5.16 TRAFFIC AND CIRCULATION

This section is based upon the *Tierra Robles Traffic Impact Study* (May 2015) and *Supplemental Traffic Impact Analysis* (August 2017) prepared by Omni-Means Engineering Solutions, both included as Appendix 15.9, TRAFFIC IMPACT STUDY. The purpose of these evaluations is to address traffic and transportation impacts of the proposed project on surrounding streets and intersections. The *Tierra Robles Traffic Impact Study* was prepared based on criteria set forth by Shasta County and the California Department of Transportation (Caltrans). Mitigation measures are recommended, if necessary, to avoid or lessen proposed project impacts on traffic and circulation. The following analysis of the potential environmental impacts related to traffic and circulation is also derived from the following sources:

- Caltrans. *Guide for the Preparation of Traffic Impact Studies.* December 2002.
- City of Redding. *Bikeway Action Plan 2010-2015*. April 2010.
- City of Redding. *Redding General Plan 2000 – 2020*. October 2000.
- City of Redding. *Traffic Impact Assessment Guidelines.* January 2009.
- Shasta County. *2030 Shasta County Travel Demand Model (SCTDM)*.
- Shasta County. *Shasta County 2010 Bicycle Transportation Plan*. 2010.
- Shasta County. *Shasta County General Plan*. September 2004.
- Shasta County. *Regional Transportation Plan*.

This section provides baseline information on, and evaluates potential impacts on traffic and circulation related to the proposed project. The following traffic analysis scenarios were evaluated:

- *Existing Conditions. Existing* conditions quantify the current traffic operations at the study locations.

- *Existing Plus Project Conditions.* The *Existing Plus Project* condition is an analysis scenario in which traffic impacts with the proposed project are investigated in comparison to the *Existing* conditions scenario. Within this scenario, the project generated peak hour traffic volumes have been added to the *Existing* conditions volumes to obtain the *Existing Plus Project* traffic volumes.

- *Year 2035 No Project Conditions. Year 2035 No Project* conditions refer to analysis scenarios that would exist following approximately twenty years of development in the greater Redding area and Shasta County. The *Year 2035 No Project* conditions scenarios were forecasted using SCTDM.

- *Year 2035 Plus Project Conditions.* The *Year 2035 Plus Project* conditions is the analysis scenario in which traffic impacts associated with the project are investigated in comparison to the *Year 2035 No Project* condition scenario.

5.16.1 ENVIRONMENTAL SETTING

STREET CLASSIFICATIONS

In order to adequately plan for the future circulation network of streets and highways within the County, the Shasta County *General Plan* utilizes a functional hierarchy of road classification as described below. This circulation system hierarchy is used in all circulation planning and the review of all development permits. The circulation system hierarchy is made up of the roadway which are classified as either

principal arterial, arterial, collectors, subcollectors, major local streets, minor local streets, and minor streets.

- *Principal Arterial.* A principal arterial provides regional, statewide, and national transportation connections. All principal arterials are under Federal jurisdiction and include Federal highways as well as interstate highways.

- *Arterial.* Arterials provide connections between links in the highway network and connects major destinations with the highway network.

- *Collector.* Accommodates traffic between principal arterial, arterial streets and/or activity centers.

- *Subcollector.* This roadway classification serves between 300 and 700 potential residences. Direct access from adjoining parcels is permitting.

- *Major Local Street.* Provides access for 50 to 300 potential residences.

- *Local Street.* Provides access for 25 to 50 potential residences.

- *Minor Local Street.* Provides access for up to 25 potential residences.

- *Minor Street.* Other types of streets that carry very low volumes of traffic.

LOCAL ACCESS

Roadways that provide primary circulation in the vicinity of the proposed project are as follows:

- *Boyle Road.* An east-west facility that runs from Old Alturas Road to Deschutes Road. Boyle Road has a two-lane cross-section.

- *Deschutes Road.* A north-south facility that extends from State Route 299 (SR-299) to the north to Interstate 5 (I-5) to the south. Deschutes Road is two-lane in the project vicinity.

- *Old Alturas Road.* An east-west collector that runs north of and approximately parallel to State Route 44 (SR-44). Old Alturas Road has a two-lane cross-section.

- *Shasta View Drive.* A two to four-lane, north-south arterial/collector street that runs between Rancho Road and College View Drive. The southerly extension of Shasta View Drive, from Rancho Road to Airport Road, and the northerly extension, from College View Drive to the City of Shasta Lake, has been conceptually indicated in the current City of Redding *General Plan* circulation system. In the project vicinity Shasta View Drive is a two-lane arterial.

- *Old Oregon Trail.* A north-south collector that runs east of and approximately parallel to Airport Road. Old Oregon Trail has a two-lane cross-section.

- *State Route 44.* An interregional highway that runs in an east-west direction linking the City of Redding with Lassen County. SR-44 begins at State Route 273 (SR-273) in the City of Redding and extends eastwards towards the City of Susanville in Lassen County. SR-44 forms a full-access interchange with Shasta View Drive. SR-44 has a four-lane divided cross section through the Shasta View Drive interchange.

- *State Route 299.* An interregional highway that begins at Highway 101 in Humboldt County and traverses east through Humboldt, Trinity, Shasta, and Modoc Counties. SR-299 forms a full-access interchange with Churn Creek Road. SR-44 has a four-lane divided cross section through the Churn Creek Road interchange.

STUDY INTERSECTIONS AND ROADWAY SEGMENTS

Intersections

The following list of critical study intersections were established through consultation with County and Caltrans staff, and were analyzed under the scenarios described above for weekday AM and PM peak hour conditions:

- *Deschutes Road & SR-299 (Intersection #1)*
- *Deschutes Road & Old Alturas Road (Intersection #2)*
- *Old Alturas Road & Seven Lakes Road (Intersection #3)*
- *Old Alturas Road & Shasta View Drive (Intersection #4)*
- *Shasta View Drive & Tarmac Road (Intersection #5)*
- *Shasta View Drive & SR-44 Westbound (WB) Ramps (Intersection #6)*
- *Shasta View Drive & SR-44 Eastbound (EB) Ramps (Intersection #7)*
- *Old Alturas Road & Old Oregon Trail (Intersection #8)*
- *Old Oregon Trail & Old 44 Drive (Intersection #9)*
- *Airport Road & SR-44 WB Ramps (Intersection #10)*
- *Airport Road & SR-44 EB Ramps (Intersection #11)*
- *Old Alturas Road & Boyle Road (Intersection #12)*
- *Boyle Road & Deschutes Road (Intersection #13)*
- *Deschutes Road & Old 44 Drive (Intersection #14)*
- *Deschutes Road & Cedro Lane (Intersection #15)*
- *Deschutes Road & SR-44 WB Ramps (Intersection #16)*
- *Deschutes Road & SR-44 EB Ramps (Intersection #17)*

Roadways

The following roadway segments were selected in coordination with County staff and Caltrans for analysis of weekday operations for existing and long-term (*Year 2035*) traffic conditions both without and with the proposed project:

- *Old Alturas Road (west of Deschutes Road) – Two lane collector (Segment #1)*
- *Old Alturas Road (north of Boyle Road) – Two lane collector (Segment #2)*
- *Old Alturas Road (east of Shasta View Drive) – Two lane collector (Segment #3)*
- *Old Alturas Road (between Old Oregon Trail and Boyle Road) – Two lane arterial (Segment #4)*

- *Boyle Road (west of Deschutes Road) – Two lane collector (Segment #5)*
- *Shasta View Drive (north of Tarmac Road) – Three lane arterial (Segment #6)*
- *Old Oregon Trail (north of Old 44 Drive) – Two lane collector (Segment #7)*
- *Deschutes Road (north of Old 44 Drive) – Two lane arterial (Segment #8)*

BICYCLE FACILITIES

Shasta County is the lead agency to provide a safe and efficient regional system of bicycle routes for commuter, school, and recreational use for the unincorporated areas of the County. The *California Streets and Highway Code* (Section 890.4) defines the various classes of bicycle facilities as follows:

- *Class I Bike Paths.* Class I facilities are completely separated right-of-way designated for the exclusive use of bicycles. Cross-flows by pedestrians and motorized vehicles are minimized.

- *Class II Bike Lanes.* Class II facilities are restricted right-of-way designated for the exclusive or semi-exclusive use of bicycles. Travel by motor vehicles or pedestrians are not allowed; except for vehicle parking and cross flows. In most cases, Class II Bikeways require a lane of at least four feet of well-maintained pavement for the cyclist to ride on.

- *Class III Bike Routes.* Class III facilities are shared right-of-way either on the street or on the sidewalk, and are designated by signs placed on vertical posts or markings stenciled on the pavement. Any bikeway which shares a through-traffic right-of-way.

- *Class IV Bikeways.* Class IV facilities or separated bikeways, promote active transportation and provide a right-of-way designated exclusively for bicycle travel adjacent to a roadway and which are separated from vehicular traffic. Types of separation include, but are not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

According to the Shasta County *2010 Bicycle Transportation Plan*, bicycles are allowed on SR-299, east of Old Oregon Trail, and on SR-44, east of Shasta View Drive. Class II bike lanes are proposed along Deschutes Road between SR-299 and Balls Ferry Road, on Old Alturas Road west of Old Oregon Trail, and on Old Oregon Trail.

According to the City of Redding's *Bikeway Action Plan 2010-2015*, Class II bike lanes exists on Shasta View Road between Hemingway Street and Tarmac Road. Class II bike lanes are proposed for remaining segment of Shasta View Drive. Class II bike lanes are also proposed on Old Oregon Trail continuing to Airport Road, Tarmac Road and Old Alturas Road in the City of Redding.

