## Attachment C

Traffic Analysis Memorandum - Phase 1

# Fehrf Peers 

## MEMORANDUM

Date: September 15, 2016<br>To: $\quad$ Andy Lee and Matt Brogan, Mark Thomas \& Company<br>From: David Stanek, Fehr \& Peers<br>Subject: SR 65 Capacity and Operational Improvements Project - Phase 1 (Revised)

This memorandum describes the results of the State Route (SR) 65 Capacity and Operational Improvements (COI) project Phase 1 analysis. The separately-planned I-80/SR 65 Interchange Improvements Phase 1 project will reduce the majority of congestion that currently occurs on the SR 65 corridor in Roseville. This analysis looks at the additional benefit the SR 65 COI Phase 1 project would provide for SR 65 under construction year (2020) conditions.

Figure 1 shows the lane configuration for the SR 65 corridor between Roseville and Lincoln in Placer County. For information on the travel demand forecasts, please see the State Route 65 Capacity and Operational Improvements Transportation Analysis Report (Fehr \& Peers, September 2015). The volumes used in this analysis are for the No Build Alternative. Under construction year conditions, the separate project for the Whitney Ranch Parkway/Placer Parkway interchange and I-80/SR 65 Interchange Improvements are assumed to have been constructed for the baseline conditions.

The SR 65 COI Phase 1 project would widen northbound SR 65 to provide an additional lane from the Pleasant Grove Boulevard off-ramp to the Pleasant Grove Boulevard on-ramp, resulting in three lanes from I-80 to Blue Oaks Boulevard. In the southbound direction, a lane would be added between the Pleasant Grove Boulevard off-ramp and the Pleasant Grove Boulevard loop on-ramp, resulting in three lanes from Blue Oaks Boulevard to I-80. In addition, the Galleria Boulevard/Stanford Ranch Road southbound off-ramp would be widened to two lanes, and auxiliary lanes would be constructed in both directions between Galleria Boulevard/Stanford Ranch Road and Pleasant Grove Boulevard.

The baseline conditions were analyzed as the Build Alternative for the Stanford Ranch Road/Galleria Boulevard/State Route 65 Northbound Ramps Transportation Analysis Report (Fehr \& Peers, July 2015). This project was later incorporated into the I-80/SR 65 Interchange Improvements Phase 1 project. Under construction year (2020) conditions, the southbound direction during the AM peak period showed the most congestion. Minor congestion (about 40 mph for 15 minutes) occurred for the northbound direction during

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the PM peak period, and no congestion occurred for the off-peak directions (southbound during the PM peak period and northbound during the AM peak period). For this analysis, the AM peak period was selected for analysis because it has the highest level of congestion.

The AM peak period construction year conditions were be analyzed to determine the additional benefits to freeway operations provided by the SR 65 COI Phase 1 project. Overall network performance statistics for the Baseline and Phase 1 Alternatives are summarized in Table 1.

| TABLE 1: COMPARISON OF OVERALL NETWORK PERFORMANCE CONSTRUCTION YEAR AM PEAK PERIOD |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Performance Measure |  | Existing Conditions | Construction Year Conditions |  |
|  |  | Baseline Alternative | Phase 1 Alternative |
| Volume Served (\% of total demand) |  |  | $\begin{gathered} 143,450 \\ (100 \%) \end{gathered}$ | $\begin{gathered} 168,820 \\ (99 \%) \end{gathered}$ | $\begin{gathered} 168,860 \\ (99 \%) \end{gathered}$ |
| Vehicle Miles of Travel (VMT) |  | 645,270 | 790,260 | 790,020 |
| Person Miles of Travel |  | 786,260 | 967,870 | 967,450 |
| Vehicle Hours of Travel (VHT) |  | 13,760 | 18,100 | 18,040 |
| Vehicle Hours of Delay (VHD) (\% of VHT) |  | $\begin{aligned} & 2,670 \\ & (19 \%) \end{aligned}$ | $\begin{aligned} & 4,550 \\ & (25 \%) \end{aligned}$ | $\begin{aligned} & 4,490 \\ & (25 \%) \end{aligned}$ |
| Average Delay per Vehicle (min) |  | 1.12 | 1.62 | 1.60 |
| Person Hours of Delay |  | 3,240 | 5,400 | 5,310 |
| Average Speed |  | 46.9 | 43.7 | 43.8 |
| Average Speed for HOVs |  | 47.0 | 46.0 | 46.2 |
| Travel Time: <br> Southbound SR 65 from <br> Sunset Blvd to I-80 | SOV | - | 5:11 | 4:21 |
|  | HOV | - | 5:11 | 4:21 |
| Source: Fehr \& Peers, 2016 |  |  |  |  |

The results presented in Table 1 are summarized below.

