LSC Responses to TIS Redline Comments

striped left-turn median) to allow for shared lane use with experienced cyclists (the adjacent sidewalk will accommodate children and families, as well as cyclists less experienced at cycling in traffic).

State whether certain signage is recommended for westbound traffic 1

Sight Distance Analysis

Figures 3a through 3f show sight-distance analysis at the proposed Collector and Arterial intersection.

Figure 3a shows the sight distance analysis for the proposed intersection of Regan Ridge/Grayling Drive. Based on a design speed of 40 miles per hour (mph) and the criteria contained in Table 2-21 of the *ECM*, the required intersection sight distance at the access points is 445 feet. This intersection is located about 391 feet west of Walleye Drive and the available stopping sight distance from the start of the pavement on the west leg of Walleye/ Grayling to the centerline of Regan Ridge/Grayling is about 356 feet. This is about 89 feet less than the *ECM* requirement. However, as Grayling/Walleye is a "T" intersection, all westbound traffic on Grayling Drive approaching Scrub Jay Trail will have either just turned right or left from Walleye Drive. The required stopping sight distance from *ECM* Table 2-17 is 305 feet. As shown in Figure 3a, this requirement can be met by the proposed spacing.

Figure 3b shows the sight distance analysis for the proposed intersection of Sanderling Street/Walleye Drive. Based on a design speed of 40 miles per hour (mph) and the criteria contained in Table 2-21 of the *ECM*, the required intersection sight distance at this intersection is 445 feet. As shown in Figure 3b, the intersection sight distance and stopping sight distance requirements can be met by the proposed spacing.

Figure 3c shows the sight distance analysis for the proposed access to Fontaine Boulevard (Buckner Way). Based on a design speed of 50 miles per hour (mph) for the ultimate Principal Arterial classification and the criteria contained in Table 2-21 of the *ECM*, the required intersection sight distance at this intersection is 555 feet. As shown in Figure 3c, the intersection sight distance and stopping sight distance requirements can be met at the proposed intersection.

Figure 3d shows the sight distance analysis for the proposed intersections of Lake Trout Drive/Walleye Drive and Splake Street/Walleye Drive. Based on a design speed of 40 miles per hour (mph) and the criteria contained in Table 2-21 of the *ECM*, the required intersection sight distance at this intersection is 445 feet. As shown in Figure 3b, the intersection sight requirements can be met at both intersections.

Figure 3e shows the sight distance analysis for the proposed access points to Lorson Boulevard (Split Mountain Drive and Kingston Peak). Based on a design speed of 25 miles per hour (mph) and the criteria contained in Table 2-21 of the *ECM*, the required intersection sight distance for Local/Local intersections is 280 feet. As Lorson Boulevard does not have lots fronting it like a

LSC Responses to TIS Redline Comments

Page: 7

Number: 1 Author: dsdrice Subject: Callout Date: 9/20/2021 10:16:57 AM

State whether certain signage is recommended for westbound traffic

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:02:28 PM

LSC Response: A statement about additional signage has been added as requested.

does this dev trigger the improvment 1

The southbound and westbound left-turn movements are projected to operate at LOS F during the afternoon peak hour, based on the short-term total traffic volumes and the existing signal-timing plan. All movements at the intersection are projected to operate at LOS D or better if 3 protected phasing is added for all left-turn movements and a 2 second southbound left-turn lane is constructed on Marksheffel approaching Fontaine. By 2040, it was assumed that Marksheffel Road would be widened to provide two northbound and southbound through lanes. Based on the 2040 total traffic volumes and the lane geometry shown in Figure 11a, all movements are projected to operate at LOS D or better during the peak hours.

Address LOS if protected phasing is added without 2nd turn lane 4

Fontaine/Carriage Meadows

Please refer to the *Carriage Meadows Townhomes Traffic Impact Analysis* PUDSP-19-005 dated May 28, 2020 for analysis of the intersection of Fontaine/Carriage Meadows. Key pages from that report are attached. As discussed in that report, the northbound and southbound left-turn and through movements at this intersection are projected to operate at LOS E or LOS F during the peak hours based on the short-term total traffic volumes from that report which do not include any traffic from The Ridges at Lorson Ranch. Fontaine/Carriage Meadows is planned as a future traffic-signal-controlled intersection. However, a traffic-signal warrant is not anticipated to be met until one or more of the future retail parcels are developed. Once signalized, all movements are projected to operate at LOS D or better through 2040.

