

Appendix J

Traffic Impact Analyses

Appendix J-1

Traffic Impact Analysis



Teichert Boca Quarry Expansion Traffic Impact Analysis

Prepared for

Teichert Aggregates

EXECUTIVE SUMMARY

PURPOSE

The Teichert Boca Quarry is located along Hinton Road east of Boca Reservoir and north of Interstate 80 (I-80) in Nevada County, California. The proposed project (the “West Pit”) would expand the site to a total area of approximately 158 acres, with up to 15 employees and a maximum potential production of one million tons per year. The quarry operates from May through October. In addition to exporting material from the quarry, backfill material is imported to the quarry from other locations. Over the course of a peak season, about 250,000 tons of backfill are brought to the site. This report analyzes the traffic impacts associated with the quarry expansion.

FINDINGS

The findings of the Traffic Impact Analysis are as follows:

1. The proposed project is expected to generate up to approximately 1,432 daily one-way vehicle trips (716 inbound and 716 outbound) over the course of a peak weekday, with 150 AM peak-hour one-way trips (75 inbound and 75 outbound) and 50 PM peak-hour one-way trips (25 inbound and 25 outbound). On a peak Saturday, the project would generate up to 1,282 daily one-way trips and 150 peak-hour one-way trips. As these figures reflect the maximum potential production levels, this analysis is considered to be conservative.
2. All study intersections are expected to operate at an acceptable Level of Service (LOS) under 2017 and 2037 conditions, with or without the project.
3. The peak-hour traffic volumes at the site access intersection (Stampede Meadows Road/West Hinton Road) do not warrant any new turn lanes under 2017 or 2037 conditions, with or without the project.
4. The driver sight distance at the Stampede Meadows Road/West Hinton Road intersection was analyzed. The stopping sight distance provided for northbound drivers on Stampede Meadows Road is adequate, but the stopping sight distance for southbound drivers does not meet the desired distance. Additionally, the desired corner sight distances for passenger cars and trucks are not provided in either direction along Stampede Meadows Road.
5. The project is expected to generate up to 28,336 daily Vehicle Miles of Travel (VMT) and 3,000 peak-hour VMT in the local region over the course of a peak day. These figures represent “worst-case” conditions, as they assume the quarry is operating at maximum potential production levels. The VMT generated by the proposed project are not all necessarily “new” VMT because the VMT associated with the Boca Quarry are not necessarily “generated” by the proposed project, but are actually necessitated by the construction projects that need the materials from the quarry. Without the proposed quarry project, these construction projects would still occur.

If the Boca Quarry Expansion Project is not implemented, it is estimated that up to 50,400 additional daily VMT (or more, depending on which quarry would serve the local construction projects) would

be generated over the course of a peak weekday in the local region and the I-80 corridor between the Hirschdale Interchange and Sparks, Nevada. Adding the 50,400 additional VMT to the 28,336 local VMT yields a total of 78,736 daily VMT without the proposed project. Without the proposed project, it can be concluded that the VMT associated with quarry trips in the region would be about 2.8 times greater than that with the project. In other words, implementation of the Boca Quarry Expansion Project would ultimately reduce VMT in the greater region by roughly 35 percent.

6. Although no crashes involving bicyclists were reported in the project area in the past 10 years, the presence of the additional trucks and the speed differentials between vehicles and bicyclists (especially on upgrades) would increase the potential for vehicle-bicycle conflicts.

RECOMMENDATIONS

It is recommended that modifications be made to the landscaping in the northeast corner of the Stampede Meadows Road/West Hinton Road intersection in order to provide the desired corner sight distances. In addition, warning signs should be provided in both directions along Stampede Meadows Road approximately 500 feet in advance of W. Hinton Road. Specifically, a sign with a picture of a truck on it (a "W11-10" vehicular traffic sign) with a supplemental warning plaque (a "W16-2a" sign) indicating "500 FT" should be placed in each direction along Stampede Meadows Road. These signs would supplement the existing "TRUCK CROSSING" signs, which are currently provided along Stampede Meadows Road roughly 1,000 feet in advance of the intersection. With these modifications, adequate driver sight distance would be provided.

In addition, pavement widening improvements are recommended along Stampede Meadows Road between the I-80 interchange ramps and West Hinton Road (site access point). These improvements are intended to provide a total pavement width of 32 feet including 4 foot paved shoulders plus 1-foot unpaved shoulders where pavement widening is feasible. Also, "Share The Road" signage (sign type W11-1 with supplemental plaque W16-1P) is recommended to be provided to alert motorists to the presence of cyclists along this route. Finally a smooth pavement transition should be provided where the site driveway meets Stampede Meadows Road. Whether or not it is acceptable to implement the pavement widening improvements in phases should be determined by County staff.

Teichert Boca Quarry Expansion Traffic Impact Analysis

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INTRODUCTION

This engineering report documents the findings and conclusions of a Traffic Impact Analysis (TIA) for the Teichert Boca Quarry Expansion Project in the eastern portion of Nevada County, California. The existing 40-acre site, which is nearly mined out, is located along Hinton Road east of Boca Reservoir and north of Interstate 80 (I-80). The project (proposed “West Pit”) would expand the site to a total area of approximately 158 acres. The entire quarry site is shown in Figure 1. The purpose of this engineering study is to determine the impacts of the traffic generated by the project on the surrounding roadway infrastructure, as well as other transportation-related factors.

SCOPE OF STUDY

The existing lane configuration and traffic control at the following study intersections is depicted in Figure 2:

- I-80/Hirschdale Road Eastbound Ramps
- I-80/Hirschdale Road Westbound Ramps
- West Hinton Road/Stampede Meadows Road

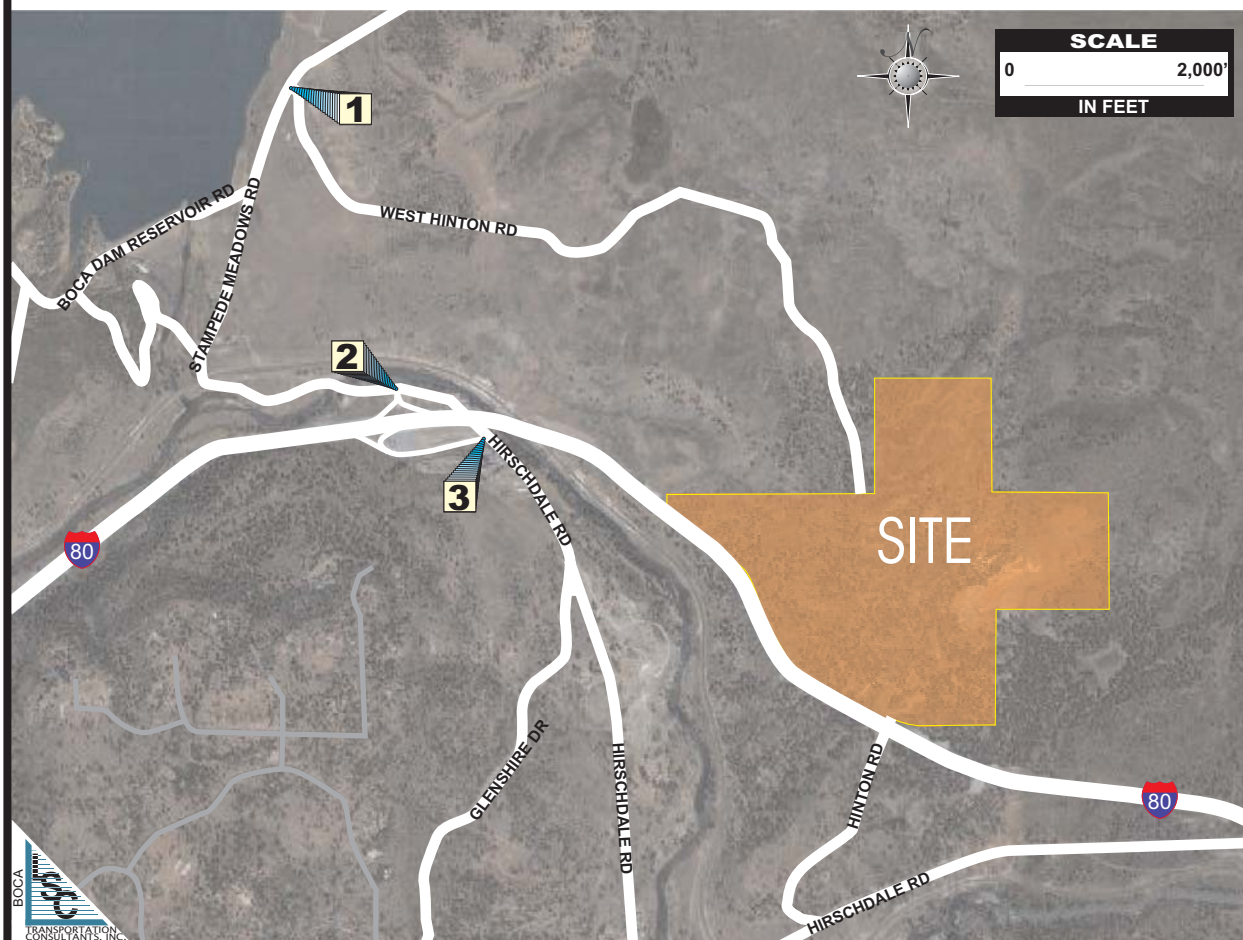
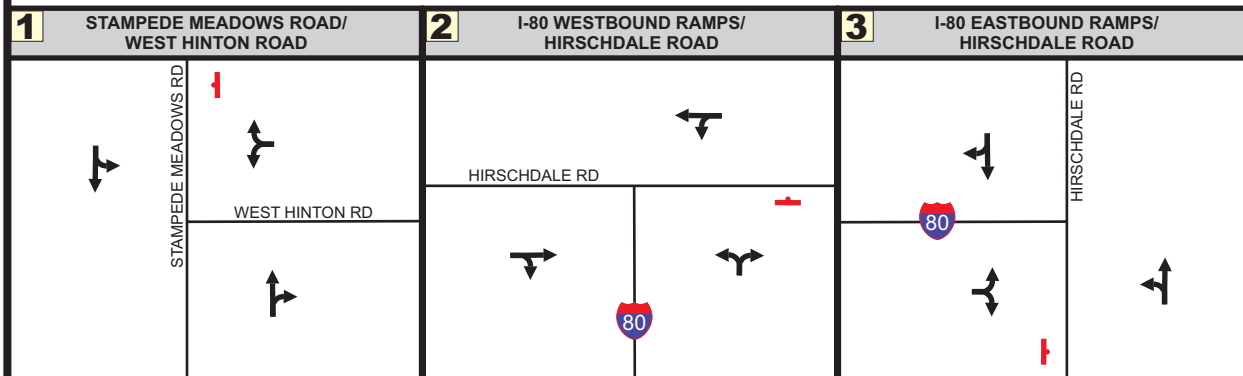
The following four scenarios were analyzed:

- Existing (2017) without project
- Existing (2017) with project
- Future (2037) without project
- Future (2037) with project

In addition, the following traffic-related issues are addressed in this report:

- The need for new turn lanes at the West Hinton Road/Stampede Meadows Road intersection.
- Driver sight distance at the West Hinton Road/Stampede Meadows Road intersection.
- The project impact on Vehicle Miles Traveled (VMT).
- A limited assessment of the projects impact on bicyclists.

FIGURE 2
Study Intersection Lane Configuration and Traffic Control



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Section 2

EXISTING CONDITIONS

EXISTING ROADWAYS

The roadways within the study area are described below:

Interstate 80

Interstate 80 (I-80) provides interregional highway connections east to Reno, Nevada and beyond, and west to Sacramento, California and the San Francisco Bay Area. The Town of Truckee area lies along both sides of I-80 to the west of the quarry site. This section of I-80 is currently a four-lane divided highway with limited truck climbing lanes, and with a posted speed limit of 65 miles per hour. There are eight interchanges serving Truckee on I-80, including the Donner Lake Road and Hirschdale Road interchanges.

West Hinton Road

West Hinton Road is an unpaved privately-maintained road running generally east-west from Stampede Meadows Road to the quarry. This roadway is about two and a half miles in length.

Stampede Meadows Road

Stampede Meadows Road runs generally north-south from Interstate 80 on the south to Henness Pass Road just north of Stampede Reservoir. The approximately 1.3-mile segment of Stampede Meadows Road between the site access (West Hinton Road) and I-80 is a two-lane Minor Collector roadway. This segment has narrow travel lanes (ranging from about 9 to 11 feet wide), with an average paved shoulder width of about one foot. The current Nevada County standards for a Minor Collector indicate 12-foot travel lanes and 4-foot unpaved shoulders. As the travel lanes are less than 12 feet, the roadway is deficient with respect to the current County standards for this type of roadway. It should be noted that Stampede Meadows Road met the standards that were applicable at the time it was constructed. As the County standards have been updated over the years, most of the rural County roadways do not meet the current County standards.

The speed limit is 35 miles per hour within the vicinity of the site access point, although the measured prevailing speeds range from 46 to 48 miles per hour. The speed limit is reduced to 30 miles per hour to the south of Boca Dam Reservoir Road (at a point on Stampede Meadows Road about 930 feet south of Boca Dam Reservoir Road, immediately north of the water company building).

This roadway has a relatively steep grade (upgrade in the northbound direction) north of the railroad tracks, as well as within the vicinity of Boca Dam Reservoir Road. In addition, the roadway is curved between the I-80 ramps and the railroad tracks. Guardrail exists along portions of the road along the river from the I-80 interchange to a point immediately north of the railroad tracks. There is a potential wetland area along the east side of Stampede Meadows Road extending from a point about 200 feet south of Boca Dam Reservoir Road to a point near the water company building to the south, and there are several existing culverts between the railroad tracks and the site access point.

Hirschdale Road

Hirschdale Road is a two-lane collector roadway that connects the Glenshire area to I-80. It also serves residences to the east of the Glenshire area. Hirschdale Road has a pavement width of about 22 feet, and the speed limit is not posted within the study area.

EXISTING TRAFFIC VOLUMES

Traffic counts were conducted at all study intersections on Friday August 11, 2017 from 7:30 AM to 9:30 AM, Friday August 18, 2017 from 4:00 PM to 6:00 PM, and on Saturday August 12, 2017 from 1:45 PM to 4:45 PM. Based on a review of Caltrans hourly traffic volumes on the I-80/Hirschdale interchange ramps, the highest hourly traffic volumes on summer Saturdays typically occurs in the afternoon. Therefore, it was not necessary to conduct AM counts on Saturday. The count data is provided in Appendix A.

During the count periods, Boca Dam Reservoir Road was closed. This road provides the primary access to a campground on the west side of Boca Reservoir, but the campground can also be accessed from State Route 89 North. In order to remain conservative in this analysis (conservatively high traffic volumes), the 2017 traffic volumes were increased to reflect traffic conditions with Boca Dam Reservoir Road open. The resulting Year 2017 weekday AM peak hour, weekday PM peak hour, and Saturday peak hour intersection volumes are shown in Figure 3.

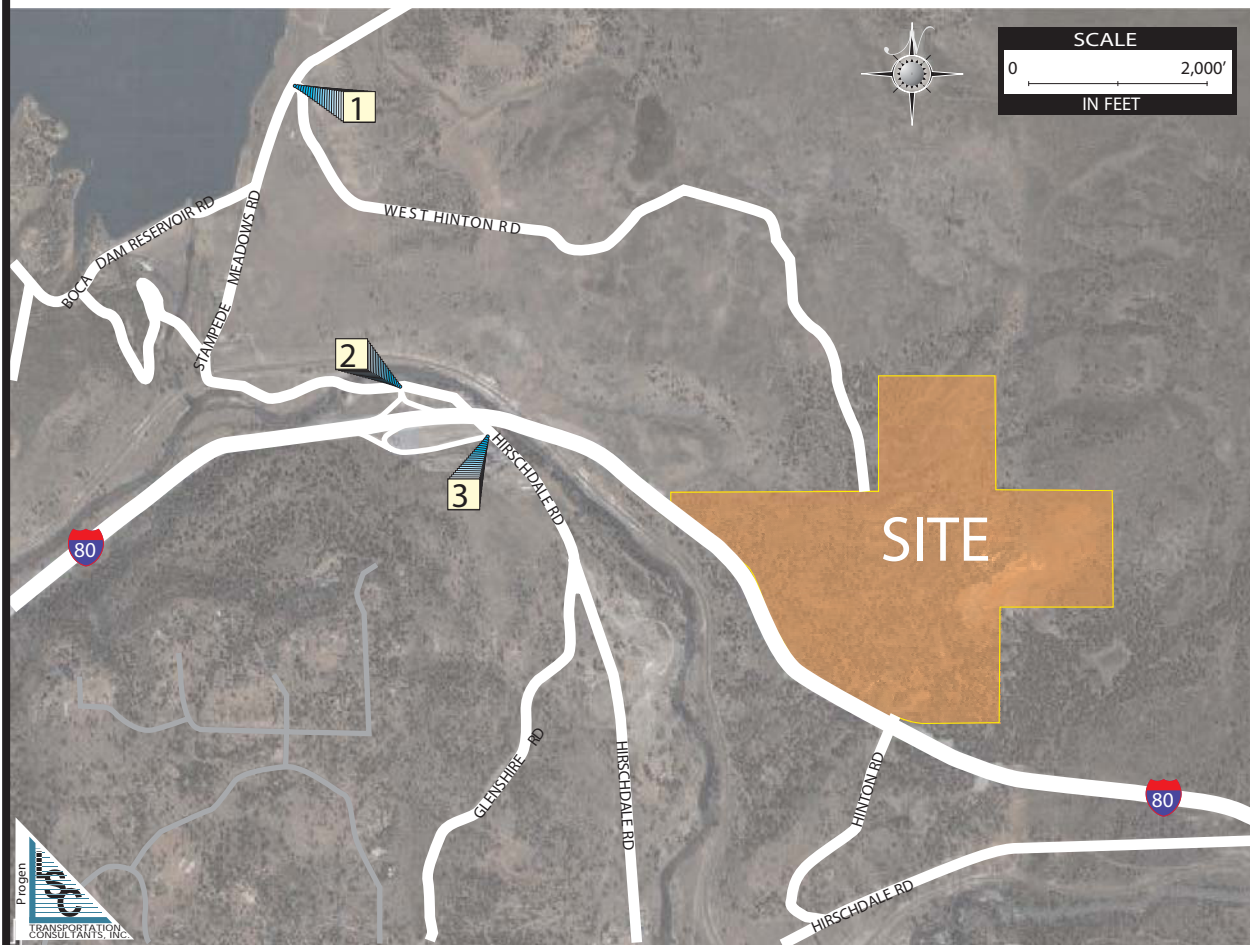
EXISTING BICYCLIST CONDITIONS

Bicycle volume counts were conducted at all study intersections at the same time as the vehicular traffic counts. The weekday AM peak hour and the Saturday peak hour saw a total of 3 bicyclists while the weekday PM peak hour saw no bicyclists. As described above, Stampede Meadows Road has no bike lanes and very little shoulder for bicyclists to use. Hirschdale Road also has no designated bike lanes.

FIGURE 3
Teichert Boca Quarry Expansion
2017 Peak Hour Volumes Without Project

LEGEND	
2	STUDY INTERSECTION
↙	TURNING MOVEMENT
TRAFFIC VOLUMES	
22	Weekday AM
(22)	Weekday PM
22	SATURDAY

1 STAMPEDE MEADOWS ROAD/ WEST HINTON ROAD		2 I-80 WESTBOUND RAMP/ HIRSCHDALE ROAD		3 I-80 EASTBOUND RAMP/ HIRSCHDALE ROAD	
18 (49) 66 ↓ ↘ 0 (1) 0	1 (0) ↶ 1 ↷ 0 (3) 1	↶ 34 (46) ↷ 38 66 (67) 31		47 (115) ↶ 106 12 (26) ↷ 35	
	↶ 2 (1) ↷ 4 39 (52) 76	16 (56) 71 → 9 (19) 46	↶ 13 (32) 24 ↶ 43 (85) 70	25 (43) 23 ↶ ↷ 39 (73) 58	↶ 80 (101) 63 ↶ ↷ 75 (74) 46



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Section 3

PROPOSED CONDITIONS

The project location, the size of the project, and the time of the project completion are all important elements that need to be considered to determine the safety and capacity impacts of the development. It is also important to examine how the project will operate with the existing transportation system, estimate how much new traffic it will generate, identify how it would impact existing traffic patterns, and identify how traffic generated by the project site would be distributed.

PROJECT DESCRIPTION

The proposed project (“West Pit”) would expand the Teichert Boca Quarry site to a total area of approximately 158 acres, with up to 15 employees and a maximum potential production of one million tons per year. The quarry operates from May through October. In addition to exporting material from the quarry, backfill material is imported to the quarry from other locations. Over the course of a peak season, about 250,000 tons of backfill are brought to the site.

Commercial access to the site is provided via unpaved West Hinton Road, which connects the site to Stampede Meadows Road to the west. Stampede Meadows Road is accessed via the I-80/Hirschdale Road Interchange. In addition, passenger vehicle and emergency vehicle access is currently temporarily provided via Hinton Road to the south and Hirschdale Road. However, this Hirschdale Road/Hinton Road route would never be used for truck trips associated with the Boca Quarry.

TRIP GENERATION AND DISTRIBUTION

Trip Generation

The first step in the analysis of traffic impacts is to prepare an estimate of the number of trips generated by the proposed project. Trip generation is the evaluation of the number of vehicle-trips that would either have an origin or destination at the project site. Due to the fact that the existing pit has been mined out, the existing quarry currently generates a minimal amount of traffic. In order to remain conservative in this analysis, no credit is taken for trips associated with the existing quarry. That is, all traffic generated by the proposed project (the West Pit) is assumed to be new traffic. As standard ITE trip generation rates are not provided for a quarry, a detailed trip generation estimate was developed based upon an analysis of truck trip patterns and “person-trip” patterns, factored by travel mode and vehicle occupancy characteristics appropriate for the local area.