- The project alternatives would have similar network performance during the AM peak period.
- The Phase 1 Alternative would have a higher volume served and a lower overall delay although the difference would be small.
- The Baseline Alternative would have a higher average travel time for southbound SR 65. The average travel time savings under the Phase 1 Alternative would be about 50 seconds.


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## bASELINE ALTERNATIVE



## PHASE 1 ALTERNATIVE



Figure 2 - Northbound SR 65 Construction Year AM Peak Period Speed Contour Map

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## baseline alternative



PHASE 1 ALTERNATIVE


Figure 3 - Southbound SR 65 Construction Year AM Peak Period Speed Contour Map

| Freeway | Location | Baseline Alternative |  | Phase 1 Alternative |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Type | LOS / Density | Type | LOS / Density |
| NB SR 65 | I-80 to Stanford Ranch Rd | Basic | D / 27 | Basic | D / 26 |
|  | Stanford Ranch Rd Off-ramp | Diverge | C / 24 | Diverge | C / 24 |
|  | Stanford Ranch Rd On-ramp | Merge | D / 31 | - | - |
|  | Pleasant Grove Blvd Off-ramp | Diverge | E / 36 | - | - |
|  | Stanford Ranch Rd to Pleasant Grove Blvd | - | - | Weave | C / 23 |
|  | Pleasant Grove Blvd Off to On-ramp | Basic | E / 36 | Basic | C / 23 |
|  | Pleasant Grove Blvd to Blue Oaks Blvd | Weave | C / 27 | - | - |
|  | Pleasant Grove Blvd On-ramp | - | - | Merge | D / 31 |
|  | Blue Oaks Blvd Off-ramp | - | - | Diverge | C / 25 |
| SB SR 65 | Blue Oaks Blvd WB On-ramp | Merge | F/78 | Merge | E/ 40 |
|  | Blue Oaks Blvd to Pleasant Grove Blvd | Weave | F/54 | - | - |
|  | Blue Oaks Blvd EB On-ramp | - | - | Merge | D / 32 |
|  | Pleasant Grove Blvd Off-ramp | - | - | Diverge | C / 27 |
|  | Pleasant Grove Blvd Off to On-ramp | Basic | E/ 36 | Basic | C / 24 |
|  | Pleasant Grove Blvd WB On-ramp | Merge | D / 30 | Merge | C / 22 |
|  | Pleasant Grove Blvd EB On-ramp | Merge | D / 29 | Merge | C / 24 |
|  | Pleasant Grove Blvd to Galleria Blvd | Basic | D / 31 | Basic | D / 28 |
|  | Galleria Blvd Off-ramp | Diverge | D / 32 | Diverge | C / 27 |
|  | Galleria Blvd On-ramp | Merge | E/ 37 | Merge | F/46 |
|  | I-80 Off-ramp | Diverge | D / 33 | Diverge | D / 33 |
| Notes: Bold and underline font indicate LOS F conditions. Shaded cells indicate a project impact. The level of service and average density for the study segment are reported. <br> The results for all locations are contained in the appendix. <br> Source: Fehr \& Peers, 2016 |  |  |  |  |  |

Detailed freeway operations analysis was completed for the peak hour (7:30 to 8:30 AM) of the four-hour AM peak period. Figures 2 and 3 display the average speed in the mixed-flow lanes for SR 65 during the peak periods for each alternative. The AM peak hour level of service (LOS) results for selected locations are reported in Table 2.

## Northbound SR 65

The northbound speed contour map (Figure 2) shows a half hour of slower speeds ( 50 to 60 mph ) from 7:45 to 8:15 AM under the Baseline Alternative between Stanford Ranch Road and Pleasant Grove Boulevard. Under the Phase 1 Alternative, all segments of northbound SR 65 north of I-80 have speeds greater than 60

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mph for the entire peak period. The freeway operations results in Table 2 show that the LOS E conditions at Pleasant Grove Boulevard under the Baseline Alternative would improve to LOS C conditions under the Phase 1 Alternative. While both alternatives would have uncongested conditions during the AM peak hour, the widening under the Phase 1 Alternative would provide additional capacity and result in better freeway operations.

## Southbound SR 65

The southbound speed contour map for the Baseline Alternative (Figure 3) shows congested conditions (speeds less than about 40 mph ) for 45 minutes at the Blue Oaks Boulevard interchange that extend about half-way to the Sunset Boulevard interchange. With the Phase 1 Alternative, the congested conditions would be reduced to 15 minutes at the Blue Oaks Boulevard on-ramps. However, lower speeds ( 50 to 60 mph ) would occur downstream at the Galleria Boulevard on-ramp during the peak interval from 8:00 to 8:15 AM. The freeway operations results (Table 2) show a similar pattern. The LOS F conditions at Blue Oaks Boulevard would improve to LOS E or better under the Phase 1 Alternative, but conditions at the Galleria Boulevard on-ramp would worsen from LOS E to F.