County roadways including Old Alturas Road, Boyle Road and Deschutes Road in the immediate project vicinity do not have bicycle facilities. The Shasta County *2010 Bicycle Transportation Plan* shows that Class II bike lanes are proposed on Deschutes Road and Old Alturas Road within unincorporated Shasta County.

TRANSIT SERVICES

Existing transit service is provided primarily by the Redding Area Bus Authority (RABA). RABA provides fixed route service, express route service and demand response service to the general public within the urbanized area of the Shasta County. RABA operates 14 fixed routes within the cities of Redding, Shasta

Lake and Anderson, none of which operate in the immediate vicinity of the project site. The nearest RABA bus stop is approximately 3 miles west of the project site at the intersection of Old Alturas Road and Shasta View Drive.

SAFETY PERFORMANCE

An offsite pedestrian, bicycle, and motorized vehicle safety review was conducted on Old Alturas Road, Boyle Road, and Deschutes Road in the immediate project vicinity, based on historical collision data and a field review. The five-year historical collision data covers the period from January 1, 2009 to December 31, 2013 and was obtained from the Statewide Integrated Traffic Records System (SWITRS) maintained by the California Highway Patrol (CHP).

Based on the five-year SWITRS data, 41 collisions have occurred along Old Alturas Road, 7 collisions have occurred along Boyle Road, and 101 collisions have occurred along Deschutes Road. Table 5.16-1, COLLISIONS BY YEAR, provides a summary of the collisions along the roadways by year. Table 5.16-2, COLLISIONS BY TYPE, provides a summary of the collisions by collision type.

Table 5.16-1
COLLISIONS BY YEAR

Roadway	Year					
	2009	2010	2011	2012	2013	Total
Boyle Road	2	1	0	2	2	7
Deschutes Road	21	21	22	17	20	101
Old Alturas Road	12	12	5	5	7	41
Total	**35**	**34**	**27**	**24**	**29**	**149**

Source: Omni-Means Engineering Solutions. *Tierra Robles Traffic Impact Study*. May 2015.

Table 5.16-2
COLLISIONS BY TYPE

Collision Type	Roadway			
	Boyle Road	Deschutes Road	Old Alturas Road	Total
Broadside	2	28	6	36
Head-On	1	4	1	6
Hit Object	4	19	17	40
Not Stated	0	0	1	1
Other	0	1	2	3
Overturned	0	6	7	13
Rear End	0	39	4	43
Sideswipe	0	4	3	7
Total	**7**	**101**	**41**	**149**

Source: Omni-Means Engineering Solutions. *Tierra Robles Traffic Impact Study*. May 2015.

As shown in Table 5.16-1, the number of collisions along these corridors has declined since 2009, with Deschutes Road consistently having the most collisions. Between 2009 and 2013, the number of collisions along Old Alturas Road has reduced by about half, while Boyle Road and Deschutes Road collisions amount remain about the same annually. As shown in Table 5.16-2, the rear end collision type had the highest amount, next to hit object collisions and broadside collisions. There were no collisions reported involving pedestrians or bicyclists. There were no fatalities reported, and there were 90 injuries over the five-year period. There were 10 injuries involving alcohol, and 20 collisions total in which alcohol was involved.

Collision rates were calculated for segments along Old Alturas Road, Boyle Road, and Deschutes Road, in terms of "accidents per million vehicle miles traveled". The collision rates are based on the number of collisions, the average daily traffic (ADT) volumes (April, 2015), and the length of the segment, and the following equation:

$$\textit{Collision Rate} = \frac{\text{(Number of Collisions) x (1,000,000)}}{\text{Vehicle Miles Traveled}}$$

The calculated collision rates were compared with statewide average rates compiled by the California Department of Transportation (Caltrans) as published in their most recent document *2011 Collision Data on California State Highways*. The document provides basic average accident rates for various types of roadways and intersections categorized by number of lanes, travel speed, etc., and are derived from the SWITRS. Table 5.16-3, COLLISION RATES FOR SEGMENTS, presents the collision rates for segments along roadways in the immediate project vicinity.

Table 5.16-3
COLLISION RATES FOR SEGEMENTS

Segments	Length (mi)	# of Collisions	2015 ADT	Collision Rate (ACC/MVM)	Statewide Basic Average Rate
Old Alturas Road					
Deschutes Road to Seven Lakes Road	1.6	6	1,046	**1.96**	1.47
Seven Lakes Road to Boyle Road	3.0	6	1,750	0.63	1.02
Boyle Road to Old Oregon Trail	1.2	9	4,197	**0.98**	0.90
Old Oregon Trail to Shasta View Drive	1.0	12	5,982	1.10	2.39
Total	**6.8**	**33**	--	--	--
Boyle Road					
Deschutes Road to Old Alturas Road	2.7	5	1,456	0.70	1.38
Deschutes Road					
SR-44 to Boyle Road	3.4	28	8,495	0.53	0.86
Boyle Road to SR-44	2.5	46	8,495	**1.19**	0.86
Total	**5.9**	**74**	**8,495**	0.81	**0.86**

Notes: ACC/MVM = Accidents per million vehicle miles.
Source: Omni-Means Engineering Solutions. *Tierra Robles Traffic Impact Study*. May 2015.

As shown in Table 5.16-3, there are three segments where the collision rate is higher than the statewide average rate. On Old Alturas Road between Deschutes Road and Seven Lakes Road, between Boyle Road and Old Oregon Trail, and on Deschutes Road between Boyle Road and SR-44 the calculated collision rates exceed the statewide basic average rate for the roadway segments. These locations are further analyzed below base on field reviews completed by an Omni-Means Engineering Solutions on May 5, 2015.

Old Alturas Road (Deschutes Road to Seven Lakes Road)

The section of Old Alturas Road between Deschutes Road to Seven Lakes Road is curvilinear and narrow with roadside obstructions. This section of rural roadway has a collision rate 33 percent higher than the statewide average for similar facilities. Of the 6 reported collisions, the primary collision factors are summarized as follows:

- 2 – DUI
- 1 – Hitting an Animal

Old Alturas Road (Boyle Road to Old Oregon Trail)

The section of Old Alturas Road between Boyle Road and Old Oregon Trail is a modern roadway with good alignment, lane widths, shoulders and roadside conditions. The collision rate is 9 percent higher than the statewide average for similar facilities. Of the 9 reported collisions, the primary collision factors are summarized as follows:

- 2 – DUI
- 2 – Unsafe Speed
- 1 – Hitting an Animal
- 4 – Improper Turn

A collision rate 9 percent higher than the statewide average for similar facilities is not statistically significant and is considered to be within a normal and expected range.

Deschutes Road (Boyle Road to SR-44)

The section of Deschutes Road between Boyle Road and SR-44 maintains good horizontal alignment, vertical alignment and sight distances. However, the shoulders are narrow, the roadside environment has numerous obstructions and there are numerous driveways and low-volume road connections. The collision rate is 38 percent higher than the statewide average for similar facilities. Of the 46 reported collisions, the primary collision factors are summarized as follows:

- 3 – DUI
- 27 – Unsafe Speed
- 2 – Hitting an Animal
- 4 – Improper Turn
- 9 – Failure to Grant R/W to Another Automobile (Includes Collisions at a Traffic Signal)
- 1 – Unsafe Lane Change

Approximately 85 percent of the collisions were during daylight conditions and 56 percent were rear end collisions. The combination of unsafe speed and the congested roadside with numerous driveways and minor road connections results in a high number of rear-end collisions.

5.16.2 DATA COLLECTION

For all study intersections, existing weekday AM and PM peak hour counts were conducted by Omni-Means Engineering Solutions on Wednesday, February 6, 2013. Schools in the area were in session and no known special events were occurring in the area at the time of the traffic counts. No precipitation or otherwise inclement weather was recorded on the collection dates. All intersections are analyzed during the weekday AM and PM peak hour period. The AM peak hour is defined as the one continuous hour of peak traffic flow counted between 7:00 AM and 9:00 AM. The PM peak hour is defined as the one continuous hour of peak traffic flow counted between 4:00 PM and 6:00 PM.

For all roadway segments, existing average daily traffic (ADT) counts were collected by Omni-Means Engineering Solutions on Thursday, April 23, 2015. Schools in the area were in session and no known special events were occurring in the area at the time of the traffic counts. No precipitation or otherwise inclement weather was recorded on the collection dates. All roadway segments were analyzed on a daily basis.

Figure 5.16-1, EXISTING LANE GEOMETRICS AND CONTROL, illustrates existing lane geometrics and controls for the project study area roadways. Figure 5.16-2, EXISTING INTERSECTION TRAFFIC VOLUMES, presents the existing traffic volumes at the seventeen study intersections for AM and PM peak hour conditions.