There are four types of trips that are generated by the quarry, as follows:

- Aggregate exporting trucks
- Backfill importing trucks
- Employee vehicles
- Maintenance trucks

Aggregate Exporting Trucks

A total of 10,080 tons of aggregate material are proposed to be hauled out of the site on a peak day in a peak year. Various sizes of trucks are used in aggregate hauling. According to Teichert Aggregates staff, the average truck is estimated to haul 18 tons of material. Dividing the total tons of material (10,080) by the average tonnage per truck (18) yields a total of 560 truckloads per day. As each truck load involves an empty truck entering the site and a full truck exiting the site, the total number of one-way trips per day generated by aggregate exporting trucks would be 1,120.

Backfill Importing Trucks

Backfill trucks consist of trucks full of construction waste entering the site, dumping the material, and exiting empty. These backfill trucks are estimated to haul at most one-quarter of the amount hauled by aggregate exporting trucks, or a total of 2,520 tons per day. With an average of 18 tons per truck, this would generate approximately 140 round trips, or 280 one-way trips.

Employees

A maximum of 15 employees would be onsite over the course of a peak day. Based on data from the *2011-2015 American Community Survey* (U.S. Census data) for the Truckee area, the average vehicle occupancy for work trips is approximately 1.2 employees per vehicle. Dividing the total number of employees (15) by the average vehicle occupancy (1.2) yields about 13 vehicles associated with employees. Assuming each employee makes one round-trip commuting to/from work, and 2 employees also make a round-trip off the site during the work day (for lunch, errands, etc.), a total of about 30 one-way vehicle-trips would be made by employees.

Maintenance Truck

One maintenance vehicle is expected to visit the site over the course of a peak day for fueling and maintenance of onsite equipment, creating 2 one-way trips.

Total Weekday Trips

In summary, the total number of trips generated by the site is estimated to be 1,432 one-way trips (716 inbound and 716 outbound) on a peak weekday.

Weekday Peak Hour Trips

In order to estimate the number of trips generated by the quarry during the peak hours, it is necessary to develop an estimate of the hourly trip generation throughout the day. On weekdays, the quarry is open from 6:00 AM to 6:00 PM. Table 1 presents the number of one-way vehicle trips associated with each project component over the course of each hour. As shown, trucks arrive on site during the hour before the quarry opens. From then on, one aggregate exporting truck per minute can be filled, processed, and exit the site, for a maximum of 60 trucks per hour exiting the site. This high rate of production is expected to last until early afternoon and then drop off to only 20 trucks per hour. The backfill trucks are assumed to enter the site, dump their contents, and exit at the rate of one truck every 4 minutes (or 15 trucks per hour) in the peak times and drop down to 5 trucks an hour in the early

Table 1: Hourly Trip Generation - Weekday

Hour Start Time	Aggregate Exporting Trucks		Backfill Importing Trucks		Employee Vehicles		Maintenance Truck		Total Vehicle Trips		
	In	Out	In	Out	In	Out	In	Out	In	Out	Total
5:00 AM	60	0	15	0	13	0	0	0	88	0	88
6:00 AM	60	60	15	15	0	0	0	0	75	75	150
7:00 AM	60	60	15	15	0	0	0	0	75	75	150
8:00 AM	60	60	15	15	0	0	0	0	75	75	150
9:00 AM	60	60	15	15	0	0	0	0	75	75	150
10:00 AM	60	60	15	15	0	0	0	0	75	75	150
11:00 AM	60	60	15	15	0	1	0	0	75	76	151
12:00 PM	60	60	15	15	1	0	0	0	76	75	151
1:00 PM	20	60	5	15	0	1	0	0	25	76	101
2:00 PM	20	20	5	5	1	0	0	0	26	25	51
3:00 PM	20	20	5	5	0	0	0	0	25	25	50
4:00 PM	20	20	5	5	0	0	0	0	25	25	50
5:00 PM	0	20	0	5	0	0	0	0	0	25	25
6:00 PM	0	0	0	0	0	13	1	0	1	13	14
7:00 PM	0	0	0	0	0	0	0	1	0	1	1
Total	560	560	140	140	15	15	1	1	716	716	1,432

AM and PM peak hours are shaded

Source: LSC Transportation Consultants

Teichert Quarry.xls

afternoon. Employees are assumed to arrive on site in the hour before the plant opens and to depart in the hour after the site closes, with two employees making one round-trip offsite in the middle of the day. The maintenance truck is assumed to enter and exit after the site is closed for the day. As indicated in Table 1, approximately 150 one-way trips (75 inbound and 75 outbound) are estimated to occur in the weekday AM peak hour and 50 trips (25 inbound and 25 outbound) during the weekday PM peak hour.

Saturday Trips

The quarry is also permitted to operate on Saturdays from 8:00 AM to 4:00 PM. Table 2 shows the hourly trips over the course of a peak Saturday. A total of up to 1,282 daily one-way trips are expected on a peak Saturday, with 150 trips (75 inbound and 75 outbound) occurring during the PM peak hour. The 2:00 PM hour is identified as the PM peak hour, considering that it is the highest hour of quarry traffic that overlaps with the highest hour of the traffic count data.

Trip Distribution and Assignment

It is necessary to identify the proportion of trips generated by the site to and from each distribution area/gate in the study area, in order to assign the trips through the study intersections. The quarry will serve the entire area between Sierra Valley on the north and Tahoe's West Shore on the south. Based upon regional access patterns, the geographic area and uses served by the quarry, and the locations of residential uses within the vicinity of the site, about 95 percent of project-generated trips are assumed to be made to/from points along I-80 to the west, and the remaining 5 percent are assumed to be made to/from the Glenshire and Hirschdale areas. No trips are distributed to/from I-80 east of Hirschdale, as hauling trips to the east are expected to be minimal.

The project trips were assigned through the study intersections based on the trip distribution percentages. The resulting project-generated peak-hour intersection volumes are illustrated in Figure 4. Although some passenger cars could potentially access the site via the Hirschdale Road/Hinton Road route to the south, all project trips are assumed to access the site via the Stampede Meadows Road/West Hinton Road route, in order to remain conservative in this analysis. Adding the project-generated volumes to the "2017 no project" volumes yields the "2017 with project" volumes shown in Figure 5.

Table 2: Hourly Trip Generation - Saturday											
Hour Start Time	Trucks		Backfill Trucks		Employee Vehicles		Maintenance Truck		Total Vehicle Trips		Total
	In	Out	In	Out	In	Out	In	Out	In	Out	
7:00 AM	60	0	15	0	13	0	0	0	88	0	88
8:00 AM	60	60	15	15	0	0	0	0	75	75	150
9:00 AM	60	60	15	15	0	0	0	0	75	75	150
10:00 AM	60	60	15	15	0	1	0	0	75	76	151
11:00 AM	60	60	15	15	1	0	0	0	76	75	151
12:00 PM	60	60	15	15	0	1	0	0	75	76	151
1:00 PM	60	60	15	15	1	0	0	0	76	75	151
2:00 PM	60	60	15	15	0	0	0	0	75	75	150
3:00 PM	20	60	5	15	0	0	0	0	25	75	100
4:00 PM	0	20	0	5	0	13	1	0	1	38	39
5:00 PM	0	0	0	0	0	0	0	1	0	1	1
Total	500	500	125	125	15	15	1	1	641	641	1,282
Saturday peak hour is shaded Source: LSC Transportation Consultants											
Teichert Quarry.xls											

FIGURE 4
Teichert Boca Quarry Expansion
Project Generated Peak Hour Traffic Volumes

LEGEND	
2	STUDY INTERSECTION
↩	TURNING MOVEMENT
22	TRAFFIC VOLUMES
(22)	Weekday AM
22	Weekday PM
22	SATURDAY

1	STAMPEDE MEADOWS ROAD/ WEST HINTON ROAD	2	I-80 WESTBOUND RAMP/ HIRSCHDALE ROAD	3	I-80 EASTBOUND RAMP/ HIRSCHDALE ROAD

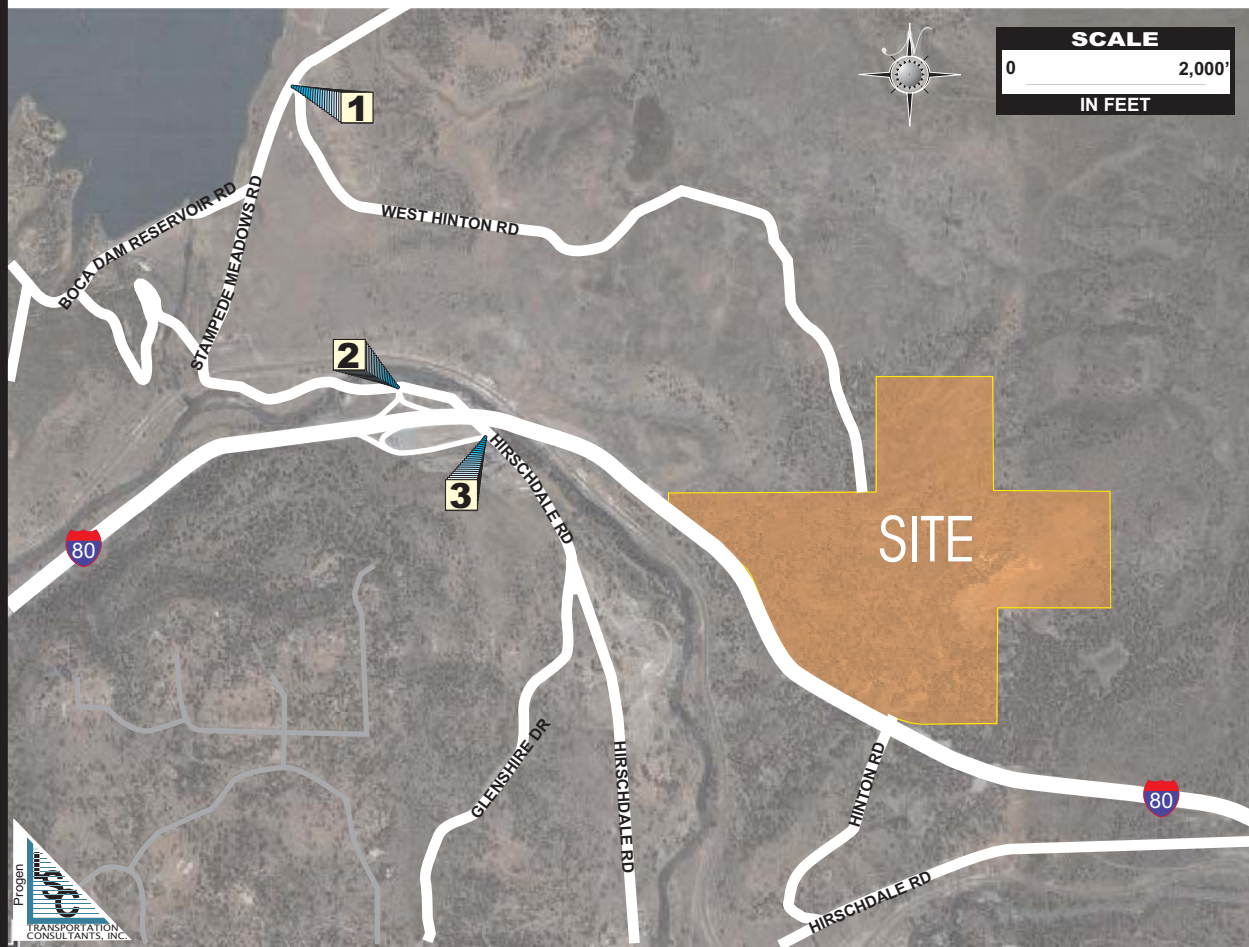
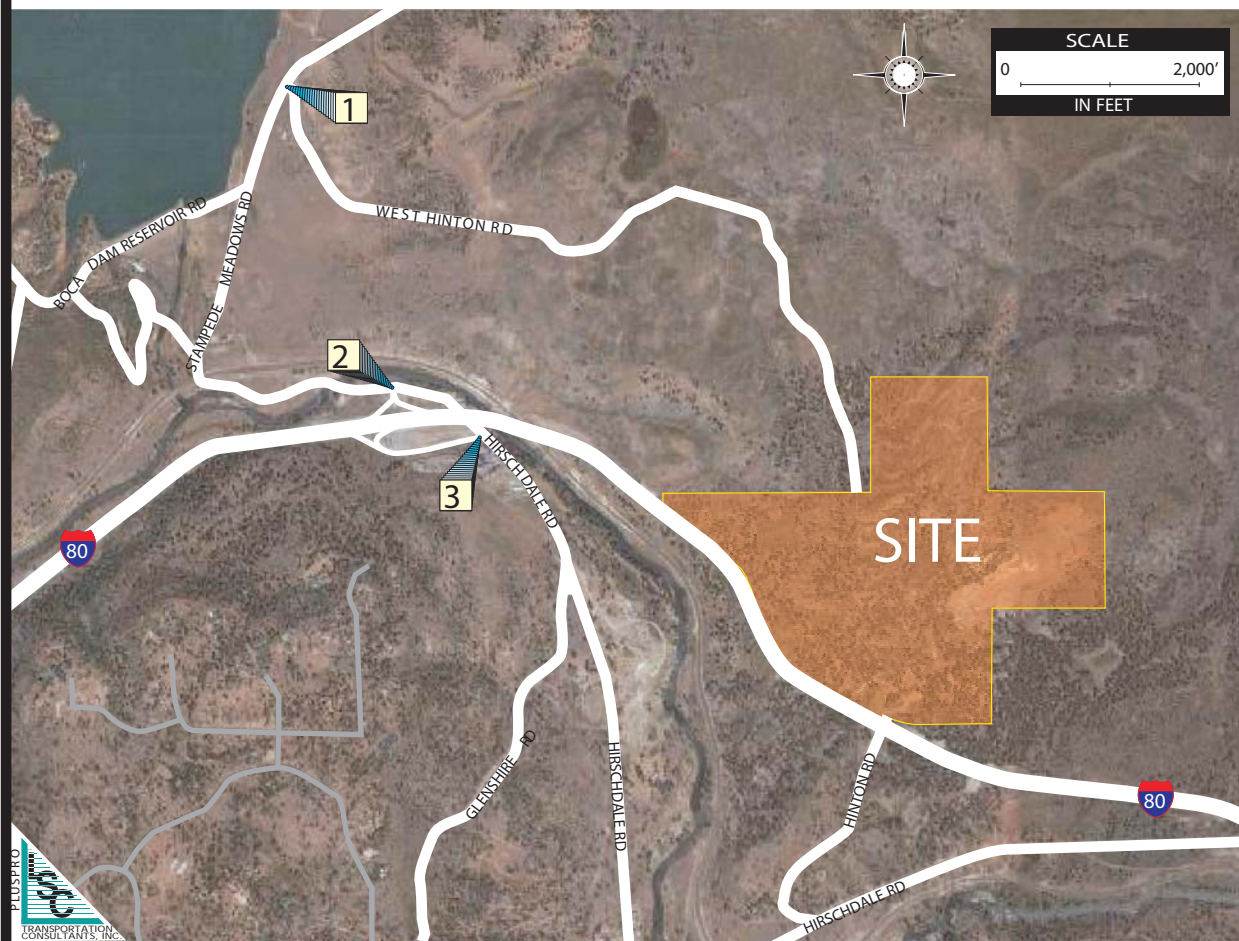


FIGURE 5
Teichert Boca Quarry Exapnsion
2017 Peak Hour Volumes With Project

<div>2</div> <div>STUDY INTERSECTION</div> <div>TURNING MOVEMENT</div> <div>TRAFFIC VOLUMES</div> <div>Weekday AM</div> <div>Weekday PM</div> <div>SATURDAY</div>			
<div>1</div> <div>STAMPEDE MEADOWS ROAD/ WEST HINTON ROAD</div>		<div>2</div> <div>I-80 WESTBOUND RAMP/ HIRSCHDALE ROAD</div>	
<div>18 (49) 66</div> <div>0 (1) 0</div> <div>↓ ↘</div>	<div>1 (0) 1</div> <div>75 (28) 76</div> <div>↙ ↘</div>	<div>109 (71) 113</div> <div>66 (67) 31</div> <div>↙ ↘</div>	
<div>39 (52) 76</div> <div>77 (26) 79</div> <div>↑ ↘</div>		<div>20 (57) 75</div> <div>80 (43) 117</div> <div>→ ↘</div>	<div>13 (32) 24</div> <div>43 (85) 70</div> <div>↘ ↘</div>
		<div>3</div> <div>I-80 EASTBOUND RAMP/ HIRSCHDALE ROAD</div>	
		<div>51 (116) 110</div> <div>12 (26) 35</div> <div>↙ ↓</div>	<div>96 (67) 94</div> <div>39 (73) 58</div> <div>↘ ↘</div>
		<div>80 (101) 63</div> <div>79 (75) 50</div> <div>↙ ↑</div>	



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LEVEL OF SERVICE ANALYSIS

DESCRIPTION

Traffic operations at the study intersections were assessed in terms of Level Of Service (LOS) and delay. LOS is a concept that was developed by transportation engineers to quantify the level of operation of intersections and roadways (*Highway Capacity Manual (HCM)*, Transportation Research Board, 2016). LOS measures are classified in grades “A” through “F,” indicating the range of operation. LOS “A” signifies the best level of operation, while “F” represents the worst. A detailed LOS description is provided in Appendix B. Intersection Level of Service (LOS) with and without the project was calculated for both existing (2017) and future (2037) weekday AM, weekday PM, and Saturday peak-hour conditions. The HCM 6 methodologies were applied to all intersections, using the *Highway Capacity Software* (McTrans Center, University of Florida).

LEVEL OF SERVICE STANDARD

The *Nevada County General Plan* (Nevada County, 2010) requires that rural intersections and roadways maintain Level of Service (LOS) C, except where the existing LOS is less than C. In those situations, the LOS shall not be allowed to drop below the existing LOS. In other words, LOS on an intersection or roadway already below LOS C should not be allowed to degrade below its existing condition.

LEVEL OF SERVICE ANALYSIS

Study intersections were evaluated to determine existing operational conditions. Appendix C presents the output from each of the runs performed for the study intersections, and Table 3 summarizes the results for existing (2017) conditions with and without the project. As indicated, all study intersections currently operate at a good level (LOS A) without the project. Although some movements would degrade from LOS A to LOS B with implementation of the proposed project, all intersections would continue to operate at an acceptable LOS B or better for the worst movement in 2017.

Table 3: Year 2017 Intersection Level of Service

	Without Project				With Project			
	Worst Movement		Total Intersection		Worst Movement		Total Intersection	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
AM Peak Hour								
Stampede Meadows Road/West Hinton	8.6	A	0.1	A	11.2	B	5.4	A
I-80 Westbound Ramps/Hirschdale Road	9.2	A	7.2	A	9.7	A	3.5	A
I-80 Eastbound Ramps/Hirschdale Road	7.4	A	4.6	A	12.0	B	7.5	A
PM Peak Hour								
Stampede Meadows Road/West Hinton	9.2	A	0.3	A	10.6	B	2.3	A
I-80 Westbound Ramps/Hirschdale Road	10.0	A	6.5	A	10.2	B	4.8	A
I-80 Eastbound Ramps/Hirschdale Road	7.7	A	4.1	A	9.2	A	4.1	A
Saturday Peak Hour								
Stampede Meadows Road/West Hinton	9.2	A	0.1	A	12.5	B	4.2	A
I-80 Westbound Ramps/Hirschdale Road	9.7	A	4.8	A	10.3	B	3.3	A
I-80 Eastbound Ramps/Hirschdale Road	8.1	A	4.0	A	10.9	B	6.0	A
Source: LSC Transportation Consultants								
Teichert Quarry 2107 Update.xls								

FUTURE CUMULATIVE CONDITIONS

The potential traffic impacts of the proposed project under future cumulative conditions were evaluated. First, Year 2037 traffic volumes were estimated without the project. Next, 2037 volumes with the project were estimated. Finally, intersection LOS was analyzed with and without the project.

FUTURE ROADWAY CONFIGURATION

Nevada County proposes to construct a new roadway connecting West Hinton Road to Hinton Road. This potential new roadway would start at a point on West Hinton Road on the west side of the proposed West Pit area, and it would run to the south and east along the West Pit boundary, terminating at a point on Hinton Road about 390 feet north of I-80. This potential roadway would provide access to private properties along Hinton Road in the event that the bridge(s) along Hirschdale Road were closed. However, given the low traffic volumes along Hinton Road, the shift in background traffic volumes to the new roadway is expected to be minimal.

FUTURE TRAFFIC VOLUMES

Future 2037 traffic volumes were estimated in three steps; first applying a growth rate, second by adding the potential Canyon Springs project, and finally by adding the Tahoe Forest Church project. The first step is applying an average annual growth rate to the “2017 no project” volumes. The Nevada County Regional Transportation Plan (April 14, 2017) estimated the countywide population average annual growth rate will be 0.7 percent from 2015 to 2025 and 0.6 percent from 2025 to 2035. This equates to an average annual growth rate of approximately 0.65 percent for the 20 year period from 2015 to 2035.

Next, the Canyon Springs Project impact on the study area was estimated. The Canyon Springs Project is assumed to construct residential units in the eastern portion of the Glenshire area, within the Town of Truckee. According to the Canyon Springs Traffic Impact Analysis, the Canyon Springs Project would generate approximately 151 PM peak-hour trips (97 inbound and 54 outbound) through the I-80/Hirschdale Road Interchange Ramp intersections under future cumulative 2031 conditions. The Canyon Springs Project would generate a minimal level of traffic on Stampede Meadows Road (1 northbound and 2 southbound trips during the PM peak hour). Comparing the turning-movement volumes at the I-80/Hirschdale Road Interchange Ramps intersections with only the Nevada county growth rate with those generated by Canyon Springs reveals that the growth rate alone does not reflect all of the Canyon Springs traffic. Therefore, it is necessary to add the Canyon Springs project-generated volumes.