The widening under the Phase 1 Alternative would provide capacity at Pleasant Grove Boulevard interchange to relieve the bottleneck under the Baseline Alternative. However, the additional capacity would deliver more traffic volume to the Galleria Boulevard interchange causing a minor bottleneck to form. This bottleneck will be addressed by a future phase of the I-80/SR 65 Interchange Improvements project.

## Summary

The Phase 1 Alternative would improve AM peak period operations by serving more volume with a lower vehicle delay. The improvement would primarily occur in the southbound direction, where the peak hour travel time would be reduced by 50 seconds and the LOS F conditions at Blue Oaks Blvd would be improved to LOS E or better. Although not analyzed here, PM peak period operations would likely improve in the northbound direction since the lane addition at the Pleasant Grove Boulevard interchange would increase capacity such that peak 15 -minute average speed of 40 mph under the Baseline Alternative would increase.


Figure 1
Freeway Peak Hour Traffic Volumes and Lane Configurations Construction Year Conditions

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ATTACHMENT A
DETAILED ANALYSIS RESULTS

VISSIM Post-Processor
Average Values from 10 Runs
Network Statistics

SR 65 Widening Construction Year - Baseline Conditions AM Peak Period

| Network Performance | Vehicle Types | Average | Std. Dev. |
| :--- | :---: | :---: | :---: |
| Number of Vehicles Served | All Vehicles | 168,819 | 78 |
| Travel Distance [mi] | All Vehicles | 790,257 | 1,123 |
| Travel Time [h] | All Vehicles | 18,104 | 67.4 |
| Average Speed [mph] | All Vehicles | 43.7 | 0.2 |
| Total Delay [h] | All Vehicles | 4,548 | 76.2 |
| Average Delay per Vehicle [s] | All Vehicles | 95 | 1.6 |
| VHD/VMT [min/mile] | All Vehicles | 0.35 | 0.01 |
| Number of Vehicles Served | HOV | 32,347 | 36 |
| Travel Distance [mi] | HOV | 159,735 | 454 |
| Travel Time [h] | HOV | 3,472 | 17 |
| Average Speed [mph] | HOV | 46.0 | 0.2 |
| Total Delay [h] | HOV | 756 | 14 |
| Average Delay per Vehicle [s] | HOV | 82 | 2 |
| VHD/VMT [min/mile] | HOV | 0.28 | 0.01 |
| Number of Vehicles Served | Truck | 7,562 | 17 |
| Travel Distance [mi] | Truck | 37,925 | 293 |
| Travel Time [h] | Truck | 897 | 3 |
| Average Speed [mph] | Truck | 42.3 | 0 |
| Total Delay [h] | Truck | 241 | 3 |
| Average Delay per Vehicle [s] | Truck | 112 | 1 |
| VHD/VMT [min/mile] | Truck | 0.38 | 0.01 |


| Performance Measure | Vehicle Types |  |  |
| :---: | :---: | :---: | :---: |
|  | HOV | Truck | All |
|  | 32,350 | 7,560 | 168,820 |
| Demand Volume | 33,520 | 8,150 | 170,610 |
| Percent Demand Served | $96.5 \%$ | $92.8 \%$ | $99.0 \%$ |
| Vehicle Miles of Travel | 159,730 | 37,920 | 790,260 |
| Person Miles of Travel | 335,440 | 39,820 | 967,870 |
| Vehicle Hours of Travel | 3,470 | 900 | 18,100 |
| Vehicle Hours of Delay | 760 | 240 | 4,550 |
| VHD $\%$ of VHT | $21.9 \%$ | $26.7 \%$ | $25.1 \%$ |
| Average Delay per Vehicle $(\mathrm{min})$ | 1.41 | 1.90 | 1.62 |
| Person Hours of Delay | 1,600 | 250 | 5,400 |
| Average Travel Speed | 46.0 | 42.3 | 43.7 |