5.16.3 METHODOLOGY AND GUIDELINES

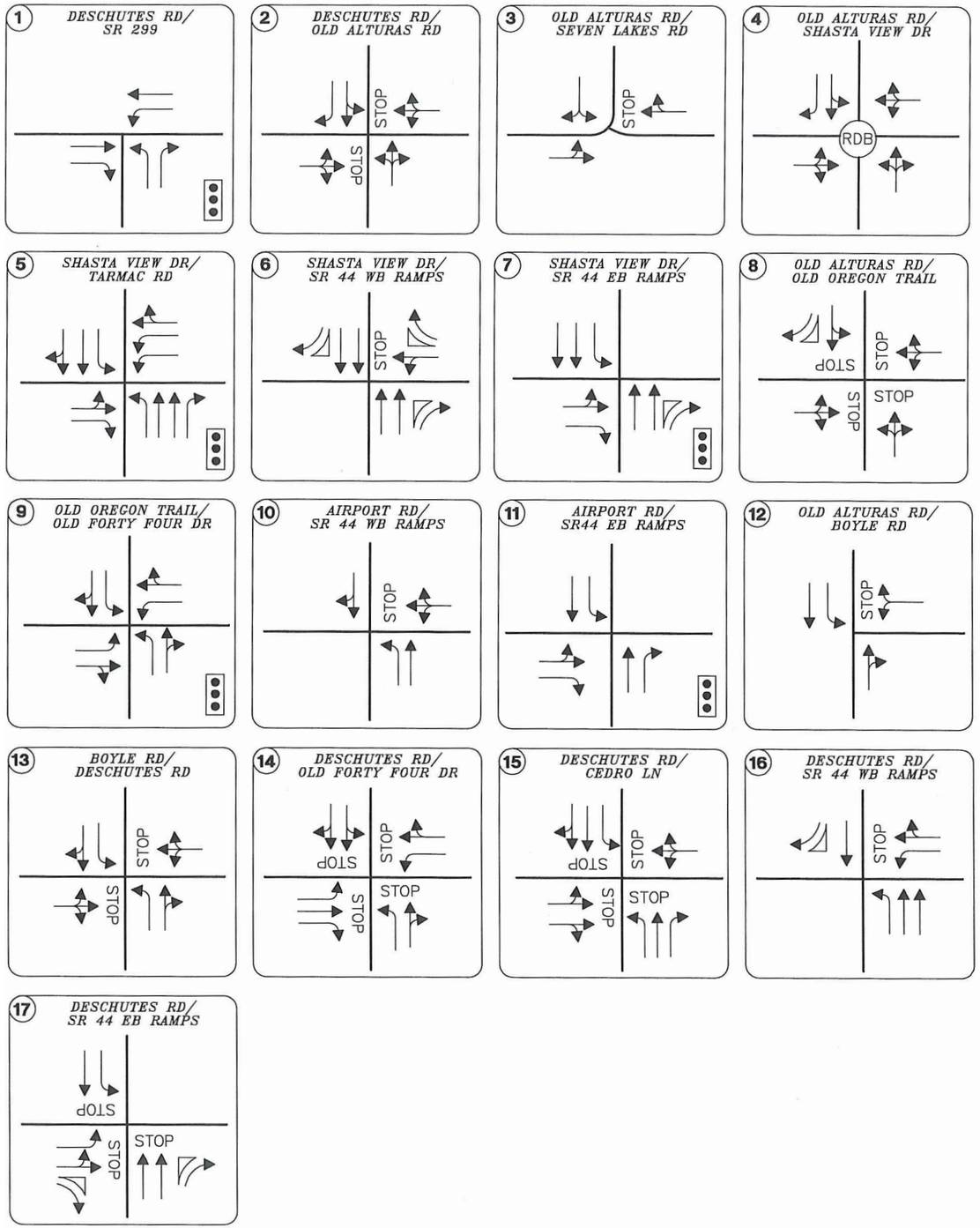
The following methodologies, including guidelines and standards of the Shasta County and Caltrans related to traffic and circulation, were utilized in the evaluation of the proposed project's traffic impacts.

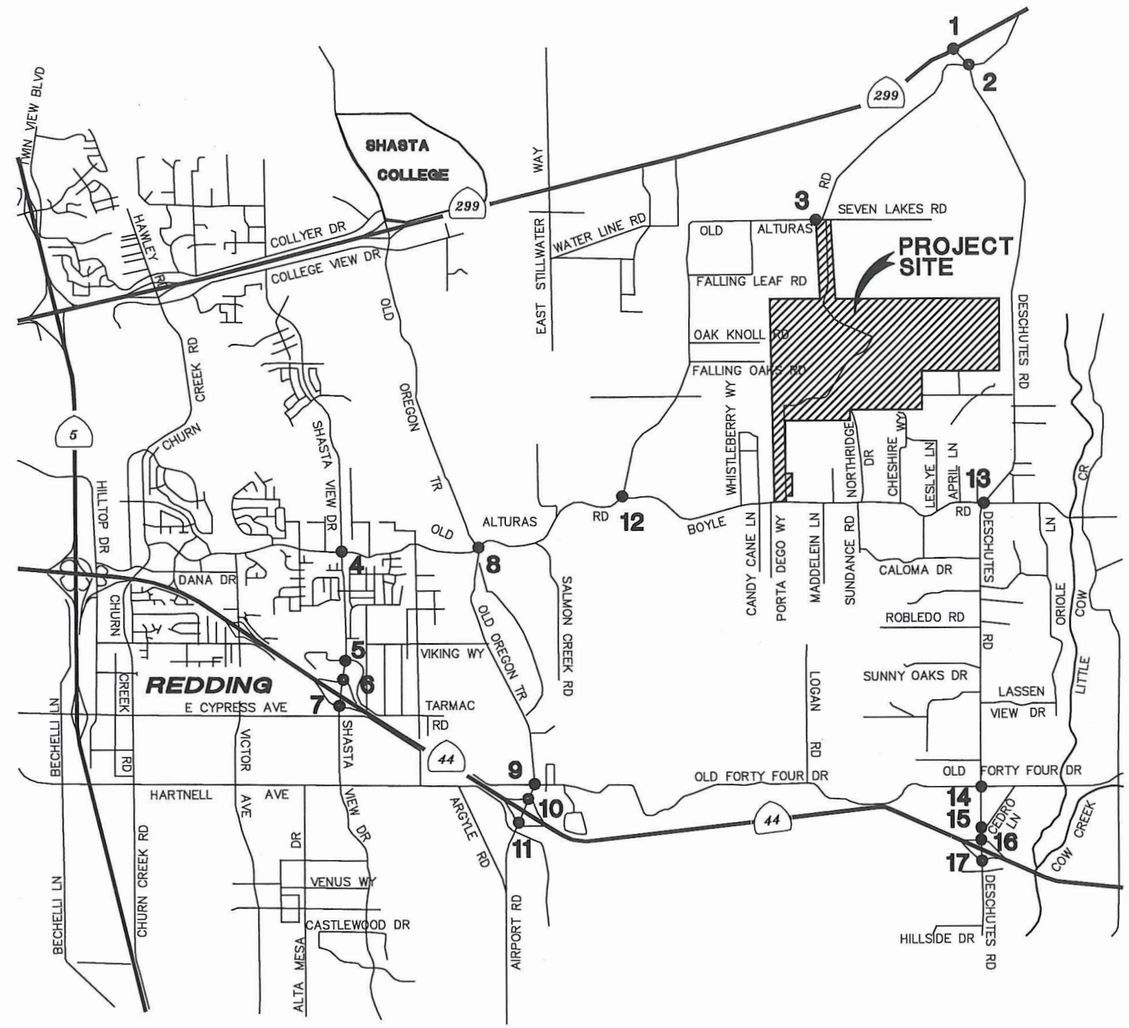
LEVEL OF SERVICE METHODOLOGIES

Intersection, roadway, mainline, and ramp level-of-service (LOS) has been calculated for all control types using the methods documented in the Transportation Research Board's *Highway Capacity Manual 2010*. LOS determinations are presented on a letter grade scale from "A" to "F", whereby LOS "A" represents free-flow operating conditions and LOS "F" represents over-capacity conditions.

Intersection LOS

Level-of-service definitions for different types of intersection controls are presented in Table 5.16-4, LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS. Intersection LOS is calculated for all control types using the *Synchro 8* software by Trafficware, implementing the methods documented in the HCM 2010. For signalized intersections and all-way-stop-controlled (AWSC) intersections, the intersection delays and LOS are average values for all intersection movements. For two-way-stop-controlled (TWSC) intersections, the intersection delays and LOS are representative of those for the worst-case movement.





