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## Sterling Ranch Sketch Plan Amendment Master Traffic Impact Study (LSC #S224440)

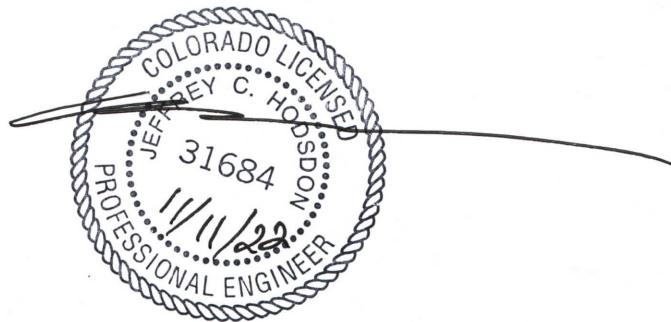
October 26, 2022

SKP-22-004

1

### Traffic Engineer's Statement

This traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.



### Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

A handwritten signature in blue ink, appearing to be 'M. L. P.', written over a horizontal line.

10/26/2022  
Date

# LSC Responses to TIS Redline Comments

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## Page: Sterling Ranch MTIS Cert Page

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 Number: 1   Author: dsdrice   Subject: Text Box   Date: 12/9/2022 13:45:41

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[SKP-22-004](#)

 Author: kdferrin   Subject: Sticky Note   Date: 12/22/2022 16:41:17  
LSC Response: Added as requested

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## STUDY AREA

### Sketch Plan

Figure 2 shows the proposed amendment to the Sketch Plan. The 1,444-acre Sterling Ranch Sketch Plan area is partially developed and planned to ultimately include a mix of residential, commercial, and educational land uses. The 2008 TIS divided the sketch plan area into 21 traffic analysis zones (TAZs). Figure 3 from that report showed the location and boundary of each TAZ. A copy of this TAZ figure is attached for reference. Table 1 shows a comparison of the land use assumed in the 2008 TIS and the land uses proposed as part of the current Sketch Plan Amendment. Figure 3 shows the location of the current TAZs. <sup>1</sup> The number of residential dwelling units for Sterling Ranch is now proposed to be capped at 4,800. Please note that although the maximum number of dwelling units for the approved Sketch Plan was 5,225, the 2008 TIS assumed 5,500 residential dwelling units within Sterling Ranch.

<sup>2</sup> This has been added as a condition on the sketch plan.

### Study-Area Access Plan

The access plan for the current Sketch Plan is generally consistent with the access plan shown in the 2008 Master TIS.

Figure 4 shows the current access plan for **Briargate Parkway**. The figure also highlights some minor changes to the access plan depicted in the 2008 Master TIS.

The following summarizes the minor changes:

- The access to Vollmer Road for TAZ 2 shown in the 2008 TIS report has since been shifted about 885 feet south (approximately halfway between the future locations of Marksheffel Road and Lochwinnoch Lane) and restricted to right-in/right-out only. This street connection to Vollmer is part of Sterling Ranch Filing No. 2 and is a public street called Alzada Drive. The Alzada Drive/Vollmer Road intersection is right-in/right-out only.  
**Note:** The June 2008 TIS report showed a shared access (shared with the adjacent Barbarick Subdivision industrial development) aligning with the existing Vollmer Road/Lochwinnoch Lane intersection.
- The originally-proposed right-in/right-out access on Marksheffel Road to TAZ 2 is no longer proposed and is not shown on the existing plans.
- The Sterling Ranch access to Briargate Parkway just east of Vollmer Road (Wheatland Drive), previously shown as a right-in/right-out-only intersection for both the north and south sides of Briargate in the Sketch Plan, is now a three-quarter-movement (left-in/right-in/right-out-only) access for the south leg (the north side access will remain right-in/right-out). A deviation request for this access point was submitted and approved.



Number: 1 Author: dsdrice Date: 12/8/2022 15:51:10

The number of residential dwelling units for Sterling Ranch is now proposed to be capped at 4,800



Number: 2 Author: dsdrice Subject: Callout Date: 12/15/2022 09:01:37

[This has been added as a condition on the sketch plan.](#)



Author: kdferrin Subject: Sticky Note Date: 12/22/2022 16:41:37

LSC Response: Comment noted.

The Briargate Parkway-Stapleton Road Corridor Study Appendix D: Access Control Plan shows the access locations and intersection access restrictions along Briargate Parkway between Black Forest Road and Meridian Road. The currently proposed Sterling Ranch Sketch Plan Amendment has several access points that are not included in the access control plan.

- The access control plan shows a right-in/right-out access to the south side of Briargate Parkway at Wheatland Drive between Vollmer Road and Sterling Ranch Road. The currently proposed Sketch Plan Amendment shows a three-quarter movement access for the south leg and a right-in/right-out access on the north leg. A deviation request for this access point has been submitted and approved.
- The access control plan shows a right-in/right-out access point north and south of Briargate Parkway between Wheatland Drive and Sterling Ranch Road. The currently proposed sketch plan shows two offset three-quarter movement (left-in/right-in/right-out only) access points.
- The access control plan shows the intersection of Briargate Parkway/Sterling Ranch Road as a three-leg intersection. The currently proposed Sketch Plan includes a north leg at this future full-movement signal-controlled intersection.
- The currently proposed Sketch Plan Amendment shows a right-in/right-out access to the north side of Briargate Parkway about 1,230 feet east of Sterling Ranch Road that is not shown on the access control plan.
- The access control plan shows a right-in/right-out access to the south side of Briargate Parkway just west of Banning Lewis Parkway. The currently proposed Sketch Plan Amendment shows a right-in/right-out access to the north side of Briargate and a three-quarter movement access to the south side of Briargate at approximately the same location (1,085 feet west of Banning Lewis Parkway).
- The access control plan shows the intersection of Briargate/Banning Lewis as a three-leg intersection. The currently proposed Sketch Plan includes a north leg at this future full-movement signal-controlled intersection.


Review changes in access points for potential deviation requests. Provide additional deviation requests where required. <sup>11</sup>

## EXISTING ROAD AND TRAFFIC CONDITIONS

The adjacent streets are shown in Figure 1 and are described below. Copies of the *2016 El Paso County Major Transportation Corridors Plan (MTCP)*, *2040 Roadway Plan*, and *2016 MTCP 2060 Corridor Preservation Plan* with the site location identified on them have been attached to this report.


**Vollmer Road** is currently a five-lane urban street within the City of Colorado Springs limits between Black Forest Road and Cowpoke Road; and a two-lane, rural, paved roadway north of Cowpoke Road extending to north of Hodgen Road. In the southbound direction, Vollmer Road has a posted speed limit of 45 mph. South of Cowpoke Road, Vollmer Road has a 40-mph posted speed limit. The *2040 El Paso County Major Transportation Corridors Plan (MTCP)* and the prior Sterling Ranch master traffic study show Vollmer Road as a four-lane Urban Minor Arterial in the vicinity of the site.

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 Number: 1 Author: Paul Brown Subject: Text Box Date: 12/14/2022 17:39:43

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Review changes in access points for potential deviation requests. Provide additional deviation requests where required.

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 16:42:27

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LSC Response: a "Deviation Requests" section has been added to this master TIS report. This paragraph includes the following statement per Jeff Rice's comment below "deviations would need to be approved for any intersections not meeting criteria"

### Woodmen/Black Forest

The signal-controlled intersection of Woodmen/Black Forest is currently operating at an overall LOS C during the morning and afternoon peak hours. The northbound, eastbound, and westbound left-turn movements are currently operating at LOS E during the peak hours.

### Woodmen/Marksheffel

Based on the existing signal-timing plan, the intersection of Woodmen/Marksheffel is currently operating at an overall LOS C during the morning and afternoon peak hours. The northbound left-turn movement is currently operating at LOS F and the eastbound left-turn, westbound left-turn, and southbound through movements are currently operating at LOS E during the peak hours.

### **Safety and Accident Analysis**

The Colorado State Patrol (CSP) provided LSC with crash history data for Vollmer Road between Tahiti Drive and Burgess Road from September 2019 through September 2022. During the reported time period, there were twelve reported crashes. Of the twelve reports, ten were single-vehicle non-intersection-related crashes on Vollmer Road. One crash involved a southbound vehicle that turned right onto Poco Road and crashed into several cars parked on Poco Road partially in the lane. The only intersection related crash occurred in June 2022. A vehicle heading northbound on Vollmer Road was slowing to turn left at Lochwinnoch Road and the vehicle behind them attempted to pass on the left side. The crash history data has been attached.


### **BASELINE CONDITIONS**

Baseline traffic is the traffic estimated to be on the adjacent roadways and at adjacent intersections without the proposed development's trip generation of site-generated traffic volumes. Baseline traffic (for a specified horizon year) includes the through traffic and the traffic generated by nearby developments (existing and planned) but assumes zero traffic generated by land uses within Sterling Ranch, including traffic generated by existing developments within Sterling Ranch.

Figure 6a shows the projected 2042 baseline daily traffic volumes on key street segments at the key area intersections and Figure 6b shows the projected 2042 peak-hour baseline traffic volumes at the key area intersections. These volumes assume buildout of the area street network, including the completion of Marksheffel Road between Vollmer Road and Black Forest Road, Briargate Parkway between Meridian Road and Black Forest Road, and Sterling Ranch Road between Marksheffel Road and Briargate Parkway.

Refer to FHU comment memorandum regarding these commitments. 

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 Number: 1 Author: Paul Brown Subject: Text Box Date: 12/14/2022 17:40:51

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Refer to FHU comment memorandum regarding these commitments.

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 16:47:44

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LSC Response: Comment noted.



The 2042 baseline traffic volumes are estimates by LSC, based on the traffic projections, the *Briargate-Stapleton Corridor Study (Draft)* by Wilson & Company dated December 9, 2021. This report indicates that the Pikes Peak Area Council of Governments' (PPACG) 2045 regional model was utilized as a basis for the projections. Previous reports completed in the area were also used to estimate the future baseline/background traffic (see Appendix Table 1).