VISSIM Post-Processor
Average Values from 10 Runs
Peak Hour Travel Time

SR 65 Widening
Construction Year - Baseline Conditions
AM Peak Period

| Mode | Description | Distance (ft) | Volume (vehicles) |  | Travel Time (min.:sec.) |  | $\begin{array}{\|c\|} \hline \text { Speed (mph) } \\ \hline \text { Average } \\ \hline \end{array}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Average | Std. Dev. | Average | Std. Dev. |  |
| SOV | SR-65 at Blue Oaks to l-80 at Antelope | 43,046 | 836 | 10 | 09:08 | 00:17 | 21.4 |
|  | I-80 at Auburn to SR-65 at Blue Oaks | 32,881 | 1,494 | 18 | 07:06 | 00:02 | 21.0 |
|  | 1-80: Sierra College to Antelope | 45,827 | 1,127 | 16 | 08:43 | 00:15 | 23.9 |
|  | 1-80: Auburn to Sierra College | 36,777 | 685 | 12 | 06:38 | 00:02 | 25.2 |
|  | SR-65: I-80 to Sunset | 43,055 | 646 | 15 | 04:19 | 00:01 | 45.4 |
|  | SR-65: Sunset to Ferrari Ranch | 45,816 | 176 | 5 | 03:31 | 00:01 | 59.2 |
|  | SR-65: Ferrari Ranch to Sunset | 36,773 | 954 | 9 | 03:36 | 00:01 | 46.4 |
|  | SR-65: Sunset to I-80 | 32,882 | 1,228 | 18 | 05:11 | 00:26 | 28.8 |
| HOV | SR-65 at Blue Oaks to I-80 at Antelope | 43,046 | 253 | 5 | 08:50 | 00:10 | 45.4 |
|  | I-80 at Auburn to SR-65 at Blue Oaks | 32,881 | 370 | 9 | 07:03 | 00:02 | 59.2 |
|  | I-80: Sierra College to Antelope | 45,827 | 499 | 8 | 08:21 | 00:04 | 46.4 |
|  | 1-80: Auburn to Sierra College | 36,777 | 233 | 6 | 06:34 | 00:01 | 28.8 |
|  | SR-65: I-80 to Sunset | 43,055 | 159 | 5 | 04:19 | 00:01 | 22.1 |
|  | SR-65: Sunset to Ferrari Ranch | 45,816 | 35 | 3 | 03:30 | 00:02 | 21.2 |
|  | SR-65: Ferrari Ranch to Sunset | 36,773 | 107 | 4 | 03:36 | 00:02 | 25.0 |
|  | SR-65: Sunset to I-80 | 32,882 | 385 | 9 | 05:11 | 00:27 | 25.5 |

VISSIM Post-Processor
Average Values from 10 Runs
Network Statistics

SR 65 Widening
Construction Year - Phase 1 Alternative AM Peak Period

| Network Performance | Vehicle Types | Average | Std. Dev. |
| :--- | :---: | :---: | :---: |
| Number of Vehicles Served | All Vehicles | 168,857 | 77 |
| Travel Distance [mi] | All Vehicles | 790,017 | 1,095 |
| Travel Time [h] | All Vehicles | 18,037 | 202.5 |
| Average Speed [mph] | All Vehicles | 43.8 | 0.5 |
| Total Delay [h] | All Vehicles | 4,489 | 213.9 |
| Average Delay per Vehicle [s] | All Vehicles | 93 | 4.5 |
| VHD/VMT [min/mile] | All Vehicles | 0.34 | 0.02 |
| Number of Vehicles Served | HOV | 32,351 | 42 |
| Travel Distance [mi] | HOV | 159,569 | 475 |
| Travel Time [h] | HOV | 3,456 | 26 |
| Average Speed [mph] | HOV | 46.2 | 0.4 |
| Total Delay [h] | HOV | 744 | 30 |
| Average Delay per Vehicle [s] | HOV | 81 | 3 |
| VHD/VMT [min/mile] | HOV | 0.28 | 0.01 |
| Number of Vehicles Served | Truck | 7,561 | 8 |
| Travel Distance [mi] | Truck | 37,920 | 309 |
| Travel Time [h] | Truck | 893 | 12 |
| Average Speed [mph] | Truck | 42.5 | 1 |
| Total Delay [h] | Truck | 237 | 12 |
| Average Delay per Vehicle [s] | Truck | 110 | 6 |
| VHD/VMT [min/mile] | Truck | 0.38 | 0.02 |


| Performance Measure | Vehicle Types |  |  |
| :---: | :---: | :---: | :---: |
|  | HOV | Truck | All |
|  | 32,350 | 7,560 | 168,860 |
| Percent Demand Served | 33,520 | 8,150 | 170,610 |
| Vehicle Miles of Travel | $96.5 \%$ | $92.8 \%$ | $99.0 \%$ |
| Person Miles of Travel | 159,570 | 37,920 | 790,020 |
| Vehicle Hours of Travel | 335,100 | 39,820 | 967,450 |
| Vehicle Hours of Delay | 740 | 890 | 18,040 |
| VHD \% of VHT | $21.4 \%$ | 240 | 4,490 |
| Average Delay per Vehicle $(\mathrm{min})$ | 1.37 | $27.0 \%$ | $24.9 \%$ |
| Person Hours of Delay | 1,550 | 1.90 | 1.60 |
| Average Travel Speed | 46.2 | 250 | 5,310 |