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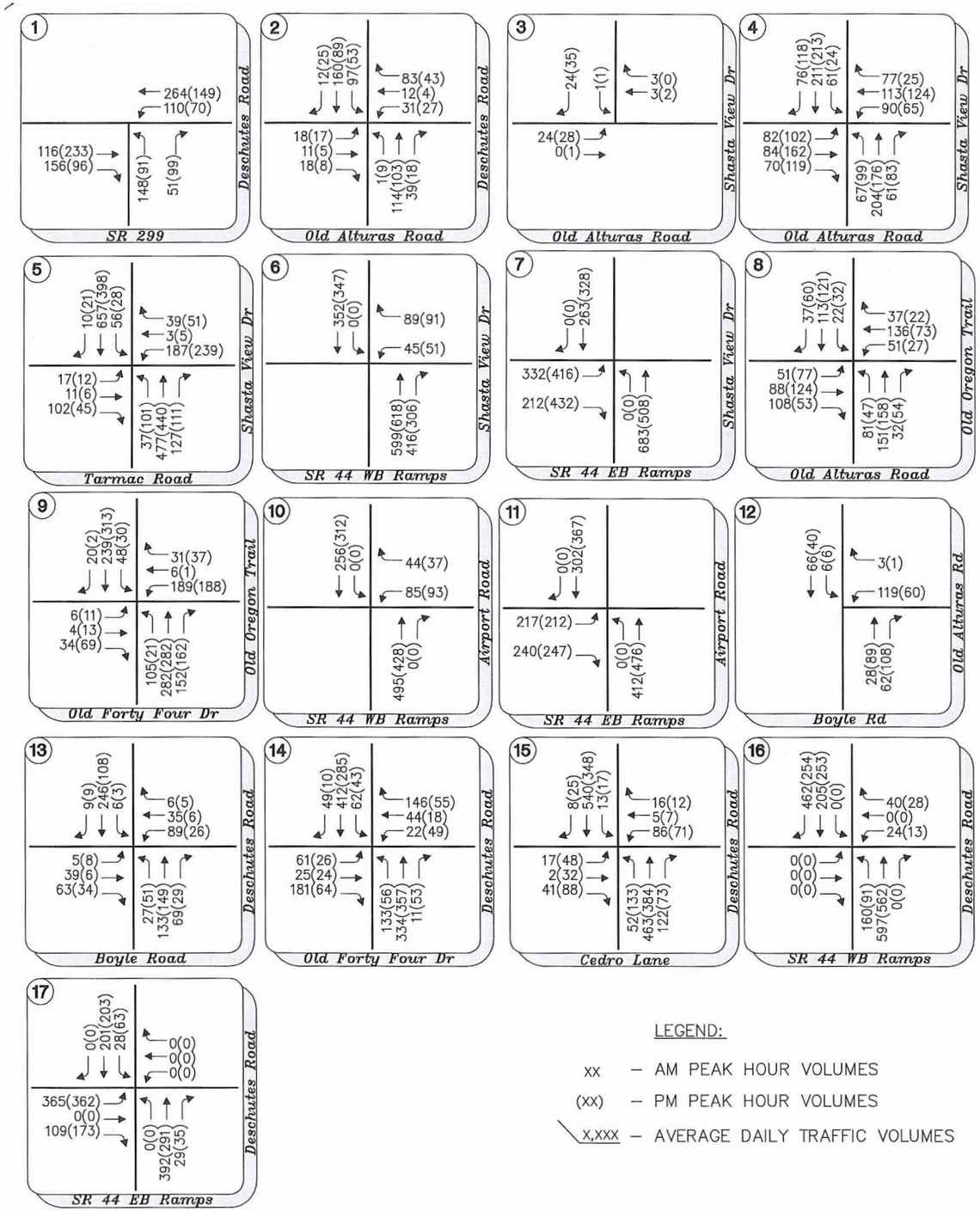
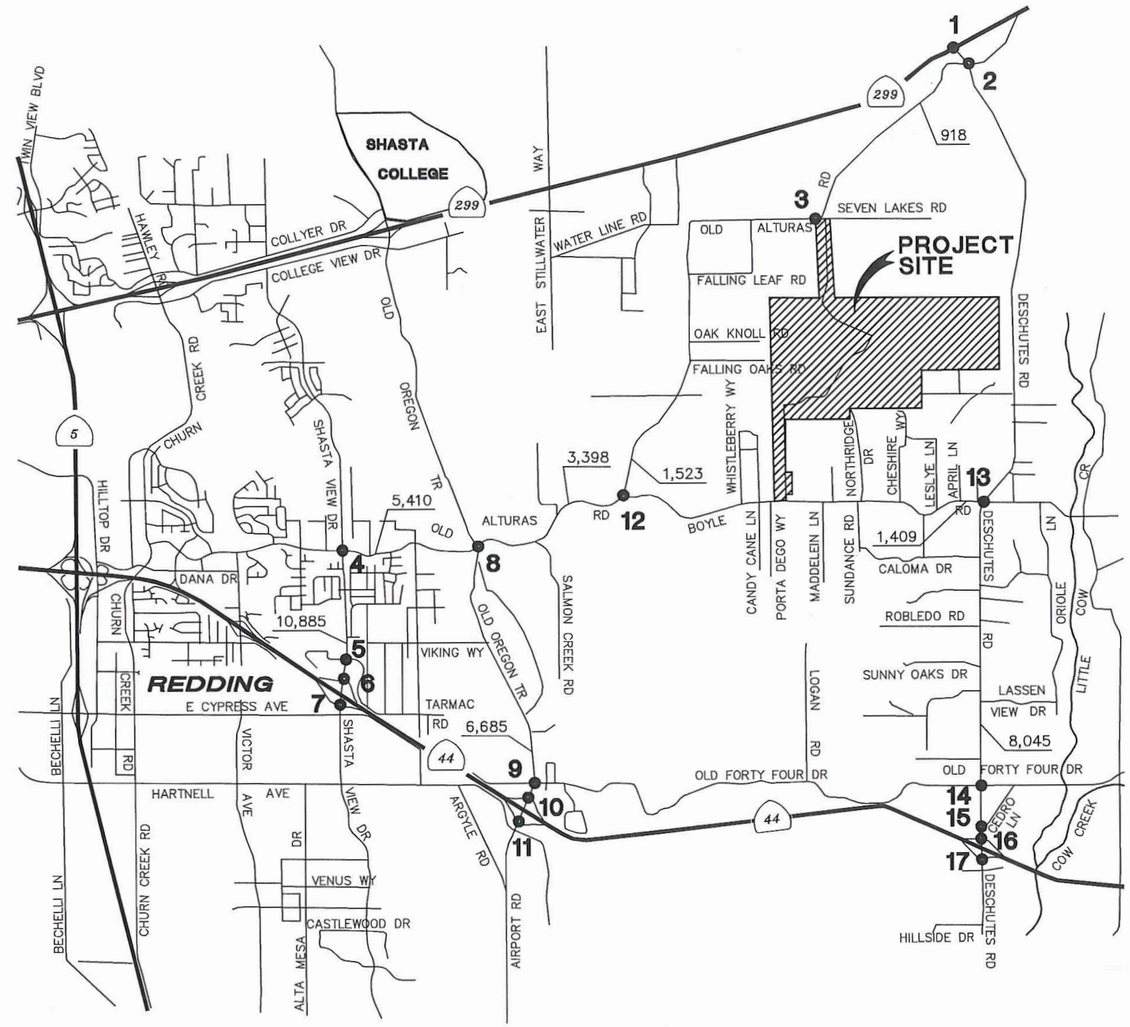
TIERRA ROBLES PLANNED DEVELOPMENT • EIR

Existing Lane Geometrics and Control

Figure 5.16-1





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TIERRA ROBLES PLANNED DEVELOPMENT • EIR

Existing Intersection Traffic Volumes

Figure 5.16-2

Table 5.16-4
LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS

LOS	Type of Flow	Delay	Maneuverability	Stopped Delay/Vehicle (sec)		
				Signalized	Unsignalized	All-Way Stop
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	≤ 10.0	≤ 10.0	≤ 10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10 and ≤ 20.0	>10 and ≤ 15.0	>10 and ≤ 15.0
C	Stable Flow	Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted	>20 and ≤ 35.0	>15 and ≤ 25.0	>15 and ≤ 25.0
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35 and ≤ 55.0	>25 and ≤ 35.0	>25 and ≤ 35.0
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55 and ≤ 80.0	>35 and ≤ 50.0	>35 and ≤ 50.0
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	> 80.0	> 50.0	> 50.0

Source: Transportation Research Board. *Highway Capacity Manual, Fifth Edition*. 2010.

Roadway LOS

The average daily traffic based roadway LOS thresholds are provided below in Table 5.16-5, LEVEL OF SERVICES CRITERIA FOR ROADWAYS.

Table 5.16-5
LEVEL OF SERVICE CRITERIA FOR ROADWAYS

Roadway Type	Average Daily Traffic (ADT) – Total of Both Directions				
	LOS "A"	LOS "B"	LOS "C"	LOS "D"	LOS "E"
6-Lane Freeway	75,000	90,000	105,000	120,000	135,000
4-Lane Freeway	50,000	60,000	70,000	80,000	90,000
6-Lane Expressway (high access control)	36,000	42,000	48,000	54,000	60,000
4-Lane Expressway (high access control)	24,000	28,000	32,000	36,000	40,000
6-Lane Divided Arterial (with left-turn lane)	32,000	38,000	43,000	49,000	54,000
4-Lane Divided Arterial (with left-turn lane)	22,000	25,000	29,000	32,500	36,000
4-Lane Undivided Arterial (no left-turn lane)	18,000	21,000	24,000	27,000	30,000
2-Lane Arterial (with left-turn lane)	11,000	12,500	14,500	16,000	18,000
2-Lane Arterial (no left-turn lane)	9,000	10,500	12,000	13,500	15,000
4-Lane Collector	12,000	15,000	18,000	21,000	24,000
2-Lane Collector	6,000	7,500	9,000	10,500	12,000

Source: Transportation Research Board. *Highway Capacity Manual, Fifth Edition*. 2010.

CALTRANS LOS GUIDELINES

The Caltrans published *Guide for the Preparation of Traffic Impact Studies* (December 2002) states the following:

"Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities, however, Caltrans acknowledges that this may not be always feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS."

SHASTA COUNTY LOS POLICY

The Shasta County *General Plan* Circulation Element as amended through September 2004 was referenced to establish level of service methodologies for the proposed project. Specifically, policies C-6k and C-6l which are provided below:

- *Policy C-6k.* Shasta County shall adopt the following LOS standards for considering any new roads:
  - Rural arterial and collectors – LOS C
  - Urban/Suburban arterials and collectors – LOS C

- *Policy C-6l.* New development which may result in exceeding LOS E on existing facilities shall demonstrate that all feasible methods of reducing travel demand have been attempted to reach LOS C. New development shall not be approved unless traffic impacts are adequately mitigated. Such mitigation may take the form of, but not limited to the following:
  - Provision of capacity improvements to the specific road link to be impacted, the transit system, or any reasonable combination.
  - Provision of demand reduction measures included as part of the project design or project operation or any feasible combination.

- *Policy C-11e.* The County shall assess fees on new development to address the impact of additional development on the County's transportation system.

CITY OF REDDING LOS POLICY

The City of Redding *General Plan* Transportation Element Policy T1A is consistent with LOS standards stated within the City of Redding *Traffic Impact Assessment Guidelines* (January 2009) and is provided below:

- *Policy T1A.* Establish the following peak hour LOS standards for transportation planning and review:
    - Use LOS "C" – "acceptable delays" – for most arterial streets and their intersections.
    - Use LOS "D" – "tolerable delays" – for the Downtown area where vitality, activity, and pedestrian and transit use are primary goals.
    - Use LOS "D" – tolerable delays – for streets within the State Highway System and interchanges.
    - Use LOS "D" – tolerable delays – for river-crossing street corridors whose capacity is affected by adjacent intersections."