Fontaine/Kearsarge

The intersection of Fontaine/Kearsarge is restricted to right-in/right-out only. There is an existing right-turn deceleration lane on Fontaine Boulevard approaching Kearsarge Drive.

Fontaine/Old Glory (west)

The northbound left-turn at the intersection of Fontaine/Old Glory (west) is currently operating at LOS E during the morning and LOS F during the afternoon peak hours. The southbound left-turn movement at this intersection is currently operating at LOS E during the morning peak hour and LOS D during the afternoon peak hour. This intersection is planned to be converted to all-way stop-sign control as part of the Hills at Lorson Ranch development. Fontaine/Old Glory is projected to operate at LOS B or better for all movements as an all-way stop-sign-controlled intersection, based on the projected short-term background traffic volumes. However, with the addition of site-generated traffic, the level of service for some of the movements is projected to degrade below a LOS D during the peak hours. Please note, the *HCM* procedure for all-way stop-sign-controlled intersections is limited to three approach lanes. As Fontaine Boulevard has four eastbound and westbound approach lanes at Old Glory Drive, this intersection was analyzed using Synchro/SimTraffic. The simulation was run five times and the average stop delay per vehicle for each lane was averaged over the five runs and compared to the control delay listed in Table 1. If this intersection is converted to traffic-signal control, all movements are projected to operate at LOS D or better during the peak hours through 2040.

Signal warrants will need to be addressed with each final plat. 5

Page: 13

Number: 1 Author: dsdparsons Subject: Cloud+ Date: 9/17/2021 9:34:33 AM

does this dev trigger the improvment

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:02:38 PM

LSC Response: The short-term analysis has been updated to assume a single southbound left-turn lane in the short-term scenario.

Number: 2 Author: dsdrice Date: 9/20/2021 10:23:33 AM

second southbound left-turn lane

Number: 3 Author: dsdrice Date: 9/20/2021 10:23:27 AM

protected phasing

Number: 4 Author: dsdrice Subject: Callout Date: 9/20/2021 10:25:14 AM

Address LOS if protected phasing is added without 2nd turn lane

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:02:43 PM

LSC Response: The additional analysis has been provided as requested.

Number: 5 Author: dsdrice Subject: Text Box Date: 9/20/2021 5:08:51 PM

Signal warrants will need to be addressed with each final plat.

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:02:49 PM

LSC Response: Comment Noted.

Fontaine/Nassau Trail

The intersection of Fontaine/Nassau Trail is restricted to right-in/right-out only. There is an existing right-turn deceleration lane on Fontaine approaching Nassau.

Fontaine/Old Glory (east)/Stingray

The southbound left-turn movement at the intersection of Fontaine/Old Glory (east)/Stingray is currently operating at LOS F during the morning peak hour and LOS C during the afternoon peak hour. This intersection is planned to be restricted to three-quarter movement (left-in/right-in/right-out only) as part of the Hills at Lorson Ranch development. As a three-quarter movement intersection, all movements are projected to operate at LOS C or better through 2040.

No plans were submitted for this construction. Provide analysis of options - channelized T, roundabout (would one fit?), and 3/4 intersection. See page 21.

Fontaine/Lamine

The intersection of Fontaine/Lamine was previously analyzed as part of the *Lorson Ranch East Updated Traffic Impact and Access Analysis* dated November 9, 2017. Key pages from this report have been attached. The northbound left-turn movement at this intersection was projected to operate at LOS F, based on the 2040 total traffic volumes during the morning and afternoon peak hours using the *Highway Capacity Manual, 2010 Edition*. Based on the currently-projected 2040 total traffic volumes shown in Figure 11a, the more current method of analysis procedures outlined in the *Highway Capacity Manual, 6th Edition,* and the existing lane geometry (which includes a center-two-way left-turn lane on Fontaine Boulevard), this movement is now projected to operate at LOS E during the morning peak hour and LOS D during the afternoon peak hour. As discussed in the Lorson Rach East TIA, northbound left-turning traffic at this intersection would have the option to turn right and execute a U-turn at the Lamprey/Fontaine roundabout.

