

MEMORANDUM

DATE: March 11, 2021

TO: Kari Parsons, PCD-Project Manager

FROM: Jeff Rice, PCD-Engineering
719-520-7877

SUBJECT: PUDSP-21-002 – Skyline at Lorson Ranch (with EGP)
First Submittal

Transportation / Traffic Impact Study

1. The developer shall participate in a fair and equitable manner in the design and construction of intersection improvements at the intersections of Fontaine Boulevard and Old Glory Drive. Address how the intersection improvements will be designed and provided for (set up escrow account?) and when they will be needed relative to The Hills at Lorson Ranch Filing No. 1 and Skyline at Lorson Ranch developments.
LSC Response: A paragraph has been added to the updated TIS report to address this comment.
2. Should escrow be provided for the Fontaine Blvd. / Carriage Meadows Dr. intersection from this development?
LSC Response: No. A paragraph has been added to the updated TIS report to address this comment.
3. Note: The TIS generally complies with Appendix B of the ECM. Additional items specified by the ECM but not addressed in this TIS, including updated analyses of Fontaine Blvd. and Lorson Blvd. to Marksheffel Road, and the respective intersections may be addressed in the TIS for the project called “The Ridge at Lorson Ranch” (EA-21-045).
LSC Response: Comment noted.
4. Note: The collector and arterial road improvements required by The Hills at Lorson Ranch (SF-21-010) need to be collateralized or completed prior to recording of a plat within the Skyline at Lorson Ranch PUDSP area.
LSC Response: Comment noted.
5. See TIS redlines for additional comments. (Also see comments on SF-21-010).
LSC Response: See attached responses to TIS redline comments.



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FAX (719) 633-5430
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Website: <http://www.lscctrans.com>

Skyline at Lorson Ranch Traffic Impact Analysis (LSC #204250) January 21, 2021

Engineering Review

03/11/2021 2:04:37 PM

dsdrice

JeffRice@elpasoco.com

(719) 520-7877

EPC Planning & Community
Development Department

Traffic Engineer's Statement

1

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.





Date

LSC Responses to TIS Redline Comments

Page: 1

 Number: 1 Author: dsdrice Subject: EPC ENG Review Date: 3/11/2021 4:04:47 PM -06'00'

RECENT AREA TRAFFIC STUDIES

Appendix Table 1 includes a list of other recent traffic studies conducted by LSC within the Lorson Ranch development and in the vicinity.

This site was previously included in *The Hills at Lorson Ranch Full Traffic Impact and Access Analysis* (TIA) by LSC Transportation Consultants, Inc. dated October 27, 2020 as traffic analysis zone 45. That TIA assumed this zone would be developed with 76 single-family homes.

LAND USE AND ACCESS

Land Use

Skyline at Lorson Ranch is planned to include 85 lots for single-family homes. This is nine more single-family homes than was assumed in the Hills at Lorson Ranch TIA. Figure 2 shows the proposed site plan.

Street Connections

Fontaine Boulevard and Lorson Boulevard are planned to be extended east to a new north-south collector (Walleye Drive) between as part of The Hills at Lorson Ranch. A new east-west collector (Grayling Drive) is planned to be constructed between Lamprey Drive and the future Walleye Drive as part of The Hills at Lorson Ranch. An additional section of Grayling Drive between Walleye Drive and the north boundary of Lorson Ranch is planned as part of the currently-proposed Skyline at Lorson Ranch. Two full-movement access points are proposed to Grayling Drive. Figure 2 shows the proposed access spacing.

Pedestrian and Bicycle Route Analysis

Grand Mountain K-8 School is located southwest of the site. The subdivision streets will include sidewalks and connecting streets within Lorson Ranch also have sidewalks. Trail corridors are planned along the powerline easement, the East Fork of Jimmy Camp Creek, and along Jimmy Camp Creek. Also, Marksheffel Road and Fontaine Boulevard have paved shoulders to accommodate cyclists. Lorson Boulevard has been constructed with wider travel lanes (and a 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).

Sight Distance Analysis

Figure 3 shows sight-distance analysis at the proposed public street intersections (note: this north street connection would become an “intersection” in the future if/when Grayling Drive is extended north (with future development to the north). 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. The required stopping sight distance from ECM Table 2-17 is 305 feet. Figure 3 shows the areas between the sight distance lines and the curb line that will need to be kept free of other obstructions (such as rear privacy fencing, landscaping, and backyard/patio amenities) that would restrict the drivers' line of sight. Landscaping should be low — about 18 inches or lower in height — to the east of the passenger vehicle lines of sight shown. Please refer to ECM Sections 2.3.6.G.1 and 2. Note: If the initial intersection traffic control (with construction of this intersection) is all-way, stop-sign control (AWSC) and the AWSC remains in-place in perpetuity, the required sight distance lines of sight would be outside the lot lines.

STREET AND TRAFFIC CONDITIONS

Area Streets

The key area 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.


The Hills ^②

- **Fontaine Boulevard** is designated as a four-lane Urban Principal Arterial east of Marksheffel Road and has been constructed as such from Marksheffel Road east to Old Glory Drive/Stingray Lane. Fontaine Boulevard has recently been constructed east of Old Glory Drive/Stingray Lane adjacent to the Lorson Ranch East development as an interim Urban Non-Residential Collector Street within 100 feet of right-of-way. As part of this development, Fontaine Boulevard will be extended east from its current terminus adjacent to the site with the same interim cross section and right-of-way. The posted speed limit on Fontaine Boulevard is 35 mph just east of (and a short distance west of) Marksheffel Road. The speed limit increases to 45 mph just east of the bridge over Jimmy Camp Creek and then decreases back to 35 mph just east of Old Glory (east)/Stingray.
- **Lorson Boulevard** currently extends east from Marksheffel Road to Lamprey Drive. Lorson Boulevard is classified as an Urban Non-Residential Collector Street (modified for a 44-foot street width, rather than the standard 52-foot street width) with an 80-foot-wide right-of-way between Marksheffel Road and Stingray Lane and as an Urban Residential Collector Street (modified for a 44-foot street width, rather than the standard 52-foot street width) with a 64- to 72-foot-wide right-of-way between Stingray Lane and Lamprey Drive. As part of this development, Lorson Boulevard will be constructed east of Lamprey Drive adjacent to the site as a standard Urban Residential Collector with a 60-foot-wide right-of-way.
- **Lamprey Drive** is an Urban Residential Collector which currently extends north from Lorson Boulevard to Shavers Drive just north of Fontaine Boulevard. Lamprey Drive is planned to be constructed east to the future Walleye Drive as part of the Hills at Lorson Ranch. The

Address the sharp
curve/knuckle ^①

 Number: 1 Author: dsdrice Subject: Callout Date: 3/11/2021 3:23:53 PM -06'00'


[Address the sharp curve/knuckle](#)

 Author: jchodsdon Subject: Sticky Note Date: 6/29/2021 4:39:01 PM


LSC Response: Addressed in the updated TIS report as requested.

 Number: 2 Author: dsdrice Subject: Callout Date: 3/11/2021 3:25:25 PM -06'00'

[The Hills](#)

 Author: jchodsdon Subject: Sticky Note Date: 6/29/2021 4:39:51 PM

LSC Response: This change has been made in the updated TIS report as requested.

 Number: 3 Author: dsdrice Date: 3/11/2021 3:24:22 PM -06'00'

f this

ROADWAY IMPROVEMENT FEE

This project will be required to participate in the El Paso County Road Improvement Fee Program. The Hills 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 86 lots, the total building permit fee would be \$103,785. 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 802 new vehicle trips on the average weekday, with about half entering and half exiting the site. During the morning peak hour, about 16 vehicles would enter and 47 vehicles would exit the site. During the afternoon peak hour, about 53 vehicles would enter and 31 vehicles would exit the site.

Intersection Sight Distance

- Please refer to the Sight Distance section of this report for areas of that site that need to allow for the required intersection sight distance lines of sight.

[See redlined exhibit](#)

¹

Projected Levels of Service & Intersection Traffic Control Recommendations

- The intersection of Fontaine/Lamprey was recently constructed as a modern one-lane roundabout. All movements at this intersection are projected to operate at LOS D or better during the peak hours, based on the projected short-term and 2040 total traffic volumes.
- The south full-movement site access point to Grayling Drive is projected to operate at a satisfactory level of service as a two-way, stop-sign-controlled intersection.

Street Classifications

- All of the streets within Skyline at Lorson Ranch should be classified as Urban Local. See Figure 10 for the recommended classifications of the adjacent roadways.

Street Classifications

- Based on the current ten-mil PID building permit fee, the total building permit fee would be \$103,785. Note: This is based on the current rate, which is subject to change. El Paso County updates this rate periodically.

delete?


²

 Number: 1 Author: dsdrice Subject: Text Box Date: 3/11/2021 4:03:52 PM -06'00'

[See redlined exhibit](#)

 Number: 2 Author: dsdrice Subject: Cloud+ Date: 3/11/2021 4:03:15 PM -06'00'

[delete?](#)

 Author: jchodsdon Subject: Sticky Note Date: 6/29/2021 4:41:34 PM

LSC Response: Deleted in the updated TIS.

Grayling Drive Striping

- Grayling Drive potentially be striped with a single dual yellow centerline stripe instead of a center painted two-way left-turn “median” South of Lamprey drive as the through and left-turning volumes are projected to be relatively low. No striping is needed on Grayling Drive north of Lamprey Drive.

See comment letter regarding offsite improvements. ¹

* * * * *

We trust this traffic impact analysis will assist you in gaining approval of the proposed Skyline 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

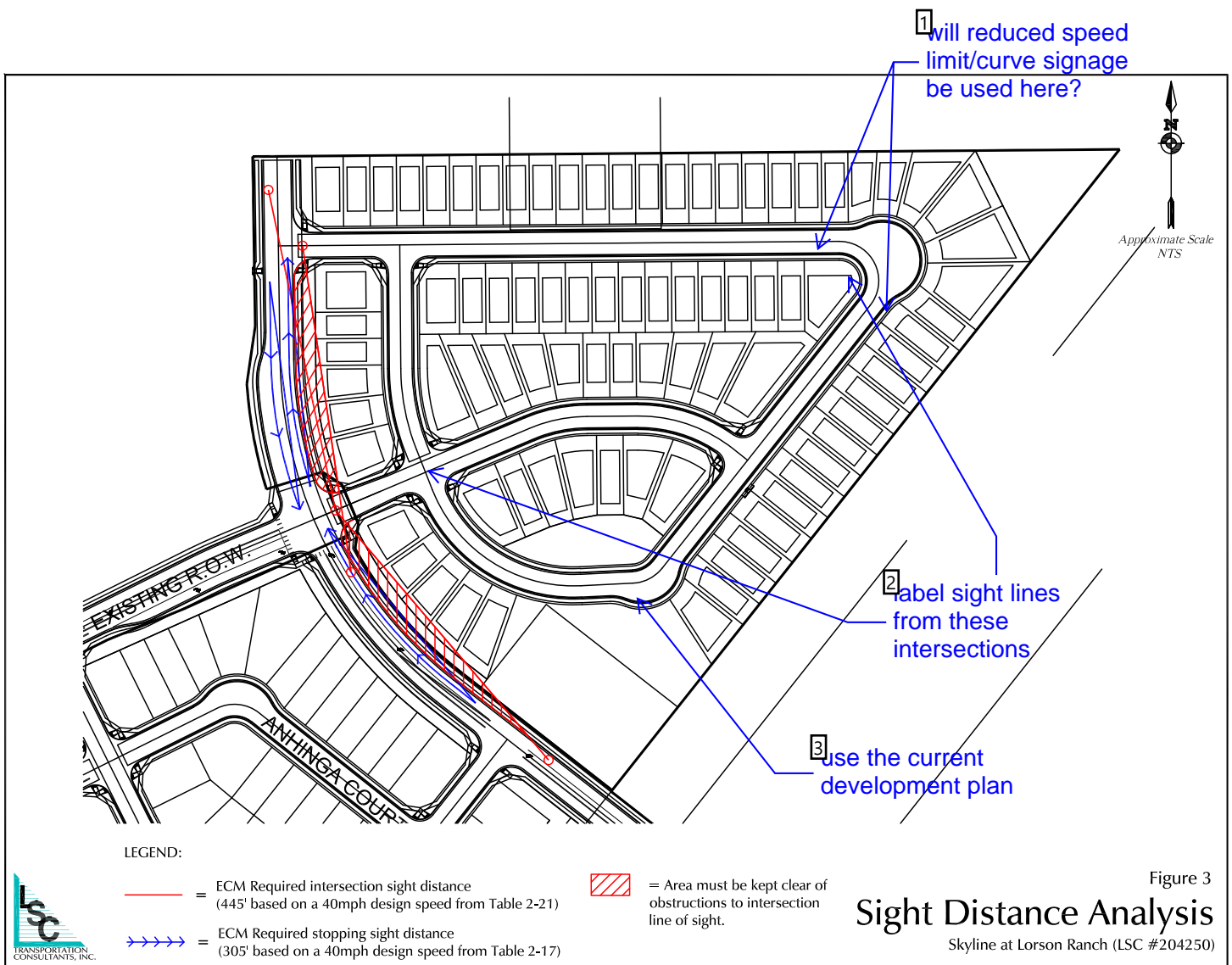
Enclosures: Table 1
Figures 1-10
Appendix Tables 1-3
Level of Service Reports
MTCP Maps

 Number: 1 Author: dsdrice Subject: Text Box Date: 3/11/2021 4:04:24 PM -06'00'

[See comment letter regarding offsite improvements.](#)


 Author: jchodsdon Subject: Sticky Note Date: 6/29/2021 4:42:26 PM

LSC Response: Please refer to LSC responses to the comment letter comments. They have been addressed in the updated TIS report as requested.



