicles per day)

Phase 1 only includes the trucking business - removing the residential distribution is recommended for clarity

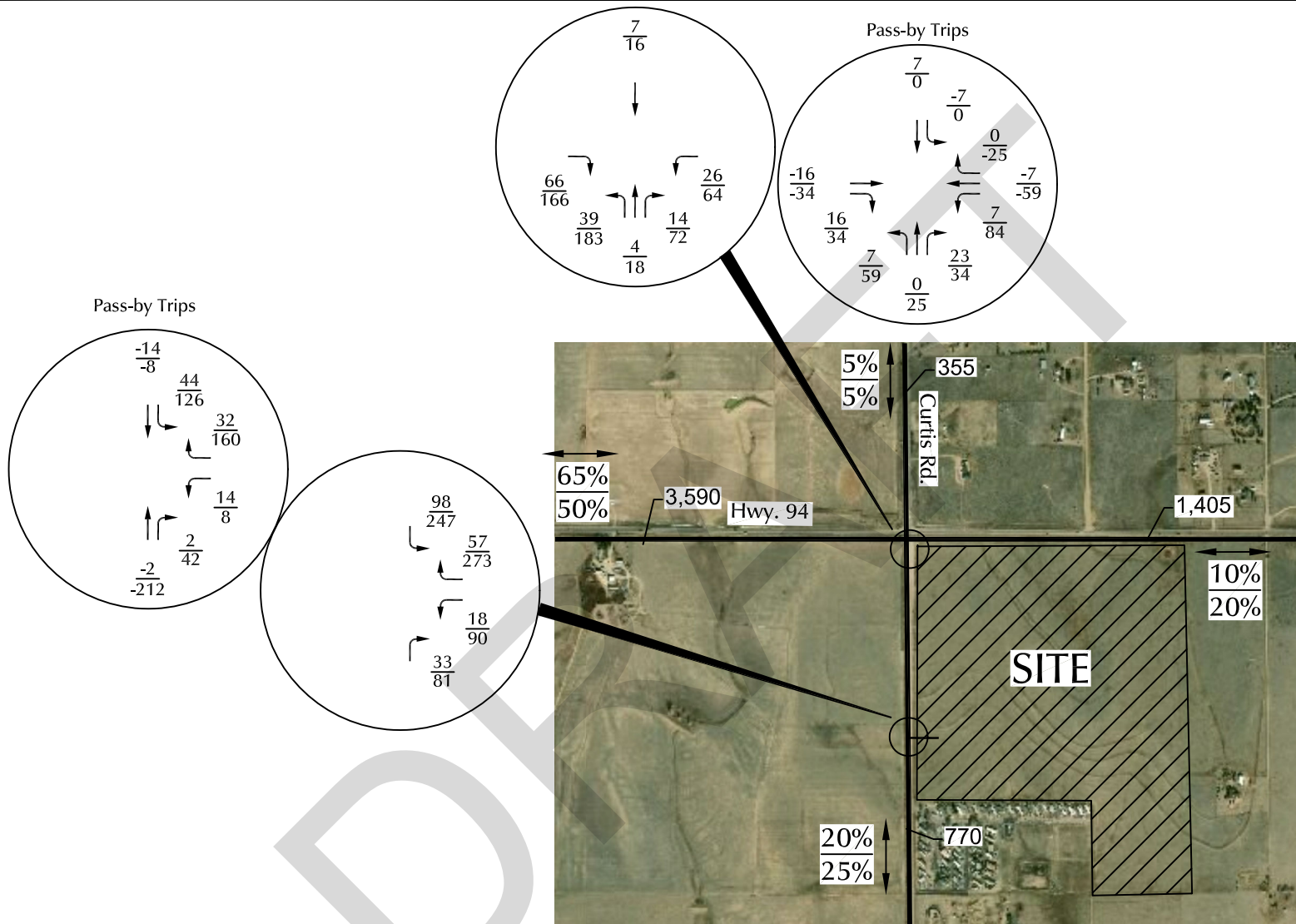
Figure 6
Phase 1 Trip Distribution and Site-Generated Traffic

Highway 93 and Curtis Road (LSC #204310)





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LEGEND:

$$\frac{XX}{XX} = \frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}}$$

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

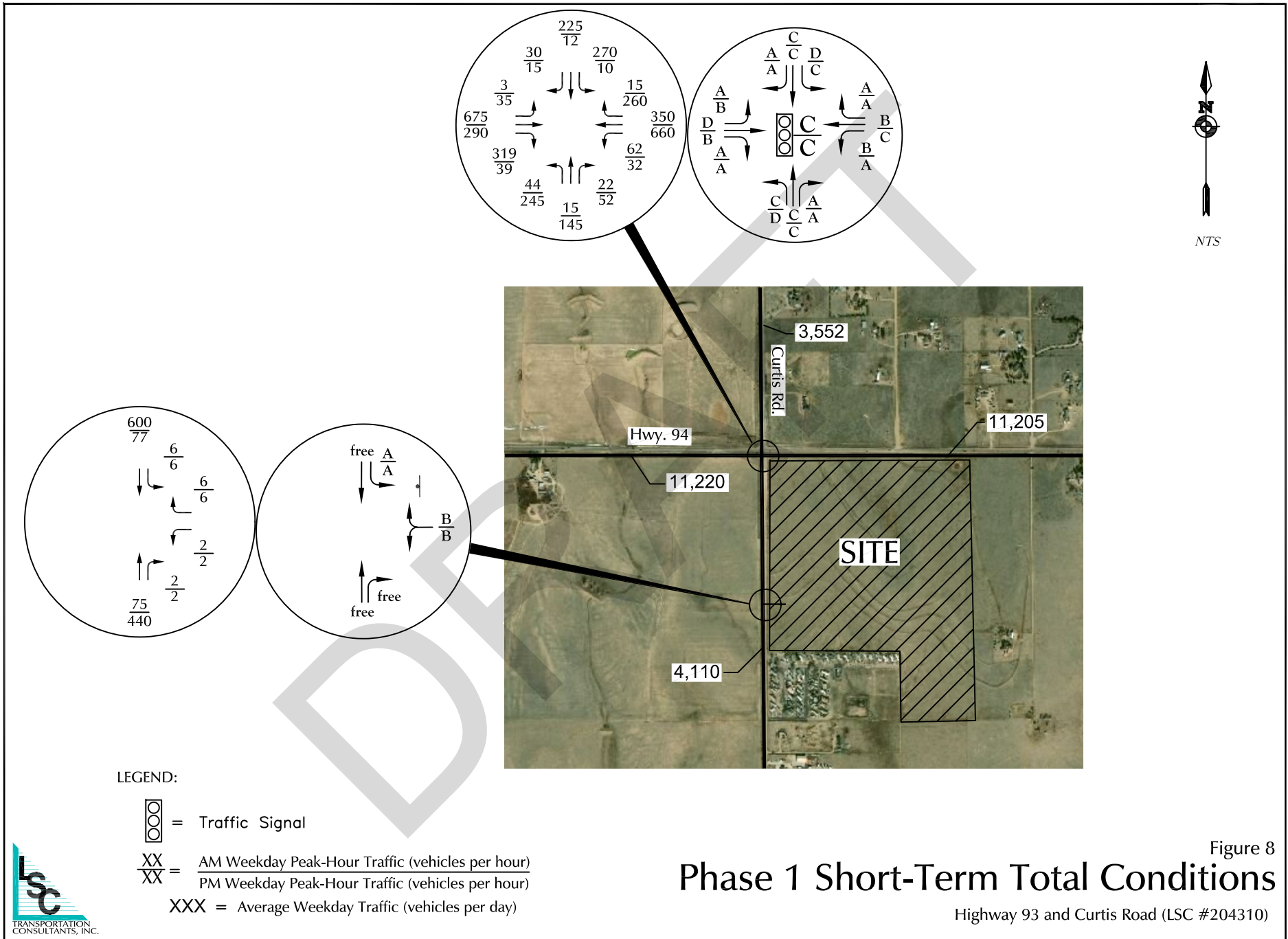
XXX = Average Weekday Traffic (vehicles per day)