Fontaine/Edisto

The intersection of Fontaine/Edisto was previously analyzed as part of the *Lorson Ranch East Updated Traffic Impact and Access Analysis* dated November 9, 2017. As shown in that report, this intersection is projected to operate at LOS C or better for all movements during the peak hours through 2040 as a two-way, stop-sign-controlled intersection.

Fontaine/Lamprey

The intersection of Fontaine/Lamprey was previously analyzed as part of *The Hills at Lorson Ranch Full Traffic Impact Analysis* PUDSP 203 October, 26, 2020. As shown in that report, this intersection is projected to operate at LOS C or better for all movements during the peak hours through 2040 as a one-lane modern roundabout.

is this in addition to the 998 lots ?

Page: 14

Number: 1 Author: dsdrice Date: 9/20/2021 10:30:06 AM

as part of the Hills at Lorson Ranch development

Number: 2 Author: dsdrice Subject: Callout Date: 9/20/2021 10:40:24 AM

No plans were submitted for this construction. Provide analysis of options - channelized T, roundabout (would one fit?), and 3/4 intersection. See page 21.

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:03:15 PM

LSC Response: Analysis of a channelized T has been added to the updated TIS. Roundabout analysis was not included due to right-of-way constraints.

Number: 3 Author: dsdparsons Subject: Callout Date: 9/17/2021 9:38:11 AM

is this in addition to the 998 lots ?

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:04:49 PM

LSC Response: The 2040 total traffic volumes analyzed in the Hills at Lorson Ranch TIS included traffic projected to be generated by 993 single-family dwelling units in the same area as the currently-proposed Ridges at Lorson Ranch. This is one fewer dwelling units than is currently proposed.

Lorson/Trappe, Lorson/Willapa, & Lorson/Skuna

The intersections of Lorson/Trappe, Lorson/Willapa, and Lorson/Skuna were previously analyzed as part of the *Lorson Ranch East Updated Traffic Impact and Access Analysis* November 9, 2017. As shown in that report, these intersections are projected to operate at LOS D or better for all movements during the peak hours through 2040 as two-way, stop-sign-controlled intersections.

Lorson/Lamprey

The intersection of Lorson/Lamprey was previously analyzed as part of *The Hills at Lorson Ranch Full Traffic Impact Analysis* PUDSP 203 October, 26, 2020. As shown in that report, this intersection is projected to operate at LOS D or better for all movements during the peak hours through 2040 as a two-way, stop-sign-controlled intersection.

Grayling/Regan Ridge/Scrub Jay

The intersection of Grayling/Regan Ridge/Scrub Jay is projected to operate at LOS A for all movements, based on the projected 2040 total traffic volumes as a two-way stop-sign-controlled intersection.

Walleye/Grayling, Walleye/Sanderling, Walleye/Lake Trout, Walleye/Splake, & Walleye/Lorson

The intersections of Walleye/Grayling, Walleye/Sanderling, Walleye/Lake Trout, Walleye/Splake and Walleye/Lorson are projected to operate at LOS B or better for all movements, based on the projected 2040 total traffic volumes as two-way stop-sign-controlled intersections.

Walleye/Fontaine

Replace the statement about LOS with stop signs on north and south legs. 1

The intersection of Walleye/Fontaine is projected to operate at LOS D or better for all movements, based on the projected 2040 total traffic volumes as a two-way stop-sign-controlled intersection with the stop control on the eastbound and westbound approaches (Fontaine Boulevard). Note: A roundabout analysis has not been included for the intersection of Fontaine/Walleye because of difficult topography- grading/slopes. The slopes are five percent just east of the intersection.

What is the anticipated long-term improvement when Fontaine connects to Meridian Road? 2

Split Mountain /Lorson

The intersection of Split Mountain/Lorson is projected to operate at LOS A for all movements, based on the projected 2040 total traffic volumes as a two-way stop-sign-controlled intersection.

Page: 16

Number: 1 Author: dsdrice Subject: Callout Date: 9/20/2021 3:11:24 PM

Replace the statement about LOS with stop signs on north and south legs.

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 1:58:36 PM

LSC Response: Analysis of two-way stop-sign control with stop signs on the north and south legs and all-way, stop-sign control has been added back to the updated TIS.

Number: 2 Author: dsdrice Subject: Callout Date: 9/20/2021 3:10:26 PM

What is the anticipated long-term improvement when Fontaine connects to Meridian Road?