TRAFFIC SIGNAL WARRANTS

Traffic signals are used to provide an orderly flow of traffic through an intersection. Many times, they are needed to offer side street traffic an opportunity to access a major road where high volumes and/or high vehicle speeds impede crossing or turn movements. Signals do not, however, increase the capacity of an intersection. In fact, they often slightly reduce the number of total vehicles that can pass through an intersection in a given period of time. Signals can also cause an increase in traffic accidents if installed at inappropriate locations. The term "signal warrants" refers to the list of established criteria used by public agencies to quantitatively justify or ascertain the need for installation of a traffic signal at an unsignalized intersection. This study has employed the signal warrant criteria presented in the *2014 California Manual on Uniform Traffic Control Devices* (MUTCD) for all study intersections. The signal warrant criteria are based upon several factors, including the volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas.

The California MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. Specifically, the peak hour volume-based Warrant 3 used in this study serves as an early indicator of whether a study intersection would benefit from signalization. Additional traffic warrant analyses are recommended to determine the true feasibility of a signal improvement. The warrant analysis results are summarized in the level-of-service intersection operation tables in subsequent sections of this chapter.

5.16.4 EXISTING CONDITIONS

The following *Existing* condition analysis establishes the baseline traffic volumes under current conditions. The *Existing* condition is the analysis scenario in which current operations at study locations, assuming no project development, are analyzed.

EXISTING ROADWAY OPERATIONS

Table 5.16-6, EXISTING ROADWAY LEVEL OF SERVICE, contains a summary of the existing roadway segment LOS conditions. As shown in Table 5.16-6, all study segments are currently found to be operating better than the threshold LOS for *Existing* conditions.

Table 5.16-6
EXISTING ROADWAY LEVEL OF SERVICE

#	Roadway Segment	Capacity Configuration	Target LOS	Average Daily Traffic (ADT)	LOS
1	Old Alturas Road (west of Deschutes Road)	Two Lane Collector	E	1,046	A
2	Old Alturas Road (north of Boyle Road)	Two Lane Collector	E	1,750	A
3	Old Alturas Road (east of Shasta View Drive)	Two Lane Collector	C	5,982	A
4	Old Alturas Road (between Old Oregon Trail & Boyle Road)	Two Lane Arterial	E	4,197	A
5	Boyle Road (west of Deschutes Road)	Two Lane Collector	E	1,456	A
6	Shasta View Drive (north of Tarmac Road)	Three Lane Arterial	C	11,952	B
7	Old Oregon Trail (north of Old 44 Drive)	Two Lane Collector	E	8,031	C
8	Deschutes Road (north of Old 44 Drive)	Two Lane Collector	E	8,495	C

Source: Omni-Means Engineering Solutions. *Tierra Robles Traffic Impact Study*. May 2015.

EXISTING INTERSECTION OPERATIONS

Existing weekday AM and weekday PM peak hour intersection traffic operations were quantified utilizing the existing intersection lane geometrics and control (Figure 5.16-1) and the existing intersection traffic volumes (Figure 5.16-2). Table 5.16-7, EXISTING INTERSECTION LEVEL OF SERVICE, contains a summary of the *Existing* study intersection LOS conditions.

Table 5.16-7
EXISTING INTERSECTION LEVEL OF SERVICE

#	Intersection	Control Type	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?	Delay	LOS	Warrant Met?
1	Deschutes Road & SR-299	Signal	C	8.9	A	-	16.6	B	-
2	Deschutes Road & Old Alturas Road	TWSC	E	15.0	B	-	11.8	B	-
3	Old Alturas Road & Seven Lakes Road	TWSC	E	8.4	A	-	3.2	A	-
4	Old Alturas Road & Shasta View Drive	RDB	C	5.1	A	-	4.9	A	-
5	Shasta View Drive & Tarmac Road	Signal	C	15.9	B	-	13.6	B	-
6	Shasta View Drive & SR-44 WB Ramps	TWSC	C	22.4	C	-	21.3	C	-
7	Shasta View Drive and SR-44 EB Ramps	Signal	C	16.8	B	-	14.2	B	-
8	Old Alturas Road & Old Oregon Trail	AWSC	E	15.5	C	-	11.6	B	-
9	Old Oregon Trail & Old 44 Drive	Signal	C	20.7	C	-	18.0	B	-
10	**Airport Road & SR-44 WB Ramps**	**TWSC**	**C**	**28.7**	**D**	**No**	**68.6**	**F**	**No**
11	Airport Road & SR-44 EB Ramps	Signal	C	11.4	B	-	11.2	B	-
12	Old Alturas Road & Boyle Road	TWSC	E	9.9	A	-	9.8	A	-
13	Boyle Road & Deschutes Road	TWSC	E	27.7	D	-	12.3	B	-
14	Deschutes Road & Old 44 Drive	AWSC	E	35.3	E	-	17.5	C	-
15	Deschutes Road & Cedro Lane	AWSC	E	47.2	E	-	20.3	C	-
16	Deschutes Road & SR-44 WB Ramps	TWSC	C	20.3	C	-	15.0	B	-
17	Deschutes Road & SR-44 EB Ramps	AWSC	C	15.2	C	-	13.8	B	-

Notes:
1. TWSC = Two Way Stop Control AWSC = All Way Stop Control OVR = >300 Seconds Delay RDB = Roundabout
2. LOS = Delay based on worst minor street approach for TWSC intersections.
3. Warrant = Based on California MUTCD Warrant 3.

Source: Omni-Means Engineering Solutions. *Tierra Robles Supplemental Traffic Impact Analysis Technical Memorandum*. August 2017.

As shown in Table 5.16-7 above, all study intersections except the following intersection listed below currently operate at or above the threshold LOS for both AM and PM peak hour periods under *Existing* conditions:

- *Airport Road & SR-44 WB Ramps (Intersection #10)*

5.16.5 TRIP GENERATION AND DISTRIBUTION

PROJECT TRIP GENERATION

Project trip generation was estimated utilizing trip generation rates contained in the Institute of Transportation Engineers (ITE) Publication *Trip Generation Manual (Ninth Edition)*. Single Family Detached Housing (ITE Code 210) has been used to estimate the trip generation for the proposed project. Table 5.16-8, PROJECT TRIP GENERATION, provides a summary of the land use and quantities (i.e., units) for the proposed project, along with corresponding ITE land use codes from which trip generation characteristics were established and analyzed.

Table 5.16-8
PROJECT TRIP GENERATION

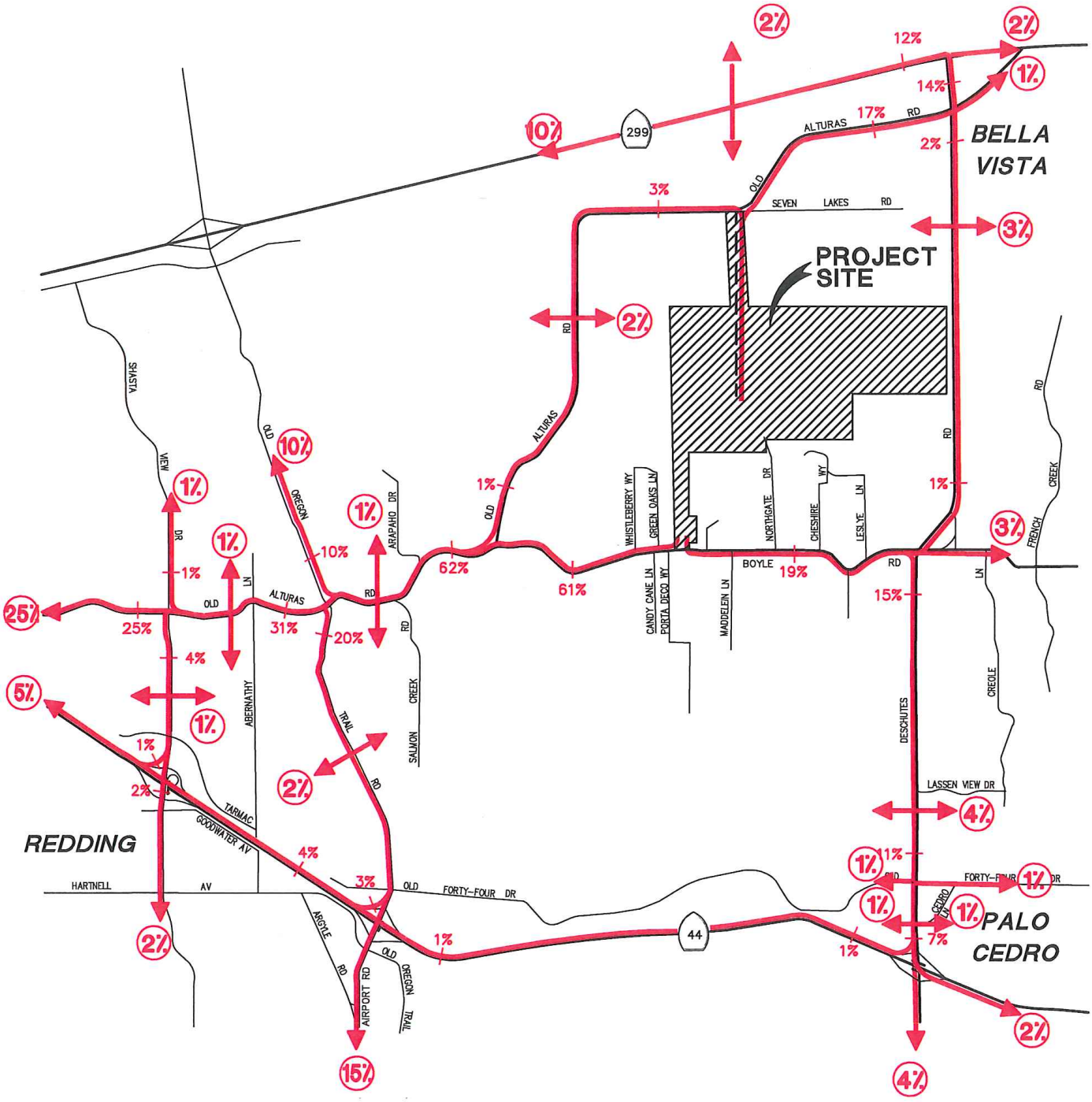
Land Use Category (ITE Code)	Unit	Daily Trip Rate / Unit	AM Peak Hour Trip Rate / Unit			PM Peak Hour Trip Rate / Unit		
			Total	In%	Out%	Total	In%	Out%
Single Family Detached Housing (210)	DU	10.09	0.76	25%	75%	1.00	63%	37%
Apartment (220)	DU	6.65	0.51	20%	80%	0.62	65%	35%
Tierra Robles Planned Development	**Quantity (Units)**	**Daily Trips**	**AM Peak Hour Trips**			**PM Peak Hour Trips**		
			Total	**In**	**Out**	**Total**	**In**	**Out**
Housing	166	1,674	126	31	94	166	104	61
Apartments	15	100	8	2	6	9	6	4
Replace with any reduction %	*0%*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Net New Project Trips		**1,774**	**134**	**33**	**101**	**175**	**110**	**65**