Finally, the Tahoe Forest Church was recently relocated to 10315 Hirschdale Road, to the east of the Town of Truckee. In order to ensure this analysis reflects busy traffic conditions at the Church, the traffic volumes estimated to be generated by the Tahoe Forest Church Project were added. The project-generated volumes were estimated based on the volumes provided in the *Tahoe Forest Church Traffic Analysis* (LSC Transportation Consultants, Inc., December, 2013).

The future '2037 No Project' traffic volumes, as shown in Figure 6, were estimated by applying the growth rate to the '2017 no project' volumes then adding the Canyon Springs and Church project volumes. Adding the Boca Quarry project-generated traffic volumes to the '2037 no project' volumes yields the '2037 with project' volumes presented in Figure 7.

FUTURE INTERSECTION LOS

Evaluation of future intersection LOS is based on the lane configurations shown in Figure 2. The LOS calculations are included in Appendix D and summarized in Table 4. The worst movement on the I-80 Westbound/Hirschdale Road intersection is expected to degrade from LOS A to LOS B due to the growth in background traffic from 2017 to 2037 for the PM peak hour and Saturday peak hour. However, as indicated in Table 4, all study intersections are expected to operate at a relatively good level (LOS B or better) in 2037 without the proposed project. With implementation of the proposed project, although some movements would degrade from LOS A to LOS B, all intersection movements would operate at an acceptable LOS B or better.

FIGURE 6
Teichert Boca Quarry Exapnsion
2037 Peak Hour Volumes Without Project

1 STAMPEDE MEADOWS ROAD/ WEST HINTON ROAD		2 I-80 WESTBOUND RAMP/ HIRSCHDALE ROAD		3 I-80 EASTBOUND RAMP/ HIRSCHDALE ROAD	
<div> <div>20 (56) 75</div> <div>0 (1) 0</div> <div>↓ ↘</div> </div>	<div> <div>1 (0) 1</div> <div>0 (3) 1</div> <div>↙ ↘</div> </div> <div> <div>44 (59) 87</div> <div>2 (1) 5</div> <div>↑ ↘</div> </div>	<div> <div>39 (53) 44</div> <div>75 (94) 99</div> <div>← ↙</div> </div> <div> <div>18 (66) 84</div> <div>10 (22) 52</div> <div>↘ ↙</div> </div>	<div> <div>54 (163) 162</div> <div>14 (30) 40</div> <div>↙ ↘</div> </div> <div> <div>15 (36) 27</div> <div>50 (127) 118</div> <div>↙ ↘</div> </div>	<div> <div>28 (49) 26</div> <div>44 (159) 147</div> <div>↙ ↘</div> </div> <div> <div>91 (132) 101</div> <div>85 (103) 117</div> <div>↙ ↘</div> </div>	

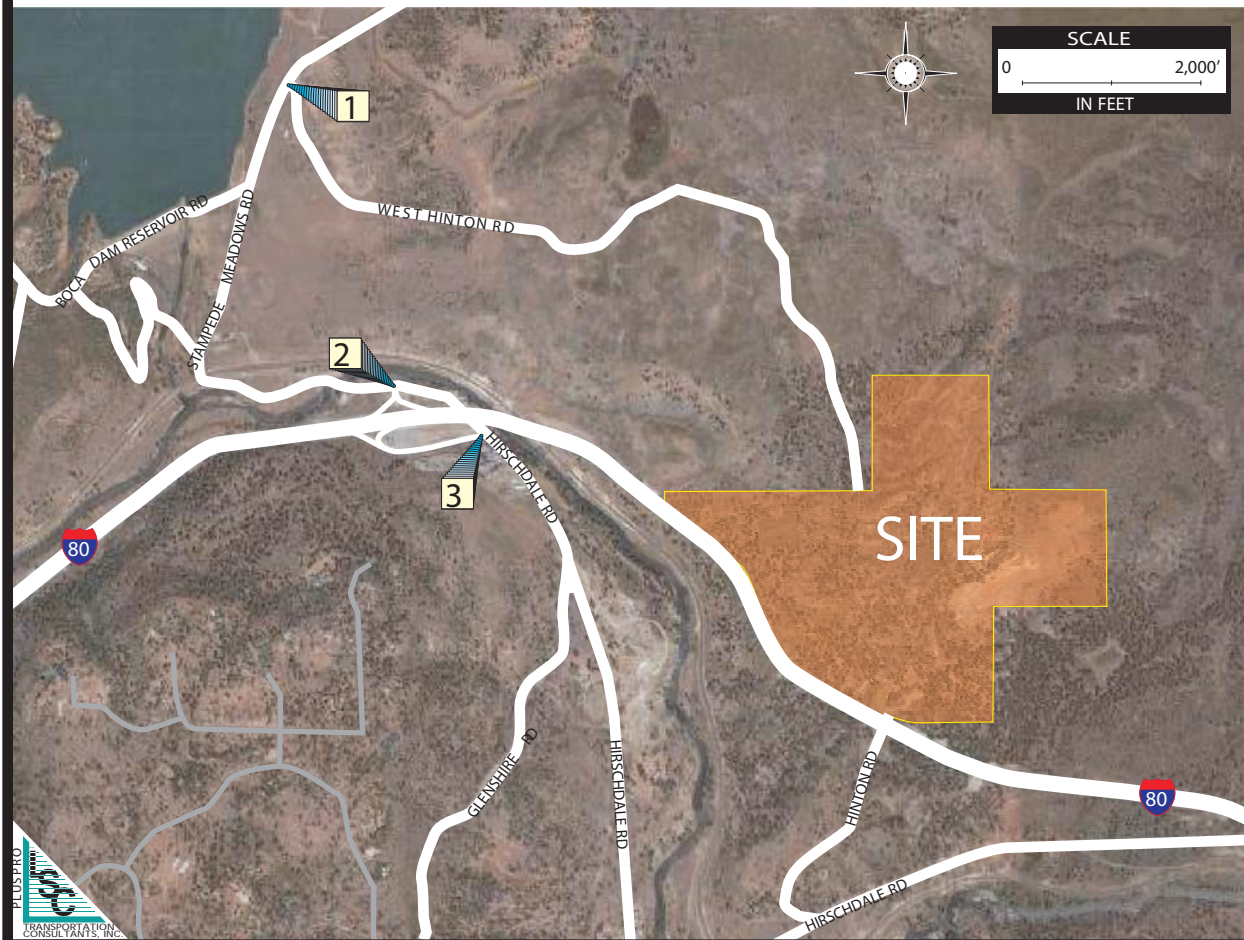
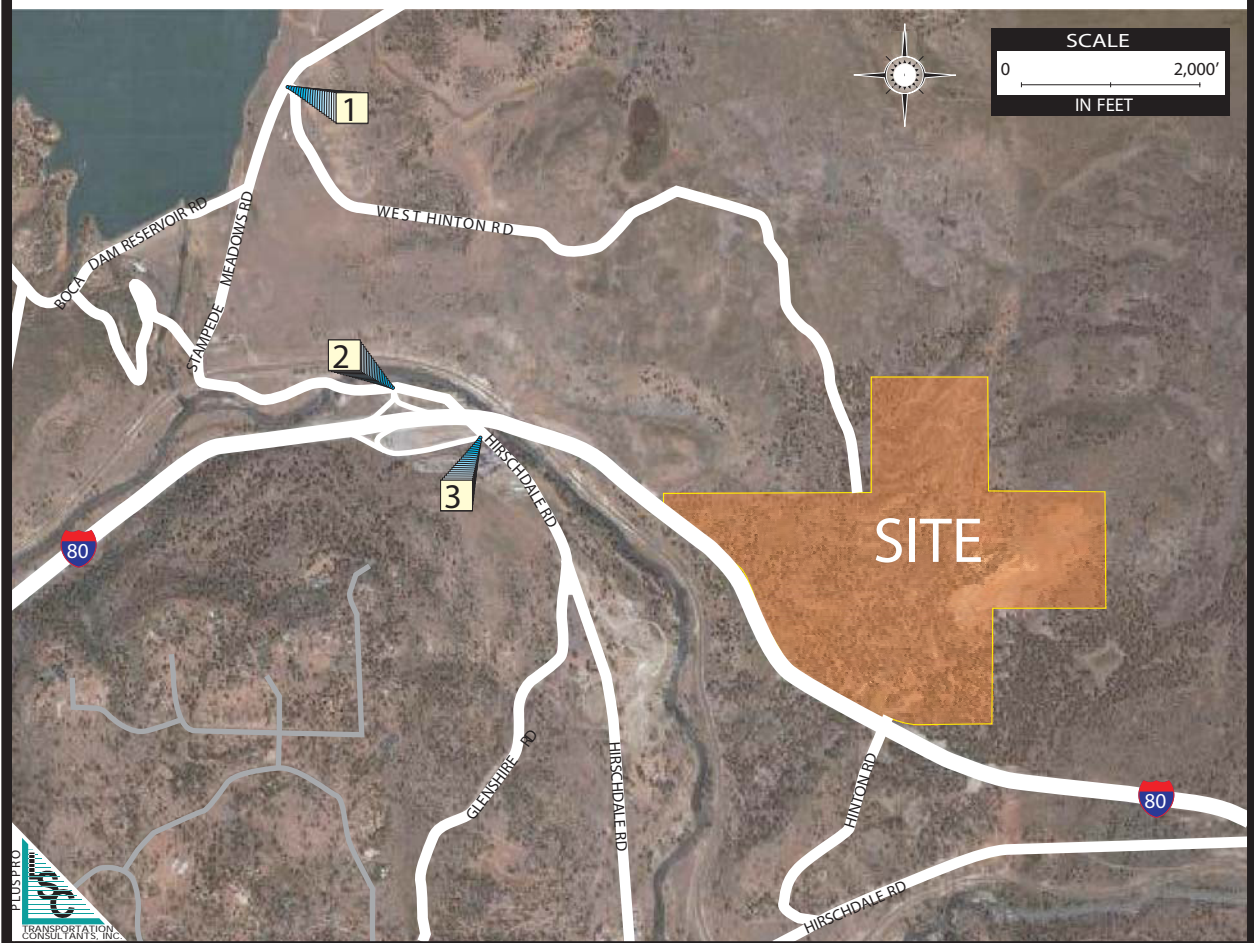


FIGURE 7
Teichert Boca Quarry Exapnsion
2037 Peak Hour Volumes with Project

LEGEND	
2	STUDY INTERSECTION
↙	TURNING MOVEMENT
TRAFFIC VOLUMES	
22	Weekday AM
(22)	Weekday PM
22	SATURDAY

1 STAMPEDE MEADOWS ROAD/ WEST HINTON ROAD		2 I-80 WESTBOUND RAMP/ HIRSCHDALE ROAD		3 I-80 EASTBOUND RAMP/ HIRSCHDALE ROAD			
<div>20 (56) 75 ↓ ↘ 0 (1) 0</div>		<div>1 (0) 1 ↖ ↘ 75 (28) 76</div> <div>↑ ↗ 77 (26) 80 44 (59) 87</div>		<div>114 (78) 119 ↖ ↘ 75 (94) 99</div> <div>22 (67) 88 → 81 (46) 123</div> <div>15 ↖ ↗ 50 (36) (127) 27 118</div>		<div>58 (164) 166 ↖ ↘ 14 (30) 40</div> <div>99 (73) 97 ↘ 44 (159) 147</div> <div>91 ↖ ↗ 89 (132) (104) 101 121</div>	



AM Peak Hour

	Without Project				With Project			
	Worst Movement		Total Intersection		Worst Movement		Total Intersection	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
AM Peak Hour								
Stampede Meadows Road/West Hinton	8.6	A	0.1	A	11.3	B	5.3	A
I-80 Westbound Ramps/Hirschdale Road	9.3	A	7.2	A	9.9	A	4.4	A
I-80 Eastbound Ramps/Hirschdale Road	7.7	A	4.7	A	13.7	B	8.1	A
PM Peak Hour								
Stampede Meadows Road/West Hinton	9.3	A	0.4	A	10.7	B	2.1	A
I-80 Westbound Ramps/Hirschdale Road	10.6	B	7.3	A	10.9	B	6.6	A
I-80 Eastbound Ramps/Hirschdale Road	9	A	4.8	A	8.8	A	4.9	A
Saturday Peak Hour								
Stampede Meadows Road/West Hinton	9.3	A	0.1	A	12.9	B	4.1	A
I-80 Westbound Ramps/Hirschdale Road	10.6	B	6.4	A	11.4	B	5.0	A
I-80 Eastbound Ramps/Hirschdale Road	9.6	A	4.8	A	13.9	B	7.2	A
Source: LSC Transportation Consultants								
Teichert Quarry 2017 update.xls								

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The following potential areas of transportation impacts are considered in this section:

- Intersection Level of Service
- The need for new turn lanes at the West Hinton Road/Stampede Meadows Road intersection
- Driver sight distance at the West Hinton Road/Stampede Meadows Road intersection
- The project impact on Vehicle Miles Traveled (VMT)
- Limited assessment of project impact on bicyclists

INTERSECTION LEVEL OF SERVICE

All study intersections are expected to operate at an acceptable Level of Service (LOS) B or better under existing and future conditions, with or without the proposed project. Therefore, no intersection LOS mitigation measures are necessary.

TURN LANE WARRANTS AT WEST HINTON ROAD/STAMPEDE MEADOWS ROAD

A turn lane warrant analysis was performed for the project access point on Stampede Meadows Road using the *“National Cooperative Highway Research Program (NCHRP) Report 457 – Evaluating Intersection Improvements: An Engineering Study Guide”* (Transportation Research Board, 2001). The peak-hour volume warrants are not met for either a southbound left-turn lane or a northbound right-turn lane along Stampede Meadows Road at West Hinton Road under existing or future scenarios, with or without the proposed project. Therefore, no new turn lanes are necessary at the site access intersection. Nevertheless, the project plans should ensure that adequate entry radius is provided for right turns made from Stampede Meadows Road onto West Hinton Road. An example of the minimum edge-of-traveled-way design is provided in Figure 9-26 of the American Association of State Highway and Transportation Officials’ (AASHTO) *A Policy on Geometric Design of Highways and Streets*, which is contained in Appendix E.

DRIVER SIGHT DISTANCE

A detailed evaluation of the driver sight distance at the site access intersection (Stampede Meadows Road/West Hinton Road intersection) was performed as a part of this study. Driver sight distance is an important criterion to consider at this location, as drivers preparing to enter a roadway from a driveway or intersection must be able to see and react to oncoming traffic in both directions in a safe manner. There are two types of sight distance criteria to consider at the site access location: stopping sight distance and corner sight distance. Driver sight distance is a function of speed, and on Stampede Meadows Road the posted speed limit is 35 miles per hour. It has been suggested that drivers are actually exceeding this speed limit. In order to address this issue, a speed survey was conducted on Stampede Meadows Road at its intersection with West Hinton.

Speed Survey

LSC staff conducted a speed survey at a point on Stampede Meadows Road approximately 500 feet north of West Hinton Road. The speeds were collected by an automatic radar counter placed on the west side of Stampede Meadows Road from 6:00 PM on Wednesday, May 22, 2013 through 5:00 PM on Tuesday, May 28, 2013. This time period included the Memorial Day holiday weekend. The speed of each vehicle traveling northbound or southbound was recorded. A total of 5,410 vehicles were recorded during the survey period. The weather was good (dry roads) from Wednesday through Saturday. However, there was some rain within the vicinity on Sunday through Tuesday. The data from these days was removed from the analysis, in order to ensure only dry road conditions were analyzed. In addition, any vehicle with a length of one meter or less and a speed of less than 20 miles per hour was assumed to be a bicycle and was removed from the analysis, in order to remain conservative in estimating the vehicular speeds.

The average speeds are approximately 42 miles per hour southbound and 40 miles per hour northbound. The calculated 85th-percentile speed in the southbound direction is approximately 48 miles per hour, based on the 1,080 vehicles surveyed in the southbound direction from Wednesday through Saturday. Similarly, the 85th-percentile speed in the northbound direction is approximately 46 miles per hour, based on 1,744 data points. The 85th-percentile of the distribution of observed speeds is the most frequently used measure of the operating speed associated with a particular roadway location. The 85th-percentile speed is usually within the “pace” or the 10-mph speed range used by most drivers. The pace in the southbound direction is calculated to be approximately 38 to 48 miles per hour, and the northbound pace is approximately 36 to 46 miles per hour. The “prevailing speed” is commonly considered to be the average of the 85th-percentile speed and the upper end of the pace. The resulting prevailing speeds on Stampede Meadows Road immediately north of the site access point are 48 miles per hour southbound and 46 miles per hour northbound. The Nevada County sight distance standards define the “prevailing speed” as the “Posted speed limit, design speed, measured prevailing speed or as determined by the Department of Transportation.” In this case, as measured prevailing speeds are available, they are applied in the driver sight distance analysis.

Stopping Sight Distance

Table 5 presents the desired stopping sight distances to ensure that drivers on Stampede Meadows Road have adequate time to perceive and react to the presence of an object in their travel path (such as a vehicle exiting West Hinton Road) and safely come to a stop. The table also provides the existing stopping sight distance. As indicated, the stopping sight distance provided for northbound drivers on Stampede Meadows Road is adequate, as it exceeds the desired distance by about 130 feet. However, the existing stopping sight distance for southbound drivers (280 feet) does not meet the desired distance (405 feet). The stopping sight distance at this location is limited by the existing vegetation and embankment along the east side of Stampede Meadows Road.

Corner Sight Distance

Table 5 presents the desired corner sight distances for drivers of passenger cars and trucks on West Hinton Road in order to accurately identify an acceptable gap in through traffic in either direction along Stampede Meadows Road, and to complete a turn maneuver onto Stampede Meadows Road. The “desired” corner sight distances for drivers of passenger cars exiting West Hinton Road are interpolated

Table 5: Driver Sight Distance at Stampede Meadows Road / West Hinton Road Intersection

Description	Prevailing Speed (mph) ¹	Desired Sight Distance (ft) ^{2,3,4,5}	Existing Sight Distance (ft)	Is Requirement Met?
<u>Stopping Sight Distance</u>				
- For Northbound Drivers on Stampede Meadows Road	46	375	505	Yes
- For Southbound Drivers on Stampede Meadows Road	48	405	280	No
<u>Corner Sight Distance</u>				
- For Trucks on W. Hinton Looking North	48	815	485	No
- For Passenger Cars on W. Hinton Looking North	48	530	210	No
- For Trucks on W. Hinton Looking South	46	780	550	No
- For Passenger Cars on W. Hinton Looking South	46	505	440	No
<p>Note 1: Prevailing speed is the estimated 85th-percentile speed, based on a speed survey conducted at a point on Stampede Meadows Road about 500 feet north of W. Hinton Road.</p> <p>Note 2: Desired stopping sight distance is based on the minimum distance requirement set forth in the Caltrans Highway Design Manual.</p> <p>Note 3: Desired distance for passenger cars is based on an interpolation between the required distances at 45 and 50 mph, rounded up to the nearest 5 feet.</p> <p>Note 4: Desired corner sight distance for passenger cars is interpolated using Nevada County sight distance requirements.</p> <p>Note 5: Desired corner sight distance for trucks is based on American Association of State Highway Transportation Officials' (AASHTO) standards pertaining to combination trucks.</p> <p>Source: LSC Transportation Consultants, Inc.</p>				
				Sight Distance.xls

based on Nevada County standard requirements. The required sight distance for trucks turning left onto a crossroad is substantially longer than that for passenger cars. The desired corner sight distances for truck drivers exiting West Hinton Road are estimated using intersection sight distance requirements pertaining to combination trucks, as provided in AASHTO's A Policy on Geometric Design of Highways and Streets. As shown in the table, a comparison of the existing and desired corner sight distances for passenger cars and trucks indicates that the desired corner sight distances are not provided in either direction along Stampede Meadows Road. The corner sight distance looking to the north from West Hinton Road is limited by the existing trees, vegetation, boulders, and embankment on the east side of Stampede Meadows Road. Similarly, the corner sight distance looking to the south is limited by the existing vegetation and embankment along the east side of Stampede Meadows Road.

Driver Sight Distance Mitigation

Tree removal, vegetation removal, and grading improvements are recommended to be implemented along Stampede Meadows Road north and south of West Hinton Road, in order to provide adequate driver sight distance at this intersection. Appendix F provides a sight distance exhibit indicating approximate areas of clearing and grading, and the resulting sight distance. With these improvements, the sight distance for passenger cars and trucks would meet the desired sight distances, with the exception of the corner sight distance for truck drivers looking to the south from West Hinton Road. Approximately 700 feet of corner sight distance would be provided, which is 80 feet short of the desired sight distance (based on a prevailing speed of 46 miles per hour in the northbound direction). The sight distance at this location is limited by the existing vertical curvature along Stampede Meadows Road.

The County sight distance standards provide both “desired” standard distances and “minimum” standard distances. The “minimum” distances are equivalent to the stopping sight distance values. Based on a northbound travel speed of 46 miles per hour, the minimum sight distance requirement for trucks (and passenger cars) is 375 feet. Therefore, although the corner sight distance for trucks looking to the south is short of the desired distance, it would exceed the minimum distance by approximately 325 feet. In addition, the Nevada County Standard Drawings indicate that the County Department of Transportation may reduce the required sight distance where there are unusual cases due to significant environmental impacts. Considering the excessive costs (and potential environmental impacts) associated with modifying the vertical curvature of Stampede Meadows Road, as well as the fact that more than adequate stopping sight distance is provided for northbound drivers on Stampede Meadows Road to see a truck turning out of West Hinton Road and safely come to a stop, 700 feet of corner sight distance at this location is considered to be adequate.