Figure 6c shows the lane geometry, traffic control, and level of service at the key area intersections, based on the 2042 baseline volumes.

## TRIP GENERATION

Refer to comments on Table 1 and Table 3 regarding trip generation and update this text accordingly. <sup>1</sup>


The site-generated vehicle trips were estimated using the nationally-published trip-generation rates from *Trip Generation, 11th Edition, 2021* by the Institute of Transportation Engineers (ITE). Table 3 shows the trip-generation estimates. The trip generation estimate is based on the average rates for all land uses. This may result in conservative estimate, especially at intersections well removed from the site. The average weekday trip generation rate for Land Use 210: Single-Family Detached Housing is 9.43 trips per dwelling units. The weekday trip generation rate based on the fitted curve equation for a development with 4,800 dwelling units would be 7.40 trips per dwelling unit. Using the fitted rate equation for 4,800 dwelling units instead of the average rate would result in a trip generation estimate of 9,729 fewer trips per day.

The total number of vehicle trips generated by the land uses has been reduced to account for the internal vehicle trips made within Sterling Ranch between land uses, without use of the external streets surrounding the site. Table 3 shows the number of internal trips assumed for each land use. Based on the number of residential dwelling units and the number of students at each school about 60 percent of the school related trips were assumed to be internal to the Sterling Ranch development. Based on the number of dwelling units and the size of the mixed-use parcels about seven percent of the "shopping plaza" trips were assumed to be internal to the Sterling Ranch development. The residential internal trips were then balanced with the school and shopping plaza internal trips.

The total number of vehicle trips generated has also been reduced to take into account the "pass by" phenomena. A pass-by trip is made by a motorist who would already be on the adjacent roadways regardless of the proposed development, but who stops in at the site while passing by. The motorist would then continue on his or her way to a final destination in the original direction. The pass-by percentages shown on Table 3 are from the *Trip Generation Handbook - An ITE Proposed Recommended Practice, 3rd Edition, 2017* by ITE.

The Sterling Ranch Sketch Plan is projected to generate about 51,513 new external vehicle trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. This is about 3,448 fewer daily trips than were estimated in the 2008 Master TIS. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about

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Number: 1    Author: Paul Brown    Subject: Text Box    Date: 12/14/2022 17:42:04

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Refer to comments on Table 1 and Table 3 regarding trip generation and update this text accordingly.

Author: kdferrin    Subject: Sticky Note    Date: 12/22/2022 16:48:17

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LSC Response: No changes are needed. See our response to the comments on Table 1 and Table 3

afternoon peak-hour periods using Synchro. The key area future stop-sign-controlled and modern-roundabout-controlled intersections have been analyzed based on the unsignalized-intersection analysis procedures from the *Highway Capacity Manual 6th Edition*. Figures 6c and 10c show the level of service analysis results. The level of service reports are attached.

Compile intersection improvements in a commitment table similar to Table 4 - Roadway Segment Improvements (typical all intersections in this section). 11

**Intersection #1: Vollmer/Burgess**

The stop-sign-controlled intersection of Burgess/Vollmer is currently operating at LOS E for the eastbound approach and LOS F for the westbound approach during the afternoon peak hour. By 2042, it was assumed that this intersection would be reconstructed as a modern one-lane roundabout with a northbound right-turn bypass lane. As a modern roundabout it is projected to operate at LOS C or better for all approaches during the peak hours based on the projected 2042 total traffic volumes.

**Intersection #2: Vollmer/Arroya**

All movements at the stop-sign-controlled intersection of Vollmer/Arroya are projected to operate at LOS C or better during the peak hours based on the projected 2042 total traffic volumes.

**Intersection #3: Black Forest/Briargate**

The intersection of Black Forest/Briargate is projected to operate at an overall LOS D or better during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c. The northbound left-turn movement is projected to operate at LOS E during the morning peak hour based on the projected 2042 baseline and total traffic volumes.

**Intersection #4: Vollmer/Briargate**

The intersection of Vollmer/Briargate is projected to operate at an overall LOS C during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c.

**Intersection #5: Sterling Ranch/Briargate**


The intersection of Sterling Ranch/Briargate is projected to operate at an overall LOS C during the peak hours as a signalized intersection based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry shown in Figure 10c.

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 Number: 1   Author: Paul Brown   Subject: Text Box   Date: 12/14/2022 17:45:13

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Compile intersection improvements in a commitment table similar to Table 4 - Roadway Segment Improvements (typical all intersections in this section).

 Author: kdferrin   Subject: Sticky Note   Date: 12/22/2022 16:54:37

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LSC Response: As discussed on page 15 detailed lane geometry recommendations are beyond the scope of a Master TIS. For your reference a copy of the Table 5 Intersection Improvements from the *Sterling Ranch East Phase 1 Rezone and Preliminary Plan TIS* dated November 17, 2021 has been attached to the updated Master TIS. Detailed improvements for intersections outside of the scope of the Phase 1 TIS will be included with future preliminary plan and/or final plat submittals.

## Level of Service

All of the intersections analyzed are projected to operate at an overall satisfactory level of service (LOS D or better) during the peak hours, based on the projected 2042 total traffic volumes shown in Figure 10b and the lane geometry and traffic control shown in Figure 10c.

Some of the left-turn movements at the intersections of Black Forest/Briargate, Banning Lewis/Briargate, E-W Collector/Banning Lewis, Black Forest/Research/Marksheffel are projected to operate at LOS E during the peak hours. These movements have projected delays in the LOS E range simply because they arrive at the traffic signal at the beginning of the red phase at an intersection with many phases and a long cycle length. These movements would not be considered “failing” since their volume-to-capacity ratios are less than one. The justification is that to progress through traffic along an arterial corridor, the traffic signal offsets and left-turn phase times have been adjusted to favor the through band, which can result in higher delay for the left-turn movements, even though there is sufficient capacity for them.

This paragraph outlines the need for progression analyses in accordance with the ECM. Please include in the TIS.


Some of the left-turn movements and through movements at the intersections along Woodmen Road are projected to operate at LOS E or F during the peak hours. It may be necessary to provide additional laneage such as four through lanes on Woodmen Road or triple left-turn lanes to maintain an acceptable level of service in the future.

## Recommended Improvements

Figure 10c shows the general/preliminary laneage requirements for the key study area intersections and Table 4 shows a list of the roadway segment improvements. These recommendations are consistent with the recently published *Briargate-Stapleton Corridor Study (Draft)* by Wilson & Company dated December 9, 2021. Detailed lane geometry will be provided at the preliminary plan stage for individual developments. Generally, turn lanes, right-of-way and cross sections of street segments will need to conform to *ECM* criteria. Right of Way preservation may also be needed per the *MTCP Corridor Preservation Plan*.

This paragraph outlines the need for progression analyses in accordance with the ECM. Please include in the TIS.

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 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 20:01:19

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LSC Response: No additional, potentially signalized intersections are proposed with this Sketch Plan Amendment. The location of the access to Banning Lewis Ranch can be evaluated in detail at the preliminary plan, and a progression analysis may be run at that time. A progression analysis may also be included with any needed deviation requests for partial turn access points on Briargate as part of the justification for these partial turn access points.