Source: Omni-Means Engineering Solutions. *Tierra Robles Supplemental Traffic Impact Analysis Technical Memorandum*. August 2017.

As shown in Table 5.16-8, it is estimated that the proposed project would generate approximately 1,774 new daily trips, with 135 vehicle trips generated during the AM peak hour and 175 vehicle trips generated during the PM peak hour period.

PROJECT TRIP DISTRIBUTION

The directional trip distribution and assignment of project-generated trips were estimated based on an understanding of existing and projected future traffic flows and travel patterns within the vicinity of the proposed project site, location of local and regional housing and employment/commercial centers in relation to the proposed project site, and supplemented by the use of the Shasta County Regional Travel Demand Forecast model. The directional trip distribution for the proposed project is graphically depicted in Figure 5.16-3, PROJECT TRIP DISTRIBUTION.



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Project Trip Distribution

Figure 5.16-3

5.16.6 REGULATORY SETTING

Traffic analysis in the State of California is guided by policies and standards set at the state level by the Caltrans and at the local level by local jurisdictions. The Shasta County *General Plan* Transportation Element provides the necessary framework to guide the growth and development of the county's transportation-related infrastructure. A discussion of the transportation-related state and local regulations, as well as objective and polices in the Shasta County *General Plan* that are pertinent to the transportation analysis for the project, are included below.

STATE

California Department of Transportation

Caltrans policies are applicable to SR-299 and SR-44, and are summarized in the *Guide for the Preparation of Traffic Impact Studies* (December 2002). These guidelines identify when a traffic impact study is required, what should be included in the study, analysis scenarios, and guidance on acceptable analysis methodologies. Caltrans endeavors to maintain a target service level of between LOS C and LOS D on State highway facilities; however, this may not always be feasible and a lower service level may be acceptable.

LOCAL

Shasta County General Plan

The Shasta County *General Plan* Circulation Element sets forth future plans for the transportation systems in the County. Transportation policies pertinent to this project are provided below.

- *Policy C-6a*. Future road and street development including future right-of-way shall comply with adopted County Development Standards.

- *Policy C*-6c. New residential lots less than five acres in size in urban and/or suburban residential areas shall avoid direct access to arterial and collectors. Where feasible, such lots shall be served by an internal street system. In all other cases, maximize intersection and driveway spacing on arterial and collector streets. Where feasible, utilize shared/common driveways.

- *Policy C-6g.* All new land division shall be provided with a legally accessible road.

- *Policy C-6h.* Development adjacent to arterial and collectors should be designed to minimize the noise impact received from traffic. The circulation system shall also be designed with consideration given to minimizing noise impacts on adjacent development.

- *Policy C-6j.* New development shall provide circulation improvements for emergency access by police, fire, and medical vehicles; and shall provide for escape by residents/occupants in accordance with Fire Safety Standards.

- *Policy C-6k.* Shasta County shall adopt the following LOS standards for considering any new roads:

- Rural arterial and collectors – LOS C
- Urban/Suburban arterials and collectors – LOS C

- *Policy C-6l.* New development which may result in exceeding LOS E on existing facilities shall demonstrate that all feasible methods of reducing travel demand have been attempted to reach LOS C. New development shall not be approved unless traffic impacts are adequately mitigated. Such mitigation may take the form of, but not limited to the following:

  - Provision of capacity improvements to the specific road link to be impacted, the transit system, or any reasonable combination.
  - Provision of demand reduction measures included as part of the project design or project operation or any feasible combination.

- *Policy C-9a.* All new roads serving new residentially-designated land divisions shall be paved to minimize air quality impacts and shall be implemented by application of the County Road Standards.

- *Policy C-11e.* The County shall assess fees on new development to address the impact of additional development on the County's transportation system.

Shasta County Regional Transportation Plan

The Shasta Regional Transportation Agency (SRTA) is the agency responsible for transportation planning for the Shasta County region, including the three cities and the unincorporated area. SRTA's responsibility includes development and adoption of transportation policy direction, review and coordination of transportation planning, preparation and endorsement of an *Overall Work Program* (OWP), a *Regional Transportation Plan* (RTP), a *Regional Transportation Improvement Plan* (RTIP), and a *Federal Transportation Improvement Plan* (FTIP).

City of Redding General Plan

The City of Redding *General Plan* Transportation Element integrates land use and transportation planning by ensuring that all existing and future developments have adequate circulation. Transportation goals and policies are discussed within the Transportation Element of the City's *General Plan*. As noted above in Section 5.16.3, METHODOLOGY AND GUIDELINES, *General Plan* Policy T1A established performance standards for acceptable LOS within the City's jurisdiction.

5.16.7 STANDARDS OF SIGNIFICANCE

LOS THRESHOLDS

Shasta County

For facilities in the unincorporated County (and not owned by Caltrans) following significance threshold is used:

Roadways

- An existing roadway segment that operates acceptable (LOS A through LOS E) without the project is degraded to an unacceptable LOS F due to the addition of the project traffic.

- A roadway segment that operates at unacceptable LOS F without the project experiences an increase in its daily volumes to capacity ratio (V/C) of 0.05 or greater due to the addition of the project traffic.

Intersections

- An existing intersection that operates acceptable (LOS A through LOS E) without the project is degraded to an unacceptable LOS F due to the addition of the project traffic.

- An existing intersection that operates at unacceptable LOS F without the project experiences an increase of 5.0 or more seconds of delay due to the addition of the project traffic.

City of Redding and Caltrans

For facilities within the corporate limits of the City of Redding or facilities owned by Caltrans, the following significance threshold is used:

Roadways

- An existing segment that operates acceptable (LOS A through LOS C) without the project is degraded to an unacceptable LOS D or worse due to the addition of the project traffic.

- A roadway segment that operates at unacceptable LOS D or worse without the project experiences an increase in its daily volumes to capacity ratio (V/C) of 0.05 or greater due to the addition of the project traffic.

Intersections

- An existing intersection that operates acceptable (LOS A through LOS C) without the project is degraded to an unacceptable LOS D or worse due to the addition of the project traffic.

- A roadway segment that operates at unacceptable LOS D or worse without the project experiences an increase of 5.0 or more seconds of delay due to the addition of the project traffic.

TIMING AND FUNDING FOR MITIGATION MEASURES

The extent to which offsite roadway improvements or transportation programs are needed to mitigate the impacts of the proposed project is described below. In some cases, the project applicant is expected to provide the full improvements needed. In other cases, where the contribution of project-generated traffic is minimal, it more appropriate for the project applicant to contribute a "fair-share" payment for the cost of the improvements.

Shasta County

The Shasta County Board of Supervisors approved the *Major Road Impact Fees Program* in June 1991, through *Resolution 91-115, A Resolution Establishing Major Road Impacts Fees for the South Central Regional Area*. The proposed project is subject to this fee program for roadway improvements within unincorporated Shasta County.

City of Redding

Consistent with the City of Redding *Traffic Impact Assessment Guidelines* (January 2009), the following mitigation guidelines are considered applicable transportation improvements within the City of Redding limits:

- *Impacts under Existing Plus Project Conditions.* It is the project's responsibility to install the project's recommended improvements at the time of development in order to mitigate impacts to a less than significant level. In the case of a subdivision, the number of units that can be constructed before triggering significant impacts will be determined.

- *Impacts under Cumulative Conditions.* If the project's fair share of a cumulative impact is 25 percent or more, then the recommended improvements shall be installed at the time of development, subject to a reimbursement agreement. If the project's fair share of a cumulative impact is less than 25 percent, then the project will be required to pay its fair share of the cost of the improvements to be constructed later by others, prior to the realization of the impact.

CEQA SIGNIFICANCE CRITERIA

In accordance with State *CEQA Guidelines*, the effects of a project are evaluated to determine whether they would result in a significant adverse impact on the environment. An EIR is required to focus on these effects and offer mitigation measures to reduce or avoid any significant impacts that are identified. The criteria used to determine the significance of impacts may vary depending on the nature of the project. According to Appendix G of the State *CEQA Guidelines*, the proposed project would have a significant impact related to traffic and circulation, if it would:

- *Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections).* Refer to Impact 5.16-1 and Impact 5.16-5 in Section 5.16.9, CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES, below.