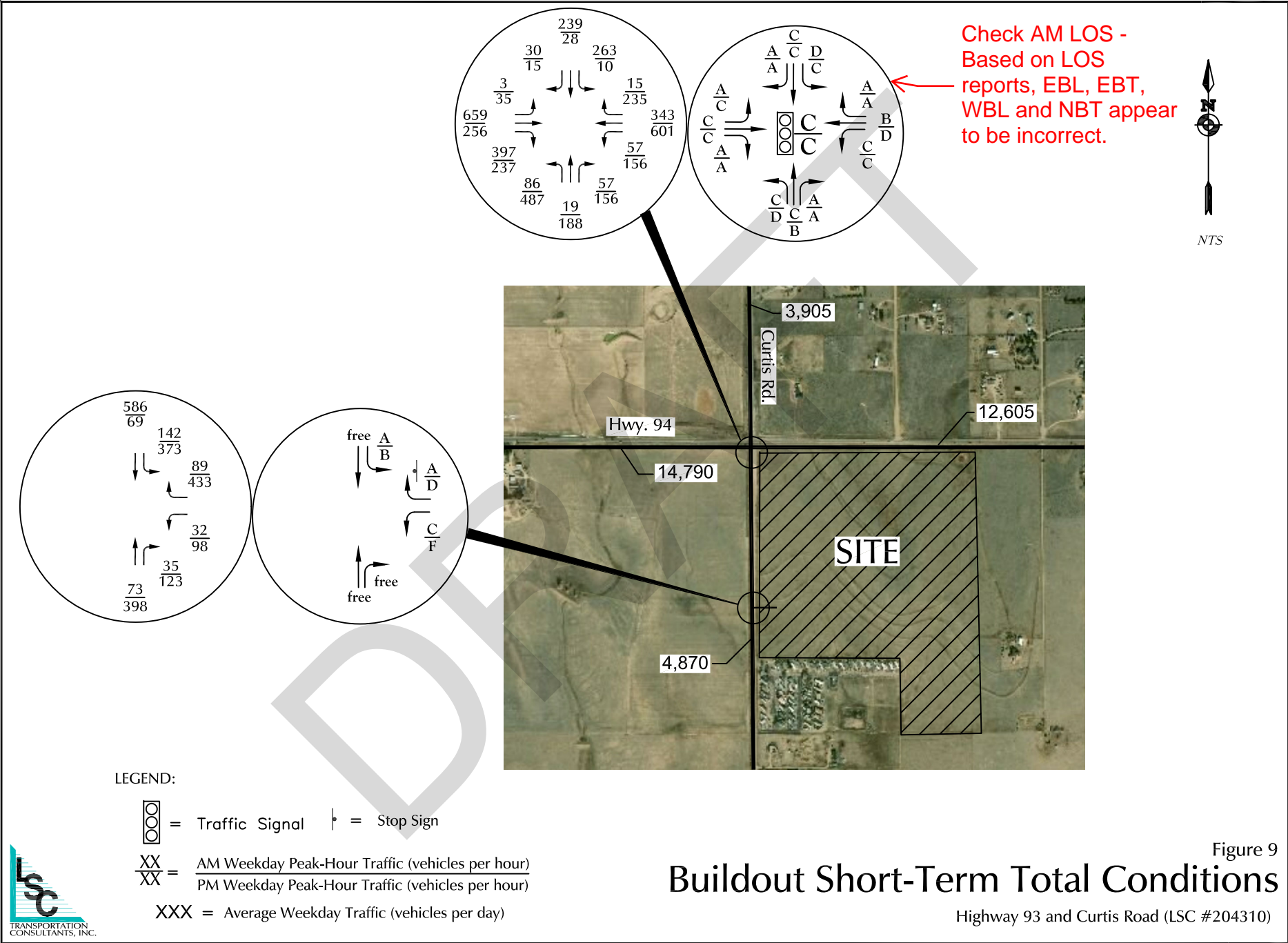


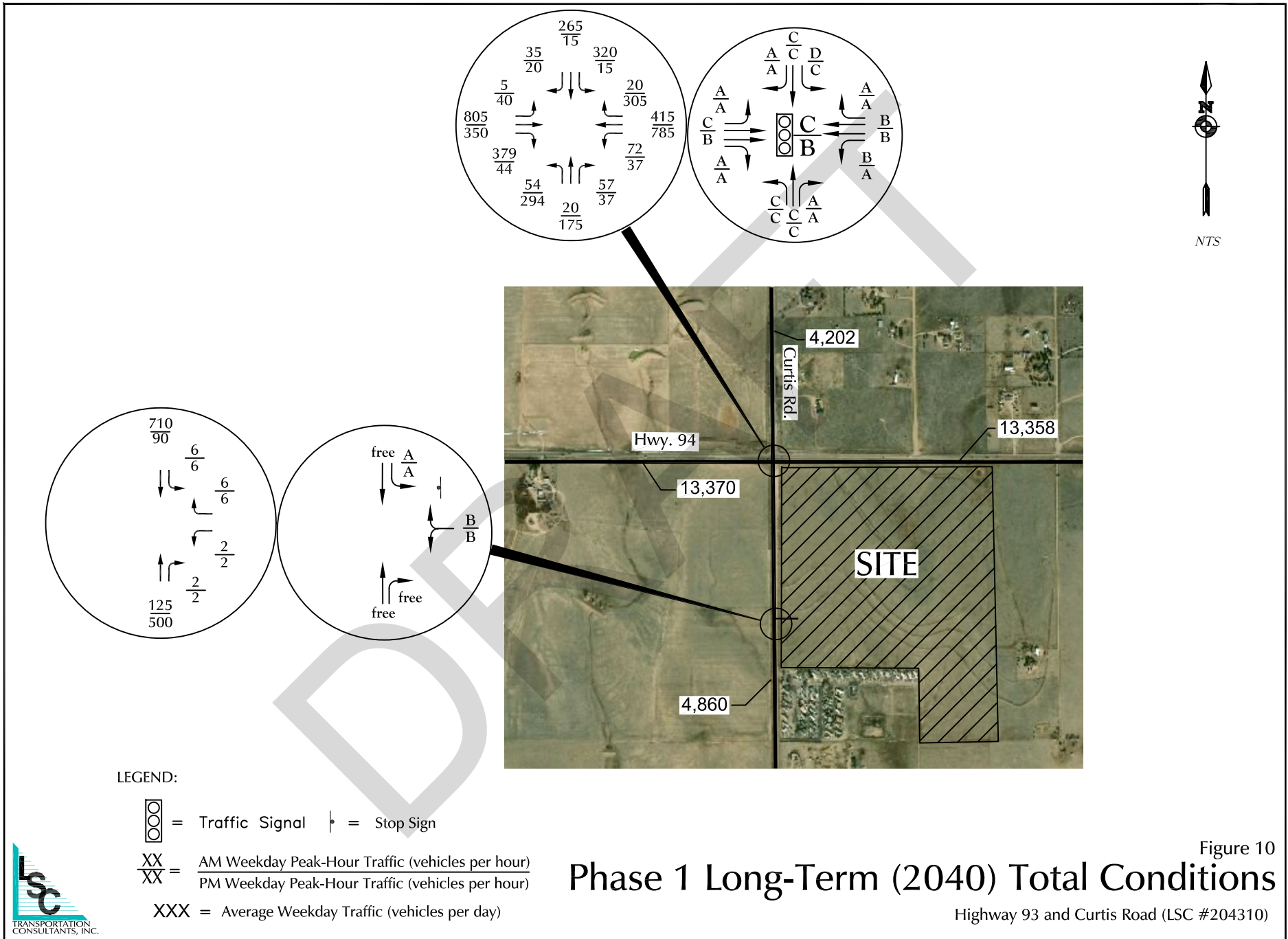
Figure 7

Buildout Trip Distribution and Site-Generated Traffic

Highway 93 and Curtis Road (LSC #204310)







35?