 Number: 1 Author: dsdrice Subject: Callout Date: 3/11/2021 3:21:14 PM -06'00'


[will reduced speed limit/curve signage be used here?](#)

 Author: jchodsdon Subject: Sticky Note Date: 6/29/2021 4:48:30 PM

LSC Response: No, as the centerline radius meets ECM criteria for an Urban Local knuckle - thus the design speed is the same. The sight distance is addressed in the updated TIS report.

 Number: 2 Author: dsdrice Subject: Callout Date: 3/11/2021 3:20:00 PM -06'00'


[label sight lines from these intersections](#)

 Author: jchodsdon Subject: Sticky Note Date: 6/29/2021 4:46:10 PM

LSC Response: Added and addressed in the updated TIS report as requested. Also, sight distance easements have been added to the plan.

 Number: 3 Author: dsdrice Subject: Callout Date: 3/11/2021 3:19:22 PM -06'00'


[use the current development plan](#)

 Author: jchodsdon Subject: Sticky Note Date: 6/29/2021 4:48:02 PM


LSC Response: Updated as requested.

Appendix Table 1 Area Traffic Impact Studies by LSC Skyline at Lorson Ranch	
Study	Date
Lorson Ranch Sketch Plan Amendment 2 Traffic Impact and Access Analysis	December 17, 2018
Carriage Meadows South at Lorson Ranch Filing No. 1 Updated Traffic Impact Analysis	August 14, 2017
Carriage Meadows North at Lorson Ranch Filing No. 1 Updated Traffic Impact Analysis	January 29, 2017
Lorson Ranch East Updated Traffic Impact and Access Analysis	November 9, 2017
Lorson Ranch East Filing No. 1 Transportation Memorandum	May 2, 2018
Lorson Ranch East Filing No. 2 Transportation Memorandum	September 24, 2018
Lorson Ranch East Filing No. 3 Transportation Memorandum	January 22, 2019
Lorson Ranch East Filing No. 4 Transportation Memorandum	March 12, 2019
Lorson Ranch PK-8 School Traffic Impact and Access Analysis	October 4, 2018
Creekside at Lorson Ranch Filing No. 1 Traffic Impact and Access Analysis	October 28, 2018
Creekside at Lorson Ranch Filing No. 1 Transportation Memorandum	April 26, 2019
Carriage Meadows Townhomes Traffic Impact Analysis	February 25, 2020
Fontaine/Old Glory Intersection Analysis	February 27, 2020
Ponderosa at Lorson Ranch Filing No. 3 Transportation Memorandum	September 2, 2020
The Glen at Widefield Filing No. 10 Transportation Memorandum	September 24, 2020
The Glen at Widefield Filing No. 11 Transportation Memorandum	September 24, 2020
Creekside South at Lorson Ranch Updated Transportation Memorandum	May 5, 2020
The Hills at Lorson Ranch Full Traffic Impact Analysis	October 26, 2020
<i>Source: LSC Transportation Consultants, Inc. (December 2020)</i>	

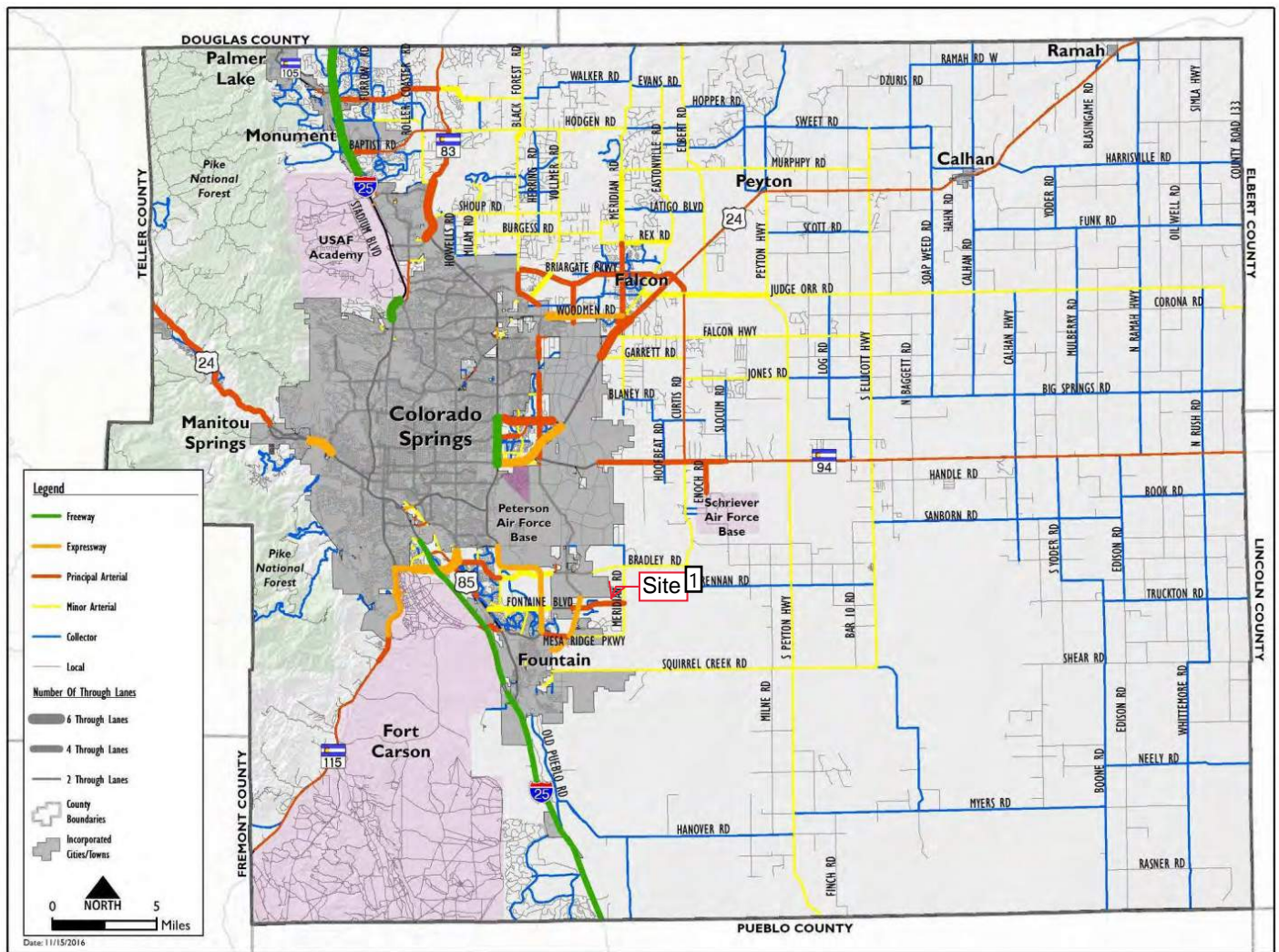
add The Hills
Memorandum
(TBD)

 Number: 1 Author: dsdrice Subject: Callout Date: 3/11/2021 3:45:34 PM -06'00'

[add The Hills Memorandum \(TBD\)](#)

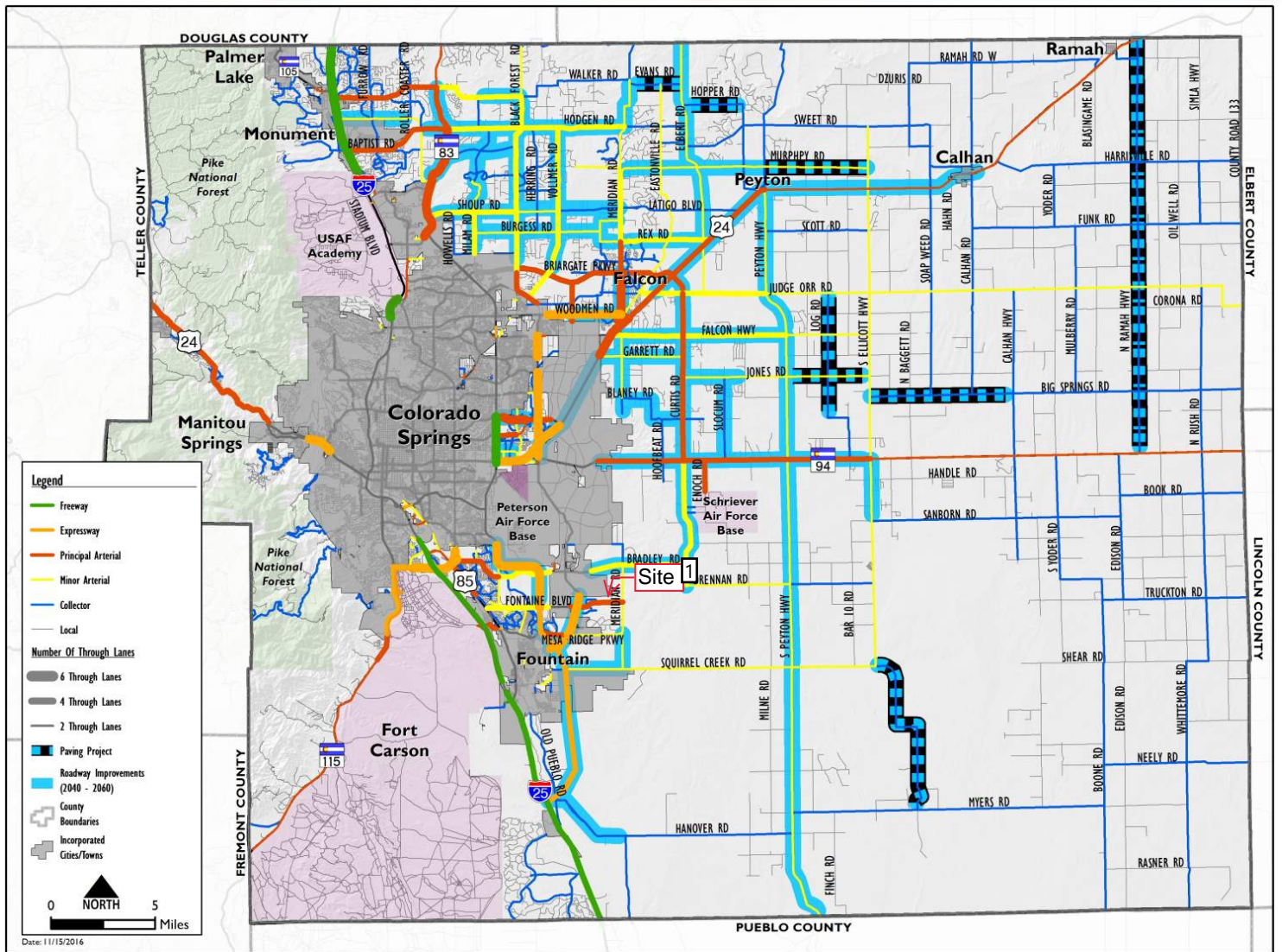
 Author: jchodsdon Subject: Sticky Note Date: 6/29/2021 4:45:23 PM

LSC Response: Added as requested.



Map 14: 2040 Roadway Plan (Classification and Lanes)

Map 17: 2060 Corridor Preservation





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Website: <http://www.lsctrans.com>

Skyline at Lorson Ranch Traffic Impact Analysis (LSC #204250) June 29, 2021

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 'J. [unclear]', written over a horizontal line.

6/30/21
Date

Skyline at Lorson Ranch

Traffic Impact Analysis

Prepared for:

The Landhuis Company

212 North Wahsatch Avenue, Suite 301

Colorado Springs, CO 80903

Contact: Mr. Jeff Mark, President

JUNE 29, 2021

LSC Transportation Consultants

Prepared by: Kirstin D. Ferrin, P.E.

Reviewed by: Jeffrey C. Hodsdon, P.E.

LSC #204250



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June 29, 2021

Mr. Jeff Mark
President
The Landhuis Company
212 North Wahsatch Avenue, Suite 301
Colorado Springs, CO 80903

RE: Skyline at Lorson Ranch
El Paso County, CO
Traffic Impact Analysis
LSC #204250

Dear Mr. Mark,

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic impact analysis for the proposed Skyline at Lorson Ranch residential development. As shown in Figure 1, the site is located within the Lorson Ranch development in El Paso County, Colorado.

REPORT CONTENTS

This report has been prepared to address the project's traffic impact at the proposed access points and adjacent intersections.

This report contains the following:

- The existing street and traffic conditions in the site's vicinity including the street widths, lane geometries, and traffic controls;
- The projected future background traffic volumes, which include estimates of traffic from other area development projects;
- The estimated average weekday and peak-hour trip generation;
- The estimated directional distribution of site-generated trips and the projected site-generated traffic volumes;
- Estimates of the resulting total traffic volumes on the adjacent streets and intersections; and
- The projected levels of service at the site access points and key area intersections;

RECENT AREA TRAFFIC STUDIES

Appendix Table 1 includes a list of other recent traffic studies conducted by LSC within the Lorson Ranch development and in the vicinity.

This site was previously included in *The Hills at Lorson Ranch Full Traffic Impact and Access Analysis* (TIA) by LSC Transportation Consultants, Inc. dated October 27, 2020 as traffic analysis zone 45. That TIA assumed this zone would be developed with 76 single-family homes.

LAND USE AND ACCESS

Land Use

Skyline at Lorson Ranch is planned to include 85 lots for single-family homes. This is nine more single-family homes than was assumed in the Hills at Lorson Ranch TIA. Figure 2 shows the proposed site plan.