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:05:18 PM

LSC Response: Discussion of potential future traffic control at this intersection has been added to the updated TIS.

1

If this intersection needs to be converted to RI/RO or 3/4 on the north and south when Meridian Road is connected, will the Walleye/Fontaine intersection LOS be adequate with the additional left turns?

Buckner/Fontaine

The intersection of Buckner/Fontaine is projected to operate at LOS A for all movements, based on the projected 2040 total traffic volumes as a two-way stop-sign-controlled intersection.

TRAFFIC SIGNAL WARRANTS

The intersections of Fontaine/Old Glory (west) and Lorson/Marksheffel were previously analyzed to determine if any traffic-signal warrants are anticipated to be met in the short term as part of *The Hills at Lorson Ranch Full Traffic Impact Analysis* PUDSP 203 October, 26, 2020. The key pages from that report are attached. As shown in that report, Four-Hour and Eight-Hour Vehicular-Volume Traffic-Signal Warrants are anticipated to be met at both of these intersections prior to the development of the currently-proposed Ridges at Lorson Ranch.

LEFT-TURN PHASE ANALYSIS: MARKSHEFFEL/FONTAINE

The intersection of Marksheffel/Fontaine is currently traffic-signal-controlled. The existing signal-timing plan has two phases, namely a northbound/southbound phase and an eastbound/westbound phase with no protected phasing for any of the left-turn movements. LSC has analyzed the need to add additional protected phases based on the criteria found in Exhibit 11-6 from the *Federal Highway Administration Report Signalized Intersections: Informational Guide Publication Number: FHWA-SA-13-027*, dated July 2013, copied below with our analysis.

Exhibit 11-6 Guidelines for use of left-turn phasing

Left-turn phasing (protected-permissive, permissive-protected, or protected-only) should be considered if any one of the following criteria is satisfied:

1. *A minimum of 2 left-turning vehicles per cycle and the product of opposing and left-turn hourly volumes exceeds the appropriate following value:*
    a. *Random arrivals (no other traffic signals within 0.8 km (0.5 mi))*
       One opposing lane: 45,000 Two opposing lanes: 90,000
    b. *Platoon arrivals (other traffic signals within 0.8 km (0.5 mi))*
       One opposing lane: 50,000 Two opposing lanes: 100,000

Table 3 shows the results of the analysis. As shown in Table 3, the existing southbound left-turn traffic volumes currently meet this criterion. The westbound left-turn traffic volumes are projected to meet this criterion based on the short-term total traffic volumes shown in Figure 10a.

2. *The left-turning movement crosses 3 or more lanes of opposing through traffic.*

This criterion is not currently applicable to the intersection of Fontaine/Marksheffel.

Page: 17

Number: 1 Author: dsdrice Subject: Callout Date: 9/20/2021 3:42:39 PM

If this intersection needs to be converted to RI/RO or 3/4 on the north and south when Meridian Road is connected, will the Walleye/Fontaine intersection LOS be adequate with the additional left turns?

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:05:28 PM

LSC Response: The potential for this access to be restricted to RIRO or 3/ 4 has been added to the discussion of the potential future traffic control at the intersection of Walleye/Fontaine.

ROADWAY IMPROVEMENT FEE

This project will be required to participate in the El Paso County Road Improvement Fee Program. The Ridges at Lorson Ranch will join the ten-mil PID. The current ten-mil PID building permit fee portion associated with this option is $1,221 per single-family dwelling unit. Based on 994 lots, the total building permit fee would be $1,213,674. Note: This is based on the current rate, which is subject to change. El Paso County updates this rate periodically.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

- The site is projected to generate about 9,383 new vehicle trips on the average weekday, with about half entering and half exiting the site. During the morning peak hour about 184 vehicles would enter and 552 vehicles would exit the site. During the afternoon peak hour about 620 vehicles would enter and 364 vehicles would exit the site.

Intersection Sight Distance

- All of the proposed site access points can meet the site-distance requirements except for the intersection of Regan Ridge/Grayling. Please refer to the Sight Distance section of this report for details. A deviation for the criteria contained in the *ECM* will be submitted for the intersection of Regan Ridge/Grayling.