- *Exceed, either individually or cumulatively, a level of service standard established by the County congestion management agency for designated roads or highway.* Refer to Impact 5.16-1 and Impact 5.16-5 in Section 5.16.9, CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES, below.

- *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).* Refer to Impact 5.16-2, below.

- *Result in inadequate emergency access.* Refer to Impact 5.16-3, below.

- *Result in inadequate parking capacity.* Refer to AREAS OF NO PROJECT IMPACT, below.

- *Conflict with adopted policies, plans or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks).* Refer to Impact 5.16-4, below.

- *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.* Refer to AREAS OF NO PROJECT IMPACT, below.

Based on these standards, the effects of the proposed project have been categorized as either a "*less than significant*" impact or a "*potentially significant*" impact. Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a "*significant and unavoidable*" impact.

AREAS OF NO PROJECT IMPACT

In October 2012 and February 2016, the County conducted an Initial Study to determine significant effects of the proposed project. In the course of this evaluation, certain impacts of the proposed project were found to not to be significant because of the inability of a project of this scope to create such impacts or the absence of project characteristics producing effects of this type. The effects determined not to be significant are not required to be included in primary analysis sections of the Draft EIR. As such, the following impacts either are not applicable to the proposed project or are not reasonably foreseeable and are not addressed further within this section (refer to Section 10.0, EFFECTS FOUND NOT TO BE SIGNIFICANT):

- *Result in inadequate parking capacity.*

- *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.*

5.16.8 POTENTIAL IMPACTS AND MITIGATION MEASURES

Traffic and circulation impacts are analyzed below according to topic. Mitigation measures directly correspond with an identified impact.

IMPACT 5.16-1	***Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections).***

Significance: Potentially Significant Impact.

Impact Analysis: Project trip generation is discussed in Section 5.16.5, TRIP GENERATION AND DISTRIBUTION, above. As shown previously in Table 5.16-8, it is estimated that the proposed project will generate approximately 125 AM peak hour trips and 164 PM peak hour trips. *Existing Plus Project* conditions were simulated by superimposing traffic generated by the proposed project onto *Existing* conditions intersection and roadway traffic volumes.

Existing Plus Project Roadway Operations

The *Existing Plus Project* daily traffic operations along roadway segments were analyzed by evaluating Existing Plus Project ADT volumes to the ADT-based LOS thresholds (refer to Table 5.16-6, above) that corresponds to the roadway type assumed for *Existing* conditions. Table 5.16-9, EXISTING PLUS PROJECT ROADWAY LEVEL OF SERVICE, contains a summary of the resulting *Existing Plus Project* roadway segment LOS conditions. As shown in Table 5.16-9, all roadway segments are project to operate at acceptable level of service, in *Existing Plus Project* conditions. Impacts would be *less than significant* in this regard.

Table 5.16-9
EXISTING PLUS PROJECT ROADWAY LEVEL OF SERVICE

#	Roadway Segment	Capacity Configuration	Target LOS	Average Daily Traffic (ADT)	LOS
1	Old Alturas Road (west of Deschutes Road)	Two Lane Collector	E	1,348	A
2	Old Alturas Road (north of Boyle Road)	Two Lane Collector	E	1,803	A
3	Old Alturas Road (east of Shasta View Drive)	Two Lane Collector	C	6,532	B
4	Old Alturas Road (between Old Oregon Trail & Boyle Road)	Two Lane Arterial	E	5,297	A
5	Boyle Road (west of Deschutes Road)	Two Lane Collector	E	1,793	A
6	Shasta View Drive (north of Tarmac Road)	Three Lane Arterial	C	12,023	B
7	Old Oregon Trail (north of Old 44 Drive)	Two Lane Collector	E	8,386	C
8	Deschutes Road (north of Old 44 Drive)	Two Lane Collector	E	8,761	C

Source: Omni-Means Engineering Solutions. *Tierra Robles Supplemental Traffic Impact Analysis Technical Memorandum*. August 2017.

Existing Plus Project Intersection Operations

Existing Plus Project AM peak hour and PM peak hour intersection traffic operations were quantified utilizing the *Existing Plus Project* traffic volumes (refer to Figure 5.16-4, EXISTING PLUS PROJECT INTERSECTION TRAFFIC VOLUMES, and Figure 5.16-5, EXISTING PLUS PROJECT INTERSECTION LANE GEOMETRICS AND CONTROLS). Table 5.16-10, EXISTING PLUS PROJECT LEVEL OF SERVICE**,** contains a summary of the *Existing Plus Project* study intersection LOS conditions.

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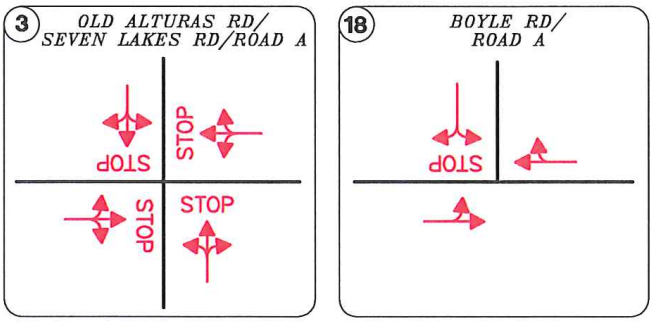
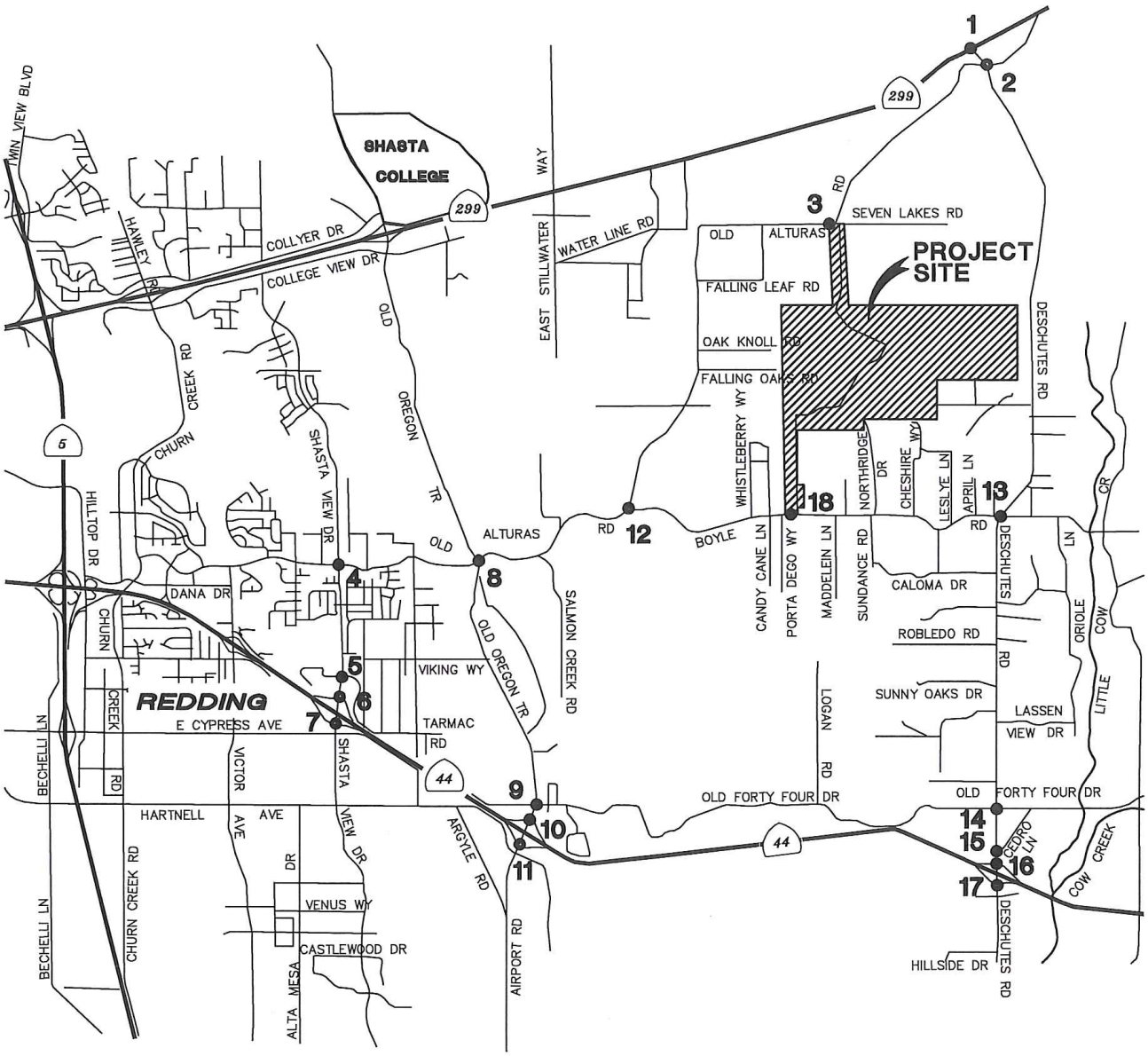
Existing Plus Project Intersection Traffic Volumes

Figure 5.16-4



LEGEND:

INTERSECTION 3 CONFIGURATION FOR ANALYSIS PURPOSES ONLY



NOTE: All other intersections will have same lane geometrics and control as shown in Figure 5.6-1

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Existing Plus Project Intersection Lane Geometrics and Controls