**Table 1**  
**Sterling Ranch Sketch Plan**  
**Land Use Comparison**

2008 Traffic Analysis Zone <sup>(1)</sup>					Sterling Ranch Updated Traffic Impact Analysis, June 5, 2008					Sterling Ranch Sketch Plan Amendment Traffic Technical Memorandum, October 26, 2018					Currently Proposed Sketch Plan Amendment					Change from 2008		
Area (Acres)	Land Use	Quantity	Unit		Area (Acres)	Land Use	Quantity	Unit		Area (Acres)	Land Use	Quantity	Unit		Area (Acres)	Land Use	Quantity	Unit		Quantity	Unit	
1	14	Shopping Center	152	KSF <sup>(2)</sup>		11	Commercial	119.79	KSF		107	Mixed Use 11 Acres (South of Markoffe Rd)	Future	Mixed Use	120	KSF	-32.46	KSF				
2	63	Single-Family Detached Housing	234	DU <sup>(2)</sup>		26	Single-Family Detached Housing	109	DU		6	Sterling Ranch Fil 2	Approved	Residential 3-5 DU/Ac	49	DU				3	DU	
3	12	Elementary School	500	Students		19	Single-Family Detached Housing	177	DU		10	Sterling Ranch Fil 4 (north)	Short-Term Future	Residential 5-8 DU/Ac	50	DU						
4	6	Apartment	89	DU		12	Elementary School	500	Students		5	Copper Chase	Under Review	Residential 5-8 DU/Ac	138	DU						
5	22	Single-Family Detached Housing	82	DU		5	Apartment	74	DU		16	Sterling Ranch Future Filing (SW Sterling Ranch/Dines)	Future	Residential 5-8 DU/Ac	82	DU						
6	17	Single-Family Detached Housing	103	DU		62	Single-Family Detached Housing	259	DU		108	Industrial 5 Acres	Future	Industrial (Lift Station)	---	---						
7	101	Single-Family Detached Housing	611	DU		101	Single-Family Detached Housing	422	DU		10	Sterling Ranch Fil 4 (south)	Short-Term Future	Residential 3-5 DU/Ac	98	DU						
8	17	Shopping Center	185	KSF		14	Shopping Center	152.46	KSF		7&8	Sterling Ranch Fil 3	Approved	Residential 3-5 DU/Ac	63	DU						
9	35	Middle School/Junior High School	1000	students							1	Branding Iron Fil No. 1	Existing	Residential 3-5 DU/Ac	51	DU						
10	94	Single-Family Detached Housing	350	DU							2	Homestead Fil No. 1	Existing	Residential 3-5 DU/Ac	72	DU						
11	68	Single-Family Detached Housing	253	DU							4	Branding Iron Fil No. 2	Existing	Residential 3-5 DU/Ac	75	DU						
12	46	Single-Family Detached Housing	171	DU							3	Homestead Fil No. 2	Existing	Residential 3-5 DU/Ac	104	DU						
13	70	Single-Family Detached Housing	260	DU							105	Mixed Use 14 Ac (SE Braggs/Volmer)	Future	Mixed Use	51	KSF						
14	10	Elementary School	500	Students											23	DU						
15	32	Residential Condominium/Townhouse	298	DU							103				K-8 School	1100	students					
16	35	Apartment	521	DU							22 & 26				Residential 3-5 DU/Ac	294	DU					
17	72	Single-Family Detached Housing	268	DU							17, 23 & 24	Sterling Ranch East Phase 1	Under Review	Residential 3-5 DU/Ac	168	DU						
18	25	Shopping Center	272	KSF							38				Residential 2 DU/Ac	19	DU					
19	91	Single-Family Detached Housing	34	DU							102				Elementary School	600	students					
20	314	Active Adult Residential	1,899	DU							27, 28, 29, 31, 33 & 39	Sterling Ranch East Future Filings	Future	Residential 3-5 DU/Ac	603	DU						
21	88	Single-Family Detached Housing	327	DU							39	Sterling Ranch East Future Filings	Future	Residential 2 DU/Ac	18	DU						
											104	Future Elementary School	Future	Elementary School	600	students						
											14, 15, 20 & 21	Village at Sterling Ranch East	Under Review	Midtown & ADU	100	DU						
											33	Sterling Ranch East Future Filings	Future	Townhomes & Duplexes	146	DU						
											106	Mixed Use 22 Ac (SW Braggs/Running Lewis)	Future	Residential 3-5 DU/Ac	106	DU						
															80	KSF						
															367	DU						
											101	Sterling Ranch East Future Filings	Future	Residential 0.2 - 5 DU/Ac	431	DU						
											18 & 37	Sterling Ranch East Phase 1	Under Review	Residential 3-5 DU/Ac	280	DU						
											19	Four Square at Sterling Ranch	Under Review	Residential 5-8 DU/Ac	158	DU						
											30, 34, 35 & 36		Future	Residential 3-5 DU/Ac	871	DU						
											9	Homestead North Fil 1	Approved	Residential 3-5 DU/Ac	73	DU						
											11	Homestead North Fil 2	Approved	Residential 3-5 DU/Ac	74	DU						
											12	Homestead North Fil 3	Approved	Residential 2 DU/Ac	77	DU						
<b>Figure 2?</b>					<b>TOTAL</b>					<b>TOTAL</b>					<b>TOTAL</b>							
					Residential 5,500 DU					Residential 4,800 DU					Residential 4,800 DU					-700 DU		
					Commercial 610 KSF					Commercial 251 KSF					Commercial 251 KSF					-359 KSF		
					School 2,000 Students					School 2,300 Students					School 2,300 Students					300 Students		

Notes:  
(1) See Appendix Figure 1 for 2008 Traffic Analysis Zones boundaries  
(2) See Figure 3 for Traffic Analysis Zone boundaries  
(3) KSF = thousand square feet of floor area  
(4) DU = dwelling unit  
Source: LSC Transportation Consultants, Inc.

Sterling

2

3

Table 1  
Sterling Ranch Sketch Plan  
Land Use Comparison

Why is this referred to as mixed use here when it is shown as "Shopping Center" in Table 3?

1

It is very difficult to relate this table to Figure 2. Clarify.

4

Trip generation should be evaluated for each TAZ shown here.

5

Why is there no trip generation for this land use?

6

seems high

7

Number: 1 Author: Paul Brown Subject: Callout Date: 12/14/2022 17:55:18

Why is this referred to as mixed use here when it is shown as "Shopping Center" in Table 3?

Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:11:42

LSC Response: A TIS was recently completed by SM Rocha, LLC as part of the Rhetoric Sterling Ranch Multi-family Rezoning PCD Number P2216. Only a portion of that project is within the Sterling Ranch Sketch Plan boundaries. The portion that is included in the Sketch Plan (TAZ 107) is planned to be developed with all commercial uses. Multi-family land uses are planned for the areas just east of TAZ 107 and industrial uses are planned for the areas west of TAZ 108.

Number: 2 Author: dsdrice Subject: Callout Date: 12/9/2022 13:51:13

Sterling

Number: 3 Author: dsdrice Date: 12/9/2022 13:50:49  
Meridia

Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:11:52

LSC Response: Revised as requested

Number: 4 Author: Paul Brown Subject: Text Box Date: 12/14/2022 17:49:16

It is very difficult to relate this table to Figure 2. Clarify.

Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:00:41

LSC Response: Notes have been added to this table to more clarify this information. In addition a detailed trip generation table has been provided in the appendix of the updated Master TIS provides that provides further help in identifying the location of each TAZ.

Number: 5 Author: Paul Brown Subject: Text Box Date: 12/14/2022 17:53:12

Trip generation should be evaluated for each TAZ shown here.

Author: kdferrin Subject: Sticky Note Date: 12/22/2022 16:58:41

LSC Response: A detailed trip generation estimate by TAZ has been included in the appendix of the updated Master TIS

Number: 6 Author: Paul Brown Subject: Callout Date: 12/14/2022 17:53:10

Why is there no trip generation for this land use?

Author: kdferrin Subject: Sticky Note Date: 12/22/2022 16:58:13

LSC Response: The proposed land use for this parcel is a lift station which generally does not generate a significant amount of vehicle trips.

Number: 7 Author: dsdrice Subject: Callout Date: 12/9/2022 16:03:13

seems high

Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:04:24

LSC Response: To provide future flexibility for the developer the total number of lots within areas where detailed plans have not yet been submitted have been calculated to result in the maximum number of dwelling units within Sterling Ranch (4,800) being reached instead of being calculated based a the area times residential density.

Number: 8 Author: Paul Brown Subject: Callout Date: 12/14/2022 17:52:16

Figure 2?

Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:12:09

LSC Response: Revised as requested



This land use code is only valid up to 150ksf, but the quantity shown here is 251ksf. Split up by TAZ.

There are multiple ES sites. Split up by TAZ.

Table 3 Sterling Ranch Sketch Plan Trip Generation																														
Sterling Ranch Sketch Plan Area Internal Trip Calculations (Long-Term Scenario Only)																														
ITE Code	ITE Land Use	Quantity Unit	Trip Generation Rates <sup>(1)</sup>					Raw ITE Trip Generation (Individual Driveway Trips)					Internal Trips (%)					Total Internal Trips Generated					Total External Trips Generated					New External Trips Generated		
			Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour		Daily	AM	PM	Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour		Passby <sup>(2)</sup> (%)	Daily			
			In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out				
Trip Generation Estimate Based on the Currently Proposed Sterling Ranch Sketch Plan Amendment																														
Non-Residential Land Uses																														
821	Shopping Plaza <sup>(3)</sup>	251 KSF <sup>(4)</sup>	67.52	1.07	0.66	2.54	2.65	16,948	269	165	638	664	7%	7%	7%	7%	7%	1,186	19	12	45	47	15,762	250	153	593	617	34%	10,403	
520	Elementary School	1,800 Students	2.27	0.40	0.34	0.07	0.09	4,086	719	613	132	156	60%	60%	30%	30%	60%	2,452	432	184	40	93	1,634	287	429	92	63	0%	1,634	
521	Middle School/Junior High	500 Students	2.10	0.36	0.31	0.07	0.08	1,050	181	154	36	39	60%	60%	30%	30%	60%	630	109	46	11	23	420	72	108	25	16	0%	420	
Total Non-Residential Land Uses								22,084	1,169	932	807	859						4,268	560	242	96	163	17,816	609	690	711	696		12,457	
Residential Land Uses																														
210	Single-Family Detached Housing	4,054 DU <sup>(5)</sup>	4.43	0.18	0.52	0.59	0.35	38,229	738	2,100	2,401	1,410	10%	30%	24%	6%	6%	3,766	219	504	148	87	34,463	519	1,596	2,253	1,323	0%	34,463	
215	Single Family Attached Housing	146 DU <sup>(5)</sup>	7.20	0.15	0.33	0.32	0.25	1,051	22	48	47	36	10%	28%	25%	6%	6%	104	6	12	3	2	947	16	36	44	34	0%	947	
220	Multifamily Housing (Low-Rise)	600 DU	6.74	0.10	0.30	0.32	0.19	4,044	58	182	193	113	10%	30%	24%	6%	6%	398	17	44	12	7	3,646	41	138	181	106	0%	3,646	
4,800 DU								43,324	817	2,331	2,641	1,559						4,268	242	560	163	96	17,816	690	609	696	711		39,056	
Total								65,408	1,987	3,263	3,448	2,418						8,536	802	802	259	259	56,872	1,185	2,461	3,189	2,159		\$1,513	
Trip Generation Estimate From the Sterling Ranch Updated Traffic Impact Analysis, June 5, 2008								70,399	1,680	3,100	3,714	2,728												63,241	1,191	2,361	3,427	2,502		\$4,961
Change in the Trip Generation Estimate								-4,991	307	163	-266	-310												-6,369	-6	100	-238	-343		-3,448
Notes:																														
(1) Source: "Trip Generation, 11th Edition, 2021" by the Institute of Transportation Engineers (ITE)																														
(2) Source: "Trip Generation Handbook - An ITE Proposed Recommended Practice 3rd Edition, September 2017" by ITE																														
(3) Rates based on a shopping plaza with no supermarket																														
(4) KSF = thousand square feet of floor area																														
(5) DU = Dwelling Unit																														
Source: LSC Transportation Consultants, Inc.																														

There is no middle school in Table 1.  
Evaluate K-8 school instead.