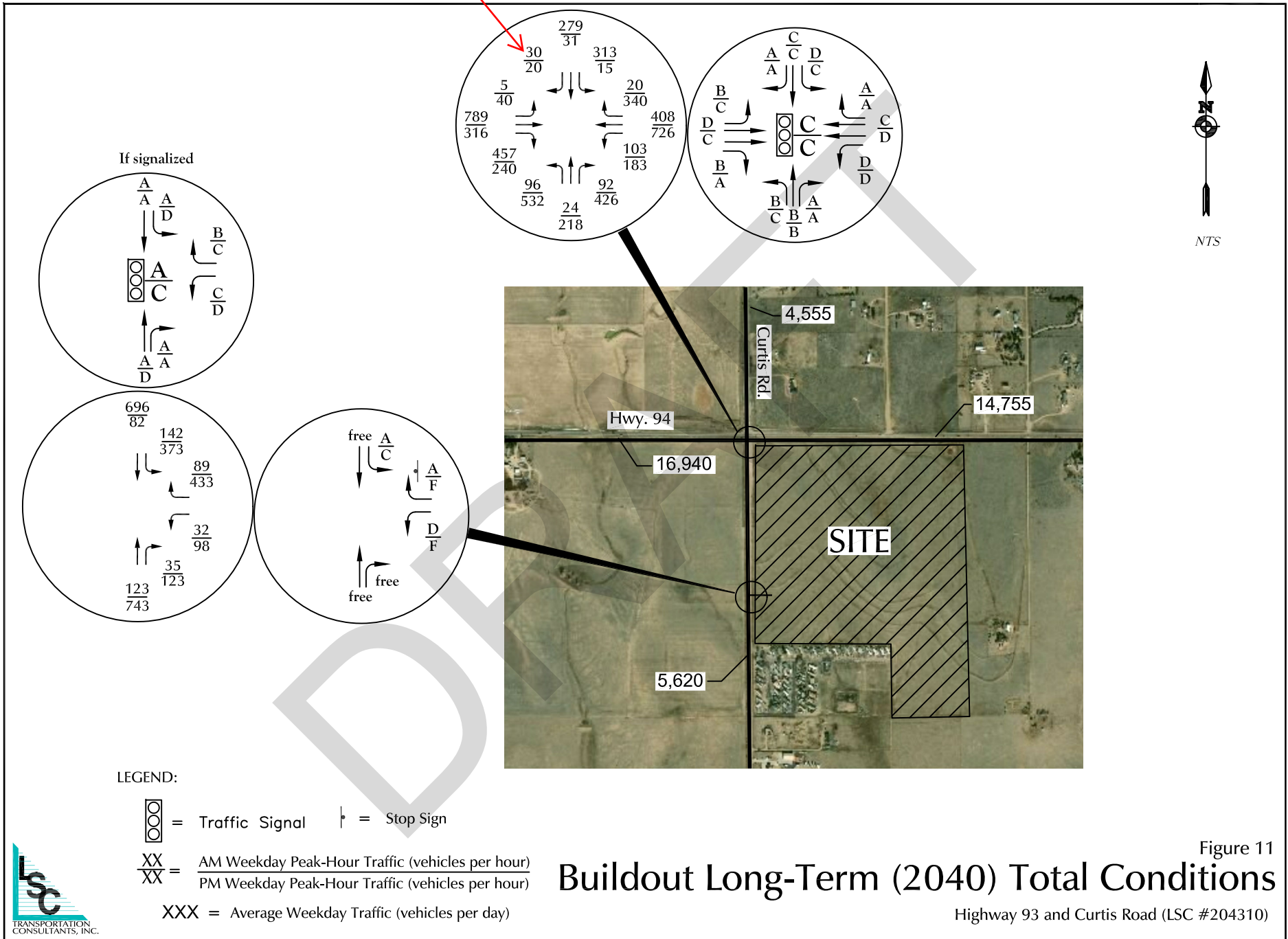


Figure 11
Buildout Long-Term (2040) Total Conditions

Highway 93 and Curtis Road (LSC #204310)

Levels of Service

DRAFT



Recurring Comment: Provide the source for the PHFs - use 0.85 (or calculated, if provided), whichever is higher, per standards for existing and short-term.

Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

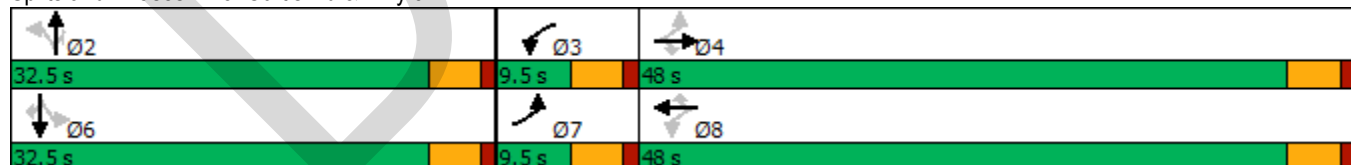
Existing
AM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↘	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↖	↖	↑	↖	↖	↑	↖	↖	↑	↖
Traffic Volume (vph)	3	675	315	60	350	15	40	15	20	270	225	30
Future Volume (vph)	3	675	315	60	350	15	40	15	20	270	225	30
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.477			0.087			0.454			0.747		
Satd. Flow (perm)	889	1863	1583	162	1863	1583	846	1863	1583	1391	1863	1583
Satd. Flow (RTOR)			355			73			73			73
Peak Hour Factor	0.25	0.84	0.82	0.82	0.90	0.70	0.77	0.94	0.79	0.74	0.81	0.81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	804	384	73	389	21	52	16	25	365	278	37
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.5	48.0	48.0	9.5	48.0	48.0	32.5	32.5	32.5	32.5	32.5	32.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	44.2	40.4	40.4	46.8	45.8	45.8	28.4	28.4	28.4	28.4	28.4	28.4
Actuated g/C Ratio	0.52	0.47	0.47	0.55	0.54	0.54	0.33	0.33	0.33	0.33	0.33	0.33
v/c Ratio	0.02	0.91	0.41	0.40	0.39	0.02	0.18	0.03	0.04	0.79	0.45	0.06
Control Delay	8.0	37.1	3.6	14.7	13.1	0.1	25.1	21.8	0.1	42.2	27.0	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	37.1	3.6	14.7	13.1	0.1	25.1	21.8	0.1	42.2	27.0	1.6
LOS	A	D	A	B	B	A	C	C	A	D	C	A
Approach Delay		26.1			12.8			17.8			33.8	
Approach LOS		C			B			B			C	

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 85.2	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 25.3	Intersection LOS: C
Intersection Capacity Utilization 73.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Curtis Rd & Hwy 94



These volumes appear to match those shown on the graphic for short-term background instead of existing AM. Please correct the LOS Report or the graphic, accordingly.

Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

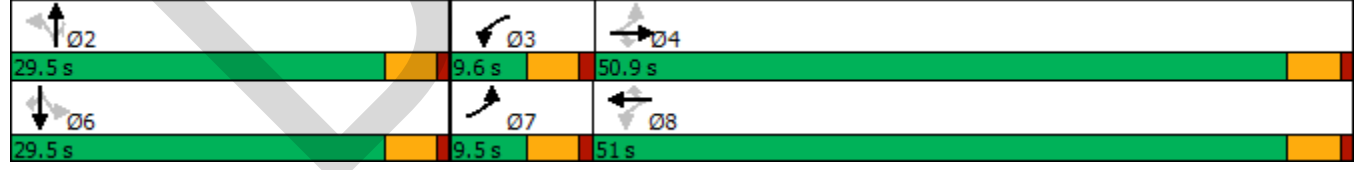
Existing
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	286	33	26	646	252	240	144	46	10	12	14
Future Volume (vph)	34	286	33	26	646	252	240	144	46	10	12	14
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.102			0.508			0.747			0.573		
Satd. Flow (perm)	190	1863	1583	946	1863	1583	1391	1863	1583	1067	1863	1583
Satd. Flow (RTOR)			73			268			73			73
Peak Hour Factor	0.65	0.92	0.63	0.54	0.80	0.94	0.86	0.72	0.68	0.83	0.75	0.58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	311	52	48	808	268	279	200	68	12	16	24
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.5	50.9	50.9	9.6	51.0	51.0	29.5	29.5	29.5	29.5	29.5	29.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	41.9	39.2	39.2	42.0	39.3	39.3	25.8	25.8	25.8	25.8	25.8	25.8
Actuated g/C Ratio	0.53	0.49	0.49	0.53	0.49	0.49	0.32	0.32	0.32	0.32	0.32	0.32
v/c Ratio	0.26	0.34	0.06	0.09	0.88	0.29	0.62	0.33	0.12	0.03	0.03	0.04
Control Delay	10.2	13.5	1.8	7.3	30.6	2.5	33.8	25.8	6.5	24.3	23.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	13.5	1.8	7.3	30.6	2.5	33.8	25.8	6.5	24.3	23.9	0.1
LOS	B	B	A	A	C	A	C	C	A	C	C	A
Approach Delay		11.6			22.9			27.5			13.0	
Approach LOS		B			C			C			B	