Street Connections

Fontaine Boulevard and Lorson Boulevard are planned to be extended east to a new north-south collector (Walleye Drive) between as part of The Hills at Lorson Ranch. A new east-west collector (Grayling Drive) is planned to be constructed between Lamprey Drive and the future Walleye Drive as part of The Hills at Lorson Ranch. An additional section of Grayling Drive between Walleye Drive and the north boundary of Lorson Ranch is planned as part of the currently-proposed Skyline at Lorson Ranch. Two full-movement access points are proposed to Grayling Drive. Figure 2 shows the proposed access spacing.

Pedestrian and Bicycle Route Analysis

Grand Mountain K-8 School is located southwest of the site. The subdivision streets will include sidewalks and connecting streets within Lorson Ranch also have sidewalks. Trail corridors are planned along the powerline easement, the East Fork of Jimmy Camp Creek, and along Jimmy Camp Creek. Also, Marksheffel Road and Fontaine Boulevard have paved shoulders to accommodate cyclists. Lorson Boulevard has been constructed with wider travel lanes (and a 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).

Sight Distance Analysis

Figure 3 shows sight-distance analysis at the proposed public street intersections (note: this north street connection would become an “intersection” in the future if/when Grayling Drive is extended north (with future development to the north). 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. The required stopping sight distance from ECM Table 2-17 is 305 feet.

Figure 3 shows the areas between the sight distance lines and the curb line that will need to be kept free of other obstructions (such as rear privacy fencing, landscaping, and backyard/patio amenities) that would restrict the drivers' line of sight. Landscaping should be low — about 18 inches or lower in height — to the east of the passenger vehicle lines of sight shown. Please refer to ECM Sections 2.3.6.G.1 and 2.

The proposed initial, short-term and long-term traffic control at Grayling/Lamprey is all-way, stop-sign control (AWSC). Provided the AWSC remains in-place in perpetuity, the required sight distance lines of sight for 445' of entering sight distance, which would otherwise apply for a TWSC intersection, would not be required for an AWSC intersection.

Regarding the Urban Local knuckle in the northeast corner of the site, please refer to the site development plan and plat for sight distance easements across lot 67 (on the inside of the curve). Although the angle between the two street legs intersecting at this knuckle is less than 90 degrees, the centerline radius through this curve/knuckle is 52 feet - the same as the standard Urban Local knuckle. Also, please refer to Figure 3. Assuming a design speed of 15 mph around the curve of this knuckle, the required stopping sight distance is 80 feet along the centerline of the roadway.

STREET AND TRAFFIC CONDITIONS

Area Streets

The key area 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.

- **Fontaine Boulevard** is designated as a four-lane Urban Principal Arterial east of Marksheffel Road and has been constructed as such from Marksheffel Road east to Old Glory Drive/Stingray Lane. Fontaine Boulevard has recently been constructed east of Old Glory Drive/Stingray Lane adjacent to the Lorson Ranch East development as an interim Urban Non-Residential Collector Street within 100 feet of right-of-way. As part of The Hills development, Fontaine Boulevard will be extended east from its current terminus adjacent to the site with the same interim cross section and right-of-way. The posted speed limit on Fontaine Boulevard is 35 mph just east of (and a short distance west of) Marksheffel Road. The speed limit increases to 45 mph just east of the bridge over Jimmy Camp Creek and then decreases back to 35 mph just east of Old Glory (east)/Stingray.

- **Lorson Boulevard** currently extends east from Marksheffel Road to Lamprey Drive. Lorson Boulevard is classified as an Urban Non-Residential Collector Street (modified for a 44-foot street width, rather than the standard 52-foot street width) with an 80-foot-wide right-of-way between Marksheffel Road and Stingray Lane and as an Urban Residential Collector Street (modified for a 44-foot street width, rather than the standard 52-foot street width) with a 64- to 72-foot-wide right-of-way between Stingray Lane and Lamprey Drive. As part of The Hills development, Lorson Boulevard will be constructed east of Lamprey Drive adjacent to the site as a standard Urban Residential Collector with a 60-foot-wide right-of-way.
- **Lamprey Drive** is an Urban Residential Collector which currently extends north from Lorson Boulevard to Shavers Drive just north of Fontaine Boulevard. Lamprey Drive is planned to be constructed east to the future Walleye Drive as part of the Hills at Lorson Ranch. The intersection of Lamprey/Fontaine was constructed as an interim one-lane modern roundabout. This roundabout is expandable to two lanes should it be needed in the long-range (beyond 2040) future.
- **Grayling Drive** is a planned Urban Residential Collector which will extend north from Lorson Boulevard to the north boundary of the Lorson Ranch development.

TRIP GENERATION

The site-generated vehicle trips were estimated using the nationally published trip-generation rates from *Trip Generation, 10th Edition, 2017* by the Institute of Transportation Engineers (ITE). Table 1 shows the average weekday and peak-hour trip-generation estimates. Table 2 also shows a comparison of the trip-generation estimate for this same area, assumed in the *Lorson Ranch Sketch Plan Amendment 2 Traffic Impact Analysis* by LSC dated December 17, 2019 and *The Hills at Lorson Ranch Full Traffic Impact Analysis* by LSC dated October 27, 2020.

The site is projected to generate about 802 new vehicle trips on the average weekday, with about half entering and half exiting the site. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 16 vehicles would enter and 47 vehicles would exit the site. During the afternoon peak hour, which generally occurs for one hour between 4:15 and 6:15 p.m., about 53 vehicles would enter and 31 vehicles would exit the site.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of the site-generated traffic volumes on the street and roadway system serving the site is one of the most important factors in determining the site's traffic impacts. Figure 4 shows the external trip-distribution estimates (external to Lorson Ranch). The directional distribution estimates have been based on the location of the site with respect to the regional residential employment, commercial, and activity centers; the land use proposed; the access/roadway connections assumed; the roadway network; and the most recent traffic counts

conducted at the intersection of Marksheffel/Fontaine. The number of external vehicle trips were based on the internal trip estimates shown in Appendix Table 2.

Figure 5 shows the site-generated traffic volume estimates, respectively. These volumes were determined by first assigning the internal vehicle trips to the street network, based on the location of the existing Grand Mountain School located northeast of the intersection of Fontaine Boulevard and Lamprey Drive and the future retail sites located near the intersection of Fontaine Boulevard and Carriage Meadows Drive.

The external vehicle trips were then assigned to the street network by applying the trip-distribution percentages (from Figure 4) to the external trip-generation estimates. The internal and external site-generated traffic volumes were then summed to determine the total site-generated traffic volumes.

BACKGROUND TRAFFIC

Background traffic is the traffic estimated to be on the roadways without the Hills at Lorson Ranch traffic.

Short Term

The short-term (Year 2025) background traffic volumes are shown in Figure 6. The short-term background traffic includes traffic projected to be generated by buildout of the approved Lorson Ranch subdivisions including Lorson Ranch East, Ponderosa at Lorson Ranch Filing 3, Creekside at Lorson Ranch, and The Hills at Lorson Ranch, but assumes zero traffic generated by Skyline at Lorson Ranch.

2040

Figure 7 shows the projected 2040 background traffic volumes. The 2040 background traffic volumes are based on estimates of traffic projected to be generated at buildout of the Lorson Ranch Sketch Plan (excluding the traffic projected to be generated by Skyline at Lorson Ranch. Appendix Tables 2 and 3 show the trip-generation estimates for all existing and future land uses assumed to be built out by 2040 in the Lorson Ranch development. The 2040 background volumes also assume full buildout of the street network within Lorson Ranch, but assume Meridian Road has not been extended south to Fontaine Boulevard.

BUILDOUT TOTAL TRAFFIC

Figure 8 shows the short-term total traffic volumes. These volumes are the sum of the short-term background traffic volumes (from Figure 6) plus the site-generated traffic volumes (from Figure 5).

Figure 9 shows the 2040 total traffic volumes. These volumes are the sum of the 2040 background traffic volumes (from Figure 7) plus the site-generated traffic volumes (from Figure 5).

PROJECTED LEVELS OF SERVICE

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from "A" to "F." LOS A represents control delay of less than 10 seconds for unsignalized and signalized intersections. LOS F represents control delay of more than 50 seconds for unsignalized intersections and more than 80 seconds for signalized intersections. Table 2 shows the level of service delay ranges.

Table 2: Intersection Levels of Service Delay Ranges

Level of Service	Signalized Intersections	Unsignalized Intersections
	Average Control Delay (seconds per vehicle)	Average Control Delay (seconds per vehicle) ⁽¹⁾
A	10.0 sec or less	10.0 sec or less
B	10.1-20.0 sec	10.1-15.0 sec
C	20.1-35.0 sec	15.1-25.0 sec
D	35.1-55.0 sec	25.1-35.0 sec
E	55.1-80.0 sec	35.1-50.0 sec
F	80.1 sec or more	50.1 sec or more
(1) For unsignalized intersections if V/C ratio is greater than 1.0 the level of service is LOS F, regardless of the projected average control delay per vehicle.		

The intersection of Lamprey/Fontaine and the access points to Grayling Drive have been analyzed to determine the projected levels of service for the short-term and 2040 background and total traffic volumes, based on the unsignalized method of analysis procedures outlined in the *Highway Capacity Manual, 6th Edition* by the Transportation Research Board. The level of service reports are attached. The results of the analysis are shown in Figures 6 through 9.

Fontaine/Lamprey

The intersection of Fontaine/Lamprey was recently constructed as a modern one-lane roundabout. All movements at this intersection are projected to operate at LOS D or better during the peak hours, based on the projected short-term and 2040 total traffic volumes.

Site Access Point

The south full-movement site access point to Grayling Drive is projected to operate at LOS A for all movements during the peak hours for all movements as an all-way, stop-sign-controlled intersection, based on the projected short-term and 2040 total traffic volumes.

ROADWAY CLASSIFICATIONS

Figure 10 shows the recommended street classifications for the Lorson Ranch streets.

ROADWAY IMPROVEMENT FEE

This project will be required to participate in the El Paso County Road Improvement Fee Program. The Hills 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 86 lots, the total building permit fee would be \$103,785. 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 802 new vehicle trips on the average weekday, with about half entering and half exiting the site. During the morning peak hour, about 16 vehicles would enter and 47 vehicles would exit the site. During the afternoon peak hour, about 53 vehicles would enter and 31 vehicles would exit the site.

Intersection Sight Distance

- Please refer to the Sight Distance section of this report for areas of that site that need to allow for the required intersection sight distance lines of sight.

Projected Levels of Service & Intersection Traffic Control Recommendations

- The intersection of Fontaine/Lamprey was recently constructed as a modern one-lane roundabout. All movements at this intersection are projected to operate at LOS D or better during the peak hours, based on the projected short-term and 2040 total traffic volumes.
- The intersection of Lamprey/Grayling Drive is proposed for **all-way, stop-sign control (AWSC)** in the short, immediate, and long term. The AWSC would mitigate the sight-distance lines of sight across the inside of the curve on Grayling from the site access/southwest-bound approach.

- The south full-movement site access point to Grayling Drive is projected to operate at a satisfactory level of service as a two-way, stop-sign-controlled intersection.

Street Classifications

- All of the streets within Skyline at Lorson Ranch should be classified as Urban Local. See Figure 10 for the recommended classifications of the adjacent roadways.

Grayling Drive Striping

- Grayling Drive potentially be striped with a single dual yellow centerline stripe instead of a center painted two-way left-turn “median” South of Lamprey drive as the through and left-turning volumes are projected to be relatively low. No striping is needed on Grayling Drive north of Lamprey Drive.

Fontaine Boulevard/Carriage Meadows Drive

- Signal escrow for the future signal at the Fontaine Boulevard/Carriage Meadows Drive intersection should not be required of this project. The escrow table for that intersection included developments adding traffic to the northbound and southbound (side-street) approaches, which this development would not. The escrow table was recently included in the Carriage Meadows Townhomes report and that table showed the contributing developments.

Fontaine/Old Glory Intersection

- The County has indicated that *“the developer shall participate in a fair and equitable manner in the design and construction of intersection improvements at the intersections of Fontaine Boulevard and Old Glory Drive. Address how the intersection improvements will be designed and provided for (set up escrow account?) and when they will be needed relative to The Hills at Lorson Ranch Filing No. 1 and Skyline at Lorson Ranch developments.”*
 - The plans for striping and signing improvements have been prepared and resubmitted with The Hills plat. The timing has been addressed in The Hills transportation memo.
 - A signal-escrow table for a future signal was prepared as part of the Ponderosa Filing No. 3 report. This project is not listed in the escrow table as this project will not add side-street approach traffic at this intersection. That table showed the contributing developments.