Projected Levels of Service & Intersection Traffic Control Recommendations

- Please see the Level of Service Analysis section above for detailed analysis of all of the intersections to Fontaine Boulevard and Lorson Boulevard between Marksheffel Road and the Ridges at Lorson Ranch west boundary. All of the key area intersections within the Ridges at Lorson Ranch analyzed are projected to projected to operate at LOS D or better during the peak hours for all movements as two-way, stop-sign-controlled intersections, based on the projected short-term and 2040 total traffic volumes.

Street Classifications

- All of the streets within the Ridges at Lorson Ranch should be classified as Urban Local. See Figure 12 for the recommended classifications of the adjacent roadways.

Street Classifications Road Fee 1

- Based on the current ten-mil PID building permit fee, the total building permit fee would be $1,213,674. Note: This is based on the current rate, which is subject to change. El Paso County updates this rate periodically.

Page: 19

Number: 1 Author: dsdrice Subject: Cloud+ Date: 9/20/2021 3:15:57 PM

Road Fee

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:05:32 PM

LSC Response: Revised as requested.

Recommended Improvements

Table 4? (missing) 1

- A list of all improvements in the vicinity of the site is presented in 2 Table 3.

* * * * *

We trust this traffic impact analysis will assist you in gaining approval of the proposed Ridges at Lorson Ranch residential development. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By Kirstin D. Ferrin, P.E.
Senior Transportation Engineer

JCH:KDF:jas

Enclosures: Tables 2-4
Figures 1-12
Traffic Count Reports
Level of Service Reports
Appendix Tables 1-3
Crash History
MTCP Maps
Key Pages from recent traffic impact studies

3 So by "Yes"; the developer understands they are installing the improvement?

Page: 20

Number: 1 Author: dsdrice Subject: Callout Date: 9/20/2021 3:20:45 PM

Table 4? (missing)

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 1:59:49 PM

LSC Response: Table 4 has been included in the updated TIS

Number: 2 Author: dsdrice Date: 9/20/2021 3:19:44 PM

Table 3.

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:00:04 PM

LSC Response: The text has been revised to refer to Table 4 and the table has been included with the updated TIS.

Number: 3 Author: dsdparsons Subject: Callout Date: 9/20/2021 5:09:52 PM

So by "Yes"; the developer understands they are installing the improvement?

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:00:30 PM

LSC Response: Table 4 calls out the timing of installation (or escrow, as applicable) and responsibility for the improvements listed in the table

Tables

Copied from PUDSP-20-003 - The Hills [1]

- Fontaine/Old Glory (east)/Stingray: Although change to all-way stop-sign control or signal/roundabout (long term) would improve the side street approach levels of service, all-way, stop-sign-control warrants and traffic-signal warrants may not be met at this intersection, based on the projected traffic volumes. Potential warrants related to pedestrian volumes and the proximity to the Grand Mountain School could be considered. However, the preferred location for school pedestrian crossing is at the Fontaine/Lamprey roundabout intersection. [2]

  Although installation of a traffic signal (traffic-signal warrants are not likely to be met), or reconstruction of the intersection as a two-lane modern roundabout could be considered to maintain an acceptable level of service for side-street turning movements, a better solution would likely be to modify the center median on Fontaine to restrict the intersection to three-quarter movement. The side-street approach volumes are relatively light. Alternate travel routes are available, and “indirect left turns” instead of northbound and southbound left turns could be accommodated through U-turning movements at downstream intersections. The three-quarter movement intersection would restrict the side-street turning movements with the highest delay/lowest levels of service. The concept of “indirect left turns” is often listed as an option to investigate when looking into possible alternatives to adding a traffic signal and/or for corridor access control.

  Another potential solution could be to modify the center median for a channelized T for the north leg (Old Glory east) and a right-in/right-out on the south leg (Stingray).

Page: 21

Number: 1 Author: dsdrice Subject: Text Box Date: 9/20/2021 10:40:03 AM

Copied from PUDSP-20-003 - The Hills

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:06:43 PM

LSC Response: Noted. As discussed above, the updated TIS includes analysis of both a 3/4 access and channelized "T."