Finally, it is recommended that warning signs be provided in both directions along Stampede Meadows Road approximately 500 feet in advance of W. Hinton Road. Specifically, a sign with a truck symbol (a “W11-10” vehicular traffic sign) with a supplemental warning plaque (a “W16-2aP” sign) indicating “500 FT” should be placed in each direction along Stampede Meadows Road. These signs will inform drivers of the distance to the location where trucks enter the roadway, and they would supplement the existing “TRUCK CROSSING” signs, which are currently provided along Stampede Meadows Road roughly 1,000 feet in advance of the intersection. These sign types are shown in Appendix G. This recommendation is consistent with the guidelines set forth in the California Manual on Uniform Traffic Control Devices (California MUTCD).

With the tree removal, vegetation removal, grading improvements, and signage discussed above, adequate sight distance is expected to be provided for all drivers using the Stampede Meadows Road/West Hinton Road intersection.

VEHICLE MILES TRAVELED (VMT)

The effect of the proposed project on Vehicle Miles Traveled (VMT) in the region is dependent on the total trip generation and the length of these vehicle trips. The increase in VMT resulting from the proposed project was estimated based on the trip lengths and the total number of daily and peak-hour trips generated. The quarry will serve the entire area between Sierra Valley on the north and Tahoe’s West Shore on the south. Hauling trips made along I-80 to the east (between Hirschdale and the California/Nevada State Line) are expected to be minimal. Considering the geographic region and uses served by the quarry, the average trip length for truck trips made to/from the quarry is estimated to be about 20 miles. The average trip length for employees is assumed to be approximately 10.5 miles, based on data from the *2011 -2015 American Community Survey* (U.S. Census data) for the Truckee area.

As Table 6 indicates, up to approximately 28,336 daily VMT are associated with the proposed project over the course of a peak weekday, with up to 3,000 VMT occurring during the busiest hour of site-generated traffic (the AM peak hour). These figures reflect “worst-case” conditions, as they assume the quarry is operating at the maximum potential production. Note that the project would generate less VMT on a Saturday. The VMT generated by the proposed project are not all necessarily “new” VMT, given the fact that there are some VMT associated with the existing site.

Table 6: Project Generated Vehicle Miles of Travel					
Description	Number of Trips ¹		Average Trip Length (miles)	Vehicle Miles Traveled	
	Daily	Peak Hour		Daily	Peak Hour
Aggregate Exporting Trucks	1,120	120	20.0	22,400	2,400
Backfill Importing Trucks	280	30	20.0	5,600	600
Employee Vehicles	30	0	10.5	315	0
Maintenance Truck	2	0	10.5	21	0
Total	1,432	150		28,336	3,000
Note: Reflects weekday conditions. Vehicle miles traveled on a Saturday would be less. Note 1: Reference Table 1. Source: LSC Transportation Consultants					
				Teichert Quarry.xls	

Furthermore, the VMT associated with the Boca Quarry are not necessarily “generated” by the proposed project, but are actually necessitated by the construction projects that need the materials from the quarry. Without the proposed quarry project, these construction projects would still occur. That is, a similar number of VMT would be generated in the study region regardless of which quarry supplies the materials.

Other than the Martis and Boca quarries, the nearest large quarry capable of supplying the typical project in the study region is located at least an additional 40 miles away via I-80 (toward Reno or Sacramento). A map illustrating the aggregate sources in the region is included in Appendix H. Without the Martis and Boca quarries, the additional trip length associated with aggregate exporting truck trips potentially made from the nearest quarry in Sparks, Nevada is estimated to be approximately 36 additional miles in one direction. (This additional distance is based on a total of about 40 miles from the Hirschdale Interchange to the Sparks quarry, minus the roughly 4 miles of travel that Boca Quarry trucks travel in order to access the Hirschdale Interchange.)

Multiplying 36 additional miles by up to 1,120 daily one-way trips associated with the aggregate exporting trucks yields a total of up to 40,320 additional VMT generated over the course of a peak weekday. Assuming the same methodology applies to the backfill importing trucks, about 10,080 additional daily VMT (36 additional miles multiplied by 280 one-way trips) would be made by the backfill importing trucks going to/from Sparks instead of to/from the Boca Quarry. Therefore, with respect to the region including the area served by the Boca Quarry as well as the I-80 corridor between the Hirschdale Interchange and Sparks, Nevada, a total of up to 50,400 additional daily VMT (40,320 plus 10,080) would be generated if the Boca Quarry Expansion Project is not implemented.

In summary, up to 28,336 daily VMT are associated with the proposed quarry project. However, without project implementation, an additional 50,400 daily VMT would be generated in the region (or more, depending on which quarry would serve the local construction projects), for a total of 78,736 daily VMT. Without the proposed project, it can be concluded that the VMT associated with quarry trips in the region would be about 2.8 times greater than that with the project. In other words, implementation of the Boca Quarry Expansion Project would ultimately reduce VMT in the greater region by roughly 35 percent. Note that these figures are based on maximum production levels.

IMPACT ON BICYCLIST CONDITIONS

The impact of the project's heavy truck traffic on bicyclists using Stampede Meadows Road is considered. An assessment of the potential for conflict between project truck traffic and bicyclists along Stampede Meadows Road is presented. First historical crash data is reviewed then applicable standards and evaluation criteria are discussed. Next, the project's impact on the potential for conflicts between trucks and bicyclists is evaluated. Finally, mitigation measures to reduce this potential for conflicts are presented.

Crash Data

Existing collision data was reviewed to identify bicycle collision locations and the nature and type of collisions that have occurred along Stampede Meadows Road/Hirschdale Road in the study area. Specifically, historical crash data along the segment of Hirschdale Road/Stampede Meadows Road from the I-80 ramps to a point approximately 500 feet north of West Hinton Road was obtained from the CHP-Statewide Integrated Traffic Records System (SWITRS) for most recent 10-year period (from September 2007 through September 2017). A review of this data indicates only four collisions reported on Hirschdale Road and none reported on Stampede Meadows Road. Of the four reported crashes, only one resulted in an injury while the others caused property damage only. None of the crashes involved a bicyclist or a pedestrian, nor were any fatalities reported. The primary collision factor in the one injury crash was that the vehicle made an improper turn resulting in a roll-over causing injury to the driver, and no other vehicles were involved. Additionally, the driver was found to have been drinking alcohol but was not under the influence.

Additionally, the haul road (via West Hinton Road) was constructed in the Fall of 2007 and Spring of 2008. This haul route (accessing I-80 via West Hinton Road and Stampede Meadows Road) was used by Boca Quarry for a full construction season from April 2008 to October 2008. No accidents involving bicyclists were reported during that period. Since October 2008, the plant has been closed with the exception of a few days here and there when it opened for scheduled load outs.

Evaluation Criteria/Standards

Applicable standards regarding impacts to bicyclist conditions were reviewed. One related criteria of significance set forth in Appendix G of the CEQA Guidelines is whether the project would substantially increase hazards due to a design feature or incompatible uses. There are many factors that affect a roadway's capability to accommodate both motorists and bicyclists, such as lane widths, speed, volumes, the presence of a bike lane or paved shoulder, and the type of vehicles using the roadway. However, there are no established standards or available methods for determining the project's impact on bicyclist conditions.

Project Impact on Potential Conflicts Between Truck Traffic and Bicyclists

At maximum production, the proposed project is expected to generate a total of approximately 1,432 one-way vehicle trips over the course of a busy weekday, and 1,282 one-way trips on a busy Saturday. Up to approximately 150 one-way vehicle trips per hour (75 trips in each direction, or more than one vehicle per minute in each direction) are expected to be generated on Stampede Meadows Road. Given the narrow pavement width and the fact that most of the project-generated vehicles would be trucks

(dump trucks and other highway-rated vehicles), it can be concluded that implementation of the proposed project could result in a noticeable impact to bicyclist conditions along the segment of Stampede Meadows Road between the I-80 interchange ramps and the site access point.

The presence of the additional trucks and the speed differentials between vehicles and bicyclists (especially on upgrades) would increase the potential for vehicular conflicts, as well as vehicle-bicycle conflicts. Note that the maximum-production truck trip figures are very conservative, because they reflect the maximum number of trucks that can actually be loaded and proceed through the scale house over the course of a day. The average number of trucks leaving the project site would depend on market demand, but would be considerably less than the maximum levels assumed in this analysis.

Mitigation Measures to Reduce the Potential for Conflicts Between Project Trucks and Bicyclists

Pavement widening improvements are recommended along Stampede Meadows Road between the I-80 interchange ramps and West Hinton Road (site access point). Appendix I provides an exhibit map showing the roadway improvements that are considered to be technically feasible, considering existing constraints (such as guardrail, steep slopes, wetlands, or cultural resources). These improvements are intended to provide a total pavement width of 32 feet with 1-foot unpaved shoulders where pavement widening is feasible, which compares to the existing pavement width of about 20 to 24 feet.

The standard width for paved shoulders designed to accommodate bicycle travel is 4 feet, although provision of even a narrow shoulder (less than 4 feet) can significantly improve riding conditions for advanced bicyclists, according to the Federal Highway Administration's (FHWA) "Selecting Roadway Design Treatments to Accommodate Bicyclists". In general, maximizing the paved shoulder width provides better separation between traffic and bicyclists. In areas where 12-foot lanes and 4-foot paved shoulders are not feasible, bicyclist conditions would be optimized with slightly narrower travel lanes and greater paved shoulder width. In areas with physical constraints, a travel lane width of at least 11 feet is recommended.

Additionally, "Share The Road" signage (sign type W11-1 with supplemental plaque W16-1P) is recommended to be provided to alert motorists to the presence of cyclists along this route. Implementation of the pavement widening improvements and signage would reduce the potential for conflicts between trucks and bicyclists. Finally, although the Vehicle Code includes requirements to limit aggregate spills, it is recommended that a smooth pavement transition be provided where West Hinton Road meets Stampede Meadows Road, in order to enhance the safety for bicyclists using Stampede Meadows Road.

Potential phasing options that would link the provision of roadway improvements to aggregate production levels at the project site could be considered, given that the maximum-production truck trip figures are very conservative, and that the quarry would not operate at maximum-production levels on opening day. Whether or not it is acceptable to implement the pavement widening improvements in phases (such as initially providing widening improvements along the climbs north of the river, and providing widening improvements south of the river in future phases) as opposed to constructing all of the "feasible" improvements during the initial phase of the project should be determined by County staff. Note that the Traffic Impact Fee Program for the Town of Truckee and Eastern Nevada County includes shoulder widening improvements along Hirschdale Road/Glenshire Drive from the I-80 Westbound Ramps to the Truckee Town Limits.

Intersection Turning Movement Counts

National Data & Surveying Services

Intersection Turning Movement Count

Location: Hirschdale Rd & I-80 EB Ramps

City: Truckee

Control:

Project ID: 17-7611-003

Date: 2017-08-12

Total

NS/EW Streets:	Hirschdale Rd				Hirschdale Rd				I-80 EB Ramps				I-80 EB Ramps				
wd	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	0 NT	0 NR	0 NU	0 SL	0 ST	0 SR	0 SU	0 EL	0 ET	0 ER	0 EU	0 WL	0 WT	0 WR	0 WU	
1:45 PM	11	13	0	0	0	18	5	0	12	0	12	0	0	0	0	0	71
2:00 PM	18	8	0	0	0	19	5	0	9	0	16	0	0	0	0	0	75
2:15 PM	12	10	0	0	0	28	9	0	9	0	12	0	0	0	0	0	80
2:30 PM	13	12	0	0	0	21	9	0	11	0	13	0	0	0	0	0	79
2:45 PM	14	11	0	0	0	16	5	0	9	0	11	0	0	0	0	0	66
3:00 PM	16	4	0	0	0	18	10	0	5	0	13	0	0	0	0	0	66
3:15 PM	9	13	0	0	0	34	6	0	7	0	20	0	0	0	0	0	89
3:30 PM	21	16	0	0	0	25	10	0	6	0	16	1	0	0	0	0	95
3:45 PM	19	6	0	0	0	28	8	0	5	0	13	0	0	0	0	0	79
4:00 PM	14	10	0	0	0	19	11	0	5	0	9	0	0	0	0	0	68
4:15 PM	10	11	0	0	0	27	13	0	10	0	12	0	0	0	0	0	83
4:30 PM	25	16	0	0	0	14	11	0	5	0	10	0	0	0	0	0	81
TOTAL VOLUMES :	NL 182	NT 130	NR 0	NU 0	SL 0	ST 267	SR 102	SU 0	EL 93	ET 0	ER 157	EU 1	WL 0	WT 0	WR 0	WU 0	TOTAL 932
APPROACH %'s :	58.33%	41.67%	0.00%	0.00%	0.00%	72.36%	27.64%	0.00%	37.05%	0.00%	62.55%	0.40%					
PEAK HR :	03:15 PM - 04:15 PM																TOTAL
PEAK HR VOL :	63	45	0	0	0	106	35	0	23	0	58	1	0	0	0	0	331
PEAK HR FACTOR :	0.750	0.703	0.000	0.000	0.000	0.779	0.795	0.000	0.821	0.000	0.725	0.250	0.000	0.000	0.000	0.000	0.871
	0.730				0.881				0.759								

National Data & Surveying Services

Intersection Turning Movement Count

Location: Hirschdale Rd & I-80 EB Ramps

City: Truckee

Control:

Project ID: 17-7611-003

Date: 8/11/2017

Total

NS/EW Streets:	Hirschdale Rd				Hirschdale Rd				I-80 EB Ramps				I-80 EB Ramps				
Time	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
7:30 AM	16	9	0	0	0	12	2	0	5	0	1	0	0	0	0	0	45
7:45 AM	17	20	0	0	0	9	1	0	4	0	6	0	0	0	0	0	57
8:00 AM	12	19	0	0	0	8	0	0	3	0	7	0	0	0	0	0	49
8:15 AM	12	17	0	0	0	16	0	0	4	0	10	1	0	0	0	0	60
8:30 AM	14	11	0	0	0	7	4	0	3	0	6	0	0	0	0	0	45
8:45 AM	16	20	0	0	0	6	1	0	6	0	8	1	0	0	0	0	58
9:00 AM	14	11	0	0	0	7	1	0	6	0	9	0	0	0	0	0	48
9:15 AM	20	18	0	0	0	12	2	0	5	0	8	0	0	0	0	0	65
TOTAL VOLUMES :	NL 121	NT 125	NR 0	NU 0	SL 0	ST 77	SR 11	SU 0	EL 36	ET 0	ER 55	EU 2	WL 0	WT 0	WR 0	WU 0	TOTAL 427
APPROACH %'s :	49.19%	50.81%	0.00%	0.00%	0.00%	87.50%	12.50%	0.00%	38.71%	0.00%	59.14%	2.15%					
PEAK HR :	08:30 AM - 09:30 AM																TOTAL
PEAK HR VOL :	64	60	0	0	0	32	8	0	20	0	31	1	0	0	0	0	216
PEAK HR FACTOR :	0.800	0.750	0.000	0.000	0.000	0.667	0.500	0.000	0.833	0.000	0.861	0.250	0.000	0.000	0.000	0.000	0.831
	0.816				0.714				0.867								

Time	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	19	7	0	0	0	17	5	0	3	0	25	0	0	0	0	0	76
4:15 PM	19	16	0	0	0	21	3	0	5	0	11	0	0	0	0	0	75
4:30 PM	23	12	0	0	0	19	3	0	7	0	15	0	0	0	0	0	79
4:45 PM	13	16	0	0	0	18	9	0	12	0	14	0	0	0	0	0	82
5:00 PM	21	12	0	0	0	19	2	0	8	0	15	0	0	0	0	0	77
5:15 PM	16	11	0	0	0	24	1	0	3	0	14	0	0	0	0	0	69
5:30 PM	15	8	0	0	0	19	10	0	2	0	14	0	0	0	0	0	68
5:45 PM	16	8	0	0	0	10	6	0	5	0	11	0	0	0	0	0	56
TOTAL VOLUMES :	NL 142	NT 90	NR 0	NU 0	SL 0	ST 147	SR 39	SU 0	EL 45	ET 0	ER 119	EU 0	WL 0	WT 0	WR 0	WU 0	TOTAL 582
APPROACH %'s :	61.21%	38.79%	0.00%	0.00%	0.00%	79.03%	20.97%	0.00%	27.44%	0.00%	72.56%	0.00%					
PEAK HR :	04:15 PM - 05:15 PM																TOTAL
PEAK HR VOL :	76	56	0	0	0	77	17	0	32	0	55	0	0	0	0	0	313
PEAK HR FACTOR :	0.826	0.875	0.000	0.000	0.000	0.917	0.472	0.000	0.667	0.000	0.917	0.000	0.000	0.000	0.000	0.000	0.954
	0.943				0.870				0.837								

National Data & Surveying Services

Intersection Turning Movement Count

Location: I-80 WB Ramps & Hirschdale Rd

City: Truckee

Control:

Project ID: 17-7611-002

Date: 2017-08-12

Total

NS/EW Streets:	I-80 WB Ramps				I-80 WB Ramps				Hirschdale Rd				Hirschdale Rd				
wd	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	0 NT	0 NR	0 NU	0 SL	0 ST	0 SR	0 SU	0 EL	0 ET	0 ER	0 EU	0 WL	0 WT	0 WR	0 WU	
1:45 PM	12	0	13	0	0	0	0	0	0	7	10	0	10	17	0	0	69
2:00 PM	9	0	15	0	0	0	0	0	0	11	9	0	9	8	0	1	62
2:15 PM	6	0	21	0	0	0	0	0	0	13	8	0	4	12	0	0	64
2:30 PM	14	0	14	0	0	0	0	0	0	16	9	0	7	18	0	0	78
2:45 PM	11	0	14	0	0	0	0	0	0	8	2	0	6	12	0	0	53
3:00 PM	8	0	15	2	0	0	0	0	0	12	3	0	1	10	0	0	51
3:15 PM	4	0	28	0	0	0	0	0	0	16	7	0	7	12	0	0	74
3:30 PM	7	0	13	0	0	0	0	0	0	17	13	0	12	10	0	0	72
3:45 PM	8	0	21	0	0	0	0	0	0	16	8	0	2	9	0	0	64
4:00 PM	4	0	15	0	0	0	0	0	0	17	8	0	8	5	0	0	57
4:15 PM	5	0	18	0	0	0	0	0	0	18	17	0	9	14	0	0	81
4:30 PM	7	0	13	0	0	0	0	0	0	15	10	0	11	10	0	0	66
TOTAL VOLUMES :	NL 95	NT 0	NR 200	NU 2	SL 0	ST 0	SR 0	SU 0	EL 0	ET 166	ER 104	EU 0	WL 86	WT 137	WR 0	WU 1	TOTAL 791
APPROACH %'s :	31.99%	0.00%	67.34%	0.67%					0.00%	61.48%	38.52%	0.00%	38.39%	61.16%	0.00%	0.45%	
PEAK HR :	03:30 PM - 04:30 PM																TOTAL
PEAK HR VOL :	24	0	67	0	0	0	0	0	0	68	46	0	31	38	0	0	274
PEAK HR FACTOR :	0.750	0.000	0.798	0.000	0.000	0.000	0.000	0.000	0.000	0.944	0.676	0.000	0.646	0.679	0.000	0.000	0.846
			0.784								0.814				0.750		

National Data & Surveying Services

Intersection Turning Movement Count

Location: I-80 WB Ramps & Hirschdale Rd

City: Truckee

Control:

Project ID: 17-7611-002

Date: 8/11/2017

Total

NS/EW Streets:	I-80 WB Ramps				I-80 WB Ramps				Hirschdale Rd				Hirschdale Rd				
Time	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
7:30 AM	2	0	7	0	0	0	0	0	0	4	1	0	9	5	0	0	28
7:45 AM	3	0	9	0	0	0	0	0	0	2	1	0	20	3	0	0	38
8:00 AM	2	0	6	0	0	0	0	0	0	1	1	0	9	12	0	0	31
8:15 AM	3	0	12	0	0	0	0	0	0	6	4	0	15	7	0	0	47
8:30 AM	2	0	7	0	0	0	0	0	0	3	1	0	10	5	0	0	28
8:45 AM	3	0	4	0	0	0	0	0	0	3	1	0	14	11	0	0	36
9:00 AM	6	0	6	0	0	0	0	0	0	1	2	0	9	9	0	0	33
9:15 AM	4	0	12	0	0	0	0	0	0	4	1	0	11	9	0	0	41
TOTAL VOLUMES :	NL 25	NT 0	NR 63	NU 0	SL 0	ST 0	SR 0	SU 0	EL 0	ET 24	ER 12	EU 0	WL 97	WT 61	WR 0	WU 0	TOTAL 282
APPROACH %'s :	28.41%	0.00%	71.59%	0.00%					0.00%	66.67%	33.33%	0.00%	61.39%	38.61%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	10	0	34	0	0	0	0	0	0	13	7	0	53	27	0	0	144
PEAK HR FACTOR :	0.833	0.000	0.708	0.000	0.000	0.000	0.000	0.000	0.000	0.542	0.438	0.000	0.663	0.563	0.000	0.000	0.766
	0.733								0.500				0.870				

Time	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	2	0	16	0	0	0	0	0	0	6	2	0	8	3	0	0	37
4:15 PM	8	0	21	0	0	0	0	0	0	4	3	0	13	6	0	0	55
4:30 PM	6	0	13	0	0	0	0	0	0	7	3	0	12	8	0	0	49
4:45 PM	6	0	16	0	0	0	0	0	0	13	4	0	11	15	0	0	65
5:00 PM	3	0	14	0	0	0	0	0	0	7	1	0	15	6	0	0	46
5:15 PM	8	0	19	0	0	0	0	0	0	9	2	0	12	5	0	0	55
5:30 PM	7	0	15	0	0	0	0	0	0	13	7	0	6	4	0	0	52
5:45 PM	2	0	8	0	0	0	0	0	0	7	5	0	6	7	0	0	35
TOTAL VOLUMES :	NL 42	NT 0	NR 122	NU 0	SL 0	ST 0	SR 0	SU 0	EL 0	ET 66	ER 27	EU 0	WL 83	WT 54	WR 0	WU 0	TOTAL 394
APPROACH %'s :	25.61%	0.00%	74.39%	0.00%					0.00%	70.97%	29.03%	0.00%	60.58%	39.42%	0.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	24	0	64	0	0	0	0	0	0	42	14	0	44	30	0	0	218
PEAK HR FACTOR :	0.750	0.000	0.842	0.000	0.000	0.000	0.000	0.000	0.000	0.808	0.500	0.000	0.733	0.500	0.000	0.000	0.838
	0.815								0.700				0.712				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Stampede Meadows Rd & West Hinton Rd