3

Oct-22

There is no middle school in Table 1. Evaluate K-8 school instead.


Split up by TAZ

---

 Number: 1 Author: Paul Brown Subject: Callout Date: 12/14/2022 17:58:41


---

This land use code is only valid up to 150ksf, but the quantity shown here is 251ksf. Split up by TAZ.

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:14:54


LSC Response: A detailed trip generation table by traffic analysis zone has been included in the appendix of the updated Master TIS.

---

 Number: 2 Author: Paul Brown Subject: Callout Date: 12/14/2022 17:59:00

---

There are multiple ES sites. Split up by TAZ.

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:12:33


LSC Response: A detailed trip generation table by traffic analysis zone has been included in the appendix of the updated Master TIS

---

 Number: 3 Author: Paul Brown Subject: Callout Date: 12/14/2022 18:01:07


---

There is no middle school in Table 1. Evaluate K-8 school instead.

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:13:48

LSC Response: ITE does not provide trip generation rates for public K-8 schools. LSC believes it is more appropriate to estimate the trip generation for a public K-8 school by adding estimates using the rates for elementary school and a middle school than to use the rates for a K-8 Private School

---

 Number: 4 Author: Paul Brown Subject: Cloud+ Date: 12/14/2022 18:00:54

---

Split up by TAZ

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:14:57

LSC Response: A detailed trip generation table by traffic analysis zone has been included in the appendix of the updated Master TIS.

Table 4 (page 1 of 2) Sterling Ranch Sketch Plan Amendment Roadway Segment Improvements					
Segment ID <sup>(1)</sup> (See Figure 12 for map)	Improvement Description	Timing	Design ADT (vpd)	Projected 2042 ADT (vpd)	Define trigger. <sup>1</sup> Responsibility
V1 northbound	Restriping the 38' of pavement for two 11' southbound lanes (remove the bike lane), a 12' northbound lane and a 4' outside paved shoulder along the east edge <sup>(2)</sup> <b>Removal of bike lane is not appropriate. Consider other improvement option(s).</b> <sup>2</sup>	With Sterling Ranch Filing No. 4	5,500 (Directional northbound)	13,080	Sterling Ranch
V1 southbound			10,000 (Directional southbound)		
V1	Improve Vollmer Road between Dry Needle Place and the Sterling Ranch south boundary to a standard 4-Lane Urban Minor Arterial Cross Section (Add a second northbound through lane and painted center median) <sup>(2)</sup>	Intermediate-Term Future	20,000		Sterling Ranch, if necessary prior to construction by Others
V2	Improve Vollmer Road between the Sterling Ranch south boundary to Lochwinnoch Lane/Sterling property boundary to a standard 4-Lane Urban Minor Arterial Cross Section <sup>(2)</sup>	Short-Term Future (With Sterling Ranch Fil No. 2 Or Sterling Ranch Phase 2)	20,000 (Note: Existing Capacity 8,000 <sup>(3)</sup> )	14,385	Sterling Ranch
V3	<b>Short Term:</b> Improve Vollmer Road from Lochwinnoch Lane to Sterling Ranch boundary (northeast of Glider Loop) to provide 36' of pavement (existing pavement 1 approx. 23.38') and stripe for one through lane and plus a 6' paved, striped outside shoulder in each direction <sup>(2)</sup>	Short-Term Future (With Homestead North)	11,000 (Note: Existing Capacity 8,000)	15,040	Sterling Ranch
	<b>Long Term:</b> Improve Vollmer Road from Lochwinnoch Lane to Sterling Ranch boundary (northeast of Glider Loop) to a standard 4-Lane Urban Minor Arterial Cross Section <sup>(2)</sup>	Long-Term Future	20,000		
V4	Improve Vollmer Road from Sterling Ranch boundary (northeast of Glider Loop) to Briargate Parkway to a standard 4-Lane Urban Minor Arterial Cross Section <sup>(2)</sup>	<b>Short-Term Future— May 2024</b> Updated 10/15/2022 - Sections V4, V5, V6 to be constructed by <b>May 2024</b> (prior note: With Homestead North Filing 1)	20,000	14,495	Sterling Ranch
V5	Improve Vollmer Road from Briargate Parkway to Jane Kirkham Drive to a standard 4-Lane Urban Minor Arterial Cross Section <sup>(2)</sup>	<b>Short-Term Future— May 2024</b> Updated 10/15/2022 - Sections V4, V5, v6 to be constructed by <b>May 2024</b> (prior note: prior note: With Homestead North Filing 1)	20,000	11,690	Sterling Ranch
V6	Improve Vollmer Road from Jane Kirkham Drive to Sam Bass Drive to a standard 4-Lane Urban Minor Arterial Cross Section <sup>(2)</sup>	<b>Short-Term Future— May 2024</b> Updated 10/15/2022 - Sections V4, V5, v6 to be constructed by <b>May 2024</b> (prior note: prior note: With Homestead North Filing 2)	20,000	11,425	Sterling Ranch
V7	Improve Vollmer Road between Sam Bass Drive and Poco Road to a 4-lane Urban Minor Arterial but with necessary lane transitions, redirect tapers, etc. south of Poco to adequately transition between the 4-Lane Urban Minor Arterial Cross Section and the 2-Lane Rural Arterial Cross Section north of Poco Road.	<b>Short-Term Future – May 2024</b> Updated 10/15/2022 - Sections V4, V5, v6 to be constructed by <b>May 2024</b> (prior note: With Homestead North Filing 3)	20,000	9,920	Sterling Ranch
V8	Improve Vollmer Road from Poco Road to Shoup Road to a Rural 2-Lane Arterial Cross Section <sup>(2)</sup>	Long-Term Future	10,000	8,760	El Paso County Project ID U-12
Part 1/2 of this table (see Part 2 on next page)					
Notes:					
(1) See Figure 10					
(2) Adequate transition/redirect tapers would be needed between the various cross sections on Vollmer Road. Based on the criteria contained in Table 2-29 of the <i>El Paso Engineering Criteria Manual</i> an appropriate taper ratio for a roadway with a design speed of 40 mile per hour is 20:1					
(3) Source: Table 20 <i>Road Impact Fee Study Updated</i> November 16, 2016					
Source: LSC Transportation Consultants, Inc. (October 25, 2022)					

Sterling Ranch with potential County assistance with ROW acquisition <sup>4</sup>

---

 Number: 1 Author: Paul Brown Subject: Callout Date: 12/14/2022 18:02:10

---

Define trigger.

 Author: jchodsdon Subject: Sticky Note Date: 12/22/2022 19:30:45

LSC Response: The triggers are listed in the preceding line item under design ADT (directional northbound and southbound).

---

 Number: 2 Author: Paul Brown Subject: Text Box Date: 12/14/2022 18:02:55


---

Removal of bike lane is not appropriate. Consider other improvement option(s).


 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:15:33

LSC Response: The rationale behind this concept was that the section of Vollmer connecting to this section will have an Urban Minor Arterial cross section, which does not include a bike lane or outside paved shoulder. We have retained this description to be consistent with recent prior TIS reports. This description includes the note indicating that City Traffic Engineering concurrence/approval is required with this note: "Pending City Traffic Engineering Approval."

---

 Number: 3 Author: dsdrice Date: 12/9/2022 16:10:21  
By other

---

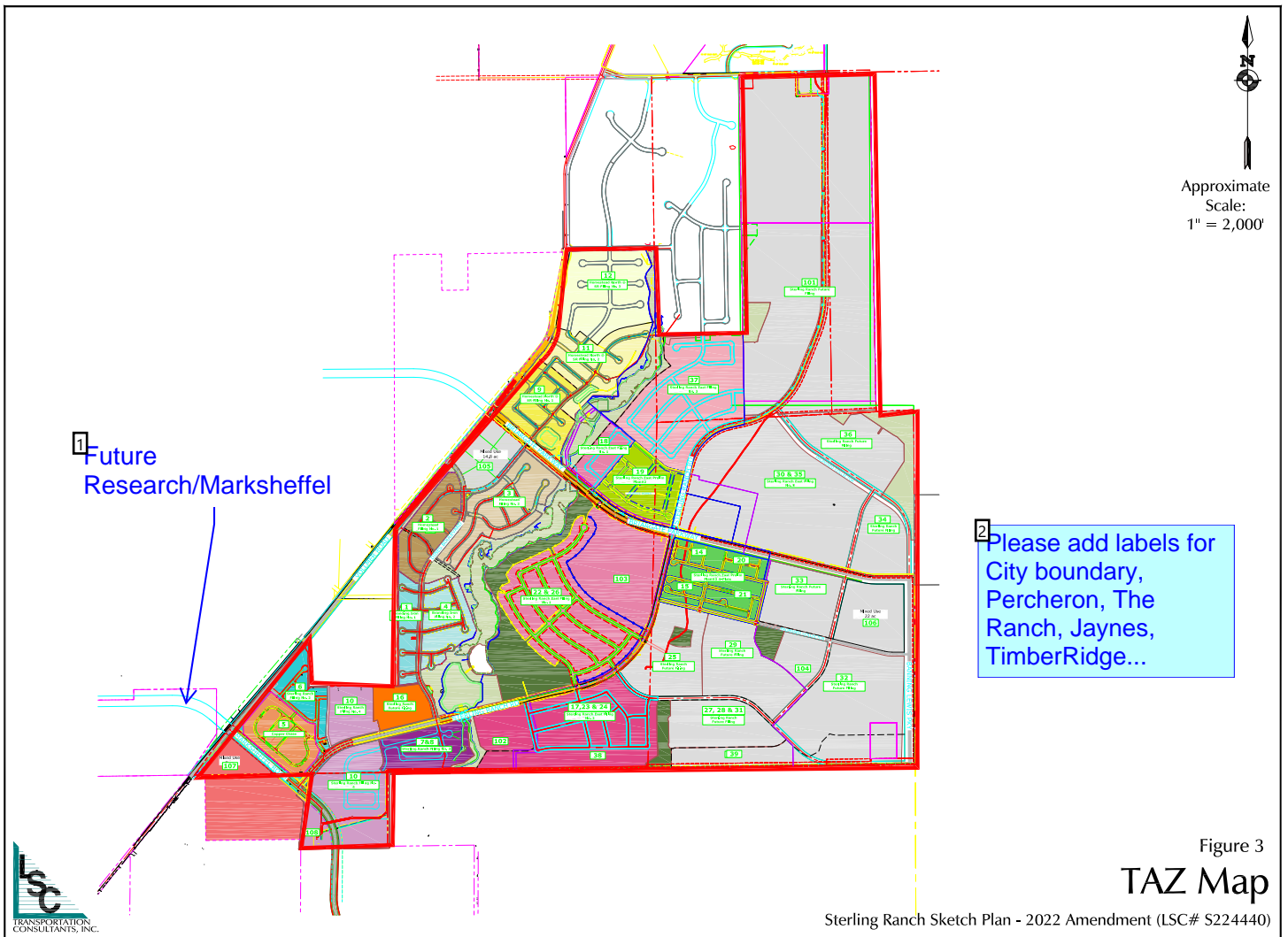
 Number: 4 Author: dsdrice Subject: Callout Date: 12/9/2022 16:10:11