VISSIM Post-Processor
Average Values from 10 Runs
Peak Hour Travel Time

SR 65 Widening
Construction Year - Phase 1 Alternative
AM Peak Period

| Mode | Description | Distance <br> (ft) | Volume (vehicles) |  | Travel Time (min.:sec.) |  | Speed (mph) <br> Average |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Average | Std. Dev. | Average | Std. Dev. |  |
| SOV | SR-65 at Blue Oaks to I-80 at Antelope | 43,046 | 840 | 13 | 08:54 | 00:20 | 22.0 |
|  | I-80 at Auburn to SR-65 at Blue Oaks | 32,881 | 1,483 | 18 | 07:05 | 00:02 | 21.1 |
|  | I-80: Sierra College to Antelope | 45,827 | 1,129 | 13 | 08:43 | 00:19 | 23.9 |
|  | 1-80: Auburn to Sierra College | 36,777 | 684 | 13 | 06:39 | 00:02 | 25.1 |
|  | SR-65: I-80 to Sunset | 43,056 | 656 | 14 | 04:17 | 00:00 | 45.7 |
|  | SR-65: Sunset to Ferrari Ranch | 45,816 | 177 | 6 | 03:31 | 00:01 | 59.1 |
|  | SR-65: Ferrari Ranch to Sunset | 36,773 | 951 | 10 | 03:36 | 00:01 | 46.5 |
|  | SR-65: Sunset to I-80 | 32,882 | 1,231 | 19 | 04:21 | 00:05 | 34.3 |
| HOV | SR-65 at Blue Oaks to I-80 at Antelope | 43,046 | 252 | 6 | 08:37 | 00:11 | 45.7 |
|  | $1-80$ at Auburn to SR-65 at Blue Oaks | 32,881 | 372 | 10 | 07:01 | 00:02 | 59.1 |
|  | I-80: Sierra College to Antelope | 45,827 | 503 | 8 | 08:20 | 00:05 | 46.5 |
|  | 1-80: Auburn to Sierra College | 36,777 | 233 | 6 | 06:34 | 00:02 | 34.3 |
|  | SR-65: I-80 to Sunset | 43,056 | 159 | 5 | 04:17 | 00:01 | 22.7 |
|  | SR-65: Sunset to Ferrari Ranch | 45,816 | 36 | 3 | 03:31 | 00:02 | 21.3 |
|  | SR-65: Ferrari Ranch to Sunset | 36,773 | 109 | 4 | 03:35 | 00:01 | 25.0 |
|  | SR-65: Sunset to I-80 | 32,882 | 377 | 8 | 04:21 | 00:05 | 25.5 |