City: Truckee

Control:

Project ID: 17-7611-001

Date: 2017-08-12

Total

NS/EW Streets:	Stampede Meadows Rd				Stampede Meadows Rd				West Hinton Rd				West Hinton Rd				
wd	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	0 NT	0 NR	0 NU	0 SL	0 ST	0 SR	0 SU	0 EL	0 ET	0 ER	0 EU	0 WL	0 WT	0 WR	0 WU	
1:45 PM	0	31	0	0	0	18	0	0	0	0	0	0	0	0	0	0	49
2:00 PM	0	13	1	0	0	14	0	0	0	0	0	0	0	0	0	0	28
2:15 PM	0	13	3	1	0	15	0	0	0	0	0	0	0	0	1	0	33
2:30 PM	0	19	0	0	0	19	0	0	0	0	0	0	1	0	0	0	39
2:45 PM	0	20	0	2	0	9	0	0	0	0	0	0	0	0	0	0	31
3:00 PM	0	18	1	0	0	14	0	0	0	0	0	0	0	0	0	0	33
3:15 PM	0	14	0	0	0	21	0	0	0	0	0	0	1	0	0	0	36
3:30 PM	0	14	1	0	0	20	0	0	0	0	0	0	4	0	0	0	39
3:45 PM	0	14	0	0	0	18	0	0	0	0	0	0	1	0	0	0	33
4:00 PM	0	8	0	0	0	25	0	0	0	0	0	0	0	0	0	0	33
4:15 PM	0	8	0	0	0	25	0	0	0	0	0	0	0	0	0	0	33
4:30 PM	0	15	0	0	0	20	0	0	0	0	0	0	0	0	0	0	35
TOTAL VOLUMES :	NL 0	NT 187	NR 6	NU 3	SL 0	ST 218	SR 0	SU 0	EL 0	ET 0	ER 0	EU 0	WL 7	WT 0	WR 1	WU 0	TOTAL 422
APPROACH %'s :	0.00%	95.41%	3.06%	1.53%	0.00%	100.00%	0.00%	0.00%	0	0	0	0	87.50%	0.00%	12.50%	0.00%	
PEAK HR :	01:45 PM - 02:45 PM																TOTAL
PEAK HR VOL :	0	76	4	1	0	66	0	0	0	0	0	0	1	0	1	0	149
PEAK HR FACTOR :	0.000	0.613	0.333	0.250	0.000	0.868	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.250	0.000	0.760
	0.653				0.868								0.500				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Stampede Meadows Rd & West Hinton Rd

City: Truckee

Control:

Project ID: 17-7611-001

Date: 8/11/2017

Total

NS/EW Streets:	Stampede Meadows Rd				Stampede Meadows Rd				West Hinton Rd				West Hinton Rd				
d	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
7:30 AM	0	5	0	0	0	3	0	0	0	0	0	0	0	0	0	0	8
7:45 AM	0	3	1	0	0	2	0	0	0	0	0	0	0	0	0	0	6
8:00 AM	0	9	1	0	0	2	0	0	0	0	0	0	0	0	0	0	12
8:15 AM	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	10
8:30 AM	0	8	0	0	0	4	0	0	0	0	0	0	0	0	1	0	13
8:45 AM	0	8	0	0	0	1	0	0	0	0	0	0	0	0	0	0	9
9:00 AM	0	6	1	0	0	3	0	0	0	0	0	0	0	0	0	0	10
9:15 AM	0	9	1	0	0	6	0	0	0	0	0	0	0	0	0	0	16
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	53	4	0	0	26	0	0	0	0	0	0	0	0	1	0	84
	0.00%	92.98%	7.02%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	
PEAK HR :	08:30 AM - 09:30 AM																TOTAL
PEAK HR VOL :	0	31	2	0	0	14	0	0	0	0	0	0	0	0	1	0	48
PEAK HR FACTOR :	0.000	0.861	0.500	0.000	0.000	0.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.750
	0.825				0.583								0.250				

d	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	0	5	0	0	0	9	0	0	0	0	0	0	0	0	0	0	14
4:15 PM	0	9	1	0	0	8	0	0	0	0	0	0	0	0	0	0	18
4:30 PM	0	13	0	0	0	5	0	0	0	0	0	0	3	0	0	0	21
4:45 PM	0	12	0	0	0	11	0	0	0	0	0	0	1	0	0	0	24
5:00 PM	0	8	1	0	0	3	0	0	0	0	0	0	0	0	0	0	12
5:15 PM	0	13	0	0	1	6	0	0	0	0	0	0	2	0	0	0	22
5:30 PM	0	6	0	0	0	17	0	0	0	0	0	0	0	0	0	0	23
5:45 PM	0	10	1	0	0	11	0	0	0	0	0	0	0	0	0	0	22
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	76	3	0	1	70	0	0	0	0	0	0	6	0	0	0	156
	0.00%	96.20%	3.80%	0.00%	1.41%	98.59%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	39	1	0	1	37	0	0	0	0	0	0	3	0	0	0	81
PEAK HR FACTOR :	0.000	0.750	0.250	0.000	0.250	0.544	0.000	0.000	0.000	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.844
	0.769				0.559								0.375				

LOS Descriptions

Descriptions of Levels of Service

The concept of Level of Service (LOS) is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A LOS definition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations, from A to F, with LOS A representing the best operating conditions and LOS F the worst.

Level-of-Service Definitions

In general, the various levels of service are defined as follows for uninterrupted flow facilities:

LOS A represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent.

LOS B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from LOS A. The level of comfort and convenience provided is somewhat less than at LOS A, because the presence of others in the traffic stream begins to affect individual behavior.

LOS C is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.

LOS D represents high-density, but stable, flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.

LOS E represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to "give way" to accommodate such maneuvers. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable, because small increases in flow or minor perturbations within the traffic stream will cause breakdowns.

LOS F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount, which can traverse the point. Queues form behind such locations. Operations within the queue are characterized by stop-and-go waves, and they are extremely unstable. Vehicles may progress at reasonable speeds for several hundred feet or more and then be required to stop in a cyclic fashion. LOS F is used to describe the operating conditions within the queue, as well as the point of the breakdown. It should be noted, however, that in many cases operating conditions of vehicles or pedestrians discharged from the queue may be quite good. Nevertheless, it is the point at which arrival flow exceeds discharge flow, which causes the queue to form, and LOS F is an appropriate designation for such points.

HCS7 Two-Way Stop-Control Report

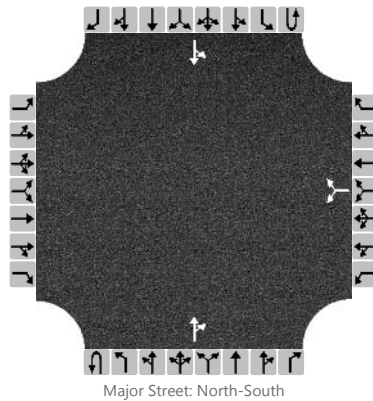
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2017
Time Analyzed	AM NP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	Stampede/West Hinton
Jurisdiction	Nevada County
East/West Street	West Hinton
North/South Street	Stampede Meadows Rd
Peak Hour Factor	0.75
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						0		1			39	2		0	18	
Percent Heavy Vehicles (%)						5		5						5		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

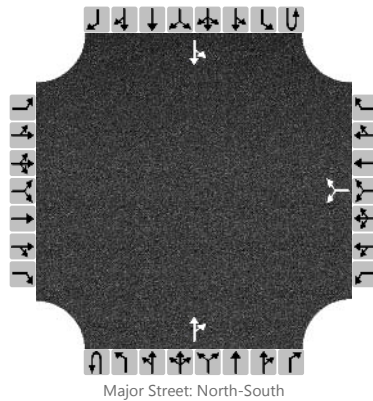
Flow Rate, v (veh/h)						1								0		
Capacity, c (veh/h)						1006								1535		
v/c Ratio						0.00								0.00		
95% Queue Length, Q ₉₅ (veh)						0.0								0.0		
Control Delay (s/veh)						8.6								7.3		
Level of Service, LOS						A								A		
Approach Delay (s/veh)					8.6								0.0			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

General Information

Analyst	CAH	Intersection	Stampede/West Hinton
Agency/Co.	LSC	Jurisdiction	Nevada County
Date Performed	09/11/2017	East/West Street	West Hinton
Analysis Year	2017	North/South Street	Stampede Meadows Rd
Time Analyzed	PM NP	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Teichert Boca Quarry		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						3		0			52	1		1	49	
Percent Heavy Vehicles (%)						5		5						5		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						4								1		
Capacity, c (veh/h)						867								1524		
v/c Ratio						0.00								0.00		
95% Queue Length, Q ₉₅ (veh)						0.0								0.0		
Control Delay (s/veh)						9.2								7.4		
Level of Service, LOS						A								A		
Approach Delay (s/veh)					9.2								0.1			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

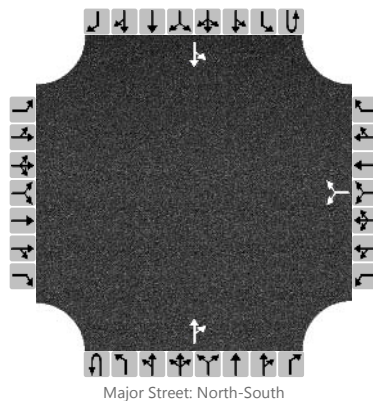
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2017
Time Analyzed	Sat NP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	Stampede/West Hinton
Jurisdiction	Nevada County
East/West Street	West Hinton
North/South Street	Stampede Meadows Rd
Peak Hour Factor	0.76
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						1		1			76	4		0	66	
Percent Heavy Vehicles (%)						5		5						5		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

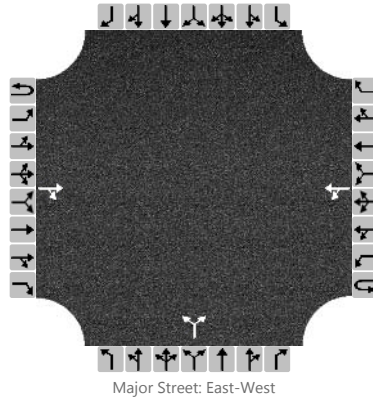
Flow Rate, v (veh/h)						2								0		
Capacity, c (veh/h)						863								1471		
v/c Ratio						0.00								0.00		
95% Queue Length, Q ₉₅ (veh)						0.0								0.0		
Control Delay (s/veh)						9.2								7.4		
Level of Service, LOS						A								A		
Approach Delay (s/veh)					9.2								0.0			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

General Information

Analyst	CAH	Intersection	80 Westbound/Hirschdale
Agency/Co.	LSC	Jurisdiction	Nevada County
Date Performed	09/11/2017	East/West Street	Hirshdale Road
Analysis Year	2017	North/South Street	I80 Westbound Ramps
Time Analyzed	AM NP	Peak Hour Factor	0.77
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Teichert Boca Quarry		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			16	9		66	34			13		43				
Percent Heavy Vehicles (%)						5				5		5				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						86					73					
Capacity, c (veh/h)						1591					935					
v/c Ratio						0.05					0.08					
95% Queue Length, Q ₉₅ (veh)						0.2					0.3					
Control Delay (s/veh)						7.4					9.2					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					5.0				9.2							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

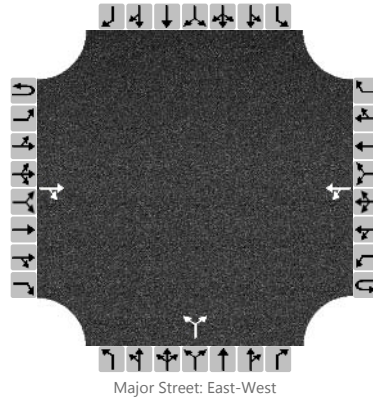
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2017
Time Analyzed	PM NP
Intersection Orientation	East-West
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Westbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	Hirshdale Road
North/South Street	I80 Westbound Ramps
Peak Hour Factor	0.84
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			56	19		67	46			32		85				
Percent Heavy Vehicles (%)						5				5		5				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						80					139					
Capacity, c (veh/h)						1514					861					
v/c Ratio						0.05					0.16					
95% Queue Length, Q ₉₅ (veh)						0.2					0.6					
Control Delay (s/veh)						7.5					10.0					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					4.6				10.0							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

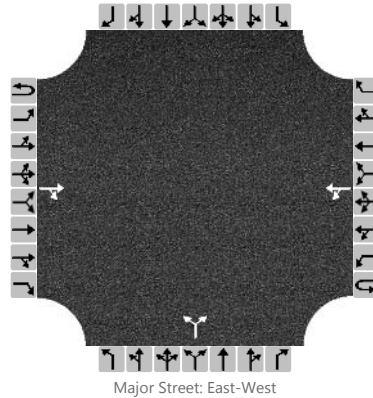
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2017
Time Analyzed	Sat NP
Intersection Orientation	East-West
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Westbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	Hirshdale Road
North/South Street	I80 Westbound Ramps
Peak Hour Factor	0.85
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			71	46		31	38			24		70				
Percent Heavy Vehicles (%)						5				5		5				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

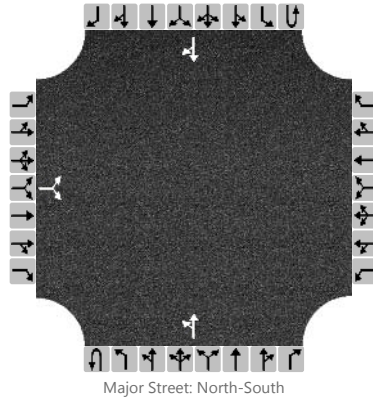
Flow Rate, v (veh/h)						36					110					
Capacity, c (veh/h)						1453					875					
v/c Ratio						0.02					0.13					
95% Queue Length, Q ₉₅ (veh)						0.1					0.4					
Control Delay (s/veh)						7.5					9.7					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					3.5				9.7							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

General Information

Analyst	CAH	Intersection	80 Eastbound/Hirschdale
Agency/Co.	LSC	Jurisdiction	Nevada County
Date Performed	09/11/17	East/West Street	I80 Eastbound Ramps
Analysis Year	2017	North/South Street	Hirshdale Rd
Time Analyzed	AM NP	Peak Hour Factor	0.83
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Teichert Boca Quarry		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		25		39						80	75				47	12
Percent Heavy Vehicles (%)		5		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			77							96						
Capacity, c (veh/h)			1554							1539						
v/c Ratio			0.05							0.06						
95% Queue Length, Q ₉₅ (veh)			0.2							0.2						
Control Delay (s/veh)			7.4							7.5						
Level of Service, LOS			A							A						
Approach Delay (s/veh)	7.4								4.1							
Approach LOS	A															

HCS7 Two-Way Stop-Control Report

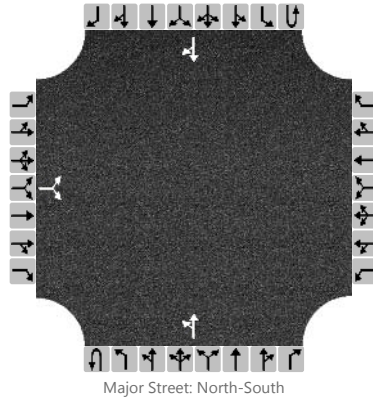
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/17
Analysis Year	2017
Time Analyzed	PM NP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Eastbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	I80 Eastbound Ramps
North/South Street	Hirshdale Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		43		73						101	74				115	26
Percent Heavy Vehicles (%)		5		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			122							106						
Capacity, c (veh/h)			1453							1440						
v/c Ratio			0.08							0.07						
95% Queue Length, Q ₉₅ (veh)			0.3							0.2						
Control Delay (s/veh)			7.7							7.7						
Level of Service, LOS			A							A						
Approach Delay (s/veh)	7.7								4.7							
Approach LOS	A															

HCS7 Two-Way Stop-Control Report

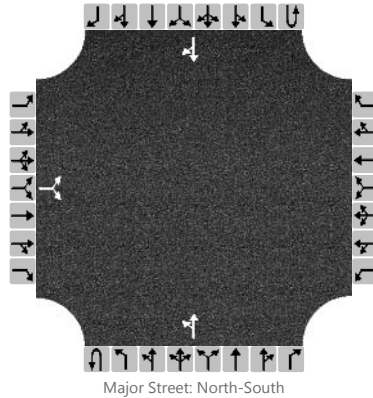
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/17
Analysis Year	2017
Time Analyzed	Sat NP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Eastbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	I80 Eastbound Ramps
North/South Street	Hirshdale Rd
Peak Hour Factor	0.87
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		23		58						63	46				106	35
Percent Heavy Vehicles (%)		5		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			93							72						
Capacity, c (veh/h)			1260							1423						
v/c Ratio			0.07							0.05						
95% Queue Length, Q ₉₅ (veh)			0.2							0.2						
Control Delay (s/veh)			8.1							7.7						
Level of Service, LOS			A							A						
Approach Delay (s/veh)	8.1								4.6							
Approach LOS	A															

HCS7 Two-Way Stop-Control Report

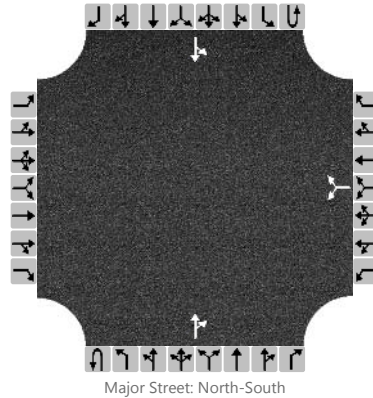
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2017
Time Analyzed	AM PP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	Stampede/West Hinton
Jurisdiction	Nevada County
East/West Street	West Hinton
North/South Street	Stampede Meadows Rd
Peak Hour Factor	0.75
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						75		1			39	77		0	18	
Percent Heavy Vehicles (%)						100		5						5		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

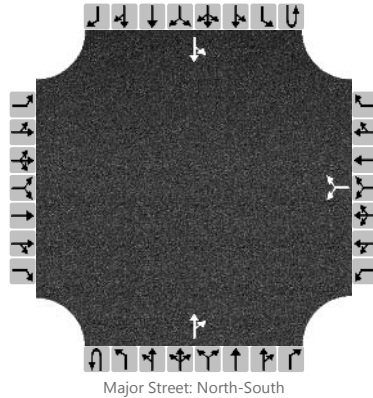
Flow Rate, v (veh/h)						101								0		
Capacity, c (veh/h)						681								1410		
v/c Ratio						0.15								0.00		
95% Queue Length, Q ₉₅ (veh)						0.5								0.0		
Control Delay (s/veh)						11.2								7.6		
Level of Service, LOS						B								A		
Approach Delay (s/veh)					11.2								0.0			
Approach LOS					B											

HCS7 Two-Way Stop-Control Report

General Information

Analyst	CAH	Intersection	Stampede/West Hinton
Agency/Co.	LSC	Jurisdiction	Nevada County
Date Performed	09/11/2017	East/West Street	West Hinton
Analysis Year	2017	North/South Street	Stampede Meadows Rd
Time Analyzed	PM PP	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Teichert Boca Quarry		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						28		0			52	26		1	49	
Percent Heavy Vehicles (%)						94		5						5		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

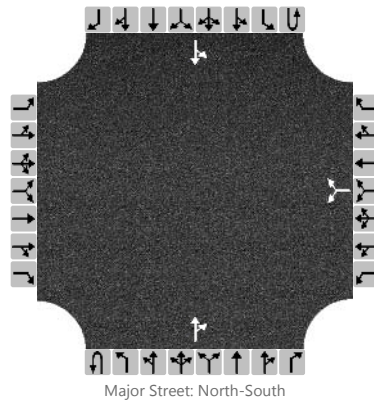
Flow Rate, v (veh/h)						33								1		
Capacity, c (veh/h)						678								1486		
v/c Ratio						0.05								0.00		
95% Queue Length, Q ₉₅ (veh)						0.2								0.0		
Control Delay (s/veh)						10.6								7.4		
Level of Service, LOS						B								A		
Approach Delay (s/veh)					10.6								0.1			
Approach LOS					B											

HCS7 Two-Way Stop-Control Report

General Information

Analyst	CAH	Intersection	Stampede/West Hinton
Agency/Co.	LSC	Jurisdiction	Nevada County
Date Performed	09/11/2017	East/West Street	West Hinton
Analysis Year	2017	North/South Street	Stampede Meadows Rd
Time Analyzed	Sat PP	Peak Hour Factor	0.76
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Teichert Boca Quarry		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						76		1			76	79		0	66	
Percent Heavy Vehicles (%)						100		5						5		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						101								0		
Capacity, c (veh/h)						579								1353		
v/c Ratio						0.17								0.00		
95% Queue Length, Q ₉₅ (veh)						0.6								0.0		
Control Delay (s/veh)						12.5								7.7		
Level of Service, LOS						B								A		
Approach Delay (s/veh)					12.5								0.0			
Approach LOS					B											