---


Sterling Ranch with potential County assistance with ROW acquisition

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:15:54

LSC Response: Modified as requested.




---

 Number: 1 Author: dsdrice Subject: Callout Date: 12/9/2022 14:13:53


---

[Future Research/Marksheffel](#)

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:16:20


LSC Response: Modified as requested.

---

 Number: 2 Author: dsdrice Subject: Text Box Date: 12/9/2022 14:12:45


---


[Please add labels for City boundary, Percheron, The Ranch, Jaynes, TimberRidge...](#)


 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:16:24


LSC Response: Modified as requested.




 Number: 1 Author: dsdrice Date: 12/9/2022 15:00:24


 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:17:49  
LSC Response: Wheatland Drive north of Briargate Parkway has been approved as part of Homestead North Fil 1 PCD SF2213


 Number: 2 Author: dsdrice Date: 12/9/2022 14:59:30


 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:14:05  
LSC Response: This access is shown in the Jaynes Property Sketch Plan (PCD No SKP225)


 Number: 3 Author: dsdrice Subject: Callout Date: 12/9/2022 14:58:19


too many accesses/roads?


 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 19:40:36  
LSC Response: See our response to each highlighted access point. The note requested in the comment above has been added to the figure as requested.


 Number: 4 Author: dsdrice Date: 12/9/2022 14:54:47


 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:14:51  
LSC Response: This access is needed to serve the future K-8 school site. A deviation to the criteria contained in the ECM will need to be submitted with future plans for this site.


 Number: 5 Author: dsdrice Date: 12/22/2022 18:20:14


 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:15:10  
LSC Response: This access is needed to serve the future Mixed Use site. A deviation to the criteria contained in the ECM will need to be submitted with future plans for this site.

 Number: 6 Author: dsdrice Date: 12/22/2022 18:20:30


 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:19:14  
LSC Response: No access is proposed to Marksheffel to the north between Vollmer Road and Sterling Ranch Road. See Copper Chase at Sterling Ranch I PCD No. PUDSP222


 Number: 7 Author: dsdrice Date: 12/22/2022 18:17:47

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:19:54  
LSC Response: This accsss is shown as part of the Rhetoric Sterling Ranch Multi-family Rezoning (PCD No. P2216)


 Number: 8 Author: dsdrice Subject: Callout Date: 12/9/2022 14:55:54


Label N-S intersection spacing

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:16:31  
LSC Response: The additional information has been added as requested


 Number: 9 Author: dsdrice Subject: Callout Date: 12/9/2022 14:57:37

delete old alignment?

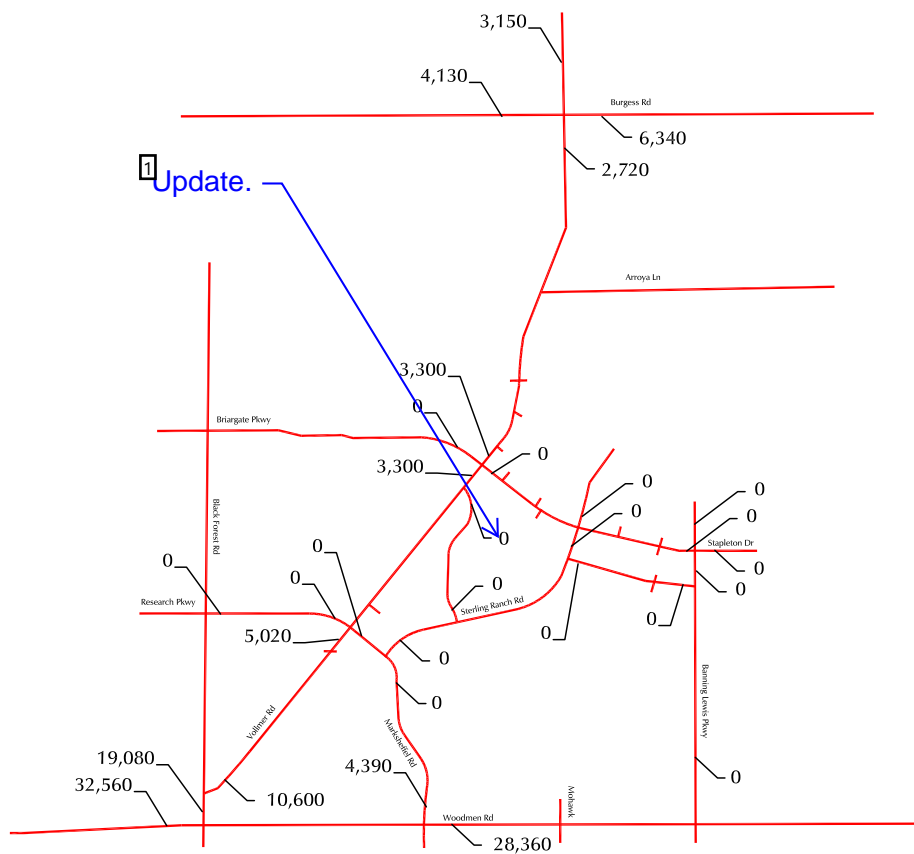
 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 17:18:01  
LSC response: Revised as requested

 Number: 10 Author: dsdrice Subject: Callout Date: 12/9/2022 15:02:23

Add a note that deviations would need to be approved for any intersections not meeting criteria

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:20:46  
LSC Response: The additional information has been added as requested





Not to scale



#### LEGEND:


XXX = Average Weekday Traffic (vehicles per day)

Counts are estimates by LSC based on factored turning movement count data shown on Figure 5b

Figure 5a  
Existing ADTs


Sterling Ranch Sketch Plan - 2022 Amendment (LSC# S224440)

---

 Number: 1 Author: dsdrice Subject: Callout Date: 12/9/2022 14:18:31

---

[Update.](#)

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:16:47  
LSC Response: The figure has been updated as requested.

---



---

 Number: 1 Author: Paul Brown Subject: Text Box Date: 12/14/2022 18:04:10

---

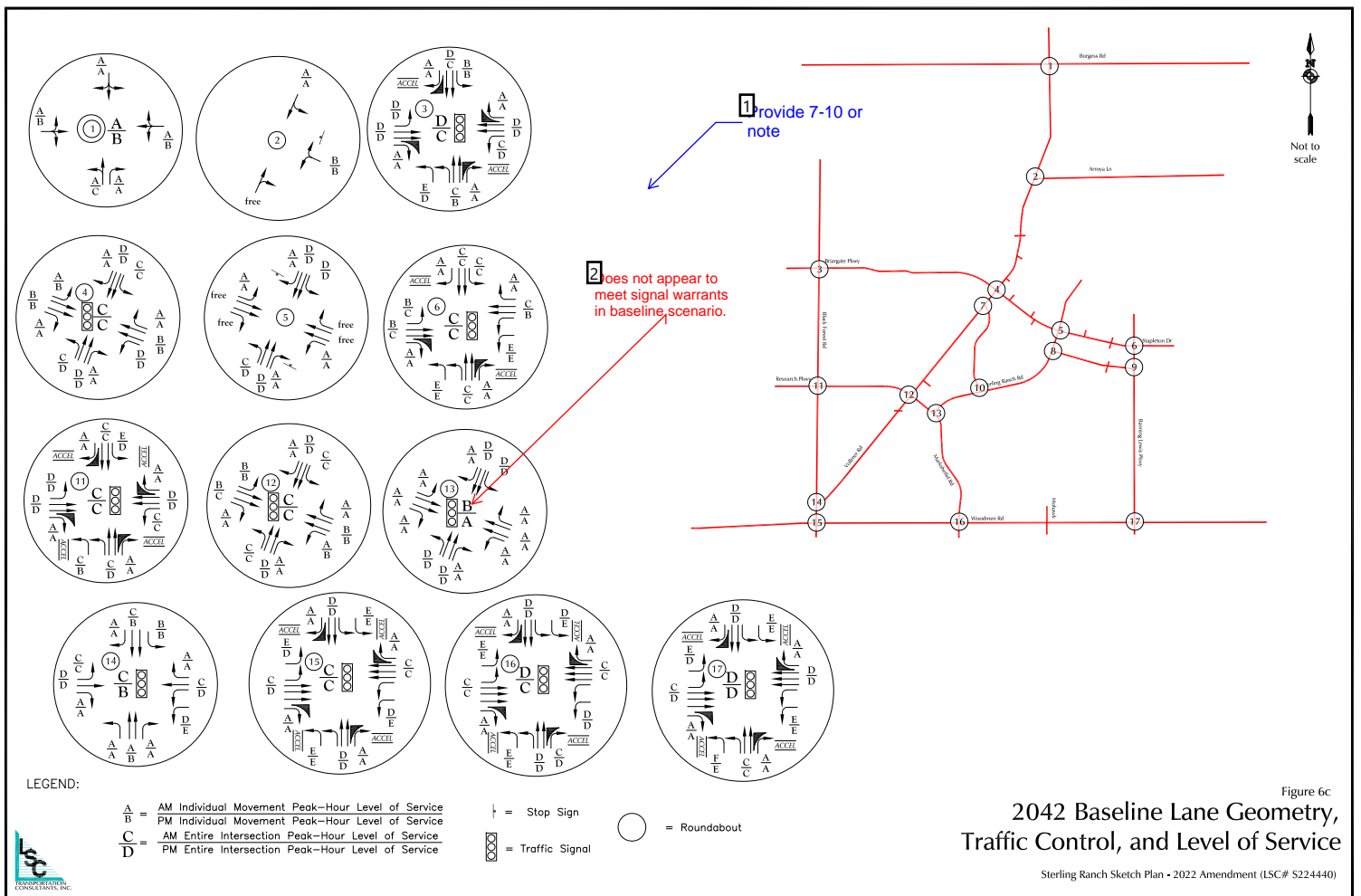
It is unclear how many of these roadway segments will be built in the baseline scenario since many segments will be funded by Sterling Ranch per Table 4. (typical all baseline figures)




Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:22:23

---

LSC Response: The Baseline Scenairo is a theoretical scenrio that assumes no traffic generated by land uses within Sterling Ranch (including existing land uses) but assumes the street network is built out. The purpose of this scenario is to evaluate the background assumptions used to calculate the total traffic volumes and potentially to determine the percent impacts due to Sterling Ranch traffic.




---


 Number: 1 Author: dsdrice Subject: Callout Date: 12/9/2022 14:35:46

---

[Provide 7-10 or note](#)


 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:23:49  
LSC Response: The figures have been revised to include intersections 7-10

---

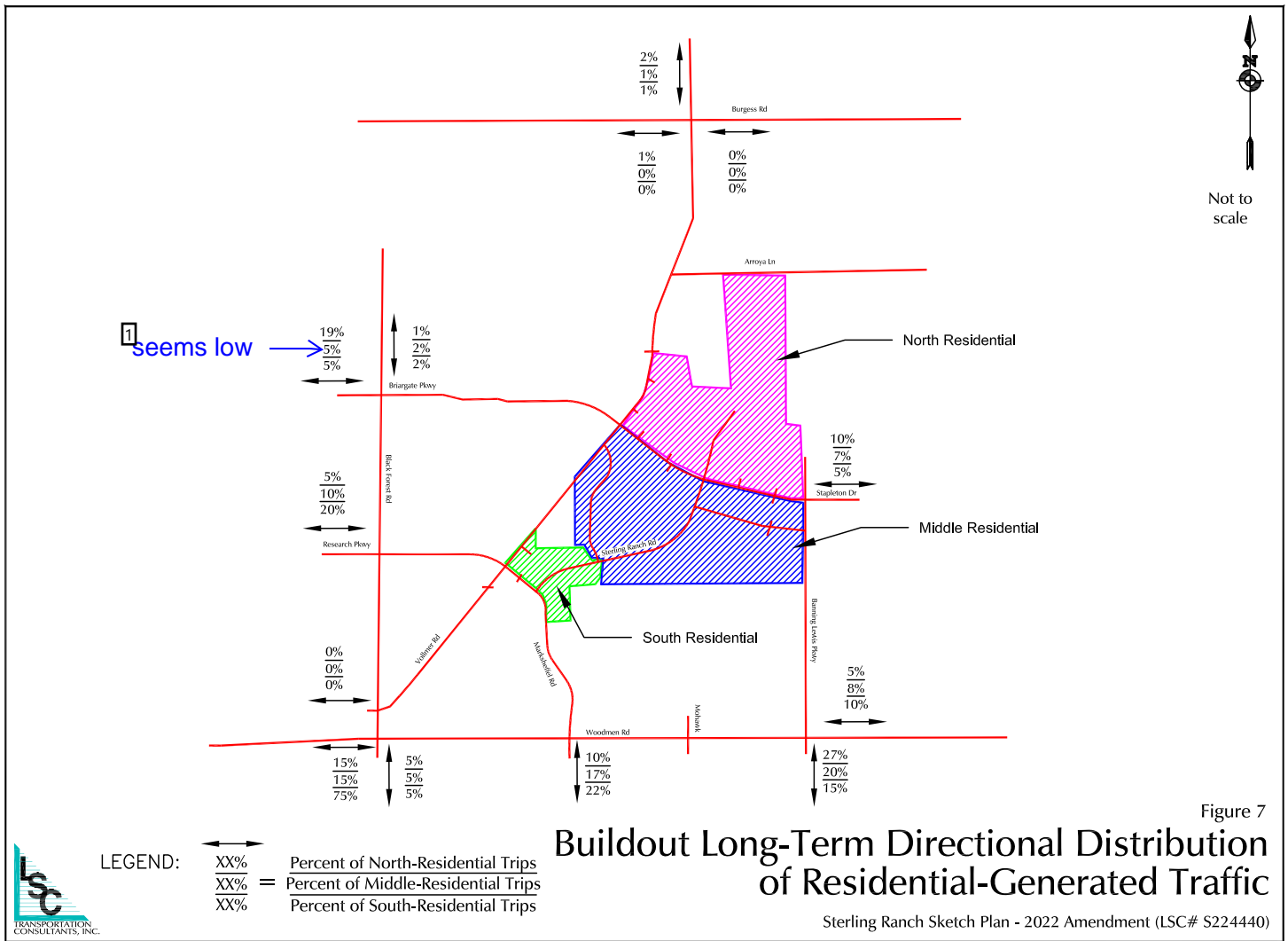
 Number: 2 Author: Paul Brown Subject: Callout Date: 12/14/2022 18:04:52

---


**Does not appear to meet signal warrants in baseline scenario.**

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:23:33  
LSC Response: This level of service analysis for this intersection has been revised to two-way, stop-sign control for the baseline scenario.

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 Number: 1 Author: dsdrice Subject: Callout Date: 12/9/2022 14:40:55

---

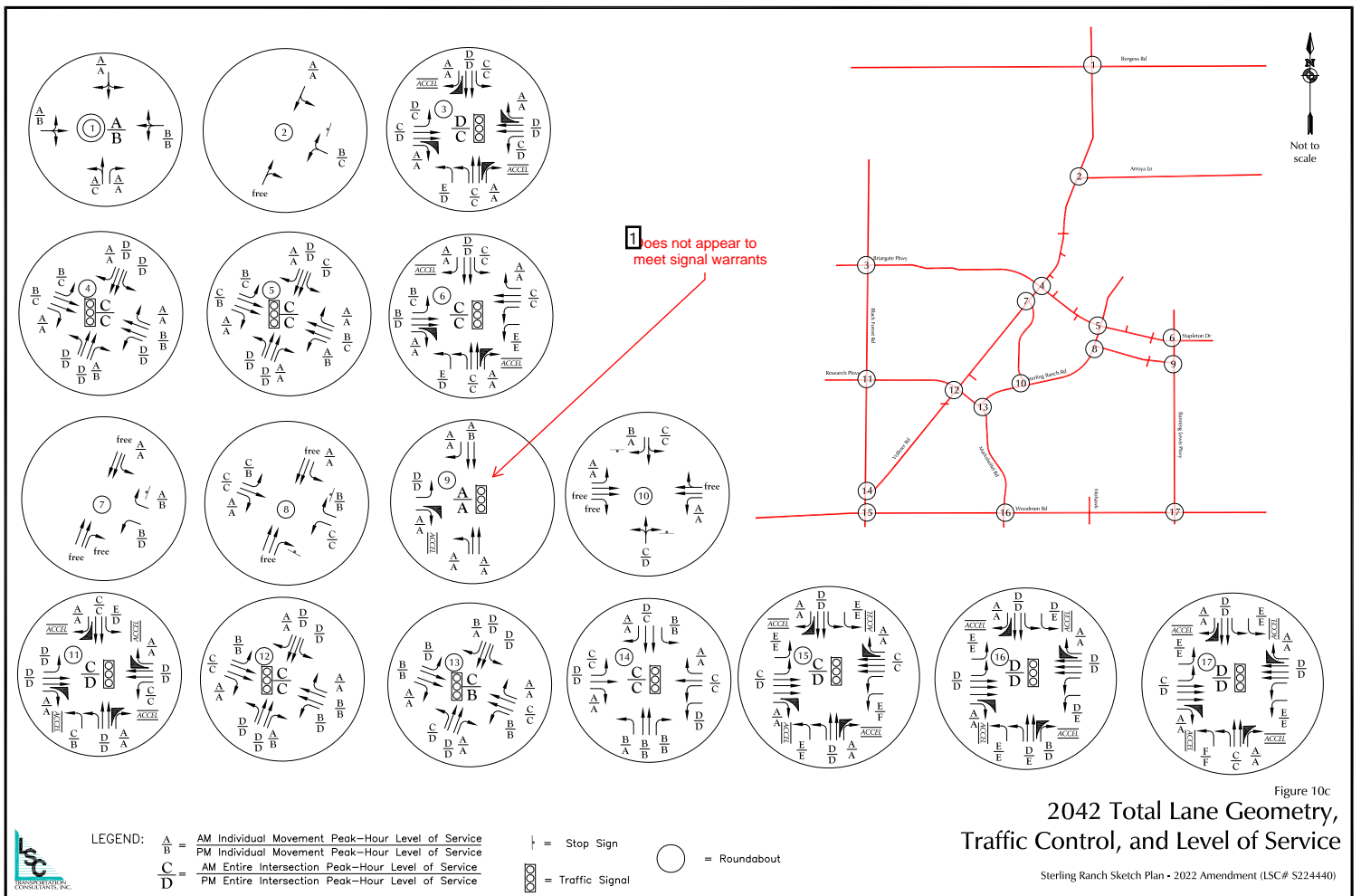
seems low

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 19:43:02


---

LSC Response: A topographical error has been corrected on this figure in the updated Master TIS. The distribution percentage of trips for the middle residential area are to and from the west on Briargate west of Black Forest Road was assumed to be 15%.