| Location |  | Facility | Mainline Volume (vph) |  |  | On-ramp Volume (vph) |  |  | Off-ramp Volume (vph) |  |  | Speed (mph) |  | Density (vplpm) |  | LOS |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Type | Avg. | St. Dev. | \% | Avg. | St. Dev. | \% | Avg. | St. Dev. | \% | Avg. | St. Dev. | Avg. | St. Dev. |  |
| 100 | SR-65 NB - EB I-80 Connector | Basic | 3,105 | 98 | 106.3\% |  |  |  |  |  |  | 42.3 | 1.3 | 43.4 | 2.0 | E |
| 101 | SR-65 NB - WB I-80 Connector | Basic | 1,452 | 70 | 105.2\% |  |  |  |  |  |  | 51.4 | 0.4 | 23.8 | 1.1 | C |
| 103 | SR-65 NB - I-80 WB On-ramp | Merge | 3,104 | 100 | 106.3\% | 1,450 | 69 | 105.1\% |  |  |  | 60.9 | 0.7 | 28.0 | 0.9 | D |
| 104 | SR-65 NB - I-80 to Stanford Ranch Rd | Basic | 4,554 | 113 | 105.9\% |  |  |  |  |  |  | 63.1 | 0.2 | 26.6 | 0.7 | D |
| 105 | SR-65 NB - Stanford Ranch Rd Off-ramp | Diverge | 4,554 | 114 | 105.9\% |  |  |  | 748 | 51 | 103.9\% | 62.7 | 0.6 | 24.1 | 0.9 | C |
| 106 | SR-65 NB - Stanford Ranch Rd Off to On-ramp | Basic | 3,814 | 113 | 106.5\% |  |  |  |  |  |  | 63.2 | 0.2 | 22.9 | 0.6 | C |
| 107 | SR-65 NB - Stanford Ranch Rd On-ramp | Merge | 3,814 | 109 | 106.5\% | 770 | 51 | 106.9\% |  |  |  | 58.4 | 1.5 | 30.9 | 1.2 | D |
| 109 | SR-65 NB - Pleasant Grove Blvd Off-ramp | Diverge | 4,584 | 120 | 106.6\% |  |  |  | 718 | 51 | 99.7\% | 57.5 | 1.8 | 36.1 | 1.6 | E |
| 110 | SR-65 NB - Pleasant Grove Blvd Off to On-ramp | Basic | 3,871 | 123 | 108.1\% |  |  |  |  |  |  | 61.4 | 0.5 | 35.9 | 1.0 | E |
| 111 | SR-65 NB - Pleasant Grove Blvd to Blue Oaks Blvd | Weave | 3,868 | 122 | 108.1\% | 230 | 25 | 100.2\% | 1,794 | 78 | 108.1\% | 62.6 | 0.3 | 26.9 | 0.7 | C |
| 114 | SR-65 NB - Blue Oaks Blvd Off to On-ramp | Basic | 2,307 | 87 | 107.3\% |  |  |  |  |  |  | 63.5 | 0.2 | 20.2 | 0.7 | C |
| 115 | SR-65 NB - Blue Oaks Blvd On-ramp | Merge | 2,308 | 90 | 107.3\% | 459 | 37 | 97.7\% |  |  |  | 60.8 | 0.4 | 22.4 | 1.0 | C |
| 116 | SR-65 NB - Blue Oaks Blvd to Sunset Blvd | Basic | 2,767 | 96 | 105.6\% |  |  |  |  |  |  | 62.1 | 0.4 | 25.3 | 1.1 | C |
| 118 | SR-65 NB - Sunset Blvd Off-ramp | Diverge | 2,766 | 104 | 105.6\% |  |  |  | 1,195 | 59 | 105.8\% | 63.6 | 0.2 | 19.4 | 0.9 | B |
| 169 | SR-65 SB - Sunset Blvd WB On-ramp | Merge | 3,209 | 96 | 108.4\% | 297 | 22 | 114.3\% |  |  |  | 58.1 | 10.7 | 31.6 | 11.3 | D |
| 170 | SR-65 SB - Sunset Blvd EB On-ramp | Merge | 3,508 | 104 | 108.9\% | 343 | 16 | 100.9\% |  |  |  | 47.8 | 13.3 | 45.7 | 16.4 | F |
| 171 | SR-65 SB - Sunset Blvd to Blue Oaks Blvd | Basic | 3,850 | 117 | 108.1\% |  |  |  |  |  |  | 41.8 | 13.9 | 54.3 | 18.6 | F |
| 172 | SR-65 SB - Blue Oaks Blvd Off-ramp | Diverge | 3,849 | 120 | 108.1\% |  |  |  | 651 | 47 | 108.5\% | 35.0 | 13.3 | 64.4 | 20.2 | F |
| 173 | SR-65 SB - Blue Oaks Blvd Off to On-ramp | Basic | 3,198 | 114 | 108.0\% |  |  |  |  |  |  | 19.4 | 8.2 | 93.9 | 20.7 | F |
| 174 | SR-65 SB - Blue Oaks Blvd WB On-ramp | Merge | 3,188 | 108 | 107.7\% | 451 | 11 | 98.0\% |  |  |  | 22.3 | 2.0 | 77.8 | 4.8 | F |
| 175 | SR-65 SB - Blue Oaks Blvd to Pleasant Grove Blvd | Weave | 3,622 | 105 | 105.9\% | 1,212 | 57 | 101.9\% | 643 | 56 | 105.3\% | 35.7 | 1.5 | 53.6 | 2.4 | F |
| 178 | SR-65 SB - Pleasant Grove Blvd Off to On-ramp | Basic | 4,188 | 77 | 104.7\% |  |  |  |  |  |  | 59.4 | 1.2 | 36.2 | 0.9 | E |
| 179 | SR-65 SB - Pleasant Grove Blvd WB On-ramp | Merge | 4,186 | 75 | 104.6\% | 746 | 34 | 102.2\% |  |  |  | 61.8 | 0.4 | 29.8 | 0.3 | D |
| 180 | SR-65 SB - Pleasant Grove Blvd EB On-ramp | Merge | 4,927 | 87 | 104.2\% | 651 | 34 | 101.7\% |  |  |  | 60.8 | 0.7 | 29.2 | 0.5 | D |
| 181 | SR-65 SB - Pleasant Grove Blvd to Galleria Blvd | Basic | 5,575 | 93 | 103.8\% |  |  |  |  |  |  | 61.5 | 0.6 | 31.4 | 0.4 | D |
| 182 | SR-65 SB - Galleria Blvd Off-ramp | Diverge | 5,574 | 94 | 103.8\% |  |  |  | 1,028 | 57 | 98.9\% | 62.2 | 0.3 | 31.8 | 0.4 | D |
| 183 | SR-65 SB - Galleria Blvd Off to On-ramp | Basic | 4,543 | 85 | 104.9\% |  |  |  |  |  |  | 61.6 | 0.9 | 29.3 | 0.5 | D |
| 185 | SR-65 SB - Galleria Blvd On-ramp | Merge | 4,544 | 88 | 105.0\% | 728 | 38 | 104.0\% |  |  |  | 57.0 | 6.4 | 37.4 | 6.7 | E |
| 186 | SR-65 SB - I-80 Off-ramp | Diverge | 5,271 | 103 | 104.8\% |  |  |  | 3,865 | 93 | 105.3\% | 60.0 | 1.0 | 32.5 | 0.7 | D |
| 187 | SR-65 SB - EB I-80 Connector (2 lanes) | Basic | 1,413 | 70 | 104.7\% |  |  |  |  |  |  | 60.3 | 0.6 | 27.0 | 0.8 | D |
| 188 | SR-65 SB - EB I-80 Connector (1 lane) | Basic | 1,415 | 74 | 104.8\% |  |  |  |  |  |  | 61.8 | 0.2 | 26.3 | 0.9 | D |
| 189 | SR-65 SB - WB I-80 Connector | Basic | 3,869 | 96 | 105.4\% |  |  |  |  |  |  | 51.6 | 0.4 | 39.2 | 0.9 | E |