* * * * *

We trust this traffic impact analysis will assist you in gaining approval of the proposed Skyline 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: Table 1
Figures 1-10
Appendix Tables 1-3
Level of Service Reports
MTCP Maps

Tables

<p style="text-align: center;"> Table 1 Trip Generation Estimate Skyline at Lorson Ranch </p>
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Traffic Analysis Zone	Land Use Code	Land Use Description	Trip Generation Units	Trip Generation Rates ⁽¹⁾						Total Trips Generated			
				Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour		Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour	
					In	Out	In	Out		In	Out		
Trip Generation Estimate Based on the Currently Proposed Plan													
45	210	Single-Family Detached Housing	85 DU ⁽²⁾	9.44	0.19	0.56	0.62	0.37	802	16	47	53	31
Trip Generation Estimate for the Same Area From the <i>The Hills at Lorson Ranch Full Traffic Impact Analysis</i> by LSC October 26, 2020													
45	210	Single-Family Detached Housing	76 DU	9.44	0.19	0.56	0.62	0.37	717	14	42	47	28
Change in Trip Generation Estimate									85	2	5	6	3
Trip Generation Estimate for the Same Area From the <i>Lorson Ranch Sketch Plan Amendment 2 Traffic Impact Analysis</i> by LSC December 17, 2018													
45	220	Multifamily Housing	123 DU	7.32	0.11	0.35	0.35	0.21	900	13	44	43	25
Change in Trip Generation Estimate									-98	3	4	10	6
Notes:													
(1) Source: " <i>Trip Generation, 10th Edition, 2017</i> " by the Institute of Transportation Engineers (ITE)													
(2) DU = dwelling unit													
Source: LSC Transportation Consultants, Inc.													
Dec-20													

Figures

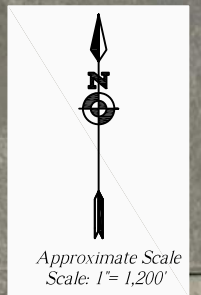
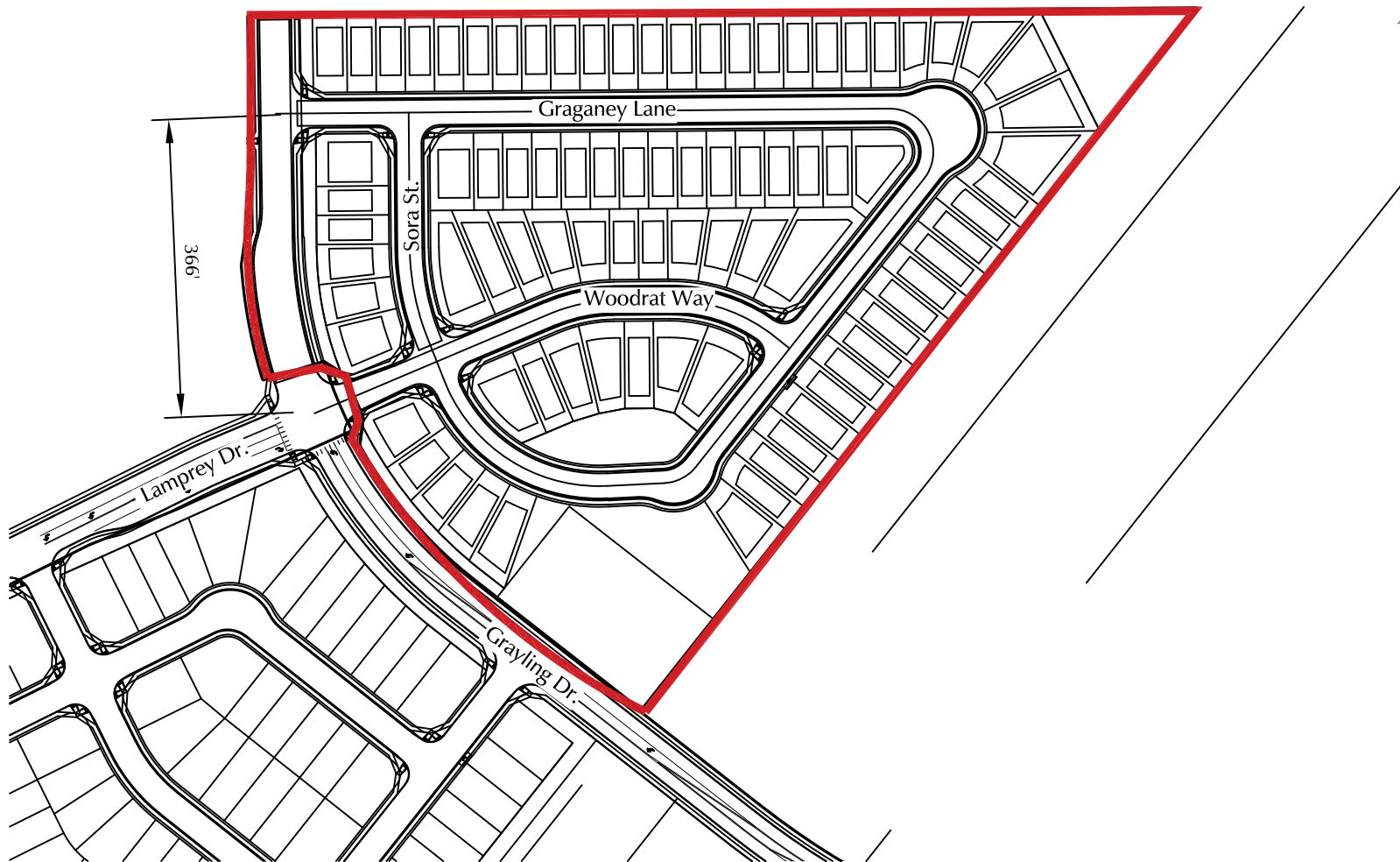


Figure 1

Vicinity Map

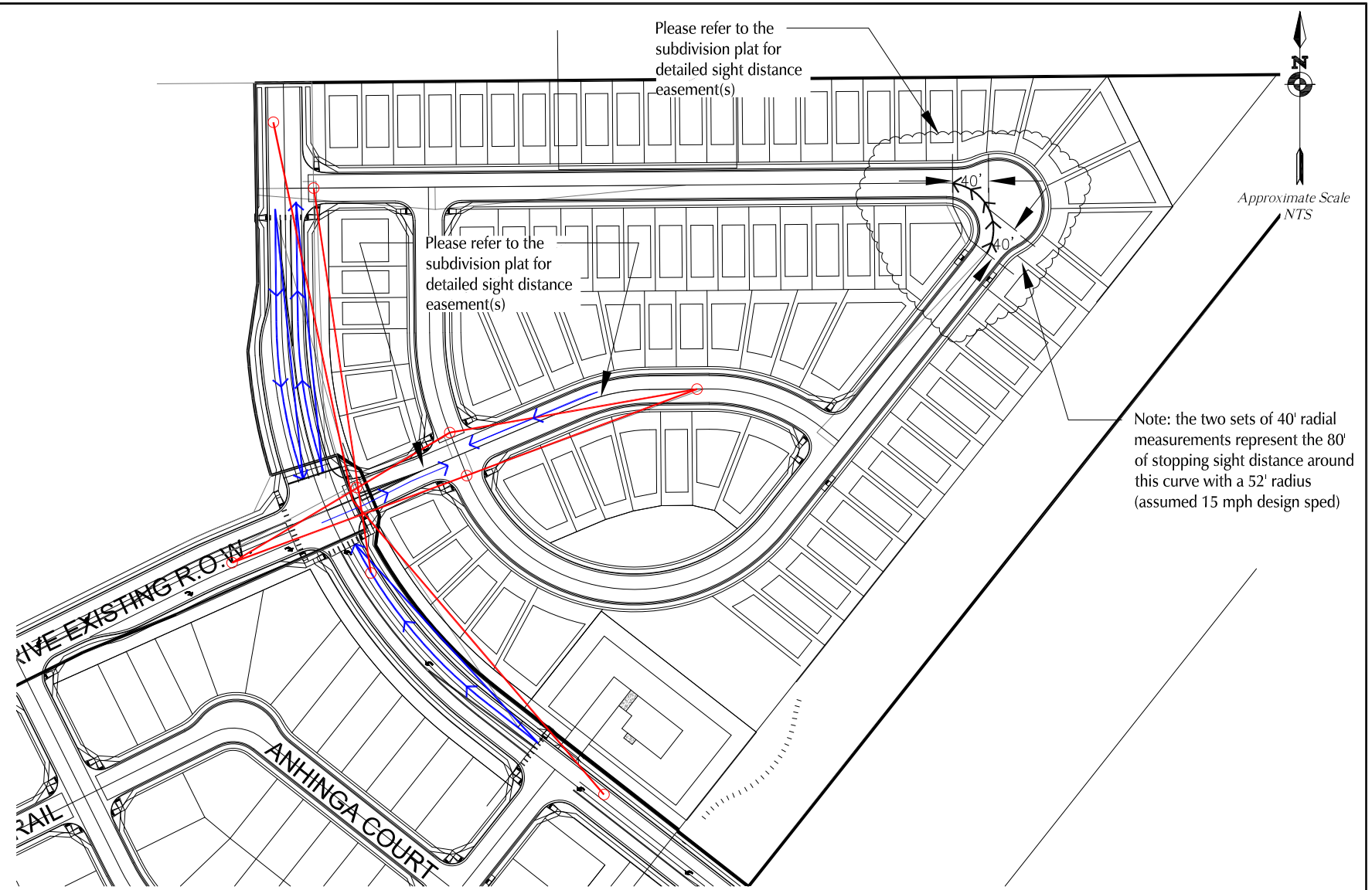
Skyline at Lorson Ranch (LSC #204250)



Approximate Scale
Scale: NTS

Figure 2
**Site
Plan**

Skyline at Lorson Ranch (LSC #204250)



LEGEND:

- = ECM Required intersection sight distance - only assuming TWSC. (445' based on a 40mph design speed from Table 2-21)
- - - - - = ECM Required stopping sight distance (305' based on a 40mph design speed from Table 2-17)

Note: The intersection is proposed for AWSC in the immediate, short, and long-term, therefore the entering sight distance lines of sight would not apply.

Sight Distance Analysis

Skyline at Lorson Ranch (LSC #204250)

Figure 3



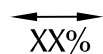
* Assumes no trip distribution east or north of the greater Lorson Ranch boundary within the 20-year horizon.

Directional Distribution of Site-Generated Traffic

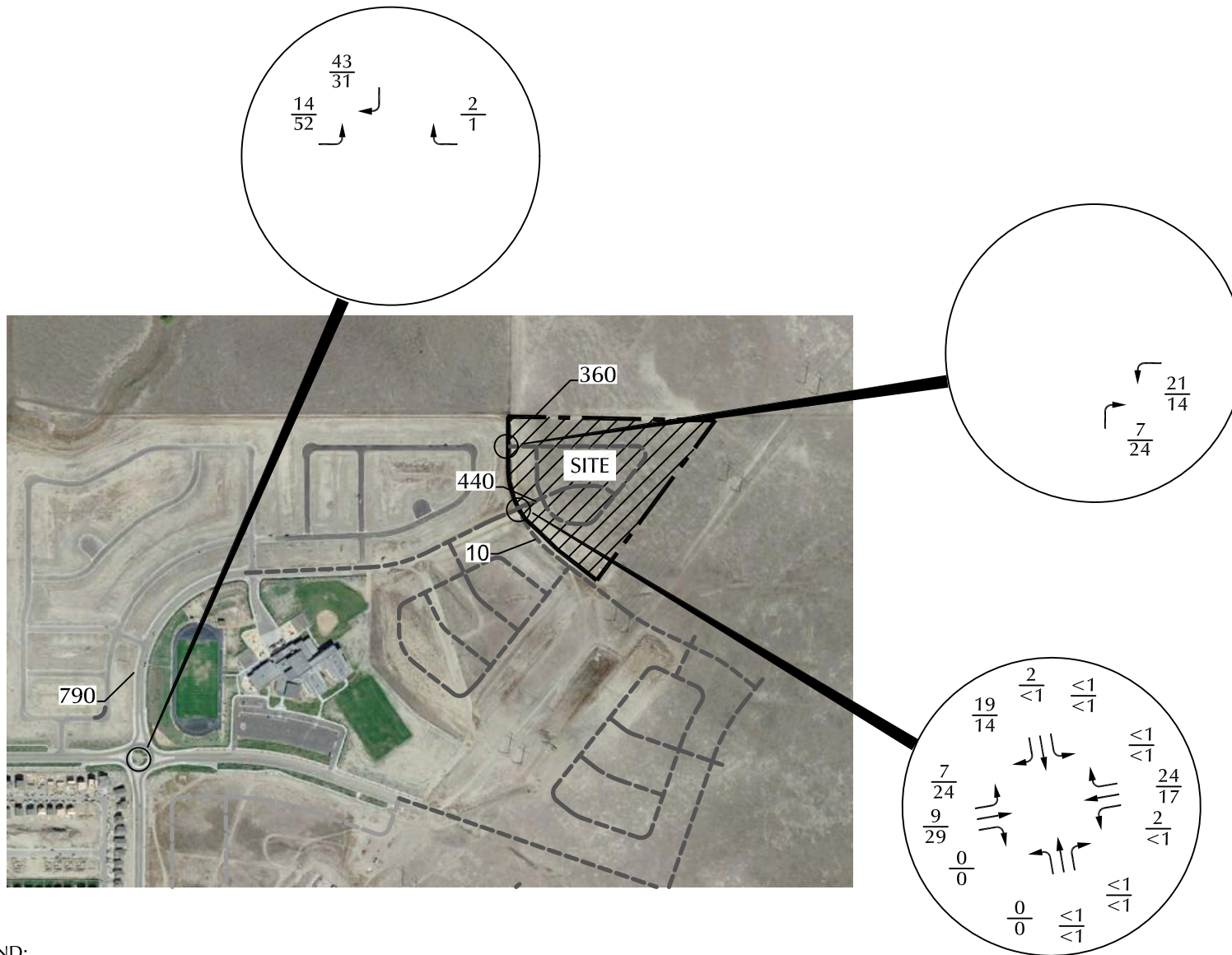
Skyline at Lorson Ranch (LSC #204250)



LEGEND:



= Percent Directional Distribution



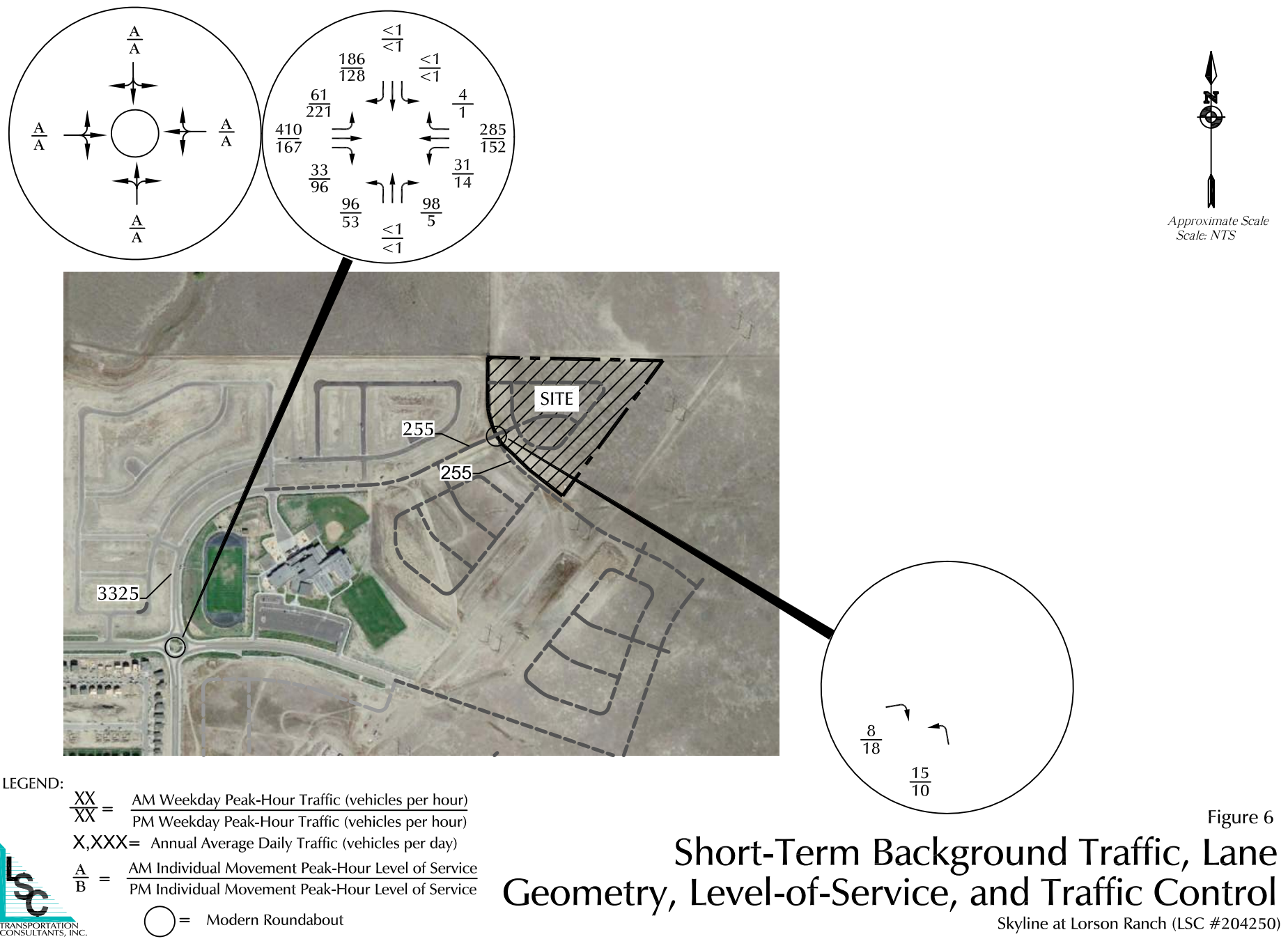
LEGEND:

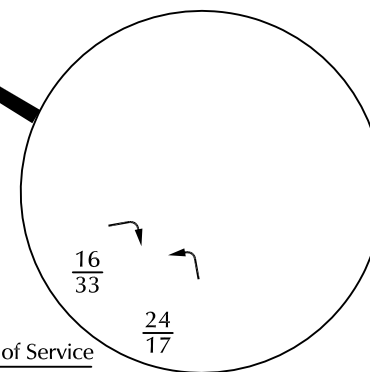
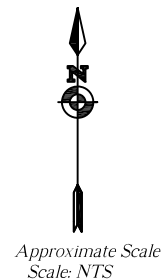
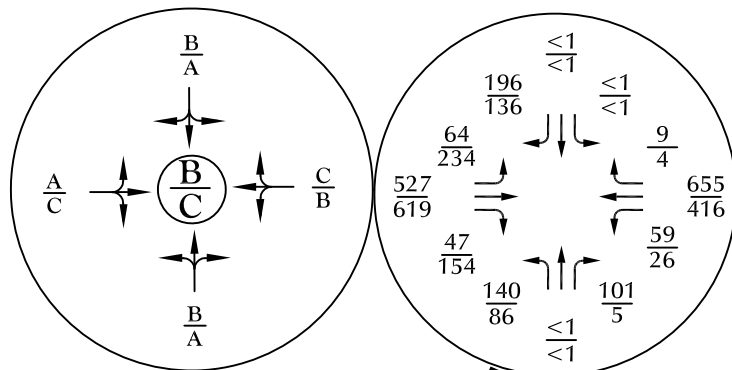
$\frac{XX}{XX}$ = AM Weekday Peak-Hour Traffic (vehicles per hour)
 $\frac{XX}{XX}$ = PM Weekday Peak-Hour Traffic (vehicles per hour)

X,XXX= Annual Average Daily Traffic (vehicles per day)



Figure 5
Site-Generated Traffic
 Skyline at Lorson Ranch (LSC #204250)





LEGEND:

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

$$X,XXX = \text{Annual Average Daily Traffic (vehicles per day)}$$

$$\frac{A}{B} = \frac{\text{AM Individual Movement Peak-Hour Level of Service}}{\text{PM Individual Movement Peak-Hour Level of Service}}$$

$$\frac{C}{C} = \frac{\text{AM Entire Intersection Peak-Hour Level of Service}}{\text{PM Entire Intersection Peak-Hour Level of Service}}$$

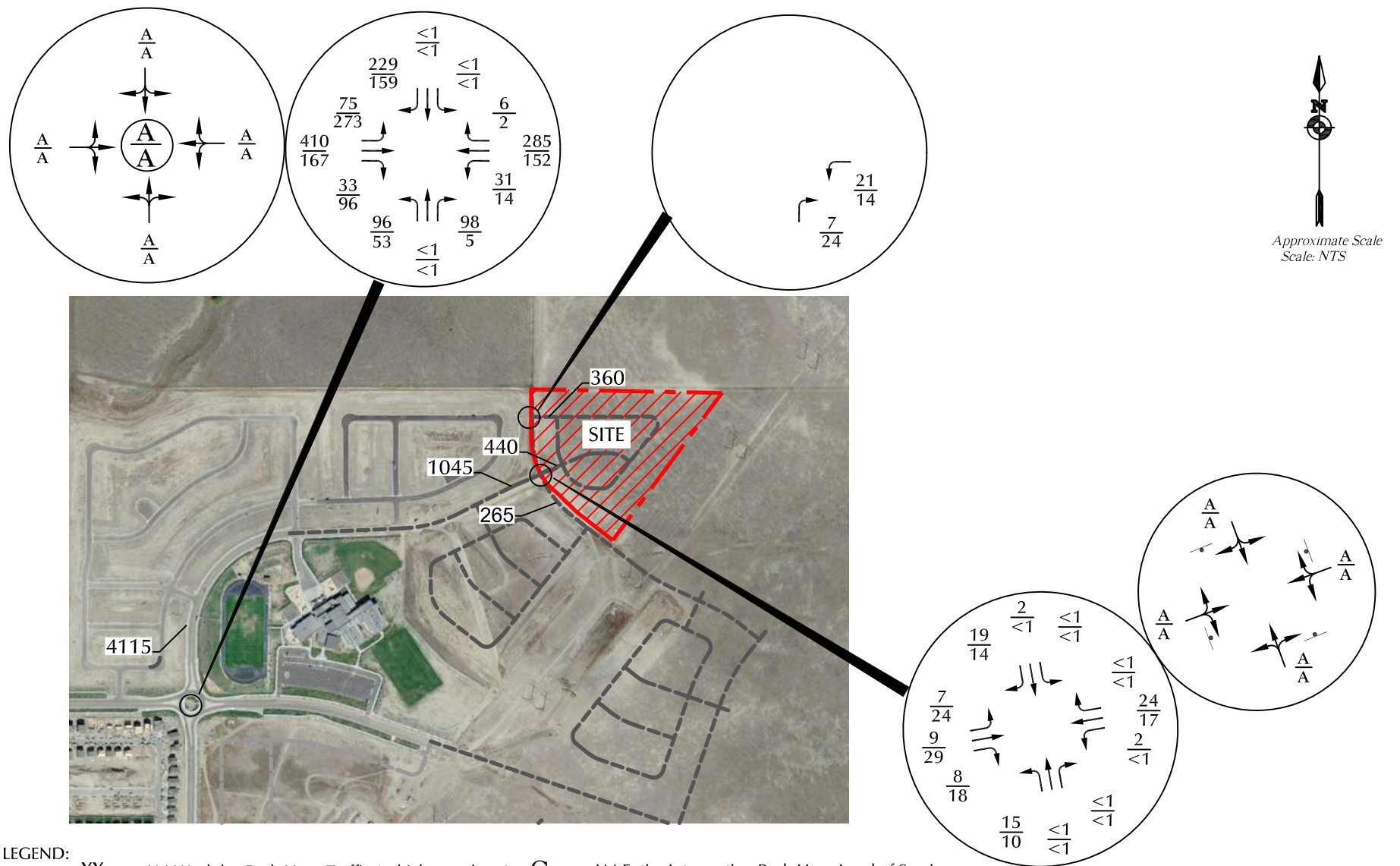
○ = Modern Roundabout



2040 Background Traffic, Lane Geometry, Level-of-Service, and Traffic Control

Skyline at Lorson Ranch (LSC #204250)

Figure 7



LEGEND:

$$\frac{XX}{XX} = \frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}} \quad \frac{C}{C} = \frac{\text{AM Entire Intersection Peak-Hour Level of Service}}{\text{PM Entire Intersection Peak-Hour Level of Service}}$$

X,XXX= Annual Average Daily Traffic (vehicles per day)

$$\frac{A}{B} = \frac{\text{AM Individual Movement Peak-Hour Level of Service}}{\text{PM Individual Movement Peak-Hour Level of Service}}$$

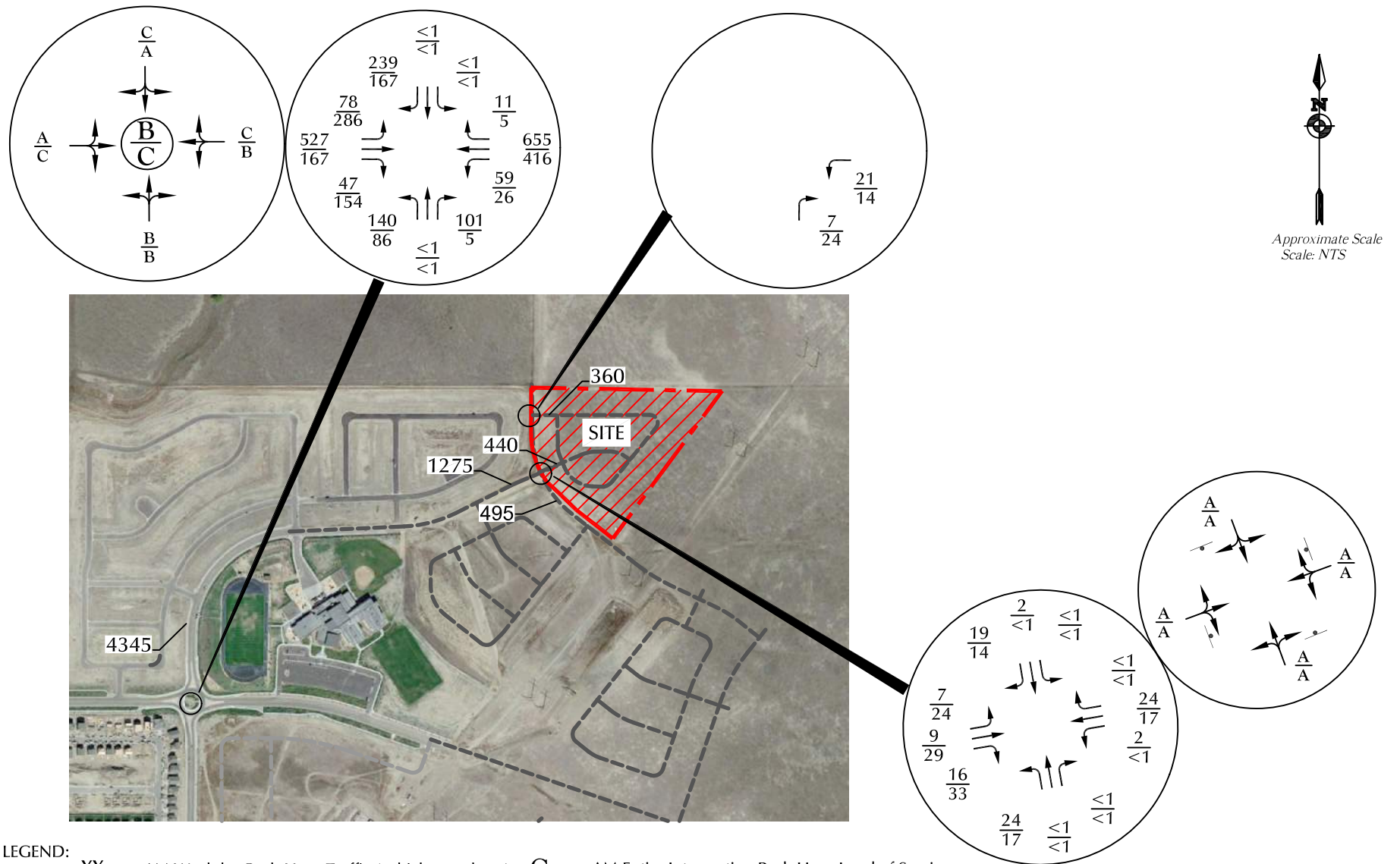
○ = Modern Roundabout



Short-Term Total Traffic, Lane Geometry, Level-of-Service, and Traffic Control

Skyline at Lorson Ranch (LSC #204250)