---

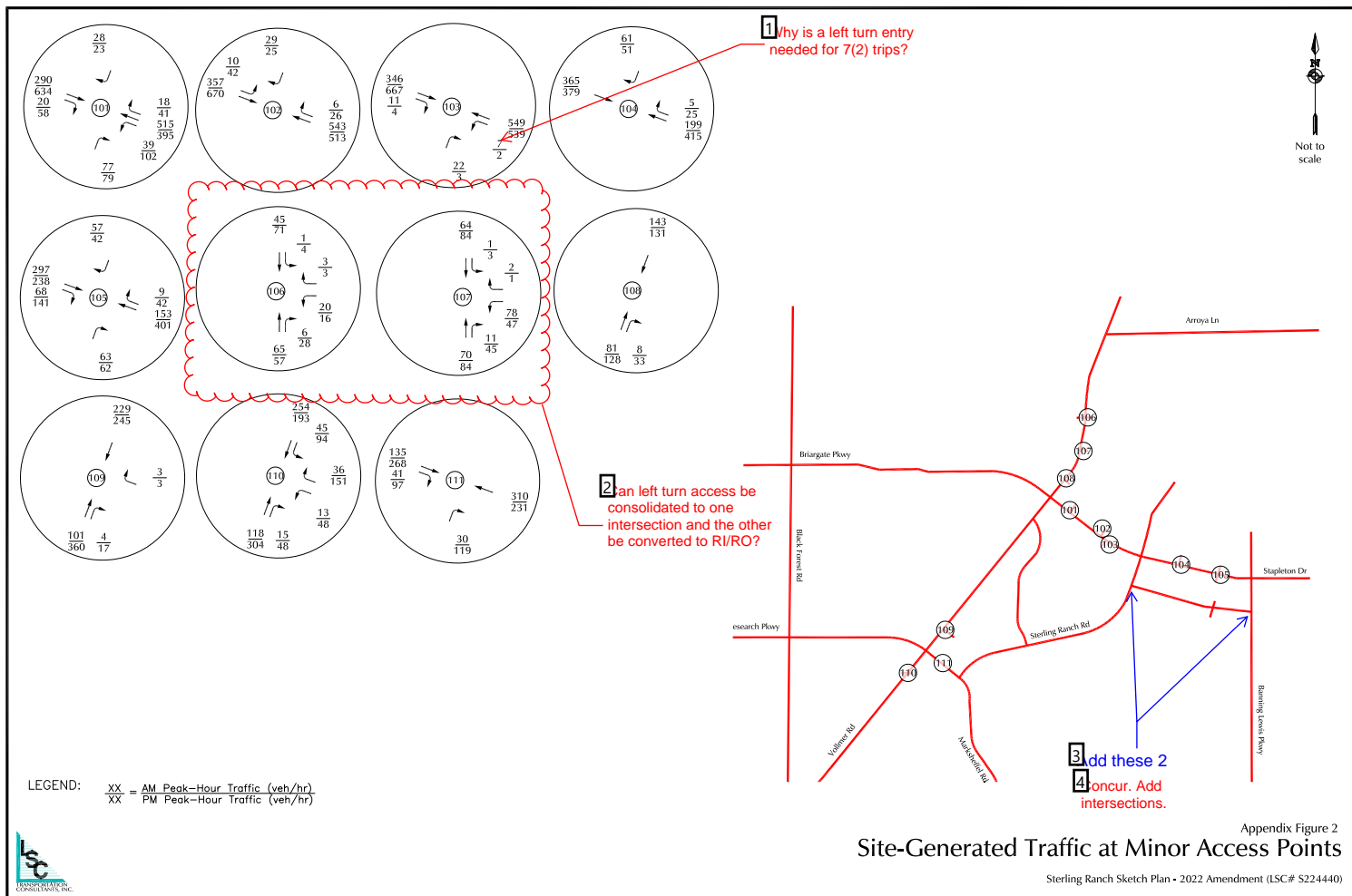
 Number: 1 Author: Paul Brown Subject: Callout Date: 12/14/2022 18:05:52

---

Does not appear to meet signal warrants


 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:26:24

LSC Response: Detailed traffic signal warrants will be provided with a future preliminary plan and/or final plat submittal. The purpose of this Master TIS is to only identify intersections that may need to be signal controlled in the future to provide information as this area is planned.




 Number: 1 Author: Paul Brown Subject: Callout Date: 12/14/2022 18:07:23


Why is a left turn entry needed for 7(2) trips?

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:30:13


LSC Response: Intersection #103 is needed to serve the future K-8 school site. There are currently no plans available that show the school layout and access plan. This Master TIS assumed the access to Briargate Parkway would serve a bus loop only, however, this intersection is requested as a 3/4 movement access to provide flexibility as actual designs are prepared for the school.

 Number: 2 Author: Paul Brown Subject: Cloud+ Date: 12/14/2022 18:08:42

Can left turn access be consolidated to one intersection and the other be converted to RI/RO?

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:28:48

LSC Response: Intersection #106 (Poco/Vollmer) is an existing full-movement intersection. Intersection #107 (Sam Bass/Vollmer) is planned as a full-movement intersection as part of Homestead North Fil 2 (PCD No. SF 2218) and Homestead North Fil 3 (PCD No. SF 2229). Traffic reports for both of these projects have been through multiple reviews and only minor comments are left to be resolved. It is anticipated that they will be approved in the short-term future.

 Number: 3 Author: dsdrice Subject: Callout Date: 12/15/2022 09:08:16

Add these 2

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 19:44:29

LSC Response: These intersections are included as #8 and #9 on Figure 9b.

 Number: 4 Author: Paul Brown Subject: Text Box Date: 12/14/2022 18:09:11

Concur. Add intersections.

 Author: jchodsdon Subject: Sticky Note Date: 12/22/2022 19:44:49

LSC Response: These intersections are included as #8 and #9 on Figure 9b.


## 2008 TIS TAZ Map

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The next page is included in the previous section., Can this cover page and the duplicate figure be removed?




---

 Number: 1 Author: Paul Brown Subject: Text Box Date: 12/14/2022 18:10:22

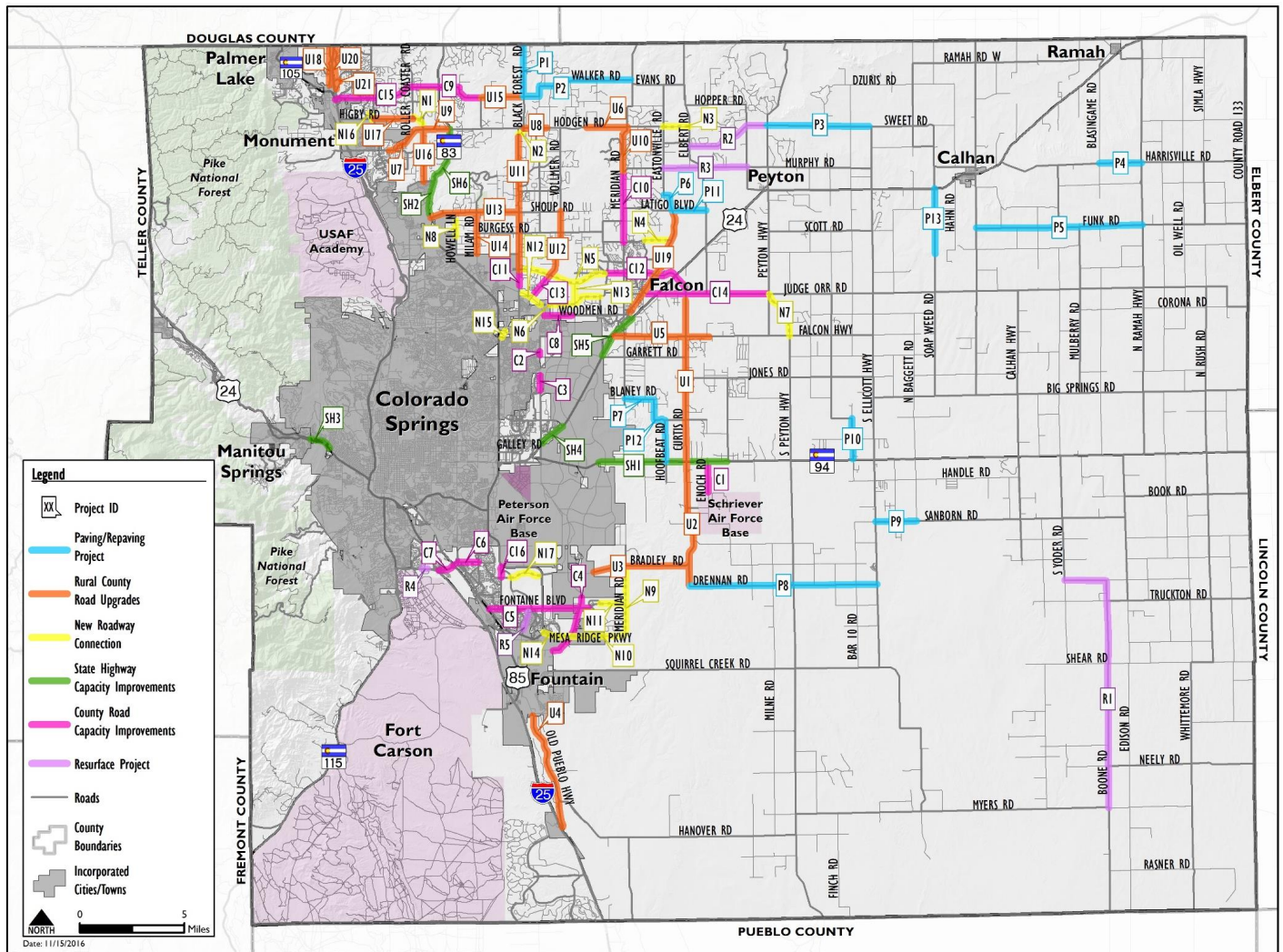
---

The next page is included in the previous section., Can this cover page and the duplicate figure be removed?