Notes: Average density reported for the analysis area only: for example, within the ramp influence area and not including the HOV lane.
Mainline volume is the upstream served volume for all lanes.

| Location |  | Facility | Mainline Volume (vph) |  |  | On-ramp Volume (vph) |  |  | Off-ramp Volume (vph) |  |  | Speed (mph) |  | Density (vplpm) |  | LOS |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Type | Avg. | St. Dev. | \% | Avg. | St. Dev. | \% | Avg. | St. Dev. | \% | Avg. | St. Dev. | Avg. | St. Dev. |  |
| 100 | SR-65 NB - EB I-80 Connector | Basic | 3,107 | 102 | 106.4\% |  |  |  |  |  |  | 41.8 | 1.0 | 43.5 | 1.4 | E |
| 101 | SR-65 NB - WB I-80 Connector | Basic | 1,452 | 73 | 105.2\% |  |  |  |  |  |  | 51.5 | 0.4 | 23.7 | 0.9 | C |
| 103 | SR-65 NB - I-80 WB On-ramp | Merge | 3,107 | 102 | 106.4\% | 1,452 | 69 | 105.2\% |  |  |  | 61.3 | 0.4 | 27.7 | 0.7 | C |
| 104 | SR-65 NB - I-80 to Stanford Ranch Rd | Basic | 4,560 | 111 | 106.0\% |  |  |  |  |  |  | 63.1 | 0.2 | 26.4 | 0.7 | D |
| 105 | SR-65 NB - Stanford Ranch Rd Off-ramp | Diverge | 4,560 | 112 | 106.0\% |  |  |  | 740 | 53 | 102.8\% | 62.9 | 0.4 | 23.6 | 0.9 | C |
| 106 | SR-65 NB - Stanford Ranch Rd Off to On-ramp | Basic | 3,826 | 107 | 106.9\% |  |  |  |  |  |  | 63.3 | 0.2 | 22.6 | 0.6 | C |
| 107 | SR-65 NB - Stanford Ranch Rd to Pleasant Grove Blvd | Weave | 3,827 | 102 | 106.9\% | 769 | 53 | 106.7\% | 718 | 56 | 99.7\% | 62.9 | 0.2 | 22.6 | 0.6 | C |
| 110 | SR-65 NB - Pleasant Grove Blvd Off to On-ramp | Basic | 3,878 | 127 | 108.3\% |  |  |  |  |  |  | 63.0 | 0.1 | 23.2 | 0.7 | C |
| 111 | SR-65 NB - Pleasant Grove Blvd on-ramp | Merge | 3,878 | 122 | 108.3\% | 233 | 25 | 101.1\% |  |  |  | 61.0 | 0.8 | 31.4 | 1.0 | D |
| 112 | SR-65 NB - Blue Oaks Blvd Off-ramp | Diverge | 4,112 | 117 | 107.9\% |  |  |  | 1,800 | 73 | 108.4\% | 62.4 | 0.2 | 25.2 | 0.6 | C |
| 114 | SR-65 NB - Blue Oaks Blvd Off to On-ramp | Basic | 2,313 | 92 | 107.6\% |  |  |  |  |  |  | 63.4 | 0.2 | 20.2 | 0.8 | C |
| 115 | SR-65 NB - Blue Oaks Blvd On-ramp | Merge | 2,313 | 96 | 107.6\% | 463 | 36 | 98.5\% |  |  |  | 61.0 | 0.4 | 22.2 | 1.1 | C |
| 116 | SR-65 NB - Blue Oaks Blvd to Sunset Blvd | Basic | 2,778 | 101 | 106.0\% |  |  |  |  |  |  | 62.2 | 0.5 | 25.2 | 1.3 | C |
| 118 | SR-65 NB - Sunset Blvd Off-ramp | Diverge | 2,777 | 97 | 106.0\% |  |  |  | 1,200 | 63 | 106.2\% | 63.6 | 0.2 | 19.4 | 1.1 | B |
| 169 | SR-65 SB - Sunset Blvd WB On-ramp | Merge | 3,195 | 98 | 107.9\% | 293 | 24 | 112.5\% |  |  |  | 61.5 | 0.3 | 29.3 | 0.8 | D |
| 170 | SR-65 SB - Sunset Blvd EB On-ramp | Merge | 3,488 | 99 | 108.3\% | 345 | 17 | 101.3\% |  |  |  | 60.1 | 0.7 | 33.5 | 1.1 | D |