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 79.4	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 21.6	Intersection LOS: C
Intersection Capacity Utilization 62.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Curtis Rd & Hwy 94



Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

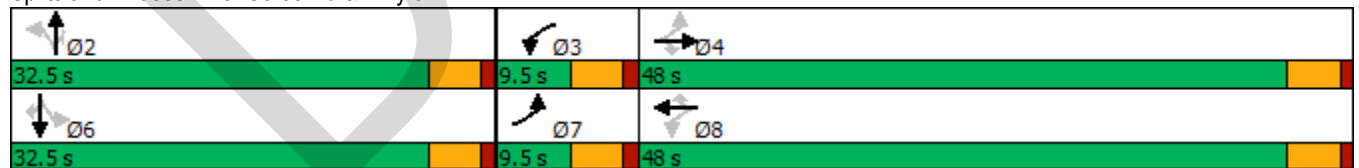
Short-Term Background
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	675	315	60	350	15	40	15	20	270	225	30
Future Volume (vph)	3	675	315	60	350	15	40	15	20	270	225	30
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.477			0.087			0.454			0.747		
Satd. Flow (perm)	889	1863	1583	162	1863	1583	846	1863	1583	1391	1863	1583
Satd. Flow (RTOR)			355			73			73			73
Peak Hour Factor	0.25	0.84	0.82	0.82	0.90	0.70	0.77	0.94	0.79	0.74	0.81	0.81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	804	384	73	389	21	52	16	25	365	278	37
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.5	48.0	48.0	9.5	48.0	48.0	32.5	32.5	32.5	32.5	32.5	32.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	44.2	40.4	40.4	46.8	45.8	45.8	28.4	28.4	28.4	28.4	28.4	28.4
Actuated g/C Ratio	0.52	0.47	0.47	0.55	0.54	0.54	0.33	0.33	0.33	0.33	0.33	0.33
v/c Ratio	0.02	0.91	0.41	0.40	0.39	0.02	0.18	0.03	0.04	0.79	0.45	0.06
Control Delay	8.0	37.1	3.6	14.7	13.1	0.1	25.1	21.8	0.1	42.2	27.0	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	37.1	3.6	14.7	13.1	0.1	25.1	21.8	0.1	42.2	27.0	1.6
LOS	A	D	A	B	B	A	C	C	A	D	C	A
Approach Delay		26.1			12.8			17.8			33.8	
Approach LOS		C			B			B			C	

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 85.2	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 25.3	Intersection LOS: C
Intersection Capacity Utilization 73.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Curtis Rd & Hwy 94



Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

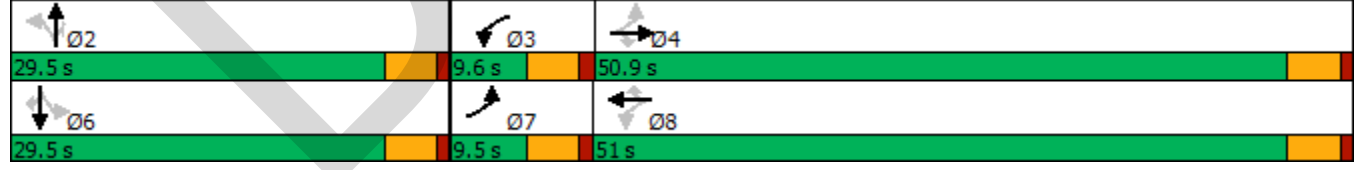
Short-Term Background
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	290	35	30	660	260	245	145	50	10	12	15
Future Volume (vph)	35	290	35	30	660	260	245	145	50	10	12	15
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.098			0.507			0.747			0.565		
Satd. Flow (perm)	183	1863	1583	944	1863	1583	1391	1863	1583	1052	1863	1583
Satd. Flow (RTOR)			73			277			74			73
Peak Hour Factor	0.65	0.92	0.63	0.54	0.80	0.94	0.86	0.72	0.68	0.83	0.75	0.58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	315	56	56	825	277	285	201	74	12	16	26
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.5	50.9	50.9	9.6	51.0	51.0	29.5	29.5	29.5	29.5	29.5	29.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	43.7	41.0	41.0	43.8	41.0	41.0	25.6	25.6	25.6	25.6	25.6	25.6
Actuated g/C Ratio	0.54	0.51	0.51	0.54	0.51	0.51	0.32	0.32	0.32	0.32	0.32	0.32
v/c Ratio	0.27	0.33	0.07	0.10	0.87	0.30	0.65	0.34	0.13	0.04	0.03	0.05
Control Delay	10.4	13.3	2.1	7.3	30.3	2.4	35.6	26.5	7.1	24.4	23.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	13.3	2.1	7.3	30.3	2.4	35.6	26.5	7.1	24.4	23.9	0.1
LOS	B	B	A	A	C	A	D	C	A	C	C	A
Approach Delay		11.5			22.5			28.6			12.6	
Approach LOS		B			C			C			B	

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 81	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 21.7	Intersection LOS: C
Intersection Capacity Utilization 63.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Curtis Rd & Hwy 94



Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

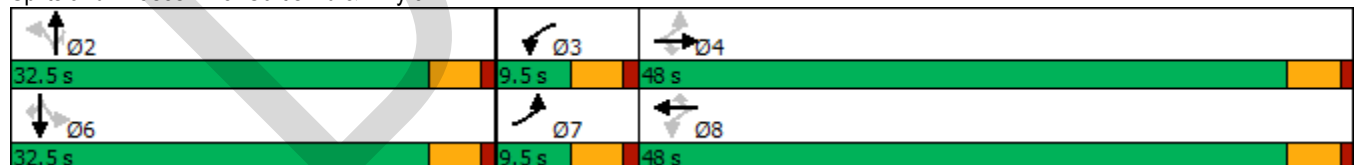
Short-Term Background
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	805	375	70	415	20	50	20	55	320	265	35
Future Volume (vph)	5	805	375	70	415	20	50	20	55	320	265	35
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.481			0.171			0.427			0.744		
Satd. Flow (perm)	896	3539	1583	319	3539	1583	795	1863	1583	1386	1863	1583
Satd. Flow (RTOR)			312			73			73			73
Peak Hour Factor	0.25	0.84	0.82	0.82	0.90	0.70	0.77	0.94	0.79	0.74	0.81	0.81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	958	457	85	461	29	65	21	70	432	327	43
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.5	48.0	48.0	9.5	48.0	48.0	32.5	32.5	32.5	32.5	32.5	32.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	36.2	32.4	32.4	38.0	36.2	36.2	28.8	28.8	28.8	28.8	28.8	28.8
Actuated g/C Ratio	0.47	0.42	0.42	0.49	0.47	0.47	0.37	0.37	0.37	0.37	0.37	0.37
v/c Ratio	0.04	0.65	0.54	0.34	0.28	0.04	0.22	0.03	0.11	0.84	0.47	0.07
Control Delay	8.4	20.1	7.7	12.4	13.2	0.1	23.8	20.4	6.0	43.4	24.6	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	20.1	7.7	12.4	13.2	0.1	23.8	20.4	6.0	43.4	24.6	2.4
LOS	A	C	A	B	B	A	C	C	A	D	C	A
Approach Delay		16.0			12.4			15.4			33.6	
Approach LOS		B			B			B			C	

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 77.6	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 20.0	Intersection LOS: B
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Curtis Rd & Hwy 94



These volumes appear to match those shown on the graphic for long-term background instead of short term background. Please correct the LOS Report or the graphic, accordingly.

Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

Typo? shown as 35
on Figure 5

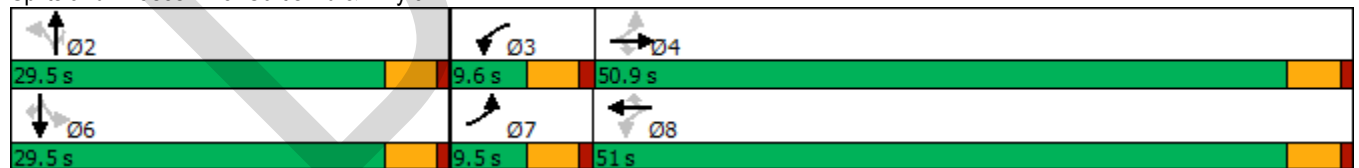
Long-Term Background
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	350	40	35	785	305	290	175	320	15	15	20
Future Volume (vph)	40	350	40	35	785	305	290	175	320	15	15	20
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.184			0.489			0.744			0.540		
Satd. Flow (perm)	343	3539	1583	911	3539	1583	1386	1863	1583	1006	1863	1583
Satd. Flow (RTOR)			73			324			471			73
Peak Hour Factor	0.65	0.92	0.63	0.54	0.80	0.94	0.86	0.72	0.68	0.83	0.75	0.58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	380	63	65	981	324	337	243	471	18	20	34
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.5	50.9	50.9	9.6	51.0	51.0	29.5	29.5	29.5	29.5	29.5	29.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	32.9	29.1	29.1	34.1	31.4	31.4	25.9	25.9	25.9	25.9	25.9	25.9
Actuated g/C Ratio	0.46	0.41	0.41	0.48	0.44	0.44	0.36	0.36	0.36	0.36	0.36	0.36
v/c Ratio	0.24	0.27	0.09	0.13	0.63	0.37	0.67	0.36	0.54	0.05	0.03	0.05
Control Delay	9.9	14.2	2.9	8.3	17.6	2.8	32.3	22.8	5.2	21.9	21.2	1.2
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	9.9	14.2	2.9	8.3	17.6	2.8	32.3	22.8	5.2	21.9	21.2	1.2
LOS	A	B	A	A	B	A	C	C	A	C	C	A
Approach Delay		12.3			13.7			18.0				11.9
Approach LOS		B			B			B				B

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 71.7	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 14.9	Intersection LOS: B
Intersection Capacity Utilization 59.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Curtis Rd & Hwy 94



Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

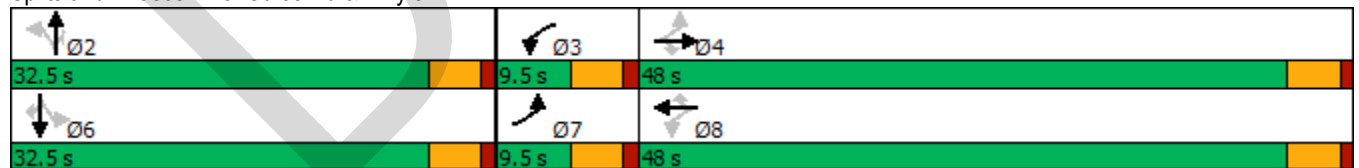
Short-Term Total - Phase 1
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	675	319	62	350	15	44	15	22	270	225	30
Future Volume (vph)	3	675	319	62	350	15	44	15	22	270	225	30
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.477			0.087			0.454			0.747		
Satd. Flow (perm)	889	1863	1583	162	1863	1583	846	1863	1583	1391	1863	1583
Satd. Flow (RTOR)			352			73			73			73
Peak Hour Factor	0.25	0.84	0.82	0.82	0.90	0.70	0.77	0.94	0.79	0.74	0.81	0.81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	804	389	76	389	21	57	16	28	365	278	37
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.5	48.0	48.0	9.5	48.0	48.0	32.5	32.5	32.5	32.5	32.5	32.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	44.2	40.4	40.4	46.8	45.8	45.8	28.4	28.4	28.4	28.4	28.4	28.4
Actuated g/C Ratio	0.52	0.47	0.47	0.55	0.54	0.54	0.33	0.33	0.33	0.33	0.33	0.33
v/c Ratio	0.02	0.91	0.42	0.41	0.39	0.02	0.20	0.03	0.05	0.79	0.45	0.06
Control Delay	8.0	37.1	3.8	15.3	13.1	0.1	25.4	21.8	0.2	42.2	27.0	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	37.1	3.8	15.3	13.1	0.1	25.4	21.8	0.2	42.2	27.0	1.6
LOS	A	D	A	B	B	A	C	C	A	D	C	A
Approach Delay		26.1			12.9			17.8			33.8	
Approach LOS		C			B			B			C	

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 85.2	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 25.3	Intersection LOS: C
Intersection Capacity Utilization 73.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Curtis Rd & Hwy 94



Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	2	6	75	2	6	600
Future Vol, veh/h	2	6	75	2	6	600
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	92	92	92	92	92	92
Heavy Vehicles, %	50	50	2	50	50	2
Mvmt Flow	2	7	82	2	7	652
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	749	83	0	0	84	0
Stage 1	83	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Critical Hdwy	6.9	6.7	-	-	4.6	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.95	3.75	-	-	2.65	-
Pot Cap-1 Maneuver	318	859	-	-	1258	-
Stage 1	832	-	-	-	-	-
Stage 2	431	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	315	859	-	-	1258	-
Mov Cap-2 Maneuver	315	-	-	-	-	-
Stage 1	832	-	-	-	-	-
Stage 2	427	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11.1	0	0.1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	600	1258	-	
HCM Lane V/C Ratio	-	-	0.014	0.005	-	
HCM Control Delay (s)	-	-	11.1	7.9	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

EBL and EBR
volumes are swapped
here or on Figure 8

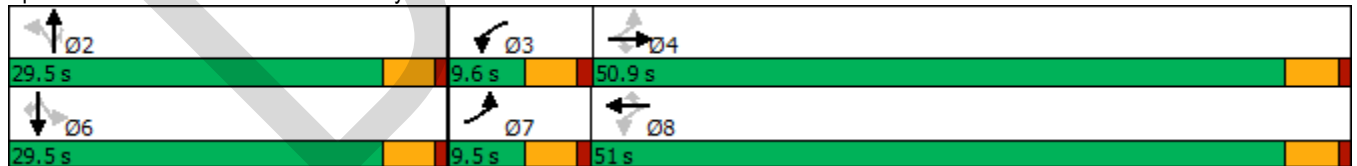
Short-Term Total - Phase 1
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	39	290	35	32	660	260	249	145	52	10	12	15
Future Volume (vph)	39	290	35	32	660	260	249	145	52	10	12	15
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.098			0.504			0.747			0.562		
Satd. Flow (perm)	183	1863	1583	939	1863	1583	1391	1863	1583	1047	1863	1583
Satd. Flow (RTOR)			73			277			76			73
Peak Hour Factor	0.65	0.92	0.63	0.54	0.80	0.94	0.86	0.72	0.68	0.83	0.75	0.58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	315	56	59	825	277	290	201	76	12	16	26
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.5	50.9	50.9	9.6	51.0	51.0	29.5	29.5	29.5	29.5	29.5	29.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	44.6	40.9	40.9	44.8	41.0	41.0	25.6	25.6	25.6	25.6	25.6	25.6
Actuated g/C Ratio	0.54	0.49	0.49	0.54	0.49	0.49	0.31	0.31	0.31	0.31	0.31	0.31
v/c Ratio	0.31	0.34	0.07	0.11	0.90	0.30	0.68	0.35	0.14	0.04	0.03	0.05
Control Delay	11.1	14.1	2.1	7.3	33.4	2.5	37.7	27.3	7.1	24.4	23.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	14.1	2.1	7.3	33.4	2.5	37.7	27.3	7.1	24.4	23.9	0.2
LOS	B	B	A	A	C	A	D	C	A	C	C	A
Approach Delay		12.1			24.7			29.9				12.6
Approach LOS		B			C			C				B

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 82.9	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 23.3	Intersection LOS: C
Intersection Capacity Utilization 63.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Curtis Rd & Hwy 94



Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	2	6	440	2	6	77
Future Vol, veh/h	2	6	440	2	6	77
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	92	92	92	92	92	92
Heavy Vehicles, %	50	50	2	50	50	2
Mvmt Flow	2	7	478	2	7	84
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	577	479	0	0	480	0
Stage 1	479	-	-	-	-	-
Stage 2	98	-	-	-	-	-
Critical Hdwy	6.9	6.7	-	-	4.6	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.95	3.75	-	-	2.65	-
Pot Cap-1 Maneuver	407	500	-	-	873	-
Stage 1	534	-	-	-	-	-
Stage 2	819	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	404	500	-	-	873	-
Mov Cap-2 Maneuver	404	-	-	-	-	-
Stage 1	534	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.8	0	0.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	472	873		
HCM Lane V/C Ratio	-	-	0.018	0.007		
HCM Control Delay (s)	-	-	12.8	9.2		
HCM Lane LOS	-	-	B	A		
HCM 95th %tile Q(veh)	-	-	0.1	0		

Shown as 659 on Figure 9, 659 appears to be the correct value.

Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

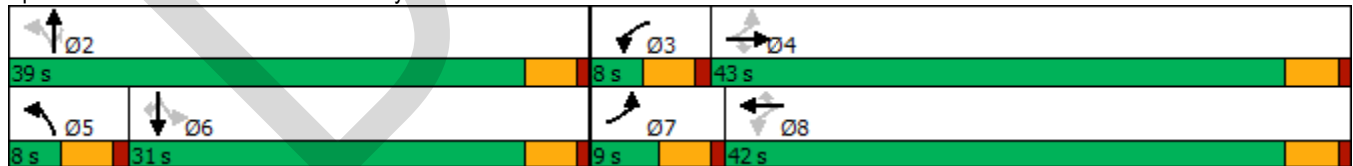
Short-Term Total
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	639	397	93	343	15	86	19	57	263	239	30
Future Volume (vph)	3	639	397	93	343	15	86	19	57	263	239	30
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.456			0.090			0.349			0.744		
Satd. Flow (perm)	849	1863	1583	168	1863	1583	650	1863	1583	1386	1863	1583
Satd. Flow (RTOR)			366			127			73			127
Peak Hour Factor	0.25	0.84	0.82	0.82	0.90	0.70	0.77	0.94	0.79	0.74	0.81	0.81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	761	484	113	381	21	112	20	72	355	295	37
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		5	2				6
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.0	43.0	43.0	8.0	42.0	42.0	8.0	39.0	39.0	31.0	31.0	31.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	42.8	38.3	38.3	45.2	44.5	44.5	34.5	34.5	34.5	28.1	28.1	28.1
Actuated g/C Ratio	0.48	0.43	0.43	0.50	0.50	0.50	0.38	0.38	0.38	0.31	0.31	0.31
v/c Ratio	0.03	0.96	0.55	0.77	0.41	0.02	0.38	0.03	0.11	0.82	0.51	0.06
Control Delay	11.0	50.0	7.3	48.9	16.8	0.1	22.9	17.6	5.0	46.9	29.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	50.0	7.3	48.9	16.8	0.1	22.9	17.6	5.0	46.9	29.7	0.2
LOS	B	D	A	D	B	A	C	B	A	D	C	A
Approach Delay		33.2			23.2			16.1				37.0
Approach LOS		C			C			B				D

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 89.8
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 30.9
 Intersection LOS: C
 Intersection Capacity Utilization 72.5%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 3: Curtis Rd & Hwy 94



Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↑	↗	↙	↑
Traffic Vol, veh/h	32	89	73	35	142	586
Future Vol, veh/h	32	89	73	35	142	586
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	150	150	-
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	35	97	79	38	154	637
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1024	79	0	0	117	0
Stage 1	79	-	-	-	-	-
Stage 2	945	-	-	-	-	-
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	261	981	-	-	1471	-
Stage 1	944	-	-	-	-	-
Stage 2	378	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	234	981	-	-	1471	-
Mov Cap-2 Maneuver	234	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	338	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.8	0	1.5			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	234	981	1471	-
HCM Lane V/C Ratio	-	-	0.149	0.099	0.105	-
HCM Control Delay (s)	-	-	23.1	9.1	7.7	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	0.5	0.3	0.4	-

Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

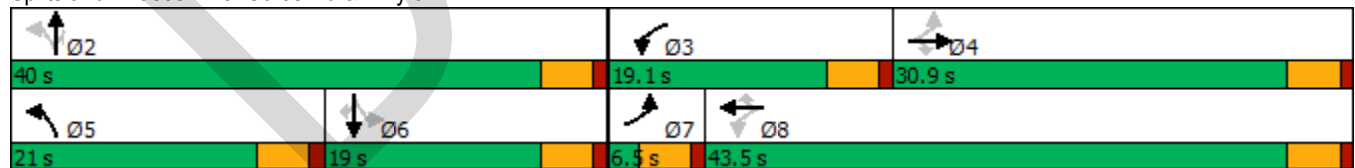
Short-Term Total
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	256	237	178	601	235	487	188	156	10	28	15
Future Volume (vph)	35	256	237	178	601	235	487	188	156	10	28	15
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.156			0.352			0.587			0.598		
Satd. Flow (perm)	291	1863	1583	656	1863	1583	1093	1863	1583	1114	1863	1583
Satd. Flow (RTOR)			376			250			229			182
Peak Hour Factor	0.65	0.92	0.63	0.54	0.80	0.94	0.86	0.72	0.68	0.83	0.75	0.58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	278	376	330	751	250	566	261	229	12	37	26
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		5	2				6
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	6.5	30.9	30.9	19.1	43.5	43.5	21.0	40.0	40.0	19.0	19.0	19.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	26.5	24.5	24.5	42.7	37.7	37.7	39.2	39.2	39.2	18.1	18.1	18.1
Actuated g/C Ratio	0.29	0.27	0.27	0.47	0.41	0.41	0.43	0.43	0.43	0.20	0.20	0.20
v/c Ratio	0.46	0.55	0.54	0.69	0.97	0.31	0.95	0.33	0.28	0.05	0.10	0.06
Control Delay	30.6	33.3	6.1	24.0	54.4	3.5	53.0	19.4	3.4	31.8	32.1	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	33.3	6.1	24.0	54.4	3.5	53.0	19.4	3.4	31.8	32.1	0.3
LOS	C	C	A	C	D	A	D	B	A	C	C	A
Approach Delay		18.6			37.3			34.0			21.0	
Approach LOS		B			D			C			C	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90.9
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 31.6
 Intersection LOS: C
 Intersection Capacity Utilization 80.7%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 3: Curtis Rd & Hwy 94



HCM 6th TWSC
6: Curtis Rd & Access

NBT volume is 398 – based on background, pass by and site generated, should be 228?

Short-Term Total
PM Peak Hour

Intersection						
Int Delay, s/veh	21.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↕	↖	↗	↕
Traffic Vol, veh/h	98	433	398	123	373	69
Future Vol, veh/h	98	433	398	123	373	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	150	150	-
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	107	471	433	134	405	75

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1318	433	0
Stage 1	433	-	-
Stage 2	885	-	-
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	173	623	-
Stage 1	654	-	-
Stage 2	403	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	~ 103	623	-
Mov Cap-2 Maneuver	~ 103	-	-
Stage 1	654	-	-
Stage 2	241	-	-

Approach	WB	NB	SB
HCM Control Delay, s	53.9	0	9.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	103	623	1005	-
HCM Lane V/C Ratio	-	-	1.034	0.755	0.403	-
HCM Control Delay (s)	-	-	175.4	26.4	11	-
HCM Lane LOS	-	-	F	D	B	-
HCM 95th %tile Q(veh)	-	-	6.5	6.8	2	-