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:30:49

---

LSC Response: This section has been removed in the updated TIS



Map 13: Roadway Improvement Projects



Number: 1 Author: Paul Brown Subject: Text Box Date: 12/14/2022 18:11:21

Call out site on this figure



Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:31:10

LSC Response: The additional information has been added as requested




# Levels of Service

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Consider using a different analysis tool<sup>1</sup>  
for roundabouts. (typical all scenarios)


Appropriate Y+AR times should be calculated<sup>2</sup>  
and included in all future signalized analyses.  
These values should come from agency signal  
timing data for existing signalized intersections,

---

 Number: 1 Author: Paul Brown Subject: Text Box Date: 12/14/2022 18:12:27

---

Consider using a different analysis tool for roundabouts. (typical all scenarios)

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 19:45:58

LSC Response: HCM methodology is appropriate for this master study/planning level of analysis. Once this intersection enters the design phase detailed roundabout reports will be required that will utilize either Sidra or Rodel.

---

 Number: 2 Author: Paul Brown Subject: Text Box Date: 12/14/2022 18:17:25

---

Appropriate Y+AR times should be calculated and included in all future signalized analyses. These values should come from agency signal timing data for existing signalized intersections,












 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 19:47:26

LSC Response: The existing Y+AR times have been used for the intersection of Woodmen/Black Forest. Typical Y+AR times are adequate for this master study/ planning level analysis as many of the intersections have yet to be designed.

Timings  
14: Black Forest Rd & Vollmer Rd

All existing conditions  
signalized analyses should  
use existing signal timings.

Existing Traffic  
AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	494	3	339	469	3	405
Future Volume (vph)	494	3	339	469	3	405
Turn Type	Prot	Prot	NA	Perm	Perm	NA
Protected Phases	3	3	2			6
Permitted Phases				2	6	
Detector Phase	3	3	2	2	6	6
Switch Phase						
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	19.5	19.5	20.0	20.0	20.0	20.0
Total Split (s)	40.0	40.0	50.0	50.0	50.0	50.0
Total Split (%)	44.4%	44.4%	55.6%	55.6%	55.6%	55.6%
Yellow Time (s)	3.5	3.5	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5	5.0	5.0		5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Effect Green (s)	33.2	33.2	47.3	47.3		47.3
Actuated g/C Ratio	0.37	0.37	0.53	0.53		0.53
v/c Ratio	0.91	0.01	0.44	0.54		0.57
Control Delay	46.7	11.0	15.7	3.1		18.1
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	46.7	11.0	15.7	3.1		18.1
LOS	D	B	B	A		B
Approach Delay	46.4		8.4			18.1
Approach LOS	D		A			B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

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

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 21.3

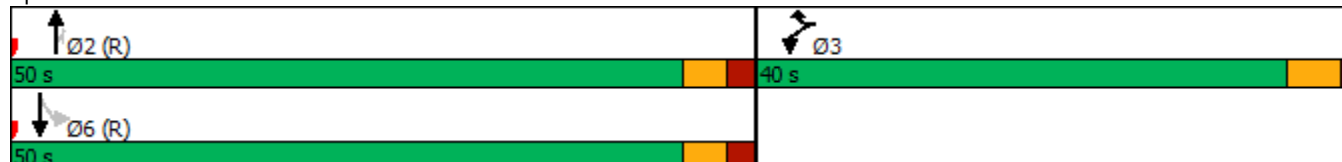
Intersection LOS: C

Intersection Capacity Utilization 59.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 14: Black Forest Rd & Vollmer Rd




---

 Number: 1   Author: Paul Brown   Subject: Text Box   Date: 12/14/2022 18:14:49

---

All existing conditions signalized analyses should use existing signal timings.

---

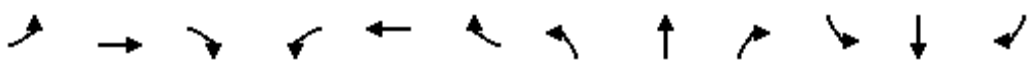
 Author: kdferrin   Subject: Sticky Note   Date: 12/22/2022 19:56:42

---

LSC Response: The exiting signal times have been used for the intersection of Woodmen/Black Forest. Signal timing plans have been requested from the City of Colorado Springs for Woodmen/Black Forest and Black Forest/Vollmer but have not yet been received by LSC. It is likely that the Black Forest Road intersection signal timings will change following completion of the City Black Forest Road project.

# Timings 16: Marksheffel Rd & Woodmen Rd

Existing Traffic  
AM Peak Hour

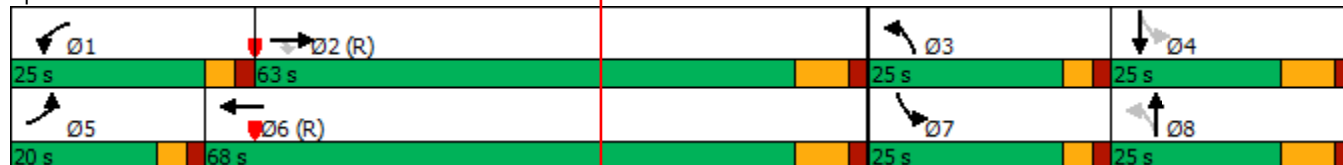
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	598	364	393	1090	6	337	184	260	7	65	229
Future Volume (vph)	49	598	364	393	1090	6	337	184	260	7	65	229
Turn Type	Prot	NA	Perm	Prot	NA	Free	pm+pt	NA	Free	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			Free	8		Free	4		Free
Detector Phase	5	2	2	1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	4.0	25.0	25.0	4.0	25.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	9.0	32.5	32.5	9.0	32.5		9.0	17.5		9.0	17.5	
Total Split (s)	20.0	63.0	63.0	25.0	68.0		25.0	25.0		25.0	25.0	
Total Split (%)	14.5%	45.7%	45.7%	18.1%	49.3%		18.1%	18.1%		18.1%	18.1%	
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-3.0	-3.0	-1.0	-3.0		-1.0	-2.0		-1.0	-2.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5		4.0	5.5		4.0	5.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None		None	None	
Act Effect Green (s)	7.6	64.2	64.2	26.0	84.5	138.0	35.3	31.6	138.0	17.2	12.3	138.0
Actuated g/C Ratio	0.06	0.47	0.47	0.19	0.61	1.00	0.26	0.23	1.00	0.12	0.09	1.00
v/c Ratio	0.28	0.39	0.41	0.77	0.64	0.01	0.99	0.47	0.18	0.05	0.24	0.17
Control Delay	65.9	26.3	3.7	61.8	20.6	0.0	91.9	49.7	0.2	37.4	60.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.9	26.3	3.7	61.8	20.6	0.0	91.9	49.7	0.2	37.4	60.3	0.2
LOS	E	C	A	E	C	A	F	D	A	D	E	A
Approach Delay		20.1			31.4			51.4			14.1	
Approach LOS		C			C			D			B	

## Intersection Summary

Cycle Length: 138  
 Actuated Cycle Length: 138  
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.99  
 Intersection Signal Delay: 31.1  
 Intersection Capacity Utilization 70.5%  
 Analysis Period (min) 15


Intersection LOS: C  
 ICU Level of Service C

Splits and Phases: 16: Marksheffel Rd & Woodmen Rd




Provide justification for lost time adjustments or remove (typical all signalized analyses)

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 Number: 1 Author: Paul Brown Subject: Cloud+ Date: 12/14/2022 18:13:36

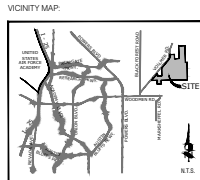
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Provide justification for lost time adjustments or remove (typical all signalized analyses)

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:34:26  
LSC Response: The analysis has been updated for all scenarios to assume 0 seconds of lost time for all signalized intersections.

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## AMENDMENT



SR LAND, LLC  
20 BOULDER CRESCENT STREET, SUITE 200  
COLORADO SPRINGS, CO 80903-3300

CLASSIC SRJ LAND, LLC  
2138 FLYING HORSE CLUB DRIVE  
COLORADO SPRINGS, CO 80921


CHALLENGER COMMUNITIES, LLC.  
8805 EXPLORER DRIVE, SUITE 250  
COLORADO SPRINGS, CO 80920-1013


Roadway	Existing	2040 MTCF	2060 MTCF/CPV	Starling Ranch Proposed
Vollmer Road	2 lane Collector - 60'	4 lane Minor - 100'	4 lane Minor - 100'	4 lane Minor - 100'
Briargate Parkway	4 lane Principal - 130'	4 lane Principal - 130'	4 lane Principal - 130'	4 lane Principal - 130'
Banning Lewis Ranch Parkway	4 lane Principal - 130'	4 lane Principal - 130'	4 lane Principal - 130'	4 lane Principal - 130'



1  
OF 1  
SKP 07-007

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 Number: 1 Author: dsdrice Date: 12/9/2022 15:15:43  
5225

 Author: kdferrin Subject: Sticky Note Date: 12/22/2022 18:34:52  
LSC Response: An updated version of the Sketch Plan showing 4,800 maximum dwelling units has been included with the updated Master TIS.

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