| 171 | SR-65 SB - Sunset Blvd to Blue Oaks Blvd | Basic | 3,834 | 104 | 107.7\% |  |  |  |  |  |  | 61.0 | 0.8 | 33.7 | 1.1 | D |
| 172 | SR-65 SB - Blue Oaks Blvd Off-ramp | Diverge | 3,834 | 104 | 107.7\% |  |  |  | 650 | 43 | 108.3\% | 61.8 | 0.3 | 32.9 | 1.0 | D |
| 173 | SR-65 SB - Blue Oaks Blvd Off to On-ramp | Basic | 3,180 | 88 | 107.4\% |  |  |  |  |  |  | 55.3 | 5.6 | 30.7 | 3.5 | D |
| 174 | SR-65 SB - Blue Oaks Blvd WB On-ramp | Merge | 3,178 | 85 | 107.4\% | 451 | 12 | 98.1\% |  |  |  | 46.0 | 3.7 | 39.6 | 4.2 | E |
| 175 | SR-65 SB - Blue Oaks Blvd WB to EB On-ramp | Basic | 3,632 | 89 | 106.2\% |  |  |  |  |  |  | 57.4 | 6.0 | 34.0 | 5.3 | D |
| 176 | SR-65 SB - Blue Oaks Blvd EB On-ramp | Merge | 3,632 | 88 | 106.2\% | 1,218 | 55 | 26.5\% |  |  |  | 52.4 | 2.9 | 32.1 | 2.3 | D |
| 177 | SR-65 SB - Pleasant Grove Blvd Off-ramp | Diverge | 4,846 | 113 | 60.4\% |  |  |  | 648 | 54 | 88.7\% | 62.0 | 0.4 | 26.8 | 0.6 | C |
| 178 | SR-65 SB - Pleasant Grove Blvd Off to On-ramp | Basic | 4,203 | 108 | 57.7\% |  |  |  |  |  |  | 62.9 | 0.2 | 24.3 | 0.6 | C |
| 179 | SR-65 SB - Pleasant Grove Blvd WB On-ramp | Merge | 4,205 | 100 | 57.7\% | 744 | 43 | 102.0\% |  |  |  | 62.4 | 0.2 | 21.5 | 0.5 | C |
| 180 | SR-65 SB - Pleasant Grove Blvd EB On-ramp | Merge | 4,946 | 105 | 61.7\% | 653 | 37 | 102.0\% |  |  |  | 60.7 | 0.6 | 24.3 | 0.7 | C |
| 181 | SR-65 SB - Pleasant Grove Blvd to Galleria Blvd | Basic | 5,595 | 98 | 64.6\% |  |  |  |  |  |  | 61.9 | 0.5 | 27.8 | 0.4 | D |
| 182 | SR-65 SB - Galleria Blvd Off-ramp | Diverge | 5,595 | 98 | 64.6\% |  |  |  | 1,030 | 53 | 99.0\% | 62.6 | 0.8 | 27.2 | 0.5 | C |
| 183 | SR-65 SB - Galleria Blvd Off to On-ramp | Basic | 4,559 | 118 | 59.8\% |  |  |  |  |  |  | 58.9 | 4.2 | 31.3 | 2.8 | D |
| 185 | SR-65 SB - Galleria Blvd On-ramp | Merge | 4,560 | 122 | 59.8\% | 724 | 37 | 103.4\% |  |  |  | 45.9 | 9.8 | 49.0 | 13.6 | F |
| 186 | SR-65 SB - I-80 Off-ramp | Diverge | 5,284 | 136 | 63.5\% |  |  |  | 3,873 | 115 | 105.5\% | 59.6 | 1.0 | 33.1 | 0.8 | D |
| 187 | SR-65 SB - EB I-80 Connector (2 lanes) | Basic | 1,419 | 73 | 105.1\% |  |  |  |  |  |  | 60.6 | 1.0 | 27.1 | 1.3 | D |
| 188 | SR-65 SB - EB I-80 Connector (1 lane) | Basic | 1,422 | 70 | 105.3\% |  |  |  |  |  |  | 61.7 | 0.6 | 26.7 | 1.1 | D |
| 189 | SR-65 SB - WB I-80 Connector | Basic | 3,878 | 114 | 105.7\% |  |  |  |  |  |  | 51.4 | 0.4 | 39.8 | 1.7 | E |

Notes: Average density reported for the analysis area only: for example, within the ramp influence area and not including the HOV lane.
Mainline volume is the upstream served volume for all lanes.