Number: 2 Author: dsdrice Subject: Snapshot Date: 9/20/2021 10:39:21 AM

Table 3
Left-Turn Signal Phase Warrant Analysis
Marksheffel Road/Fontaine Blvd
Ridge at Lorson Ranch

		Existing Traffic Volumes[1]					Short-Term Background Traffic					Short-Term Total Traffic				
Movement	Time	Left-Turn Volume (vph)	Through and Right-Turn (vph)	Product	Threshold[2]	Met?	Left-Turn Volume (vph)	Through and Right-Turn (vph)	Product	Threshold	Met?	Left-Turn Volume (vph)	Through and Right-Turn (vph)	Product	Threshold	Met?
WB LT	AM	118	150	17,700	90,000	NO	184	224	41,216	100,000	NO	246	289	71,094	90,000	NO
	PM	69	345	23,805	90,000	NO	115	641	73,715	100,000	NO	159	885	140,715	90,000	YES
EB LT	AM	25	452	11,300	90,000	NO	25	782	19,550	90,000	NO	25	1,112	27,800	90,000	NO
	PM	51	282	14,382	90,000	NO	51	515	26,265	90,000	NO	51	747	38,097	90,000	NO
NB LT	AM	38	177	6,726	45,000	NO	51	187	9,537	45,000	NO	51	187	9,537	45,000	NO
	PM	61	399	24,339	45,000	NO	70	436	30,520	45,000	NO	70	436	30,520	45,000	NO
SB LT[3]	AM	74	408	30,192	50,000	NO	111	375	41,625	50,000	NO	151	375	56,625	50,000	YES
	PM	259	230	59,570	50,000	YES	398	258	102,684	50,000	YES	551	258	142,158	50,000	YES

Notes:

(1) Based on manual turning movement counts by LSC in July 2021.

(2) Based on the criteria contained in Exhibit 11-6 from the Federal Highway Administration Report *Signalized Intersections: Informational Guide* Publication Number: FHWA-SA-13-027 dated July 2013

(3) The opposing volume for the southbound left-turn movement only includes the northbound through movement as there is an existing acceleration lane for the northbound right-turn movement

Source:LSC Transportation Consultants, Inc. Aug-21

Replace / update Table 4

1

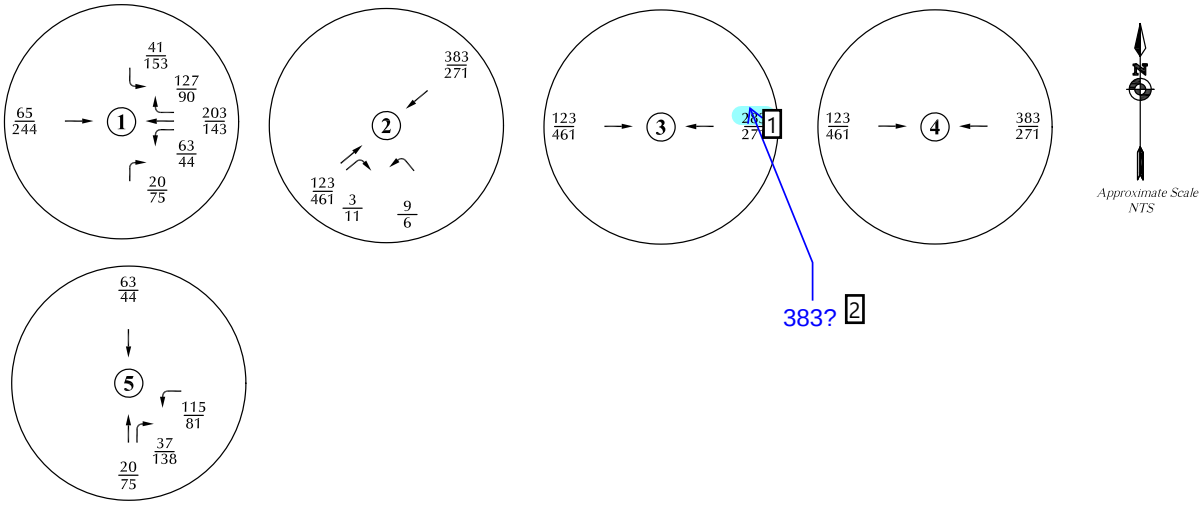
Page: 23

Number: 1 Author: dsdrice Subject: Text Box Date: 9/20/2021 5:10:22 PM

Replace / update Table 4

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:06:51 PM

LSC Response: Table 4 has been included in the updated TIS.