Figure 8



LEGEND:

$$\frac{XX}{XX} = \frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}} \quad \frac{C}{C} = \frac{\text{AM Entire Intersection Peak-Hour Level of Service}}{\text{PM Entire Intersection Peak-Hour Level of Service}}$$

X,XXX= Annual Average Daily Traffic (vehicles per day)

$$\frac{A}{B} = \frac{\text{AM Individual Movement Peak-Hour Level of Service}}{\text{PM Individual Movement Peak-Hour Level of Service}}$$

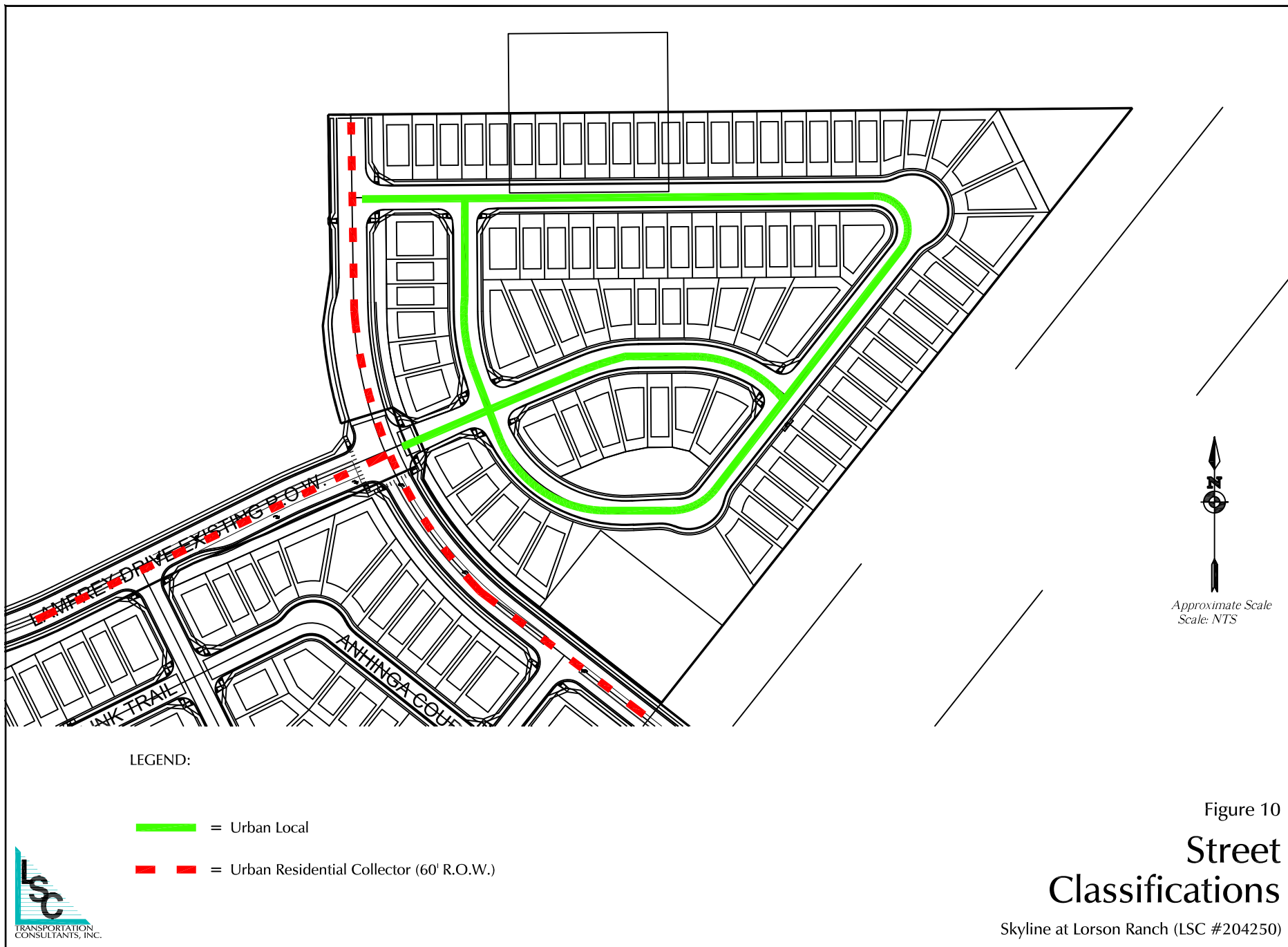
○ = Modern Roundabout



2040 Total Traffic, Lane Geometry, Level-of-Service, and Traffic Control

Figure 9

Skyline at Lorson Ranch (LSC #204250)



Appendix Tables

Appendix Table 1
Area Traffic Impact Studies by LSC
Skyline at Lorson Ranch

Study	Date
Lorson Ranch Sketch Plan Amendment 2 Traffic Impact and Access Analysis	December 17, 2018
Carriage Meadows South at Lorson Ranch Filing No. 1 Updated Traffic Impact Analysis	August 14, 2017
Carriage Meadows North at Lorson Ranch Filing No. 1 Updated Traffic Impact Analysis	January 29, 2017
Lorson Ranch East Updated Traffic Impact and Access Analysis	November 9, 2017
Lorson Ranch East Filing No. 1 Transportation Memorandum	May 2, 2018
Lorson Ranch East Filing No. 2 Transportation Memorandum	September 24, 2018
Lorson Ranch East Filing No. 3 Transportation Memorandum	January 22, 2019
Lorson Ranch East Filing No. 4 Transportation Memorandum	March 12, 2019
Lorson Ranch PK-8 School Traffic Impact and Access Analysis	October 4, 2018
Creekside at Lorson Ranch Filing No. 1 Traffic Impact and Access Analysis	October 28, 2018
Creekside at Lorson Ranch Filing No. 1 Transportation Memorandum	April 26, 2019
Carriage Meadows Townhomes Traffic Impact Analysis	February 25, 2020
Fontaine/Old Glory Intersection Analysis	February 27, 2020
Ponderosa at Lorson Ranch Filing No. 3 Transportation Memorandum	September 2, 2020
The Glen at Widefield Filing No. 10 Transportation Memorandum	September 24, 2020
The Glen at Widefield Filing No. 11 Transportation Memorandum	September 24, 2020
Creekside South at Lorson Ranch Updated Transportation Memorandum	May 5, 2020
The Hills at Lorson Ranch Full Traffic Impact Analysis	October 26, 2020
The Hills at Lorson Ranch Final Plat Transportation Memorandum	April 19, 2021
<i>Source: LSC Transportation Consultants, Inc. (June 2021)</i>	

Appendix Table 2 Skyline at Lorson Ranch Lorson Ranch Trip Generation Estimate																																						
Land Use Data						Trip Generation Rates ⁽¹⁾					Raw ITE Trip Generation (Individual Driveway Trips)					School Internal Trips ⁽²⁾					Retail Internal Trips ⁽²⁾					Pass-by ⁽³⁾ (%)	Pass-by Trips					Total New External Trips						
Traffic Zone	Name	ITE Land Use	ITE Code	Quantity	Unit	Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour			Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour			
							In	Out	In	Out		In	Out	In	Out		In	Out	In	Out		In	Out	In	Out			In	Out	In	Out		In	Out	In	Out	In	Out
RESIDENTIAL																																						
All Residential North of Lorson Boulevard "Between the Creeks"																																						
8	Ponderosa	Single-Family Detached Housing	210	102	DU ⁽⁴⁾	9.44	0.19	0.56	0.62	0.37	963	19	57	64	37	26	2	5	1	1	99	0	2	5	2	0%	0	0	0	0	0	838	17	50	58	34		
9	Ponderosa	Single-Family Detached Housing	210	102	DU	9.44	0.19	0.56	0.62	0.37	963	19	57	64	37	26	2	5	1	1	99	0	2	5	2	0%	0	0	0	0	0	838	17	50	58	34		
10	Meadows Fil 1	Single-Family Detached Housing	210	97	DU	9.44	0.19	0.56	0.62	0.37	916	18	54	60	36	25	2	4	1	1	94	0	1	5	2	0%	0	0	0	0	0	797	16	49	54	33		
11	Meadows Fil 3	Single-Family Detached Housing	210	51	DU	9.44	0.19	0.56	0.62	0.37	481	9	28	32	19	13	1	2	1	0	50	0	1	2	1	0%	0	0	0	0	0	418	8	25	29	18		
12	Meadows Fil 3	Single-Family Detached Housing	210	87	DU	9.44	0.19	0.56	0.62	0.37	821	16	48	54	32	22	2	4	1	0	85	0	1	4	2	0%	0	0	0	0	0	714	14	43	49	30		
3	The Meadows Fil 2	Single-Family Detached Housing	210	109	DU	9.44	0.19	0.56	0.62	0.37	1,029	20	60	68	40	28	2	5	1	1	106	1	2	5	2	0%	0	0	0	0	0	895	17	53	62	37		
13	Allegiant Fil 1	Single-Family Detached Housing	210	97	DU	9.44	0.19	0.56	0.62	0.37	916	18	54	60	36	25	2	4	1	1	94	0	1	5	2	0%	0	0	0	0	0	797	16	49	54	33		
5	Buffalo Crossing	Single-Family Detached Housing	210	204	DU	9.44	0.19	0.56	0.62	0.37	1,926	38	113	127	75	53	5	9	2	1	198	1	3	10	5	0%	0	0	0	0	0	1,675	32	101	115	69		
	Townhomes at Lorson Ranch	Multifamily Housing	220	46	DU	7.32	0.11	0.35	0.35	0.21	337	5	16	16	10	9	1	2	0	0	35	0	1	2	1	0%	0	0	0	0	0	293	4	13	14	9		
6	Pioneer Landing	Single-Family Detached Housing	210	59	DU	9.44	0.19	0.56	0.62	0.37	557	11	33	37	22	15	1	3	1	0	57	0	1	3	1	0%	0	0	0	0	0	485	10	29	33	21		
7	Pioneer Landing	Single-Family Detached Housing	210	59	DU	9.44	0.19	0.56	0.62	0.37	557	11	33	37	22	15	1	3	1	0	57	0	1	3	1	0%	0	0	0	0	0	485	10	29	33	21		
15	Meadows Future Fil 4 West	Single-Family Detached Housing	210	110	DU	9.44	0.19	0.56	0.62	0.37	1,038	20	61	69	40	28	2	5	1	1	107	1	2	5	2	0%	0	0	0	0	0	903	17	54	63	37		
16	Meadows Future Fil 4 East	Single-Family Detached Housing	210	126	DU	9.44	0.19	0.56	0.62	0.37	1,189	23	70	79	46	32	3	6	1	1	123	1	2	6	3	0%	0	0	0	0	0	1,034	19	62	72	42		
18	Ponderosa Fil 3	Multifamily Housing	220	90	DU	7.32	0.11	0.35	0.35	0.21	659	10	32	32	19	18	2	3	1	0	68	0	1	3	2	0%	0	0	0	0	0	573	8	28	28	17		
39	Pioneer Landing Fil 2	Single-Family Detached Housing	210	170	DU	9.44	0.19	0.56	0.62	0.37	1,605	31	94	106	62	44	4	8	2	1	165	1	3	8	4	0%	0	0	0	0	0	1,396	26	83	96	57		
Total All Residential "Between the Creeks"						1,509	DU							13,957	268	810	905	533	379	32	68	16	9	1,437	5	24	71	32						12,141	231	718	818	492
Residential Adjacent to Marksheffel																																						
1	Carriage Meadows North	Single-Family Detached Housing	210	155	DU	9.44	0.19	0.56	0.62	0.37	1,463	29	86	97	57	40	3	7	2	1	151	1	2	7	3	0%	0	0	0	0	0	1,272	25	77	88	53		
147	Carriage Meadows Town Homes	Multifamily Housing	220	49	DU	7.32	0.11	0.35	0.35	0.21	359	5	17	17	10	10	1	2	0	0	37	0	1	2	1	0%	0	0	0	0	0	312	4	14	15	9		
47	Carriage Meadows South	Single-Family Detached Housing	210	86	DU	9.44	0.19	0.56	0.62	0.37	812	16	48	54	32	22	2	4	1	0	84	0	1	4	2	0%	0	0	0	0	0	706	14	43	49	30		
247		Single-Family Detached Housing	210	51	DU	9.44	0.19	0.56	0.62	0.37	481	9	28	32	19	13	1	2	1	0	50	0	1	2	1	0%	0	0	0	0	0	418	8	25	29	18		
347		Single-Family Detached Housing	210	97	DU	9.44	0.19	0.56	0.62	0.37	916	18	54	60	36	25	2	4	1	1	94	0	1	5	2	0%	0	0	0	0	0	797	16	49	54	33		
Total All Residential Adjacent to Marksheffel						438	DU							4,031	77	233	260	154	110	9	19	5	2	416	1	6	20	9						3,505	67	208	235	143
Cumulative Total						1,947	DU							17,988	345	1,043	1,165	687	489	41	87	21	11	1,853	6	30	91	41						15,646	298	926	1,053	635
Lorson Ranch East																																						
42	North of Fontaine	Single-Family Detached Housing	210	277	DU	9.44	0.19	0.56	0.62	0.37	2,615	51	154	173	101	71	6	13	3	2	269	1	4	13	6	0%	0	0	0	0	0	2,275	44	137	157	93		
37	East of Lamprey	Single-Family Detached Housing	210	122	DU	9.44	0.19	0.56	0.62	0.37	1,152	23	68	76	45	31	3	6	1	1	119	1	2	6	3	0%	0	0	0	0	0	1,002	19	60	69	41		
27	West of Lamprey	Single-Family Detached Housing	210	303	DU	9.44	0.19	0.56	0.62	0.37	2,860	56	168	189	111	78	7	14	3	2	295	1	5	15	7	0%	0	0	0	0	0	2,487	48	149	171	102		
127	South of Lorson - West	Single-Family Detached Housing	210	76	DU	9.44	0.19	0.56	0.62	0.37	717	14	42	47	28	20	2	3	1	0	74	0	1	4	2	0%	0	0	0	0	0	623	12	38	42	26		
227	South of Lorson - East	Single-Family Detached Housing	210	48	DU	9.44	0.19	0.56	0.62	0.37	453	9	27	30	18	12	1	2	0	0	47	0	1	2	1	0%	0	0	0	0	0	394	8	24	28	17		
Lorson Ranch East						826	DU							7,797	153	459	515	303	212	19	38	8	5	804	3	13	40	19						6,781	131	408	467	279
Cumulative Total						2,773	DU							25,785	498	1,502	1,680	990	701	60	125	29	16	2,657	9	43	131	60						22,427	362	1,126	1,285	771
Creekside at Lorson Ranch																																						
26	Creekside East (Filing 1)	Single-Family Detached Housing	210	97	DU	9.44	0.19	0.56	0.62	0.37	916	18	54	60	36	25	2	4	1	1	94	0	1	5	2	0%	0	0	0	0	0	797	16	49	54	33		
126	Creekside West (Filing 1)	Single-Family Detached Housing	210	138	DU	9.44	0.19	0.56	0.62	0.37	1,303	26	77	86	51	36	3	6	1	1	134	1	2	7	3	0%	0	0	0	0	0	1,133	22	69	78	47		
427	Creekside South Tract B	Multifamily Housing	220	97	DU	7.32	0.11	0.35	0.35	0.21	710	10	34	34	20	19	2	3	1	0	73	0	1	4	2	0%	0	0	0	0	0	618	8	30	29	18		
327	Creekside South	Single-Family Detached Housing	210	200	DU	9.44	0.19	0.56	0.62	0.37	1,888	37	111	125	73	52	4	9	2	1	195	1	3	10	4	0%	0	0	0	0	0	1,641	32	99	113	68		
Creekside at Lorson Ranch						532	DU							4,817	91	276	305	180	132	11	22	5	3	496	2	7	26	11						4,189	78	247	274	166
Cumulative Total						3,305	DU							30,602	589	1,778	1,985	1,170	833	71	147	34	19	3,153	11	50	157	71						26,616	507	1,581	1,794	1,080
The Hills PUD																																						
43	Area 'B'	Single-Family Detached Housing	210	116	DU	9.44	0.19	0.56	0.62	0.37	1,095	21	64	72	42	30	3	5	1	1	113	1	2	6	3	0%	0	0	0	0	0	952	17	57	65	38		
44	Area 'C'	Single-Family Detached Housing	210	123	DU	9.44	0.19	0.56	0.62	0.37	1,161	23	68	77	45	32	3	6	1	1	120	1	2	6	3	0%	0	0	0	0	0	1,009	19	60	70	41		
36	Areas 'E' & 'G'	Single-Family Detached Housing	210	275	DU	9.44	0.19	0.56	0.62	0.37	2,596	51	153	172	101	71	6	13	3	2	268	1	4	13	6	0%	0	0	0	0	0	2,257	44	136	156	93		
The Hills PUD						514	DU							4,852	95	285	321	188	133	12	24	5	4	501	3	8	25	12						4,218	80	253	291	172
Cumulative Total						3,819	DU							35,454	684	2,063	2,306	1,358	966	83	171	39																