HCS7 Two-Way Stop-Control Report

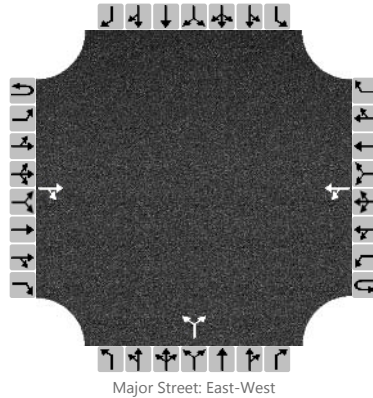
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2017
Time Analyzed	AM PP
Intersection Orientation	East-West
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Westbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	Hirshdale Road
North/South Street	I80 Westbound Ramps
Peak Hour Factor	0.77
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			20	80		66	109			13		43				
Percent Heavy Vehicles (%)						5				5		5				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						86					73					
Capacity, c (veh/h)						1463					838					
v/c Ratio						0.06					0.09					
95% Queue Length, Q ₉₅ (veh)						0.2					0.3					
Control Delay (s/veh)						7.6					9.7					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					3.2				9.7							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

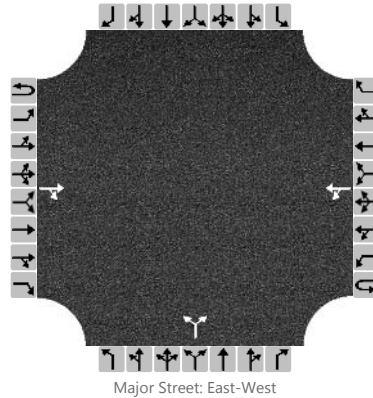
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2017
Time Analyzed	PM PP
Intersection Orientation	East-West
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Westbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	Hirshdale Road
North/South Street	I80 Westbound Ramps
Peak Hour Factor	0.84
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			57	43		67	71			32		85				
Percent Heavy Vehicles (%)						5				5		5				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						80					139					
Capacity, c (veh/h)						1477					831					
v/c Ratio						0.05					0.17					
95% Queue Length, Q ₉₅ (veh)						0.2					0.6					
Control Delay (s/veh)						7.6					10.2					
Level of Service, LOS						A					B					
Approach Delay (s/veh)					3.9				10.2							
Approach LOS									B							

HCS7 Two-Way Stop-Control Report

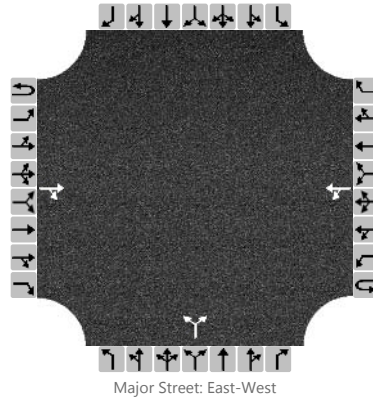
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2017
Time Analyzed	Sat PP
Intersection Orientation	East-West
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Westbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	Hirshdale Road
North/South Street	I80 Westbound Ramps
Peak Hour Factor	0.85
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			75	117		31	113			24		70				
Percent Heavy Vehicles (%)						5				5		5				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

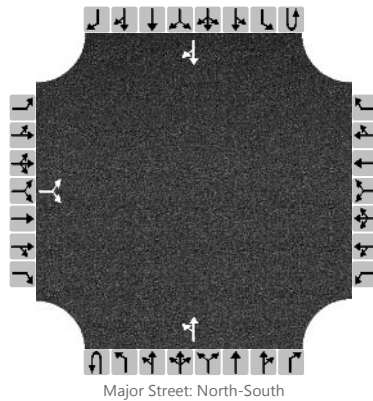
Flow Rate, v (veh/h)						36					110					
Capacity, c (veh/h)						1346					794					
v/c Ratio						0.03					0.14					
95% Queue Length, Q ₉₅ (veh)						0.1					0.5					
Control Delay (s/veh)						7.7					10.3					
Level of Service, LOS						A					B					
Approach Delay (s/veh)					1.8				10.3							
Approach LOS									B							

HCS7 Two-Way Stop-Control Report

General Information

Analyst	CAH	Intersection	80 Eastbound/Hirschdale
Agency/Co.	LSC	Jurisdiction	Nevada County
Date Performed	09/11/17	East/West Street	I80 Eastbound Ramps
Analysis Year	2017	North/South Street	Hirshdale Rd
Time Analyzed	AM PP	Peak Hour Factor	0.83
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Teichert Boca Quarry		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		96		39						80	79				51	12
Percent Heavy Vehicles (%)		79		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

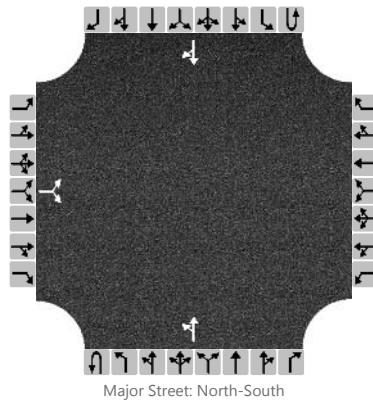
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			163							96						
Capacity, c (veh/h)			677							1534						
v/c Ratio			0.24							0.06						
95% Queue Length, Q ₉₅ (veh)			0.9							0.2						
Control Delay (s/veh)			12.0							7.5						
Level of Service, LOS			B							A						
Approach Delay (s/veh)	12.0								4.0							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	CAH	Intersection	80 Eastbound/Hirschdale
Agency/Co.	LSC	Jurisdiction	Nevada County
Date Performed	09/11/17	East/West Street	I80 Eastbound Ramps
Analysis Year	2017	North/South Street	Hirshdale Rd
Time Analyzed	PM PP	Peak Hour Factor	0.95
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Teichert Boca Quarry		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		67		73						101	75				116	26
Percent Heavy Vehicles (%)		41		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			148							106						
Capacity, c (veh/h)			1000							1439						
v/c Ratio			0.15							0.07						
95% Queue Length, Q ₉₅ (veh)			0.5							0.2						
Control Delay (s/veh)			9.2							7.7						
Level of Service, LOS			A							A						
Approach Delay (s/veh)	9.2								4.7							
Approach LOS	A															

HCS7 Two-Way Stop-Control Report

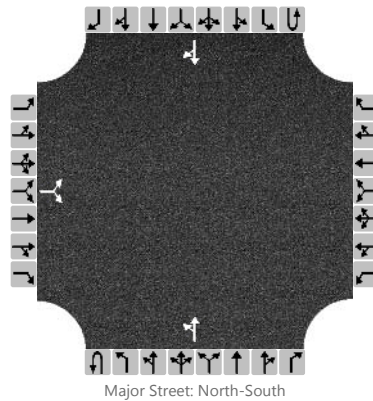
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/17
Analysis Year	2017
Time Analyzed	Sat PP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Eastbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	I80 Eastbound Ramps
North/South Street	Hirshdale Rd
Peak Hour Factor	0.87
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		94		58						65	50				110	35
Percent Heavy Vehicles (%)		81		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			175							75						
Capacity, c (veh/h)			787							1418						
v/c Ratio			0.22							0.05						
95% Queue Length, Q ₉₅ (veh)			0.8							0.2						
Control Delay (s/veh)			10.9							7.7						
Level of Service, LOS			B							A						
Approach Delay (s/veh)	10.9								4.5							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

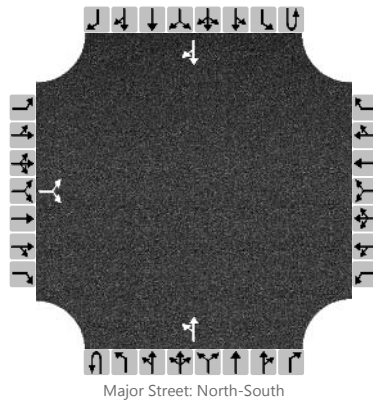
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/17
Analysis Year	2037
Time Analyzed	AM NP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Eastbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	I80 Eastbound Ramps
North/South Street	Hirshdale Rd
Peak Hour Factor	0.83
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		28		44						91	85				54	14
Percent Heavy Vehicles (%)		5		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

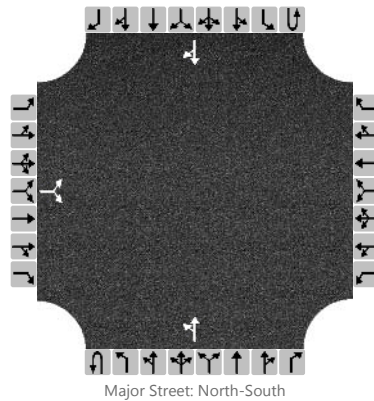
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			87							110						
Capacity, c (veh/h)			1434							1525						
v/c Ratio			0.06							0.07						
95% Queue Length, Q ₉₅ (veh)			0.2							0.2						
Control Delay (s/veh)			7.7							7.5						
Level of Service, LOS			A							A						
Approach Delay (s/veh)	7.7								4.2							
Approach LOS	A															

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	CAH	Intersection	80 Eastbound/Hirschdale
Agency/Co.	LSC	Jurisdiction	Nevada County
Date Performed	09/11/17	East/West Street	I80 Eastbound Ramps
Analysis Year	2037	North/South Street	Hirshdale Rd
Time Analyzed	PM NP	Peak Hour Factor	0.95
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Teichert Boca Quarry		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		49		159						132	103				163	30
Percent Heavy Vehicles (%)		5		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

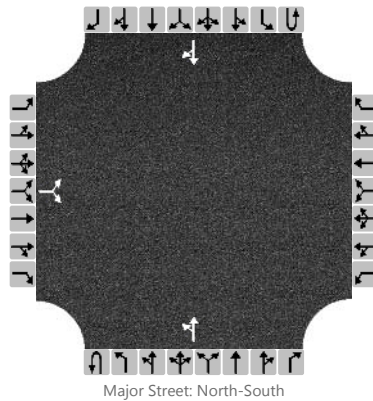
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			219							139						
Capacity, c (veh/h)			1121							1372						
v/c Ratio			0.20							0.10						
95% Queue Length, Q ₉₅ (veh)			0.7							0.3						
Control Delay (s/veh)			9.0							7.9						
Level of Service, LOS			A							A						
Approach Delay (s/veh)	9.0								4.8							
Approach LOS	A															

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	CAH	Intersection	80 Eastbound/Hirschdale
Agency/Co.	LSC	Jurisdiction	Nevada County
Date Performed	09/11/17	East/West Street	I80 Eastbound Ramps
Analysis Year	2037	North/South Street	Hirshdale Rd
Time Analyzed	Sat NP	Peak Hour Factor	0.87
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Teichert Boca Quarry		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		26		147						101	117				162	40
Percent Heavy Vehicles (%)		5		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			199							116						
Capacity, c (veh/h)			979							1339						
v/c Ratio			0.20							0.09						
95% Queue Length, Q ₉₅ (veh)			0.8							0.3						
Control Delay (s/veh)			9.6							7.9						
Level of Service, LOS			A							A						
Approach Delay (s/veh)	9.6								4.1							
Approach LOS	A															

HCS7 Two-Way Stop-Control Report

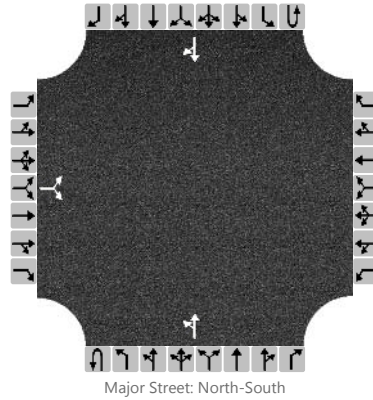
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/17
Analysis Year	2037
Time Analyzed	AM PP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Eastbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	I80 Eastbound Ramps
North/South Street	Hirshdale Rd
Peak Hour Factor	0.83
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		99		44						91	89				58	14
Percent Heavy Vehicles (%)		79		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			172							110						
Capacity, c (veh/h)			587							1518						
v/c Ratio			0.29							0.07						
95% Queue Length, Q ₉₅ (veh)			1.2							0.2						
Control Delay (s/veh)			13.7							7.6						
Level of Service, LOS			B							A						
Approach Delay (s/veh)	13.7								4.1							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

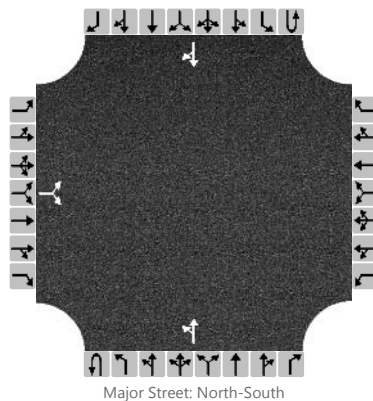
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/17
Analysis Year	2037
Time Analyzed	PM PP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Eastbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	I80 Eastbound Ramps
North/South Street	Hirshdale Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		73		159						132	104				164	30
Percent Heavy Vehicles (%)		41		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			244							139						
Capacity, c (veh/h)			1195							1371						
v/c Ratio			0.20							0.10						
95% Queue Length, Q ₉₅ (veh)			0.8							0.3						
Control Delay (s/veh)			8.8							7.9						
Level of Service, LOS			A							A						
Approach Delay (s/veh)	8.8								4.8							
Approach LOS	A															

HCS7 Two-Way Stop-Control Report

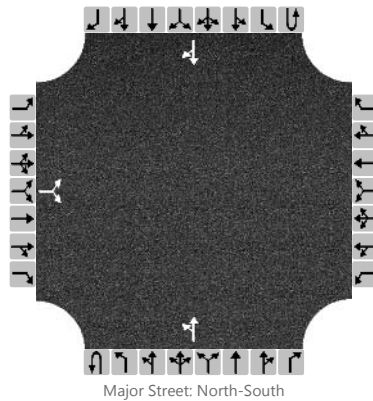
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/17
Analysis Year	2037
Time Analyzed	Sat PP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Eastbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	I80 Eastbound Ramps
North/South Street	Hirshdale Rd
Peak Hour Factor	0.87
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		97		147						101	121				166	40
Percent Heavy Vehicles (%)		81		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			280							116						
Capacity, c (veh/h)			680							1333						
v/c Ratio			0.41							0.09						
95% Queue Length, Q ₉₅ (veh)			2.0							0.3						
Control Delay (s/veh)			13.9							8.0						
Level of Service, LOS			B							A						
Approach Delay (s/veh)	13.9								4.0							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

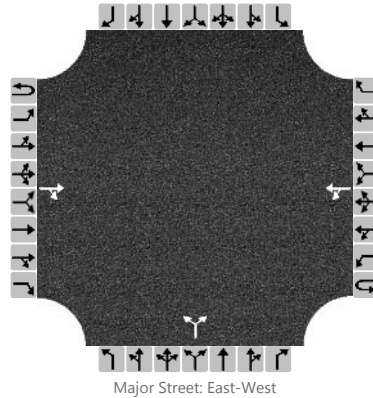
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2037
Time Analyzed	AM NP
Intersection Orientation	East-West
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Westbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	Hirshdale Road
North/South Street	I80 Westbound Ramps
Peak Hour Factor	0.77
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			18	10		75	39			15		50				
Percent Heavy Vehicles (%)						5				5		5				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						97					84					
Capacity, c (veh/h)						1587					922					
v/c Ratio						0.06					0.09					
95% Queue Length, Q ₉₅ (veh)						0.2					0.3					
Control Delay (s/veh)						7.4					9.3					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					5.0				9.3							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

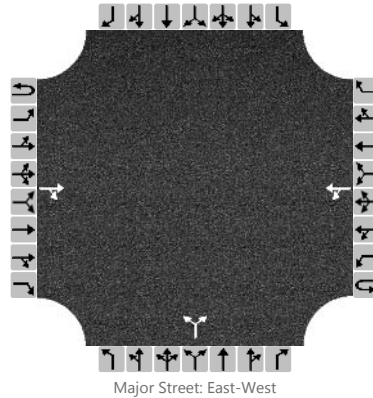
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2037
Time Analyzed	PM NP
Intersection Orientation	East-West
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Westbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	Hirshdale Road
North/South Street	I80 Westbound Ramps
Peak Hour Factor	0.84
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			66	22		94	53			36		127				
Percent Heavy Vehicles (%)						5				5		5				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						112					194					
Capacity, c (veh/h)						1495					834					
v/c Ratio						0.07					0.23					
95% Queue Length, Q ₉₅ (veh)						0.2					0.9					
Control Delay (s/veh)						7.6					10.6					
Level of Service, LOS						A					B					
Approach Delay (s/veh)					5.1				10.6							
Approach LOS									B							

HCS7 Two-Way Stop-Control Report

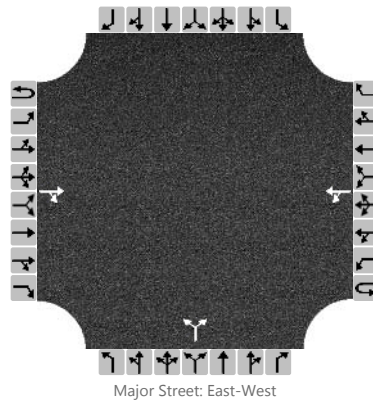
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2037
Time Analyzed	Sat NP
Intersection Orientation	East-West
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Westbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	Hirshdale Road
North/South Street	I80 Westbound Ramps
Peak Hour Factor	0.85
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			84	52		99	44			27		118				
Percent Heavy Vehicles (%)						5				5		5				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						116					171					
Capacity, c (veh/h)						1425					809					
v/c Ratio						0.08					0.21					
95% Queue Length, Q ₉₅ (veh)						0.3					0.8					
Control Delay (s/veh)						7.7					10.6					
Level of Service, LOS						A					B					
Approach Delay (s/veh)					5.6				10.6							
Approach LOS									B							

HCS7 Two-Way Stop-Control Report

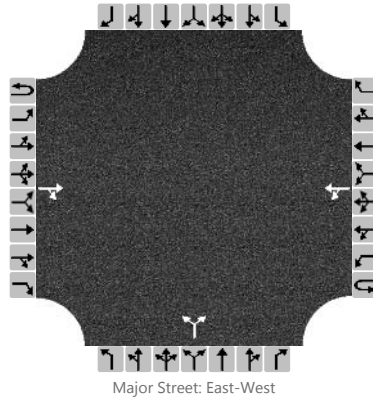
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2037
Time Analyzed	AM PP
Intersection Orientation	East-West
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Westbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	Hirshdale Road
North/South Street	I80 Westbound Ramps
Peak Hour Factor	0.77
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			22	81		75	114			15		50				
Percent Heavy Vehicles (%)						5				5		5				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						97					84					
Capacity, c (veh/h)						1458					824					
v/c Ratio						0.07					0.10					
95% Queue Length, Q ₉₅ (veh)						0.2					0.3					
Control Delay (s/veh)						7.6					9.9					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					3.4				9.9							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

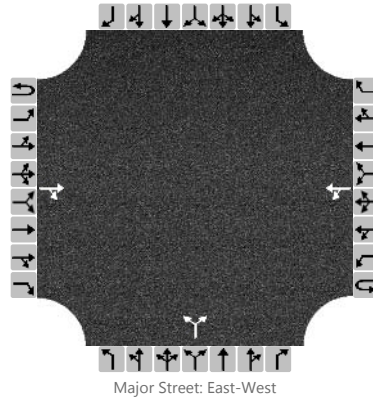
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2037
Time Analyzed	PM PP
Intersection Orientation	East-West
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Westbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	Hirshdale Road
North/South Street	I80 Westbound Ramps
Peak Hour Factor	0.84
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			67	46		94	78			36		127				
Percent Heavy Vehicles (%)						5				5		5				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						112					194					
Capacity, c (veh/h)						1457					806					
v/c Ratio						0.08					0.24					
95% Queue Length, Q ₉₅ (veh)						0.2					0.9					
Control Delay (s/veh)						7.7					10.9					
Level of Service, LOS						A					B					
Approach Delay (s/veh)					4.5				10.9							
Approach LOS									B							

HCS7 Two-Way Stop-Control Report

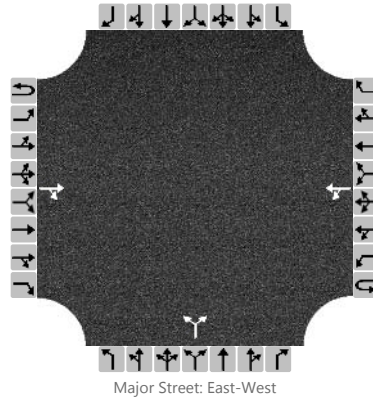
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2037
Time Analyzed	Sat PP
Intersection Orientation	East-West
Project Description	Teichert Boca Quarry

Site Information

Intersection	80 Westbound/Hirschdale
Jurisdiction	Nevada County
East/West Street	Hirshdale Road
North/South Street	I80 Westbound Ramps
Peak Hour Factor	0.85
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			88	123		99	119			27		118				
Percent Heavy Vehicles (%)						5				5		5				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

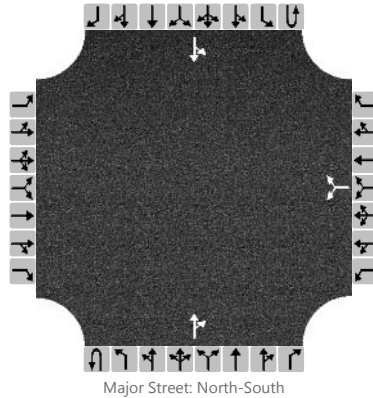
Flow Rate, v (veh/h)						116					171					
Capacity, c (veh/h)						1319					735					
v/c Ratio						0.09					0.23					
95% Queue Length, Q ₉₅ (veh)						0.3					0.9					
Control Delay (s/veh)						8.0					11.4					
Level of Service, LOS						A					B					
Approach Delay (s/veh)					4.0				11.4							
Approach LOS									B							

HCS7 Two-Way Stop-Control Report

General Information

Analyst	CAH	Intersection	Stampede/West Hinton
Agency/Co.	LSC	Jurisdiction	Nevada County
Date Performed	09/11/2017	East/West Street	West Hinton
Analysis Year	2037	North/South Street	Stampede Meadows Rd
Time Analyzed	AM NP	Peak Hour Factor	0.75
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Teichert Boca Quarry		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						0		1			44	2		0	20	
Percent Heavy Vehicles (%)						5		5						5		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