LEGEND:

(#) = Intersection Number

XX/XX = AM Weekday Peak-Hour Traffic (vehicles per hour) / PM Weekday Peak-Hour Traffic (vehicles per hour)

X,XXX= Average Weekday Traffic (vehicles per day)

Figure 6a

Assignment of Short-Term Site-Generated Traffic at the External Intersections

Ridges at Lorson Ranch (LSC #S214080)

LSC TRANSPORTATION CONSULTANTS, INC.

Page: 36

Number: 1 Author: dsdrice Date: 9/20/2021 4:10:21 PM

Number: 2 Author: dsdrice Subject: Callout Date: 9/20/2021 4:10:36 PM

383?

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:06:59 PM

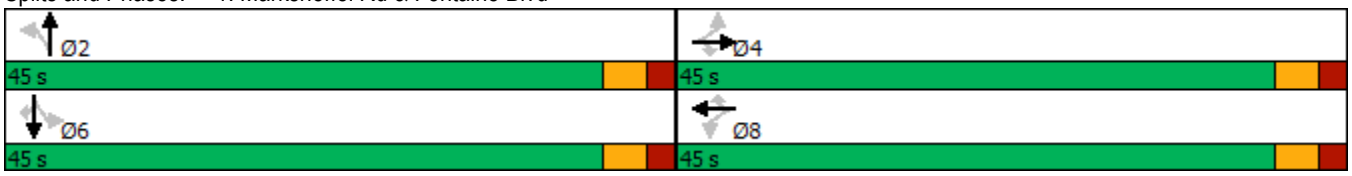
LSC Response: Revised to 383 in the updated TIS.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	816	69	159	452	295	70	258	310	551	403	33
Future Volume (vph)	51	816	69	159	452	295	70	258	310	551	403	33
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Free	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		Free	6		6
Detector Phase	4	4	4	8	8	8	2	2		6	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	5.0
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0		23.0	23.0	23.0
Total Split (s)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0		45.0	45.0	45.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	50.0%
Yellow Time (s)	3.0	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	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	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	5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	Max
Act Effct Green (s)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	90.0	40.0	40.0	40.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	1.00	0.44	0.44	0.44
v/c Ratio	0.17	0.60	0.11	1.12	0.33	0.38	0.24	0.33	0.21	1.31	0.51	0.05
Control Delay	16.8	20.9	11.2	133.4	17.0	3.1	18.1	17.8	0.3	182.3	20.6	5.2
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	16.8	20.9	11.2	133.4	17.0	3.1	18.1	17.8	0.3	182.3	20.6	5.2
LOS	B	C	B	F	B	A	B	B	A	F	C	A
Approach Delay		19.9			33.0			9.3			110.4	
Approach LOS		B			C			A			F	

1

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Natural Cycle: 50	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.31	
Intersection Signal Delay: 45.8	Intersection LOS: D
Intersection Capacity Utilization 92.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 1: Marksheffel Rd & Fontaine Blvd



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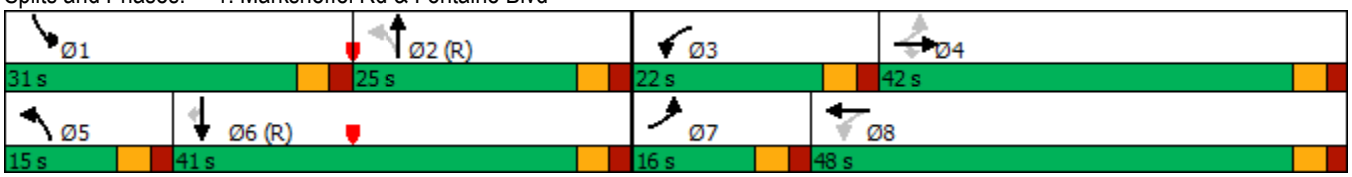
Number: 1 Author: dsdrice Date: 9/20/2021 4:40:31 PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	969	177	244	553	414	105	410	432	710	651	93
Future Volume (vph)	107	969	177	244	553	414	105	410	432	710	651	93
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Free	pm+pt	NA	Free	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		Free	2		Free			6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	15.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	20.0	23.0		10.0	23.0		10.0	23.0	23.0
Total Split (s)	16.0	42.0	42.0	22.0	48.0		15.0	25.0		31.0	41.0	41.0
Total Split (%)	13.3%	35.0%	35.0%	18.3%	40.0%		12.5%	20.8%		25.8%	34.2%	34.2%
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		-1.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		4.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	45.9	36.6	36.6	58.0	43.6	120.0	30.2	21.1	120.0	27.0	37.9	37.9
Actuated g/C Ratio	0.38	0.30	0.30	0.48	0.36	1.00	0.25	0.18	1.00	0.22	0.32	0.32
v/c Ratio	0.31	0.92	0.30	0.85	0.45	0.28	0.42	0.70	0.29	0.94	0.61	0.16
Control Delay	20.0	54.1	4.7	54.2	30.5	0.4	28.6	53.6	0.5	66.6	38.2	1.4
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	20.0	54.1	4.7	54.2	30.5	0.4	28.6	53.6	0.5	66.6	38.2	1.4
LOS	B	D	A	D	C	A	C	D	A	E	D	A
Approach Delay		43.9			25.0			26.6			49.5	
Approach LOS		D			C			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 38 (32%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 37.4	Intersection LOS: D
Intersection Capacity Utilization 87.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: Marksheffel Rd & Fontaine Blvd