**Appendix Table 3
Skyline at Lorson Ranch
Internal Trip Estimate**

ITE Land Use	ITE Code	Quantity	Unit	Raw ITE Trip Generation (Individual Driveway Trips)										Percent Internal Trips					Total Internal Trips					Total External Trips									
				Trip Generation Rates ⁽¹⁾				Trips																									
				Daily	AM Peak Hour	Out	PM Peak Hour	In	Out	In	Out	Daily	AM Peak Hour	Out	PM Peak Hour	In	Out	Daily	AM Peak Hour	Out	PM Peak Hour	In	Out	Daily	AM Peak Hour	Out	PM Peak Hour	In	Out				
Single-Family Detached Housing	210	5,056	DU ⁽²⁾	9.44	0.19	0.56	0.62	0.37	47,729	935	2,806	3,153	1,852	School Retail Total	3%	12%	8%	2%	2%	1,360	117	241	53	29	43,302	823	2,584	2,946	1,764				
Residential Condominium/Townhouse	210	282	DU	7.32	0.11	0.35	0.35	0.21	2,064	30	100	99	58		10%	3%	3%	8%	6%	5,131	25	81	253	117									
									49,793	965	2,906	3,252	1,910		13%	15%	11%	9%	8%	6,491	142	322	306	146									
Elementary School	520	690	Students	1.89	0.36	0.31	0.07	0.08	1,304	250	213	51	53		70%	70%	40%	40%	70%	913	175	85	20	37		391	75	128	31	16			
Middle School/Junior High School	522	300	Students	2.13	0.31	0.27	0.07	0.08	639	94	80	22	23		70%	70%	40%	40%	70%	447	66	32	9	16		192	28	48	13	7			
Total School									1,943	344	293	73	76											1,360	241	117	29	53	583	103	176	44	23
Shopping Center	820	219	KSF ⁽³⁾	46.75	0.74	0.45	2.13	2.30	10,261	162	99	467	506						5,131	81	25	117	253	5,129	80	74	350	252					
Total School and Retail									12,204	506	392	540	582											6,491	322	142	146	306					
49,014 1,006 2,834 3,340 2,039																																	

Notes:

(1) Source: "Trip Generation, 10th Edition, 2017" by the Institute of Transportation Engineers (ITE)

(2) DU = dwelling Unit

(3) KSF = thousand square feet of floor area













LSC Transportation Consultants, Inc.

Dec-20

Levels of Service

Volume
3: Lamprey Dr & Fontaine Blvd

Short-Term Background Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	61	410	33	31	285	4	96	0	98	0	0	186
Future Volume (vph)	61	410	33	31	285	4	96	0	98	0	0	186
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	72	482	39	36	335	5	113	0	115	0	0	219
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	593	0	0	376	0	0	228	0	0	219	0
Intersection Summary												













HCM 6th Roundabout
3: Lamprey Dr & Fontaine Blvd

Short-Term Background Traffic
AM Peak Hour

Intersection				
Intersection Delay, s/veh	7.3			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	593	376	228	219
Demand Flow Rate, veh/h	605	384	232	223
Vehicles Circulating, veh/h	37	188	565	494
Vehicles Exiting, veh/h	680	609	77	78
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.3	6.5	8.2	7.3
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	605	384	232	223
Cap Entry Lane, veh/h	1329	1139	775	834
Entry HV Adj Factor	0.981	0.980	0.983	0.982
Flow Entry, veh/h	593	376	228	219
Cap Entry, veh/h	1303	1116	762	819
V/C Ratio	0.455	0.337	0.299	0.267
Control Delay, s/veh	7.3	6.5	8.2	7.3
LOS	A	A	A	A
95th %tile Queue, veh	2	2	1	1

Volume
3: Lamprey Dr & Fontaine Blvd

Short-Term Background Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	221	167	96	14	152	1	53	0	5	0	0	128
Future Volume (vph)	221	167	96	14	152	1	53	0	5	0	0	128
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	260	196	113	16	179	1	62	0	6	0	0	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	569	0	0	196	0	0	68	0	0	151	0
Intersection Summary												













HCM 6th Roundabout
3: Lamprey Dr & Fontaine Blvd

Short-Term Background Traffic
PM Peak Hour

Intersection				
Intersection Delay, s/veh	6.2			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	569	196	68	151
Demand Flow Rate, veh/h	580	200	69	154
Vehicles Circulating, veh/h	16	328	465	262
Vehicles Exiting, veh/h	400	206	131	266
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.8	5.7	5.0	4.8
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	580	200	69	154
Cap Entry Lane, veh/h	1358	988	859	1056
Entry HV Adj Factor	0.981	0.982	0.986	0.981
Flow Entry, veh/h	569	196	68	151
Cap Entry, veh/h	1332	970	846	1036
V/C Ratio	0.427	0.203	0.080	0.146
Control Delay, s/veh	6.8	5.7	5.0	4.8
LOS	A	A	A	A
95th %tile Queue, veh	2	1	0	1

Volume
3: Lamprey Dr & Fontaine Blvd

2040 Background Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	64	527	47	59	655	9	140	0	101	0	0	196
Future Volume (vph)	64	527	47	59	655	9	140	0	101	0	0	196
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	70	573	51	64	712	10	152	0	110	0	0	213
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	694	0	0	786	0	0	262	0	0	213	0
Intersection Summary												













HCM 6th Roundabout
3: Lamprey Dr & Fontaine Blvd

2040 Background Traffic
AM Peak Hour

Intersection				
Intersection Delay, s/veh	12.3			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	694	786	262	213
Demand Flow Rate, veh/h	707	801	267	217
Vehicles Circulating, veh/h	65	226	655	946
Vehicles Exiting, veh/h	1098	696	117	81
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.0	15.5	10.2	13.9
Approach LOS	A	C	B	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	707	801	267	217
Cap Entry Lane, veh/h	1291	1096	707	526
Entry HV Adj Factor	0.981	0.981	0.981	0.982
Flow Entry, veh/h	694	786	262	213
Cap Entry, veh/h	1267	1075	694	516
V/C Ratio	0.547	0.731	0.377	0.413
Control Delay, s/veh	9.0	15.5	10.2	13.9
LOS	A	C	B	B
95th %tile Queue, veh	3	7	2	2

Volume
3: Lamprey Dr & Fontaine Blvd

2040 Background Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	234	619	154	26	416	4	86	0	5	0	0	136
Future Volume (vph)	234	619	154	26	416	4	86	0	5	0	0	136
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	254	673	167	28	452	4	93	0	5	0	0	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1094	0	0	484	0	0	98	0	0	148	0
Intersection Summary												













HCM 6th Roundabout
3: Lamprey Dr & Fontaine Blvd

2040 Background Traffic
PM Peak Hour

Intersection				
Intersection Delay, s/veh	15.0			
Intersection LOS	C			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1094	484	98	148
Demand Flow Rate, veh/h	1115	494	100	151
Vehicles Circulating, veh/h	29	354	945	585
Vehicles Exiting, veh/h	707	691	199	263
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	18.7	10.4	9.6	7.0
Approach LOS	C	B	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	1115	494	100	151
Cap Entry Lane, veh/h	1340	962	526	760
Entry HV Adj Factor	0.981	0.980	0.980	0.980
Flow Entry, veh/h	1094	484	98	148
Cap Entry, veh/h	1314	942	516	745
V/C Ratio	0.832	0.514	0.190	0.199
Control Delay, s/veh	18.7	10.4	9.6	7.0
LOS	C	B	A	A
95th %tile Queue, veh	11	3	1	1

Volume
3: Lamprey Dr & Fontaine Blvd

Short-Term Total Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	75	410	33	31	285	6	96	0	98	0	0	229
Future Volume (vph)	75	410	33	31	285	6	96	0	98	0	0	229
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	88	482	39	36	335	7	113	0	115	0	0	269
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	609	0	0	378	0	0	228	0	0	269	0
Intersection Summary												

HCM 6th Roundabout
3: Lamprey Dr & Fontaine Blvd

Short-Term Total Traffic
AM Peak Hour

Intersection				
Intersection Delay, s/veh	7.6			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	609	378	228	269
Demand Flow Rate, veh/h	622	386	232	274
Vehicles Circulating, veh/h	37	205	582	494
Vehicles Exiting, veh/h	731	609	77	97
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.5	6.7	8.4	8.2
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	622	386	232	274
Cap Entry Lane, veh/h	1329	1120	762	834
Entry HV Adj Factor	0.980	0.980	0.983	0.982
Flow Entry, veh/h	609	378	228	269
Cap Entry, veh/h	1302	1097	749	819
V/C Ratio	0.468	0.345	0.304	0.329
Control Delay, s/veh	7.5	6.7	8.4	8.2
LOS	A	A	A	A
95th %tile Queue, veh	3	2	1	1

HCM 6th AWSC
5: Grayling Dr & Lamprey Dr/Woodrat Way




Short-Term Total Traffic
AM Peak Hour

Intersection	
Intersection Delay, s/veh	7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	9	8	2	24	0	15	1	0	0	2	19
Future Vol, veh/h	7	9	8	2	24	0	15	1	0	0	2	19
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	11	9	2	28	0	18	1	0	0	2	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0













Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7	7.2	7.4	6.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	94%	29%	8%	0%
Vol Thru, %	6%	38%	92%	10%
Vol Right, %	0%	33%	0%	90%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	16	24	26	21
LT Vol	15	7	2	0
Through Vol	1	9	24	2
RT Vol	0	8	0	19
Lane Flow Rate	19	28	31	25
Geometry Grp	1	1	1	1
Degree of Util (X)	0.022	0.031	0.034	0.024
Departure Headway (Hd)	4.242	3.891	4.047	3.507
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	843	921	886	1018
Service Time	2.269	1.911	2.066	1.536
HCM Lane V/C Ratio	0.023	0.03	0.035	0.025
HCM Control Delay	7.4	7	7.2	6.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.1