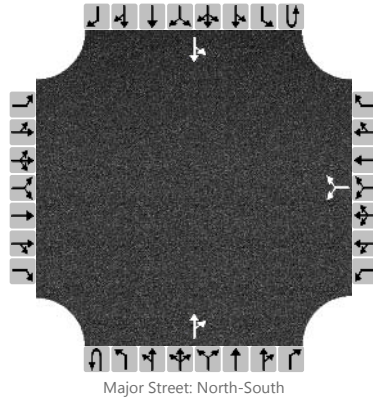
Flow Rate, v (veh/h)						1								0		
Capacity, c (veh/h)						999								1525		
v/c Ratio						0.00								0.00		
95% Queue Length, Q ₉₅ (veh)						0.0								0.0		
Control Delay (s/veh)						8.6								7.4		
Level of Service, LOS						A								A		
Approach Delay (s/veh)					8.6								0.0			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

General Information

Analyst	CAH	Intersection	Stampede/West Hinton
Agency/Co.	LSC	Jurisdiction	Nevada County
Date Performed	09/11/2017	East/West Street	West Hinton
Analysis Year	2037	North/South Street	Stampede Meadows Rd
Time Analyzed	PM NP	Peak Hour Factor	0.84
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Teichert Boca Quarry		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						3		0			59	1		1	56	
Percent Heavy Vehicles (%)						5		5						5		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						4								1		
Capacity, c (veh/h)						847								1514		
v/c Ratio						0.00								0.00		
95% Queue Length, Q ₉₅ (veh)						0.0								0.0		
Control Delay (s/veh)						9.3								7.4		
Level of Service, LOS						A								A		
Approach Delay (s/veh)					9.3								0.1			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

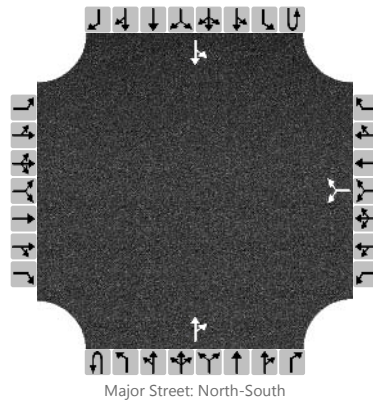
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2037
Time Analyzed	Sat NP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	Stampede/West Hinton
Jurisdiction	Nevada County
East/West Street	West Hinton
North/South Street	Stampede Meadows Rd
Peak Hour Factor	0.76
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						1		1			87	4		0	75	
Percent Heavy Vehicles (%)						5		5						5		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						2								0		
Capacity, c (veh/h)						840								1454		
v/c Ratio						0.00								0.00		
95% Queue Length, Q ₉₅ (veh)						0.0								0.0		
Control Delay (s/veh)						9.3								7.5		
Level of Service, LOS						A								A		
Approach Delay (s/veh)					9.3								0.0			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

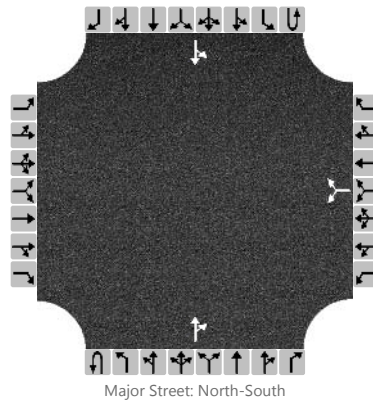
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2037
Time Analyzed	AM PP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	Stampede/West Hinton
Jurisdiction	Nevada County
East/West Street	West Hinton
North/South Street	Stampede Meadows Rd
Peak Hour Factor	0.75
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						75		1			44	77		0	20	
Percent Heavy Vehicles (%)						100		5						5		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						101								0		
Capacity, c (veh/h)						672								1402		
v/c Ratio						0.15								0.00		
95% Queue Length, Q ₉₅ (veh)						0.5								0.0		
Control Delay (s/veh)						11.3								7.6		
Level of Service, LOS						B								A		
Approach Delay (s/veh)					11.3								0.0			
Approach LOS					B											

HCS7 Two-Way Stop-Control Report

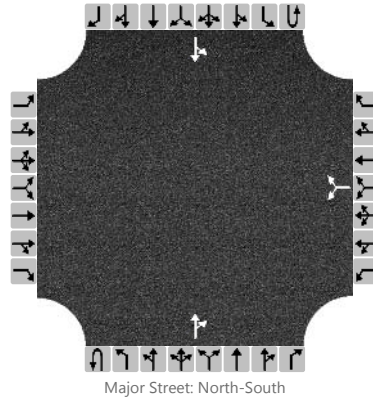
General Information

Analyst	CAH
Agency/Co.	LSC
Date Performed	09/11/2017
Analysis Year	2037
Time Analyzed	PM PP
Intersection Orientation	North-South
Project Description	Teichert Boca Quarry

Site Information

Intersection	Stampede/West Hinton
Jurisdiction	Nevada County
East/West Street	West Hinton
North/South Street	Stampede Meadows Rd
Peak Hour Factor	0.84
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						28		0			59	26		1	56	
Percent Heavy Vehicles (%)						94		5						5		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

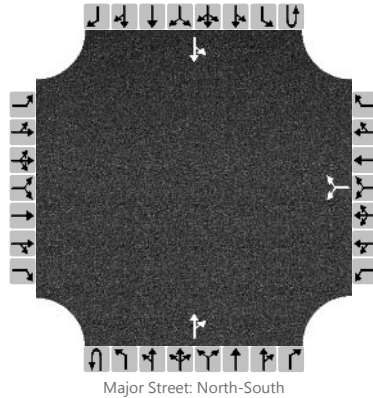
Flow Rate, v (veh/h)						33								1		
Capacity, c (veh/h)						662								1476		
v/c Ratio						0.05								0.00		
95% Queue Length, Q ₉₅ (veh)						0.2								0.0		
Control Delay (s/veh)						10.7								7.4		
Level of Service, LOS						B								A		
Approach Delay (s/veh)					10.7								0.1			
Approach LOS					B											

HCS7 Two-Way Stop-Control Report

General Information

Analyst	CAH	Intersection	Stampede/West Hinton
Agency/Co.	LSC	Jurisdiction	Nevada County
Date Performed	09/11/2017	East/West Street	West Hinton
Analysis Year	2037	North/South Street	Stampede Meadows Rd
Time Analyzed	Sat PP	Peak Hour Factor	0.76
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Teichert Boca Quarry		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						76		1			87	80		0	75	
Percent Heavy Vehicles (%)						100		5						5		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

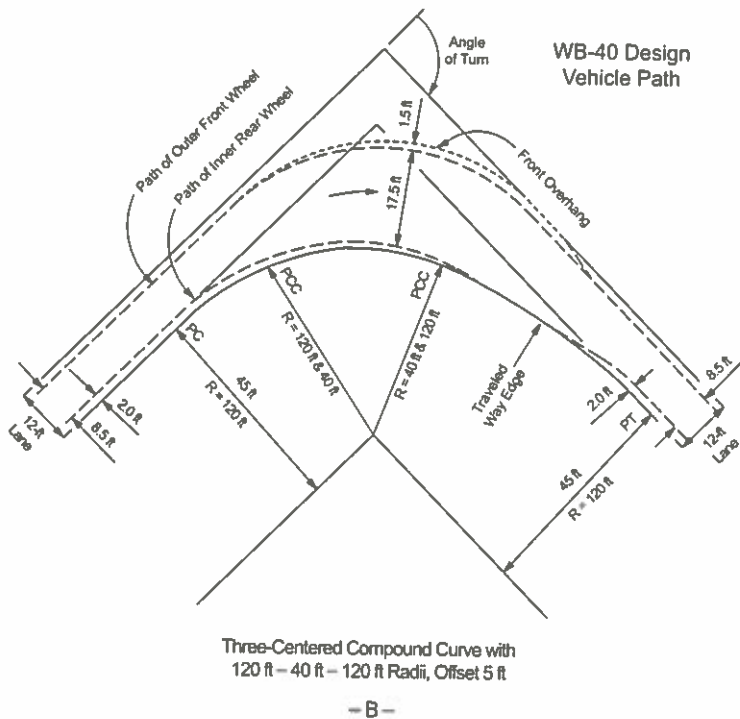
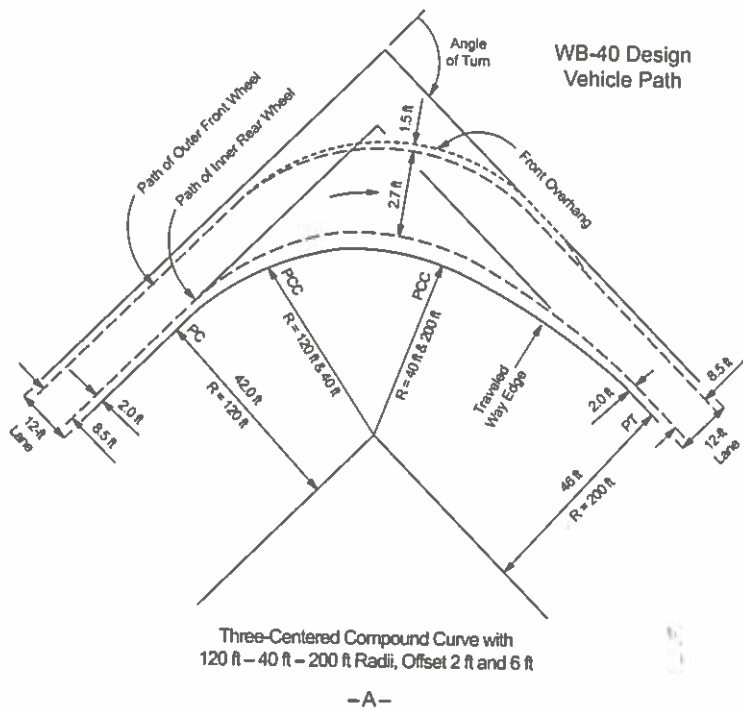
Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						101								0		
Capacity, c (veh/h)						557								1336		
v/c Ratio						0.18								0.00		
95% Queue Length, Q ₉₅ (veh)						0.7								0.0		
Control Delay (s/veh)						12.9								7.7		
Level of Service, LOS						B								A		
Approach Delay (s/veh)					12.9								0.0			
Approach LOS					B											

Entry Radius Diagram



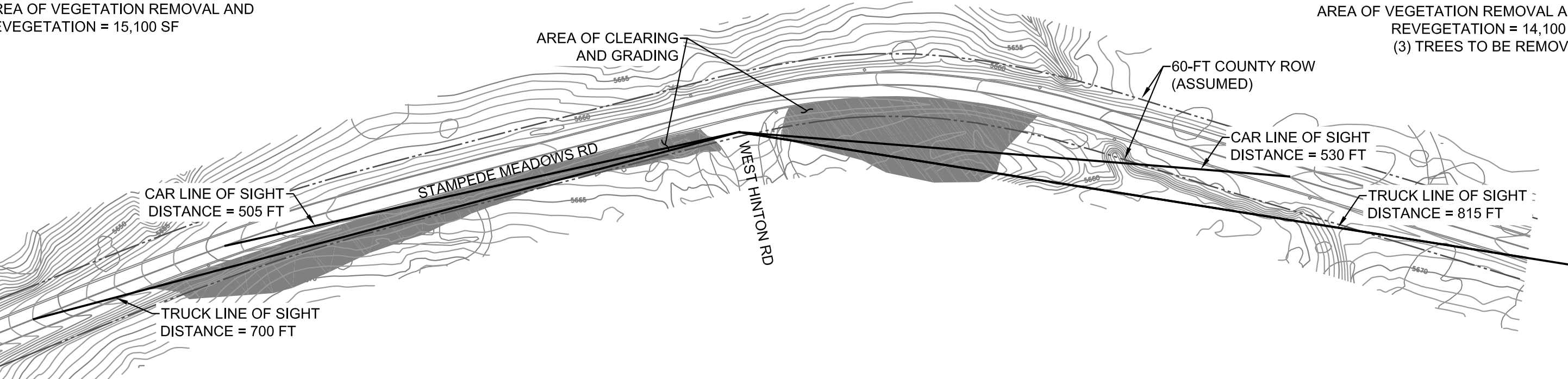
U.S. CUSTOMARY

Figure 9-26. Minimum Edge-of-Traveled-Way Designs (WB-12 [WB-40] Combination Trucks) (Continued)

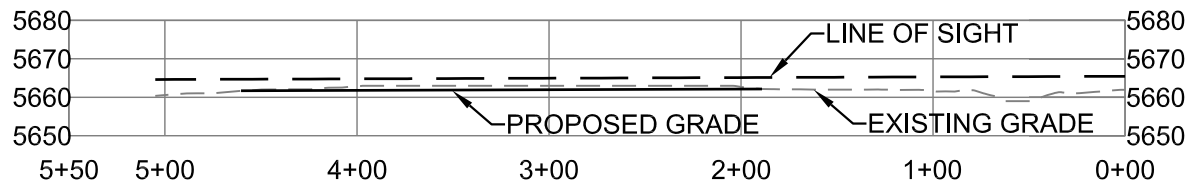
Sight Distance Exhibit

SOUTH
REQUIRED GRADING = 1,100 CY
AREA OF VEGETATION REMOVAL AND
REVEGETATION = 15,100 SF

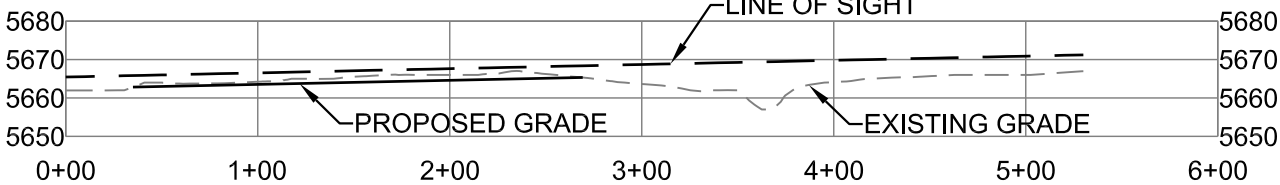
NORTH
REQUIRED GRADING = 200 CY
AREA OF VEGETATION REMOVAL AND
REVEGETATION = 14,100 SF
(3) TREES TO BE REMOVED



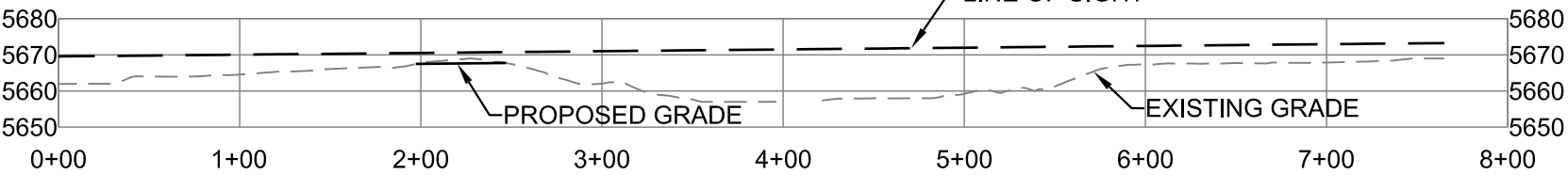
SOUTH CAR PROFILE



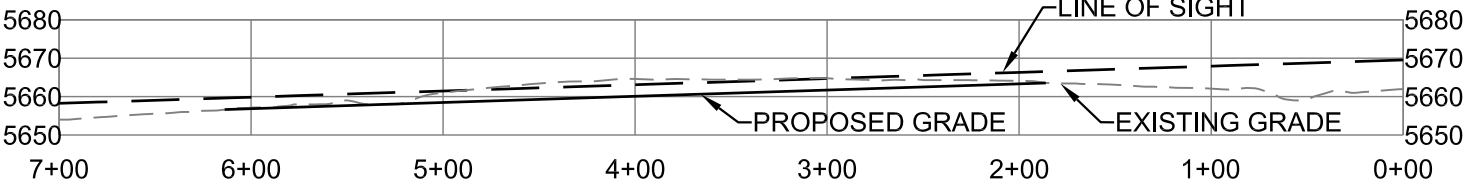
NORTH CAR PROFILE



NORTH TRUCK PROFILE



SOUTH TRUCK PROFILE

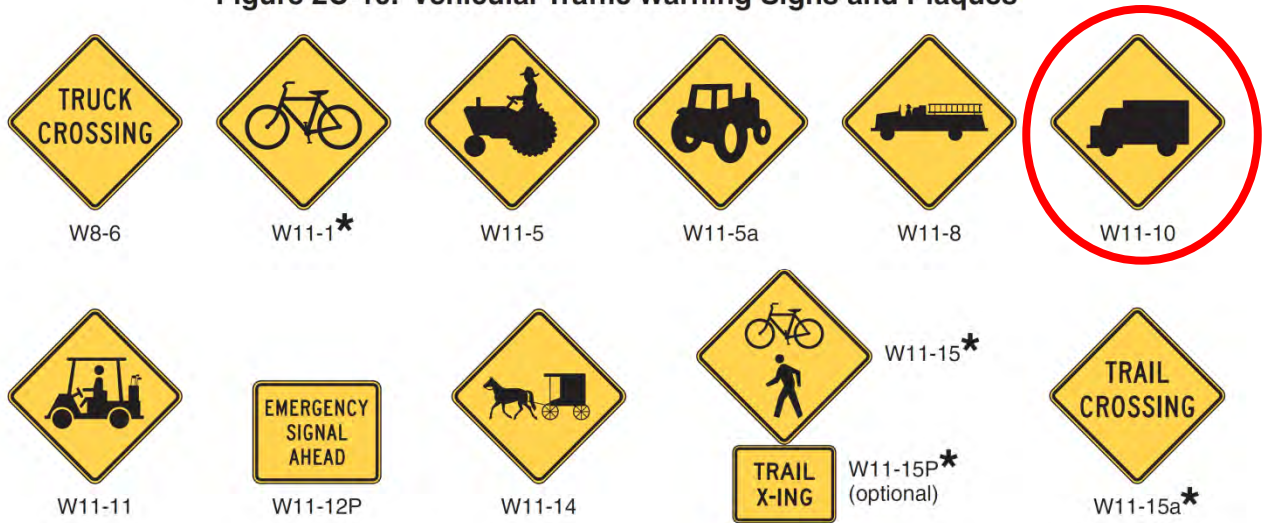


- NOTES:**
- 1. CAR DRIVER'S EYE HEIGHT = 3.5 FT.
 - 2. TRUCK DRIVER'S EYE HEIGHT = 7.6 FT.
 - 3. OBJECT HEIGHT ON STAMPEDE MEADOWS RD = 4.25 FT.
 - 4. REQUIRED GRADING ALLOWS FOR 3 FT CLEARANCE BELOW LINE OF SIGHT FOR VEGETATION GROWTH.

SIGHT DISTANCE EXHIBIT
Stampede Meadows Rd./West Hinton Rd.
Teichert Boca Quarry
Project: 2200.31 October, 2013

Advance Warning Signs

Figure 2C-10. Vehicular Traffic Warning Signs and Plaques



* A fluorescent yellow-green background color may be used for this sign or plaque.