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Number: 1 Author: dsdrice Date: 9/20/2021 4:46:00 PM

Stop Signs on E & W Legs

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:07:10 PM

LSC Response: Analysis with stop signs on the N & S legs and with all-way, stop-sign control has been included in the updated TIS.

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	24	253	1240	292	5	747	4	160	6	5	3	6
Future Volume (vph)	24	253	1240	292	5	747	4	160	6	5	3	6
Turn Type	pm+pt	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	5	5	2		1	6		3	8		7	4
Permitted Phases	2	2		2	6		6	8		8	4	
Detector Phase	5	5	2	2	1	6	6	3	8	8	7	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0
Total Split (s)	20.0	20.0	75.0	75.0	10.0	65.0	65.0	20.0	25.0	25.0	20.0	25.0
Total Split (%)	15.4%	15.4%	57.7%	57.7%	7.7%	50.0%	50.0%	15.4%	19.2%	19.2%	15.4%	19.2%
Yellow Time (s)	3.0	3.0	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	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	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	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)		86.2	84.0	84.0	72.1	66.5	66.5	33.8	31.6	31.6	20.8	15.0
Actuated g/C Ratio		0.66	0.65	0.65	0.55	0.51	0.51	0.26	0.24	0.24	0.16	0.12
v/c Ratio		0.68	0.59	0.28	0.02	0.45	0.00	0.48	0.02	0.01	0.01	0.03
Control Delay		17.5	15.2	1.9	9.2	21.9	0.0	44.2	40.0	0.0	35.7	51.7
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		17.5	15.2	1.9	9.2	21.9	0.0	44.2	40.0	0.0	35.7	51.7
LOS		B	B	A	A	C	A	D	D	A	D	D
Approach Delay			13.4			21.7			42.9			15.4
Approach LOS			B			C			D			B

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 109 (84%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 17.4	Intersection LOS: B
Intersection Capacity Utilization 74.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Old Glory Dr & Fontaine Blvd

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Number: 1 Author: dsdrice Date: 9/20/2021 4:46:26 PM

Stop Signs on E & W Leg

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:07:19 PM

LSC Response: Analysis with stop signs on the N & S legs and with all-way, stop-sign control has been included in the updated TIS.

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	142
Future Volume (vph)	142
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Detector Phase	4
Switch Phase	
Minimum Initial (s)	15.0
Minimum Split (s)	23.0
Total Split (s)	25.0
Total Split (%)	19.2%
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	5.0
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	None
Act Effct Green (s)	15.0
Actuated g/C Ratio	0.12
v/c Ratio	0.48
Control Delay	13.4
Queue Delay	0.0
Total Delay	13.4
LOS	B
Approach Delay	
Approach LOS	

Intersection Summary

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Number: 1 Author: dsdrice Date: 9/20/2021 4:46:47 PM

Stop Signs on E & W Legs

Author: kdferrin Subject: Sticky Note Date: 10/8/2021 2:07:27 PM

LSC Response: Analysis with stop signs on the N & S legs and with all-way, stop-sign control has been included in the updated TIS.