Intersection						
Int Delay, s/veh	6.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	0	0	7	0	0
Future Vol, veh/h	21	0	0	7	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	0	0	8	0	0
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	5	4	0	0	8	0
Stage 1	4	-	-	-	-	-
Stage 2	1	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	1017	1080	-	-	1612	-
Stage 1	1019	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	1017	1080	-	-	1612	-
Mov Cap-2 Maneuver	930	-	-	-	-	-
Stage 1	1019	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	930	1612	-	
HCM Lane V/C Ratio	-	-	0.027	-	-	
HCM Control Delay (s)	-	-	9	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Volume
3: Lamprey Dr & Fontaine Blvd

Short-Term Total Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	273	167	96	14	152	2	53	0	5	0	0	159
Future Volume (vph)	273	167	96	14	152	2	53	0	5	0	0	159
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	321	196	113	16	179	2	62	0	6	0	0	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	630	0	0	197	0	0	68	0	0	187	0
Intersection Summary												

HCM 6th Roundabout
3: Lamprey Dr & Fontaine Blvd

Short-Term Total Traffic
PM Peak Hour

Intersection				
Intersection Delay, s/veh	6.7			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	630	197	68	187
Demand Flow Rate, veh/h	642	201	69	191
Vehicles Circulating, veh/h	16	390	527	262
Vehicles Exiting, veh/h	437	206	131	329
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.5	6.1	5.4	5.2
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	642	201	69	191
Cap Entry Lane, veh/h	1358	927	806	1056
Entry HV Adj Factor	0.981	0.982	0.986	0.979
Flow Entry, veh/h	630	197	68	187
Cap Entry, veh/h	1332	910	794	1034
V/C Ratio	0.473	0.217	0.086	0.181
Control Delay, s/veh	7.5	6.1	5.4	5.2
LOS	A	A	A	A
95th %tile Queue, veh	3	1	0	1

HCM 6th AWSC
5: Grayling Dr & Lamprey Dr/Woodrat Way




Short-Term Total Traffic
PM Peak Hour

Intersection												
Intersection Delay, s/veh	7.2											
Intersection LOS	A											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	29	18	0	17	0	10	1	0	0	0	14
Future Vol, veh/h	24	29	18	0	17	0	10	1	0	0	0	14
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	34	21	0	20	0	12	1	0	0	0	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0













Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.3	7.2	7.4	6.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	34%	0%	0%
Vol Thru, %	9%	41%	100%	0%
Vol Right, %	0%	25%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	71	17	14
LT Vol	10	24	0	0
Through Vol	1	29	17	0
RT Vol	0	18	0	14
Lane Flow Rate	13	84	20	16
Geometry Grp	1	1	1	1
Degree of Util (X)	0.015	0.091	0.022	0.016
Departure Headway (Hd)	4.309	3.917	4.049	3.523
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	828	917	884	1010
Service Time	2.35	1.929	2.072	1.566
HCM Lane V/C Ratio	0.016	0.092	0.023	0.016
HCM Control Delay	7.4	7.3	7.2	6.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.3	0.1	0

Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	0	0	24	0	0
Future Vol, veh/h	14	0	0	24	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	0	0	28	0	0
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	15	14	0	0	28	0
Stage 1	14	-	-	-	-	-
Stage 2	1	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	1004	1066	-	-	1585	-
Stage 1	1009	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	1004	1066	-	-	1585	-
Mov Cap-2 Maneuver	920	-	-	-	-	-
Stage 1	1009	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	920	1585	-	
HCM Lane V/C Ratio	-	-	0.018	-	-	
HCM Control Delay (s)	-	-	9	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Volume
3: Lamprey Dr & Fontaine Blvd

2040 Total Traffic
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	78	527	47	59	655	11	140	0	101	0	0	239
Future Volume (vph)	78	527	47	59	655	11	140	0	101	0	0	239
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	85	573	51	64	712	12	152	0	110	0	0	260
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	709	0	0	788	0	0	262	0	0	260	0
Intersection Summary												

HCM 6th Roundabout
3: Lamprey Dr & Fontaine Blvd

2040 Total Traffic
AM Peak Hour

Intersection				
Intersection Delay, s/veh	13.1			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	709	788	262	260
Demand Flow Rate, veh/h	723	803	267	265
Vehicles Circulating, veh/h	65	242	671	946
Vehicles Exiting, veh/h	1146	696	117	99
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.2	16.3	10.4	16.4
Approach LOS	A	C	B	C
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	723	803	267	265
Cap Entry Lane, veh/h	1291	1078	696	526
Entry HV Adj Factor	0.980	0.981	0.981	0.981
Flow Entry, veh/h	709	788	262	260
Cap Entry, veh/h	1266	1058	683	516
V/C Ratio	0.560	0.745	0.384	0.504
Control Delay, s/veh	9.2	16.3	10.4	16.4
LOS	A	C	B	C
95th %tile Queue, veh	4	7	2	3

HCM 6th AWSC
5: Grayling Dr & Lamprey Dr/Woodrat Way

2040 Total Traffic
AM Peak Hour

Intersection

Intersection Delay, s/veh 7.1
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	9	16	2	24	0	24	1	0	0	2	19
Future Vol, veh/h	7	9	16	2	24	0	24	1	0	0	2	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	10	17	2	26	0	26	1	0	0	2	21
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7	7.2	7.4	6.6
HCM LOS	A	A	A	A




Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	96%	22%	8%	0%
Vol Thru, %	4%	28%	92%	10%
Vol Right, %	0%	50%	0%	90%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	32	26	21
LT Vol	24	7	2	0
Through Vol	1	9	24	2
RT Vol	0	16	0	19
Lane Flow Rate	27	35	28	23
Geometry Grp	1	1	1	1
Degree of Util (X)	0.032	0.037	0.032	0.022
Departure Headway (Hd)	4.253	3.785	4.062	3.52
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	842	945	881	1014
Service Time	2.28	1.81	2.086	1.552
HCM Lane V/C Ratio	0.032	0.037	0.032	0.023
HCM Control Delay	7.4	7	7.2	6.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.1

HCM 6th TWSC
101: Grayling Dr & Garganey Ln

2040 Total Traffic
AM Peak Hour

Intersection

Int Delay, s/veh 6.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	0	0	7	0	0
Future Vol, veh/h	21	0	0	7	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	0	0	8	0	0













Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	5	4	0
Stage 1	4	-	-
Stage 2	1	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	1017	1080	-
Stage 1	1019	-	-
Stage 2	1022	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1017	1080	-
Mov Cap-2 Maneuver	930	-	-
Stage 1	1019	-	-
Stage 2	1022	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	930	1612
HCM Lane V/C Ratio	-	-	0.025	-
HCM Control Delay (s)	-	-	9	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Volume
3: Lamprey Dr & Fontaine Blvd

2040 Total Traffic
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	286	619	154	26	416	5	86	0	5	0	0	167
Future Volume (vph)	286	619	154	26	416	5	86	0	5	0	0	167
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	311	673	167	28	452	5	93	0	5	0	0	182
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1151	0	0	485	0	0	98	0	0	182	0
Intersection Summary												

HCM 6th Roundabout
3: Lamprey Dr & Fontaine Blvd

2040 Total Traffic
PM Peak Hour

Intersection				
Intersection Delay, s/veh	17.6			
Intersection LOS	C			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1151	485	98	182
Demand Flow Rate, veh/h	1173	495	100	186
Vehicles Circulating, veh/h	29	412	1003	585
Vehicles Exiting, veh/h	742	691	199	322
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	22.3	11.5	10.3	7.6
Approach LOS	C	B	B	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	1173	495	100	186
Cap Entry Lane, veh/h	1340	906	496	760
Entry HV Adj Factor	0.981	0.980	0.980	0.978
Flow Entry, veh/h	1151	485	98	182
Cap Entry, veh/h	1314	888	486	743
V/C Ratio	0.876	0.546	0.202	0.245
Control Delay, s/veh	22.3	11.5	10.3	7.6
LOS	C	B	B	A
95th %tile Queue, veh	13	3	1	1

HCM 6th AWSC
5: Grayling Dr & Lamprey Dr/Woodrat Way

2040 Total Traffic
PM Peak Hour

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	29	33	0	17	0	17	1	0	0	0	14
Future Vol, veh/h	24	29	33	0	17	0	17	1	0	0	0	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	32	36	0	18	0	18	1	0	0	0	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.3	7.2	7.5	6.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	94%	28%	0%	0%
Vol Thru, %	6%	34%	100%	0%
Vol Right, %	0%	38%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	18	86	17	14
LT Vol	17	24	0	0
Through Vol	1	29	17	0
RT Vol	0	33	0	14
Lane Flow Rate	20	93	18	15
Geometry Grp	1	1	1	1
Degree of Util (X)	0.024	0.1	0.021	0.015
Departure Headway (Hd)	4.329	3.834	4.065	3.541
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	824	936	879	1003
Service Time	2.372	1.853	2.095	1.59
HCM Lane V/C Ratio	0.024	0.099	0.02	0.015
HCM Control Delay	7.5	7.3	7.2	6.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.1	0

Intersection

Int Delay, s/veh 3.2

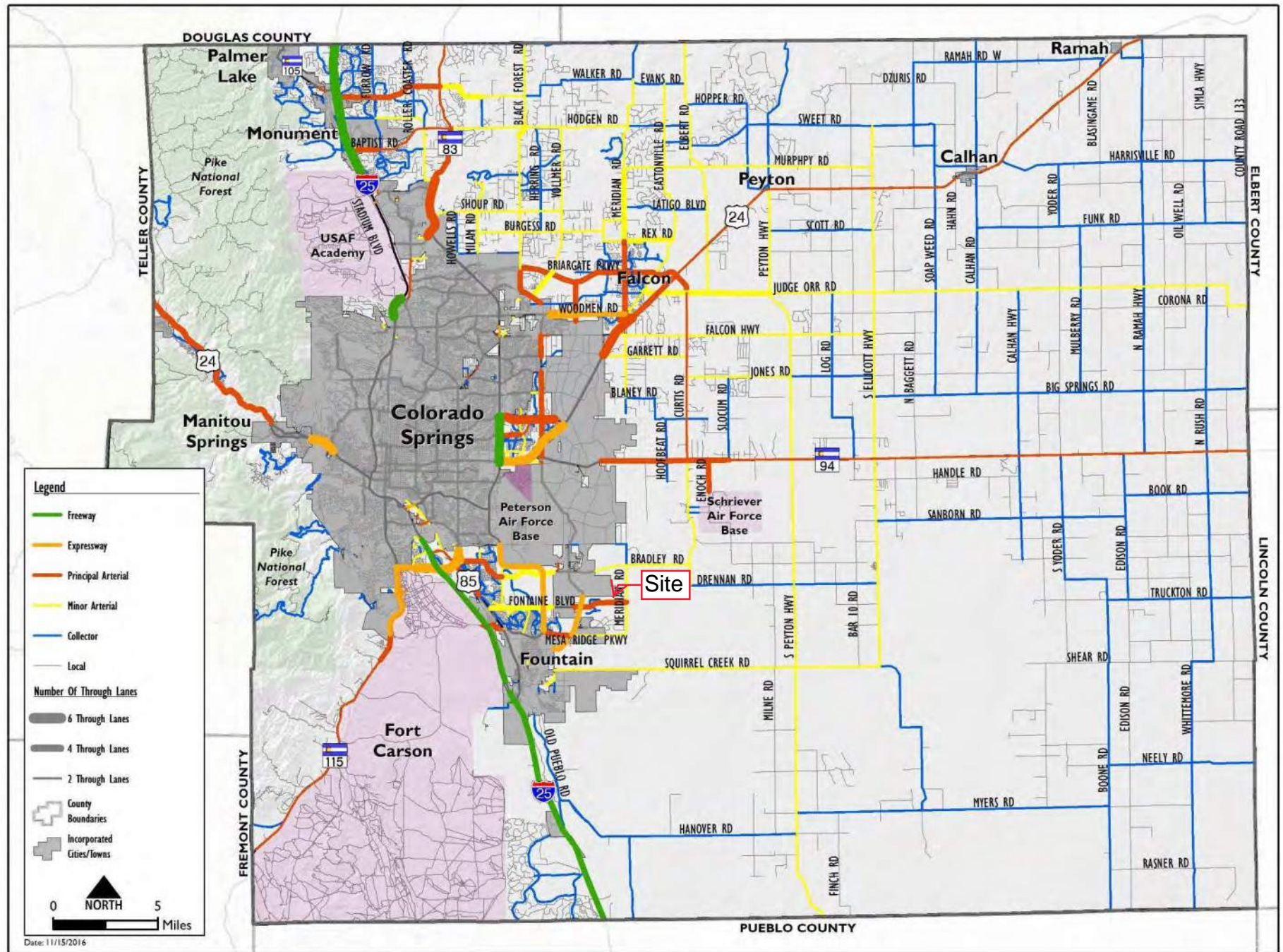
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	0	0	24	0	0
Future Vol, veh/h	14	0	0	24	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	0	0	26	0	0

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	14	13	0
Stage 1	13	-	-
Stage 2	1	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	1005	1067	-
Stage 1	1010	-	-
Stage 2	1022	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1005	1067	-
Mov Cap-2 Maneuver	921	-	-
Stage 1	1010	-	-
Stage 2	1022	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	921	1588
HCM Lane V/C Ratio	-	-	0.017	-
HCM Control Delay (s)	-	-	9	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

MTCP Maps



Map 14: 2040 Roadway Plan (Classification and Lanes)

Map 17: 2060 Corridor Preservation