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

Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

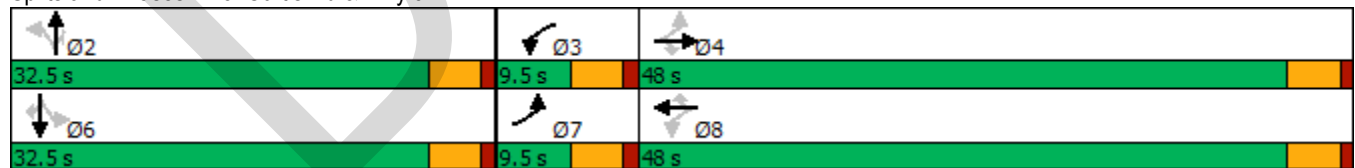
Short-Term Total - Phase 1
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	805	379	72	415	20	54	20	57	320	265	35
Future Volume (vph)	5	805	379	72	415	20	54	20	57	320	265	35
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.481			0.172			0.427			0.744		
Satd. Flow (perm)	896	3539	1583	320	3539	1583	795	1863	1583	1386	1863	1583
Satd. Flow (RTOR)			311			73			73			73
Peak Hour Factor	0.25	0.84	0.82	0.82	0.90	0.70	0.77	0.94	0.79	0.74	0.81	0.81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	958	462	88	461	29	70	21	72	432	327	43
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.5	48.0	48.0	9.5	48.0	48.0	32.5	32.5	32.5	32.5	32.5	32.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	36.4	32.6	32.6	38.2	36.4	36.4	28.8	28.8	28.8	28.8	28.8	28.8
Actuated g/C Ratio	0.47	0.42	0.42	0.49	0.47	0.47	0.37	0.37	0.37	0.37	0.37	0.37
v/c Ratio	0.04	0.65	0.55	0.35	0.28	0.04	0.24	0.03	0.11	0.84	0.47	0.07
Control Delay	8.4	20.0	7.9	12.5	13.1	0.1	24.2	20.5	6.2	43.7	24.7	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	20.0	7.9	12.5	13.1	0.1	24.2	20.5	6.2	43.7	24.7	2.4
LOS	A	C	A	B	B	A	C	C	A	D	C	A
Approach Delay		16.0			12.4			15.8			33.8	
Approach LOS		B			B			B			C	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 77.8
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 20.0
 Intersection LOS: C
 Intersection Capacity Utilization 63.3%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 3: Curtis Rd & Hwy 94



Volumes appear to match Long Term Total - Phase 1. Please clarify which horizon this LOS report is for.

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	2	6	125	2	6	710
Future Vol, veh/h	2	6	125	2	6	710
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	7	136	2	7	772
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	923	137	0	0	138	0
Stage 1	137	-	-	-	-	-
Stage 2	786	-	-	-	-	-
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	299	911	-	-	1446	-
Stage 1	890	-	-	-	-	-
Stage 2	449	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	297	911	-	-	1446	-
Mov Cap-2 Maneuver	297	-	-	-	-	-
Stage 1	890	-	-	-	-	-
Stage 2	445	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11.1	0	0.1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	601	1446		
HCM Lane V/C Ratio	-	-	0.014	0.005		
HCM Control Delay (s)	-	-	11.1	7.5		
HCM Lane LOS	-	-	B	A		
HCM 95th %tile Q(veh)	-	-	0	0		

Recurring Comment: Use 0.95 for long term conditions per standards.

NBR = 37 on Figure 5

Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

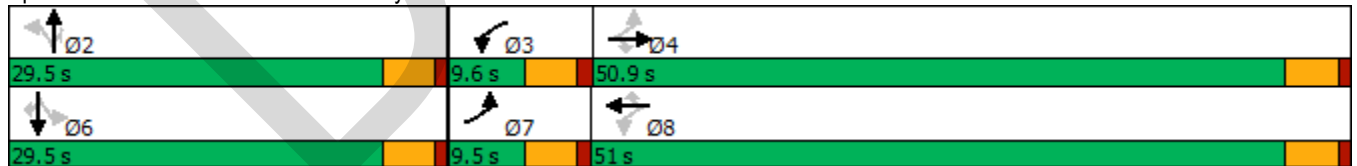
Long-Term Total - Phase 1
PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	40	350	44	37	785	305	294	175	322	15	15	20
Future Volume (vph)	40	350	44	37	785	305	294	175	322	15	15	20
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.184			0.489			0.744			0.540		
Satd. Flow (perm)	343	3539	1583	911	3539	1583	1386	1863	1583	1006	1863	1583
Satd. Flow (RTOR)			73			324			474			73
Peak Hour Factor	0.65	0.92	0.63	0.54	0.80	0.94	0.86	0.72	0.68	0.83	0.75	0.58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	380	70	69	981	324	342	243	474	18	20	34
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.5	50.9	50.9	9.6	51.0	51.0	29.5	29.5	29.5	29.5	29.5	29.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	32.9	29.1	29.1	34.1	31.4	31.4	25.9	25.9	25.9	25.9	25.9	25.9
Actuated g/C Ratio	0.46	0.41	0.41	0.48	0.44	0.44	0.36	0.36	0.36	0.36	0.36	0.36
v/c Ratio	0.24	0.27	0.10	0.14	0.63	0.37	0.68	0.36	0.54	0.05	0.03	0.05
Control Delay	9.9	14.2	3.3	8.4	17.6	2.8	32.7	22.8	5.2	21.9	21.2	1.2
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	9.9	14.2	3.3	8.4	17.6	2.8	32.7	22.8	5.2	21.9	21.2	1.2
LOS	A	B	A	A	B	A	C	C	A	C	C	A
Approach Delay		12.2			13.6			18.1				11.9
Approach LOS		B			B			B				B

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 71.7	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 14.9	Intersection LOS: B
Intersection Capacity Utilization 60.1%	ICU Level of Service B
Analysis Period (min) 15	










Splits and Phases: 3: Curtis Rd & Hwy 94



Long Term Total - Phase 1 AM appears to be missing - please add.

Lanes, Volumes, Timings
6: Curtis Rd & Access

Long-Term Total - Phase 1
PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	6	500	2	6	96
Future Volume (vph)	2	6	500	2	6	96
Satd. Flow (prot)	1649	0	1863	0	0	1857
Flt Permitted	0.989					0.997
Satd. Flow (perm)	1649	0	1863	0	0	1857
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	9	0	545	0	0	111
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 36.4%			ICU Level of Service A			
Analysis Period (min) 15						

DRAFT

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	2	6	500	2	6	96
Future Vol, veh/h	2	6	500	2	6	96
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	7	543	2	7	104

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	662	544	0	0	545	0
Stage 1	544	-	-	-	-	-
Stage 2	118	-	-	-	-	-
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	427	539	-	-	1024	-
Stage 1	582	-	-	-	-	-
Stage 2	907	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	424	539	-	-	1024	-
Mov Cap-2 Maneuver	424	-	-	-	-	-
Stage 1	582	-	-	-	-	-
Stage 2	901	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.3	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	505	1024
HCM Lane V/C Ratio	-	-	0.017	0.006
HCM Control Delay (s)	-	-	12.3	8.5
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

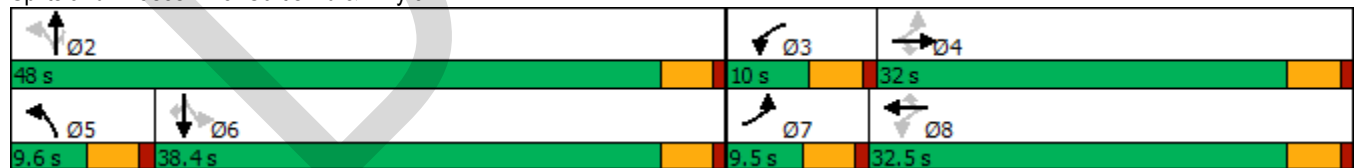
Long-Term Total
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	789	457	103	408	20	96	24	92	313	279	35
Future Volume (vph)	5	789	457	103	408	20	96	24	92	313	279	35
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.474			0.119			0.354			0.740		
Satd. Flow (perm)	883	3539	1583	222	3539	1583	659	1863	1583	1378	1863	1583
Satd. Flow (RTOR)			407			127			116			127
Peak Hour Factor	0.25	0.84	0.82	0.82	0.90	0.70	0.77	0.94	0.79	0.74	0.81	0.81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	939	557	126	453	29	125	26	116	423	344	43
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.5	32.0	32.0	10.0	32.5	32.5	9.6	48.0	48.0	38.4	38.4	38.4
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	32.4	27.4	27.4	35.8	33.6	33.6	43.5	43.5	43.5	33.9	33.9	33.9
Actuated g/C Ratio	0.36	0.30	0.30	0.40	0.37	0.37	0.48	0.48	0.48	0.38	0.38	0.38
v/c Ratio	0.05	0.87	0.73	0.69	0.34	0.04	0.33	0.03	0.14	0.82	0.49	0.06
Control Delay	16.2	39.9	13.9	39.0	22.1	0.1	15.5	12.4	3.0	39.9	24.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	39.9	13.9	39.0	22.1	0.1	15.5	12.4	3.0	39.9	24.4	0.2
LOS	B	D	B	D	C	A	B	B	A	D	C	A
Approach Delay		30.0			24.6			9.8			31.2	
Approach LOS		C			C			A			C	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 89.9
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 27.6
 Intersection LOS: C
 Intersection Capacity Utilization 64.0%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 3: Curtis Rd & Hwy 94