Figure 2C-10 (CA). Vehicular Traffic Warning Signs and Plaques



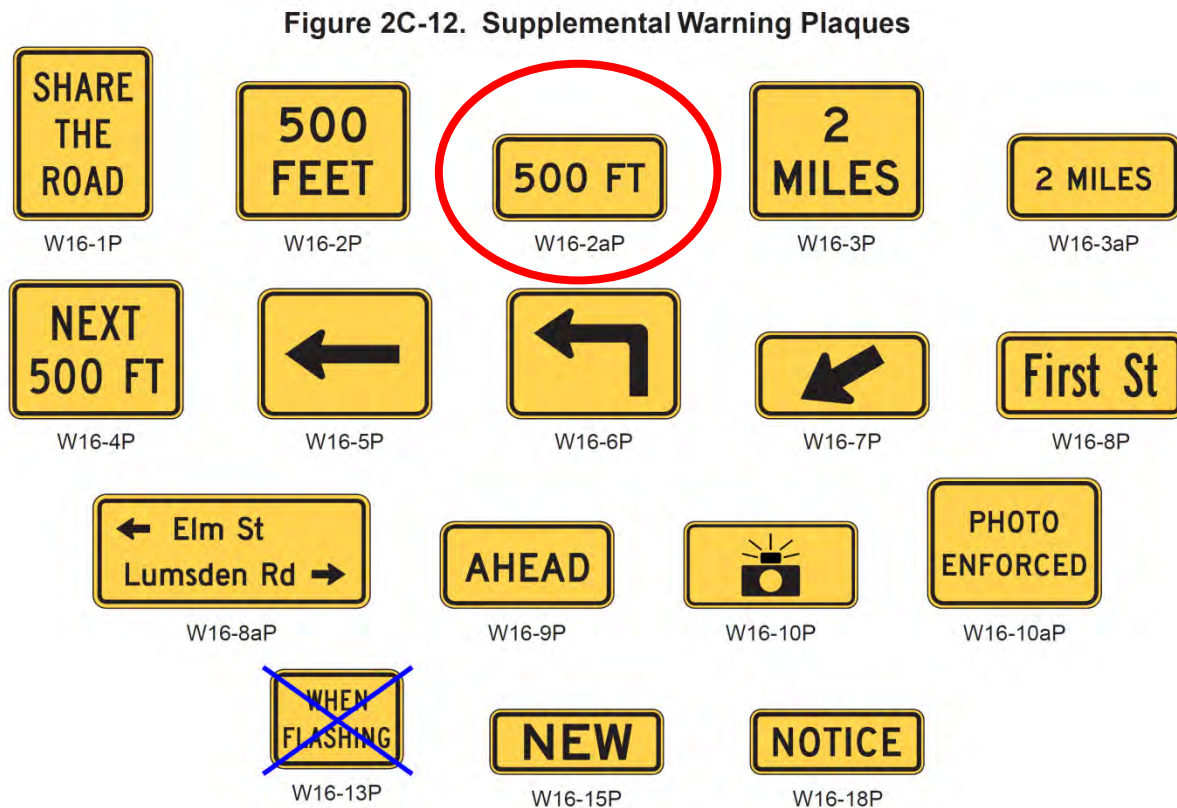
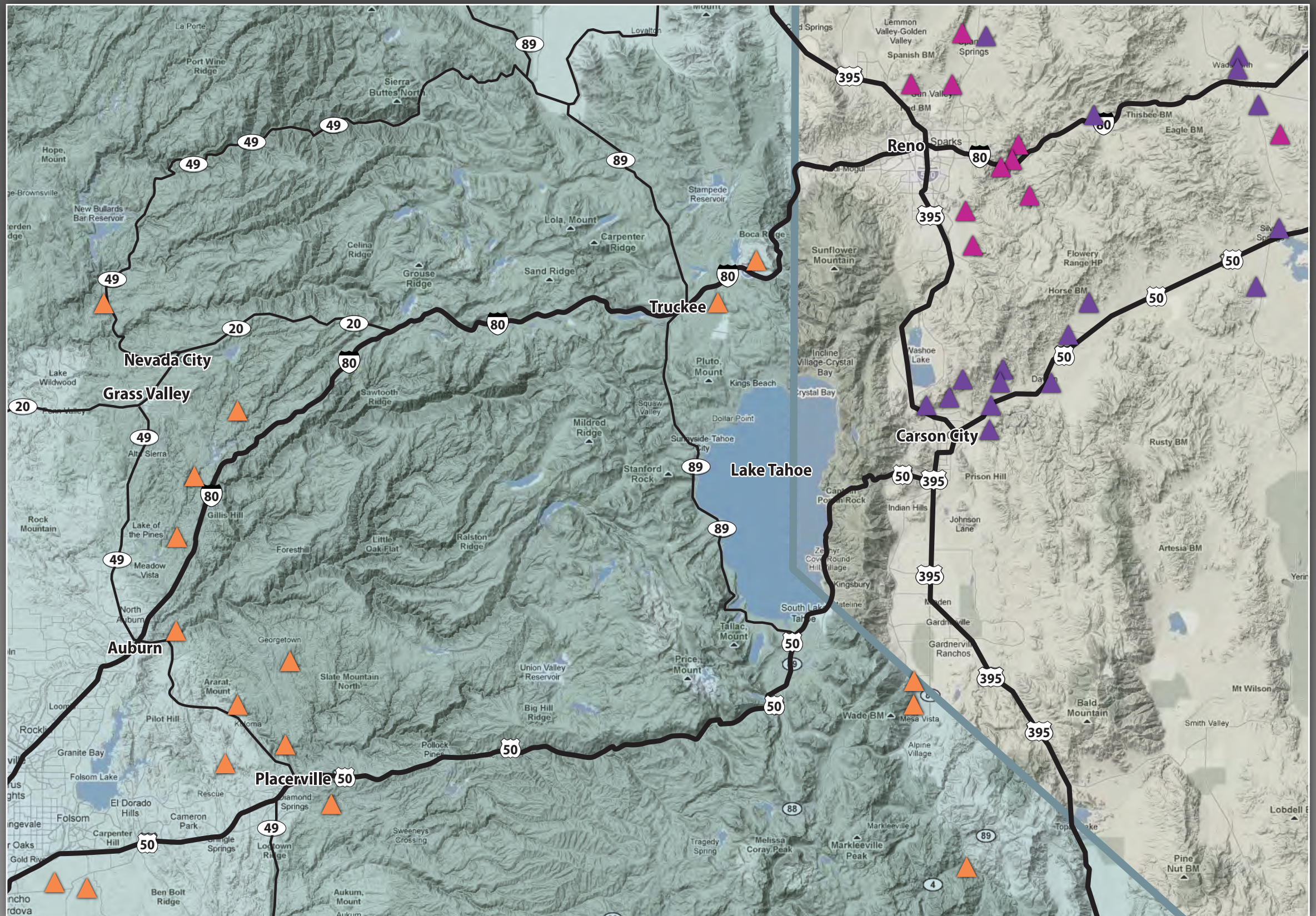


Figure 2C-12 (CA). Supplemental Warning Plaques



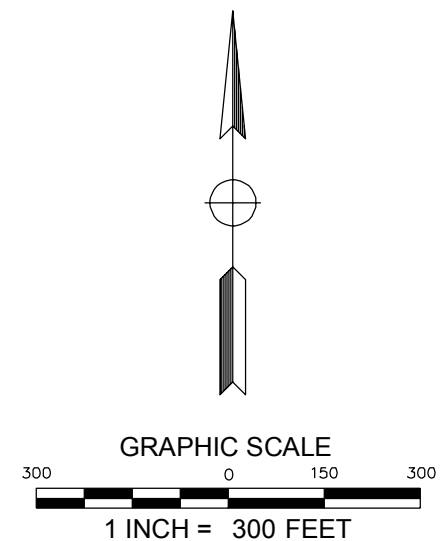
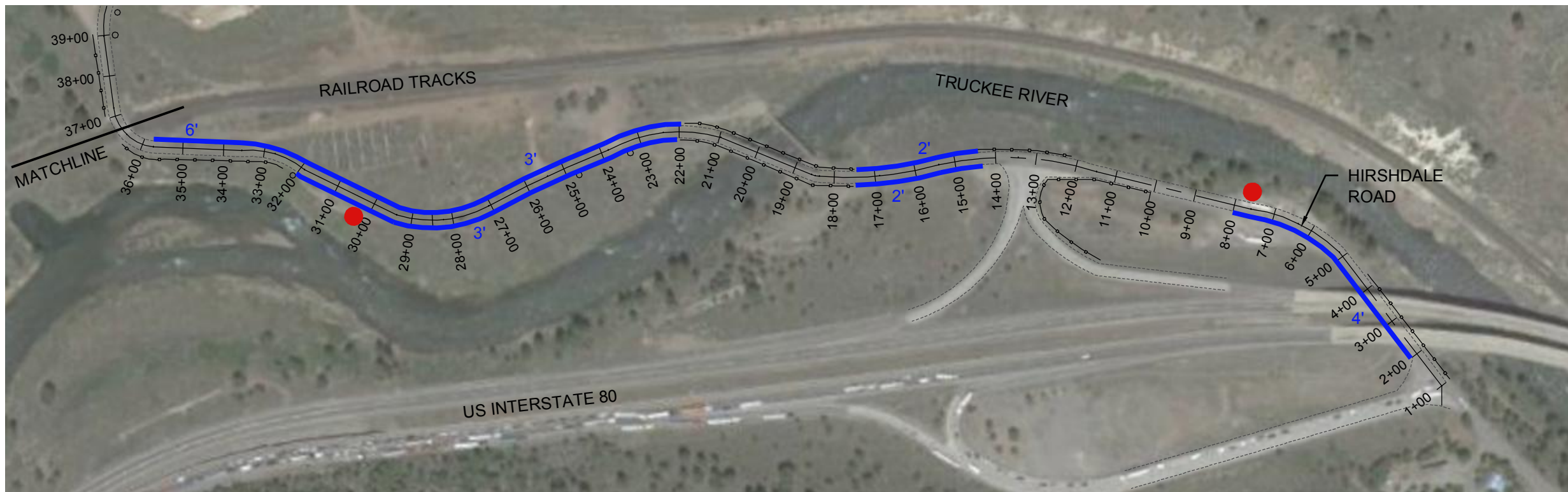
W34A (CA)

Aggregate Resources



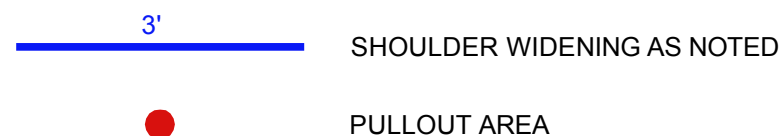
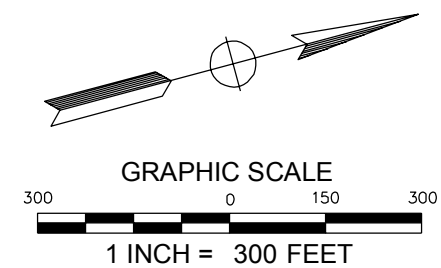
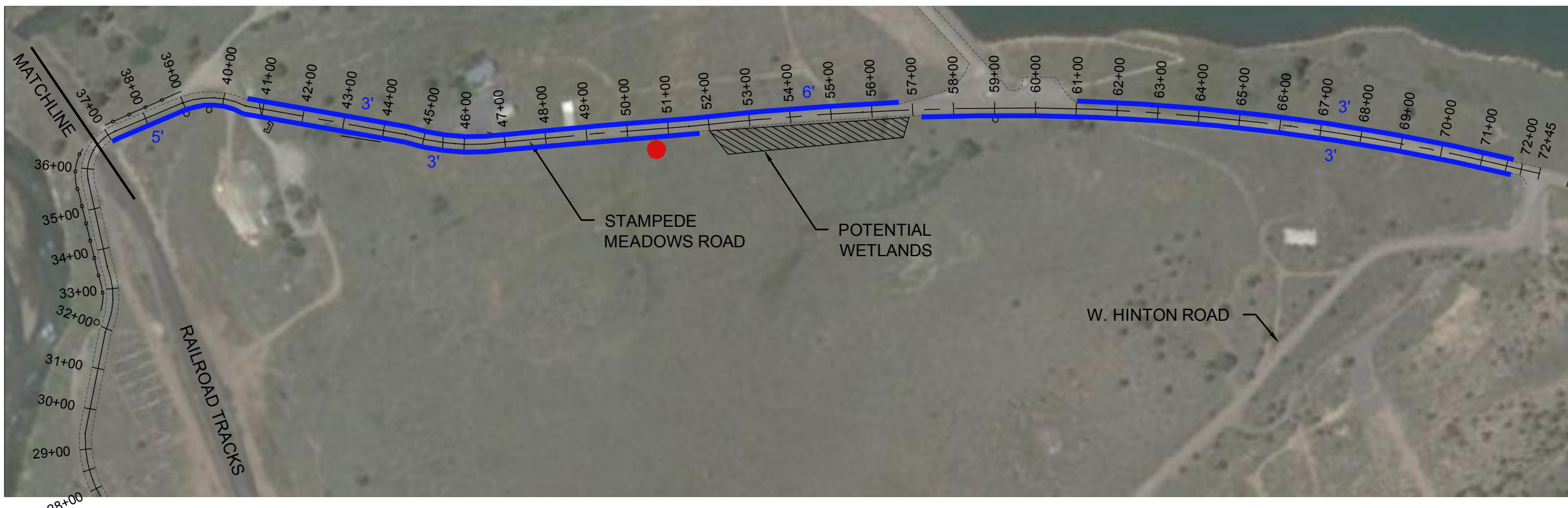
Aggregate sources in the Truckee/Tahoe region

Proposed Shoulder Improvements



NOTES:

1. SHOULDER IMPROVEMENTS INTENDED TO DEVELOP A 32-FOOT PAVED SECTION WITH 1-FOOT DIRT SHOULDERS.
2. CENTERLINE SHIFTS MAY BE REQUIRED.
3. SIGNAGE NOT SHOWN.



DRAFT

EXHIBIT MAP

PROPOSED SHOULDER IMPROVEMENTS
HIRSCHDALE RD/STAMPEDE MEADOWS RD
TEICHERT
2200.31 3/26/2014



TRANSPORTATION PLANNING AND TRAFFIC ENGINEERING CONSULTANTS

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TECHNICAL MEMORANDUM

Date: February 26, 2018

TO: Michael Smith, Teichert Aggregates
CC: Jesse Yang, Taylor & Wiley

FROM: Sara Hawley, PE, LSC Transportation Consultants, Inc.

RE: Teichert Boca Quarry Expansion – Construction Traffic Impacts

This memorandum presents an analysis of the traffic impacts during construction of driver sight distance improvements and shoulder widening improvements along Stampede Meadows Road in association with the proposed expansion of Boca Quarry. Construction of the improvements would likely occur on Monday through Saturday from 7:00 AM to 3:30 PM.

Construction traffic was estimated based on information provided by Teichert Construction (the likely construction contractor for the proposed roadway improvements) with regards to construction phases, number of construction employees and visitors anticipated to be on the site over the course of a busy day, and truck hauling activity. Assumptions include the following:

- All three phases of construction, including excavation, aggregate base rock, and asphaltic concrete paving, could occur simultaneously. This analysis assumes all phases overlap, in order to remain conservatively high in the estimation of traffic volumes.
- A maximum of 34 import/export trucks would visit the site per day. This would result in 34 inbound and 34 outbound truck trips.
- There would be approximately 22 construction workers per day, of which 75 percent are assumed to arrive in the hour before construction starts and 100 percent would depart in the hour construction ends. Average vehicle occupancy for workers is estimated to be approximately 1.2 workers per vehicle, consistent

with the vehicle occupancy rate assumed for quarry employees. This would result in approximately 19 inbound and 19 outbound trips generated by construction workers over the course of a busy day.

- A maximum of 4 managers/inspectors visit the site per day and 50 percent of these make an off-site trip in the middle of the day for lunch or other reasons, resulting in 6 inbound and 6 outbound trips per day.

As shown in Table A, all construction traffic will generate a total of approximately 118 daily one-way trips with 17 occurring in the AM peak hour (17 inbound and 0 outbound) and 31 occurring in the PM peak hour (2 inbound and 29 outbound). This is considerably less than the estimated quarry traffic at up to 1,432 daily trips, with up to 150 trips occurring in the AM peak hour (75 inbound and 75 outbound), 50 trips occurring in the weekday PM peak hour (25 inbound and 25 outbound), and 150 trips during the Saturday peak hour. Note the outbound PM peak hour trips on a weekday could be slightly higher during construction at 29 trips versus 25 trips. This small increase would not create a Level of Service (LOS) concern at any of the study intersections, which are expected to operate at a relatively good LOS during construction (LOS B or better).

The construction trips were distributed as follows:

- 93 percent to/from I-80 westbound
- 5 percent to/from Glenshire
- 2 percent to/from I-80 eastbound

Table B shows the resulting construction project generated volumes at the study intersections. Note that the volumes through the Stampede Meadows Road/West Hinton Road intersection are conservatively high, given that some of the construction traffic may not impact Stampede Meadows Road that far to the north.

Attachments: Table A-B

Table A: Hourly Trip Generation - Construction Traffic Weekdays and Saturdays

Hour Start Time	Export/Import Trucks		Construction Workers		Managers/Inspectors		Total Vehicle Trips		
	In	Out	In	Out	In	Out	In	Out	Total
5:00 AM							0	0	0
6:00 AM			14		3		17	0	17
7:00 AM	4		5		1		10	0	10
8:00 AM	4	4					4	4	8
9:00 AM	4	4					4	4	8
10:00 AM	4	4					4	4	8
11:00 AM	4	4				2	4	6	10
12:00 PM	4	4			2		6	4	10
1:00 PM	4	4					4	4	8
2:00 PM	4	4					4	4	8
3:00 PM	2	6	19		4		2	29	31
4:00 PM							0	0	0
Total Daily	34	34	19	19	6	6	59	59	118

AM and PM peak hours are shaded

Source: LSC Transportation Consultants

Table B: Construction Generated Peak Hour Intersection Turning Movement Volumes

Intersection	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour													
Stampede Meadows Road/West Hinton			17										17
I-80 Westbound Ramps/Hirschdale Road											17		17
I-80 Eastbound Ramps/Hirschdale Road		1					16						17
PM Peak Hour													
Stampede Meadows Road/West Hinton			2							29			31
I-80 Westbound Ramps/Hirschdale Road								2	27		2		31
I-80 Eastbound Ramps/Hirschdale Road					1	1	2						4

Source: LSC Transportation Consultants



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TECHNICAL MEMORANDUM

Date: September 10, 2018

TO: Michael Smith, Teichert Aggregates
CC: Jim Wiley, Taylor & Wiley
CC: Jesse Yang, Taylor & Wiley
CC: Leslie Suen, PE, LSC Transportation Consultants, Inc.

FROM: Sara Hawley, PE, LSC Transportation Consultants, Inc.

RE: Teichert Boca Quarry Expansion – Timber Harvesting Traffic Impacts

This memorandum presents an analysis of the traffic impacts associated with the timber harvesting activities anticipated as a part of the proposed expansion of Boca Quarry. In addition, an updated discussion of Vehicle Miles Traveled (VMT) impacts is provided, considering that Teichert's Truckee Quarry recently resumed operation.

Timber Harvesting Impacts

According to the project description, the total number of harvestable trees on the Boca Quarry site is about 750, and the trees are spread over approximately 100 acres. No additional employment would be generated by the timber harvesting activities, as they are merely part of the site preparation and would occur as needed as new areas become available for mining. Based on Teichert's recent tree removal activities at the nearby Truckee Quarry site, the trees are anticipated to be taken to a lumber mill located in Quincy, approximately 75 miles away from Truckee (via I-80, SR 89 north, and SR 70).

In Teichert's experience based on past tree removal operations, approximately 8-10 trees can be hauled off in one truck load. Dividing 750 trees by 8 trees per truck load, conservatively, the total number of truck loads is approximately 94. Assuming each truck makes 2 one-way trips (one entering and one exiting the site), this equates to 188 one-way truck trips made to/from the site over the 30-year life of the project. Even if all

of those loads occur during a single operating season, there would be less than one load per day, on average. On a busy day, the number of truck trips generated by timber harvesting activities would be minimal compared to the approximately 1,432 maximum daily one-way vehicle trips estimated to be generated by the quarry operations (as indicated in the *Teichert Boca Quarry Expansion Traffic Impact Analysis*, LSC Transportation Consultants, Inc., October, 2017). As such, the timber harvesting activities would not materially affect the conclusions and recommendations in the traffic study.

VMT Impacts

The effect of the proposed project on Vehicle Miles Traveled (VMT) in the region is dependent on the total trip generation and the length of these vehicle trips. The increase in VMT resulting from the proposed project was estimated based on the trip lengths and the total number of daily and peak-hour trips generated. The quarry will serve the entire area between Sierra Valley on the north and Tahoe's West Shore on the south. Hauling trips made along I-80 to the east (between Hirschdale and the California/Nevada State Line) are expected to be minimal. Considering the geographic region and uses served by the quarry, the average trip length for truck trips made to/from the quarry is estimated to be about 20 miles. The average trip length for employees is assumed to be approximately 10.5 miles, based on data from the 2011-2015 American Community Survey (U.S. Census data) for the Truckee area.

As Table A indicates, up to approximately 28,336 daily VMT are associated with the proposed project over the course of a peak weekday, with up to 3,000 VMT occurring during the busiest hour of site-generated traffic (the AM peak hour). These figures reflect "worst-case" conditions, as they assume the quarry is operating at the maximum potential production. Note that the project would generate less VMT on a Saturday. The VMT generated by the proposed project are not all necessarily "new" VMT, given the fact that there are some VMT associated with the existing site.

Furthermore, the VMT associated with the Boca Quarry are not necessarily "generated" by the proposed project, but are actually necessitated by the construction projects that need the materials from the quarry. Without the proposed quarry project, these construction projects would still occur. That is, a similar number of VMT would be generated in the study region regardless of which quarry supplies the materials.

Other than the Truckee, Martis and Boca quarries, the nearest large quarry capable of supplying the typical project in the study region is located at least an additional 40 miles away via I-80 (toward Reno or Sacramento). Without the Truckee, Martis and Boca quarries, the additional trip length associated with aggregate exporting truck trips potentially made from the nearest quarry in Sparks, Nevada is estimated to be approximately 36 additional miles in one direction. (This additional distance is based on a total of about 40 miles from the Hirschdale Interchange to the Sparks quarry, minus

the roughly 4 miles of travel that Boca Quarry trucks travel in order to access the Hirschdale Interchange.)

Multiplying 36 additional miles by up to 1,120 daily one-way trips associated with the aggregate exporting trucks yields a total of 40,320 additional VMT generated over the course of a peak weekday. Assuming the same methodology applies to the backfill importing trucks, about 10,080 additional daily VMT (36 additional miles multiplied by 280 one-way trips) would be made by the backfill importing trucks going to/from Sparks instead of to/from the Boca Quarry. Therefore, with respect to the region including the area served by the Boca Quarry as well as the I-80 corridor between the Hirschdale Interchange and Sparks, Nevada, a total of up to 50,400 additional daily VMT (40,320 plus 10,080) would be generated if the Boca Quarry Expansion Project is not implemented.

In summary, approximately 28,336 daily VMT are associated with the proposed quarry project. However, without project implementation, an additional 50,400 daily VMT would be generated in the region (or more, depending on which quarry would serve the local construction projects), for a total of 78,736 daily VMT. Without the proposed project, it can be concluded that the VMT associated with quarry trips in the region would be about 2.8 times greater than that with the project. In other words, implementation of the Boca Quarry Expansion Project would ultimately reduce VMT in the greater region by roughly 35 percent. Note that these figures are based on maximum production levels.

Attachment: Table A – VMT

TABLE A: Project-Generated Vehicle Miles Traveled

Description	Number of Trips ¹		Average Trip Length (miles)	Vehicle Miles Traveled	
	Daily	Peak Hour		Daily	Peak Hour
Aggregate Exporting Trucks	1,120	120	20.0	22,400	2,400
Backfill Importing Trucks	280	30	20.0	5,600	600
Employee Vehicles	30	0	10.5	315	0
Maintenance Truck	2	0	10.5	21	0
Total	1,432	150		28,336	3,000

Note: Reflects weekday conditions. VMT on a Saturday would be less.

Note 1: Reference Table 1 in traffic study.

Source: LSC Transportation Consultants, Inc.

Teichert Quarry.xls