Lanes, Volumes, Timings
6: Curtis Rd & Access

Long-Term Total
AM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	32	89	123	35	142	696
Future Volume (vph)	32	89	123	35	142	696
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.950				0.617	
Satd. Flow (perm)	1770	1583	1863	1583	1149	1863
Satd. Flow (RTOR)		97		38		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	97	134	38	154	757
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Total Split (s)	26.0	26.0	53.0	53.0	11.0	64.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	7.1	7.1	51.6	51.6	62.4	63.3
Actuated g/C Ratio	0.09	0.09	0.67	0.67	0.81	0.83
v/c Ratio	0.21	0.41	0.11	0.04	0.16	0.49
Control Delay	34.6	13.3	5.6	2.1	2.3	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.6	13.3	5.6	2.1	2.3	4.1
LOS	C	B	A	A	A	A
Approach Delay	18.9		4.8			3.8
Approach LOS	B		A			A

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 76.6
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 5.6
 Intersection LOS: A
 Intersection Capacity Utilization 48.3%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 6: Curtis Rd & Access



Intersection						
Int Delay, s/veh	2.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↗	↘	↑
Traffic Vol, veh/h	32	89	123	35	142	696
Future Vol, veh/h	32	89	123	35	142	696
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	150	150	-
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	35	97	134	38	154	757
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1199	134	0	0	172	0
Stage 1	134	-	-	-	-	-
Stage 2	1065	-	-	-	-	-
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	205	915	-	-	1405	-
Stage 1	892	-	-	-	-	-
Stage 2	331	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	182	915	-	-	1405	-
Mov Cap-2 Maneuver	182	-	-	-	-	-
Stage 1	892	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	14.7	0	1.3			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)	-	-	182	915	1405	
HCM Lane V/C Ratio	-	-	0.191	0.106	0.11	
HCM Control Delay (s)	-	-	29.4	9.4	7.9	
HCM Lane LOS	-	-	D	A	A	
HCM 95th %tile Q(veh)	-	-	0.7	0.4	0.4	

Lanes, Volumes, Timings
3: Curtis Rd & Hwy 94

WBR volume is 340 – based on background, pass by and site generated, should be 280

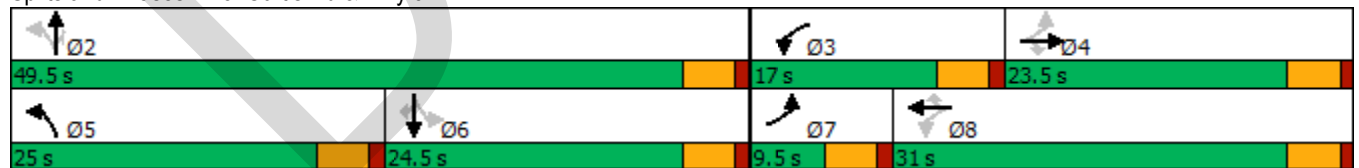
Long-Term Total
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	316	240	183	726	340	532	218	426	15	31	20
Future Volume (vph)	40	316	240	183	726	340	532	218	426	15	31	20
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.222			0.353			0.598			0.575		
Satd. Flow (perm)	414	3539	1583	658	3539	1583	1114	1863	1583	1071	1863	1583
Satd. Flow (RTOR)			381			362			413			182
Peak Hour Factor	0.65	0.92	0.63	0.54	0.80	0.94	0.86	0.72	0.68	0.83	0.75	0.58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	343	381	339	908	362	619	303	626	18	41	34
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		5	2				6
Permitted Phases	4		4	8		8	2		2	6		6
Total Split (s)	9.5	23.5	23.5	17.0	31.0	31.0	25.0	49.5	49.5	24.5	24.5	24.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	22.0	17.0	17.0	34.0	26.6	26.6	45.1	45.1	45.1	20.4	20.4	20.4
Actuated g/C Ratio	0.25	0.19	0.19	0.39	0.30	0.30	0.51	0.51	0.51	0.23	0.23	0.23
v/c Ratio	0.34	0.50	0.62	0.82	0.85	0.50	0.86	0.32	0.62	0.07	0.10	0.07
Control Delay	23.3	34.3	8.4	39.5	38.6	5.4	31.7	14.3	8.1	28.8	28.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	34.3	8.4	39.5	38.6	5.4	31.7	14.3	8.1	28.8	28.7	0.2
LOS	C	C	A	D	D	A	C	B	A	C	C	A
Approach Delay		20.9			31.4			18.7				18.3
Approach LOS		C			C			B				B

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 88.1
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 24.2
 Intersection LOS: C
 Intersection Capacity Utilization 71.6%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 3: Curtis Rd & Hwy 94



Lanes, Volumes, Timings
6: Curtis Rd & Access

NBT volume is 743 – based on background, pass by and site generated, should be 288

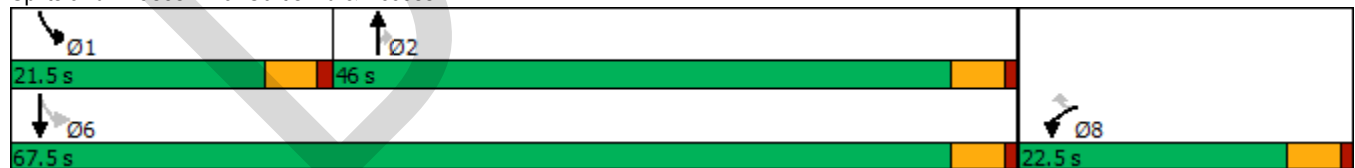
Long-Term Total
PM Peak Hour

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗	↘	↑
Traffic Volume (vph)	98	433	743	123	373	82
Future Volume (vph)	98	433	743	123	373	82
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.950				0.092	
Satd. Flow (perm)	1770	1583	1863	1583	171	1863
Satd. Flow (RTOR)		393		86		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	107	471	808	134	405	89
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Total Split (s)	22.5	22.5	46.0	46.0	21.5	67.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Act Effect Green (s)	11.8	11.8	39.1	39.1	60.9	60.9
Actuated g/C Ratio	0.14	0.14	0.48	0.48	0.74	0.74
v/c Ratio	0.42	0.84	0.91	0.17	0.88	0.06
Control Delay	37.4	21.0	36.4	6.2	43.5	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	21.0	36.4	6.2	43.5	3.7
LOS	D	C	D	A	D	A
Approach Delay	24.0		32.1			36.3
Approach LOS	C		C			D

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 81.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 30.8	Intersection LOS: C
Intersection Capacity Utilization 76.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Curtis Rd & Access



Intersection

Int Delay, s/veh	84.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↗	↘	↑
Traffic Vol, veh/h	98	433	743	123	373	82
Future Vol, veh/h	98	433	743	123	373	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	150	150	-
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	107	471	808	134	405	89

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1707	808	0	0	942	0
Stage 1	808	-	-	-	-	-
Stage 2	899	-	-	-	-	-
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	~ 100	~ 381	-	-	728	-
Stage 1	438	-	-	-	-	-
Stage 2	397	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	~ 44	~ 381	-	-	728	-
Mov Cap-2 Maneuver	~ 44	-	-	-	-	-
Stage 1	438	-	-	-	-	-
Stage 2	176	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	283.9	0	13.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	44	381	728
HCM Lane V/C Ratio	-	-	2.421	1.235	0.557
HCM Control Delay (s)	-	-	\$ 844	157.1	16
HCM Lane LOS	-	-	F	F	C
HCM 95th %tile Q(veh)	-	-	11.3	20	3.5

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