Figure 5.16-5

Table 5.16-10
EXISTING PLUS PROJECT INTERSECTION LEVEL OF SERVICE

#	Intersection	Control Type	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?	Delay	LOS	Warrant Met?
1	Deschutes Road & SR-299	Signal	C	18.5	B	-	20.8	C	-
2	Deschutes Road & Old Alturas Road	TWSC	E	16.7	C	-	12.5	B	-
3	Old Alturas Road & Seven Lakes Road	TWSC	E	7.0	A	-	7.1	A	-
4	Old Alturas Road & Shasta View Drive	RDB	C	5.3	A	-	5.0	A	-
5	Shasta View Drive & Tarmac Road	Signal	C	15.9	B	-	15.1	B	-
6	Shasta View Drive & SR-44 WB Ramps	TWSC	C	22.6	C	-	24.1	C	-
7	Shasta View Drive and SR-44 EB Ramps	Signal	C	16.8	B	-	17.1	B	-
8	Old Alturas Road & Old Oregon Trail	AWSC	E	18.8	C	-	17.1	C	-
9	Old Oregon Trail & Old 44 Drive	Signal	C	20.9	C	-	21.7	C	-
10	**Airport Road & SR-44 WB Ramps**	**TWSC**	**C**	**29.7**	**D**	**No**	**88.1**	**F**	**Yes**
11	Airport Road & SR-44 EB Ramps	Signal	C	11.4	B	-	12.3	B	-
12	Old Alturas Road & Boyle Road	TWSC	E	10.5	B	-	10.1	B	-
13	Boyle Road & Deschutes Road	TWSC	E	31.3	D	-	15.4	C	-
14	Deschutes Road & Old 44 Drive	AWSC	E	37.1	E	-	22.6	C	-
15	Deschutes Road & Cedro Lane	AWSC	E	49.0	E	-	27.5	D	-
16	Deschutes Road & SR-44 WB Ramps	TWSC	C	20.5	C	-	15.5	C	-
17	Deschutes Road & SR-44 EB Ramps	AWSC	C	15.4	C	-	14.4	B	-
18	Boyle Road & Tierra Robles Parkway	TWSC	C	9.5	A	-	8.5	A	-

Notes:
TWSC = Two Way Stop Control AWSC = All Way Stop Control OVR = >300 Seconds Delay RDB = Roundabout
LOS = Delay based on worst minor street approach for TWSC intersections.
Warrant = Based on California MUTCD Warrant 3.
Source: Omni-Means Engineering Solutions. *Tierra Robles Supplemental Traffic Impact Analysis Technical Memorandum*. August 2017.

As shown in Table 5.16-10, above, all study intersections, except the following are projected to operate at or above the threshold LOS during the AM and PM peak hour:

- *Airport Road & SR-44 WB Ramps (Intersection #10)*

Table 5.16-11, EXISTING PLUS PROJECT SIGNIFICANT IMPACTS, presents the intersections projected to operate at unacceptable levels of service under the *Existing Plus Project* conditions and those intersections that warrant mitigation.

Table 5.16-11
EXISTING PLUS PROJECT SIGNIFICANT IMPACTS

AM Peak Hour									
#	Intersection	Control Type	Target LOS	Existing LOS	Existing Plus Project LOS	Existing Delay (D1)	Existing Plus Project Delay (D2)	D2-D1	Significant Impact?
10	Airport Road & SR-44 WB Ramps	TWSC	C	D	D	28.7	29.7	1	No
PM Peak Hour									
#	Intersection	Control Type	Target LOS	Existing LOS	Existing Plus Project LOS	Existing Delay (D1)	Existing Plus Project Delay (D2)	D2-D1	Significant Impact?
10	Airport Road & SR-44 WB Ramps	TWSC	C	**F**	**F**	68.6	88.1	19.5	**Yes**

Notes:
TWSC = Two Way Stop Control AWSC = All Way Stop Control OVR = >300 Seconds Delay RDB = Roundabout
LOS = Delay based on worst minor street approach for TWSC intersections.
Source: Omni-Means Engineering Solutions. *Tierra Robles Supplemental Traffic Impact Analysis Technical Memorandum*. August 2017.

- *Airport Road & SR-44 WB Ramps (Intersection #10).* This un-signalized intersection (within the City of Redding) is projected to operate at LOS D during the AM peak hour and LOS F during the PM peak hour with implementation of the proposed project. Although this intersection operates at an unacceptable LOS F in the *No Project* condition, the proposed project creates a significant impact by causing the delay to increase by more than 5 seconds per vehicle. This intersection meets the peak hour signal warrant under *Existing Plus Project* PM peak hour conditions. Construction of intersection improvements and a traffic signal or a modern roundabout (refer to **MM 5.16-1**) would reduce the impact at this intersection to a *less than significant* level (LOS B and A, respectively) for *Existing Plus Project* conditions (refer to Table 5.16-12, MITIGATED EXISTING PLUS PROJECT INTERSECTION LEVEL OF SERVICE, below). The improvement at this intersection was planned and funded, but not built in 2008.

Table 5.16-12
MITIGATED EXISTING PLUS PROJECT INTERSECTION LEVEL OF SERVICE

#	Intersection	Control Type	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
10	Airport Road & SR-44 WB Ramps	Signal	C	10.2	B	19.6	B
10	Airport Road & SR-44 WB Ramps	RDB	C	3.5	A	4.3	A

Notes:
TWSC = Two Way Stop Control AWSC = All Way Stop Control OVR = >300 Seconds Delay RDB = Roundabout
LOS = Delay based on worst minor street approach for TWSC intersections.
Warrant = Based on California MUTCD Warrant 3.
Source: Omni-Means Engineering Solutions. *Tierra Robles Supplemental Traffic Impact Analysis Technical Memorandum*. August 2017.

Overall implementation of **MM 5.16-1** would reduce *Existing Plus Project* intersection impacts to a *less than significant* level. It should be noted that implementation of **MM 5.16-1** would also serve to mitigate *Year 2035 Plus Project* conditions at *Airport Road & SR-44 WB Ramps (Intersection #10)* (refer to Impact 5.16-5, below). No additional mitigation measures are required for the *Existing Plus Project* or *Year 2035 Plus Project* conditions for this intersection.

Mitigation Measures:

MM 5.16-1: In accordance with the City of Redding *Traffic Impact Analysis Guidelines* (January 2009), the project applicant shall construct the following improvements in the corporate limits of the City of Redding prior to issuance of a building permit that would allow construction of the first residence:

- *Airport Road & SR-44 WB Ramps (Intersection #10).* Construct traffic signal or a single/multi-lane roundabout. Traffic signal construction at this location shall also be coordinated with existing traffic signals at *Old Oregon Trail & Old 44 Drive (Intersection #9)* and *Airport Road & SR-44 EB Ramps (Intersection #11)*.

Level of Significance After Mitigation: Impacts would be *less than significant* with mitigation incorporated.

IMPACT 5.16-2 ***Project implementation could increase hazards due to a design feature (e.g., sharp curves or dangerous intersections).***

Significance: Potentially Significant Impact.

Impact Analysis: As indicated on the Figure 3-6, PROPOSED SITE LAYOUT, in Section 3.0, PROJECT DESCRIPTION, onsite access would be facilitated via a new road extension (Chatham Ranch Drive) from Old Alturas Road, south to the project site. Chatham Ranch Drive is proposed to connect to Old Alturas Road approximately 187 feet west from the existing intersection of Seven Lakes Road and Old Alturas Road.

The volume of traffic on Seven Lakes Road is projected to be approximately 30 AM peak hour trips and 70 PM peak hour trips under 2035 conditions. Given the low traffic forecasts on Seven Lakes Road and approximately 17 AM and 23 PM peak hour project trips on Chatham Ranch Drive, it is expected that the Seven Lakes Road/Chatham Ranch Drive intersection would operate at acceptable LOS with the addition of project trips and be controlled through implementation of a four-way stop controlled intersection. In addition, the section of Seven Lakes Road from the intersection with Chatham Ranch Drive to the existing intersection of Old Alturas would be widened to a Local Rural Street section. As a result of these improvements implemented as part of the proposed project, potential impacts associated with construction of this new intersection would be *less than significant*.

Safety Performance

As previously discussed above in Section 5.16.1, ENVIRONMENTAL SETTING, an offsite pedestrian, bicycle, and motorized vehicle safety review was conducted on Old Alturas Road, Boyle Road, and Deschutes Road in the immediate project vicinity, based on historical collision data and a field review. Based on the five-year SWITRS data, 41 collisions have occurred along Old Alturas Road, 7 collisions have occurred along Boyle Road, and 101 collisions have occurred along Deschutes Road. The type of collisions included broadsides, head-on, and vehicles versus object. Tables 5.16-1, COLLISIONS BY YEAR, and 5.16-2, COLLISIONS BY TYPE, above, illustrate the number type of collisions for each roadway segment evaluated.

- *Old Alturas Road (Deschutes Road to Seven Lakes Road).* The section of Old Alturas Road between Deschutes Road to Seven Lakes Road is curvilinear and narrow with roadside obstructions. This section of rural roadway has a collision rate 33 percent higher than the statewide average for similar facilities.

  It is estimated that 17 percent of the project traffic will use this section of roadway which will increase the ADT by 27 percent in the *Existing Plus Project* conditions and by 23 percent in the *Year 2035 Plus Project* conditions. The increase in traffic, in combination with the overall very low traffic volumes and LOS A conditions, is not expected to significantly increase the rate of collisions. *Less than significant* impacts would occur in this regard. No mitigation measures are required.

- *Old Alturas Road (Boyle Road to Old Oregon Trail).* The section of Old Alturas Road between Boyle Road and Old Oregon Trail is a modern roadway with good alignment, lane widths, shoulders and roadside conditions. The collision rate is 9 percent higher than the statewide average for similar facilities.

  It is estimated that 61 percent to 62 percent of the project traffic will use this section of roadway which will increase the ADT by 24 percent in the *Existing Plus Project* conditions and by 22 percent in the *Year 2035 Plus Project* conditions. A collision rate 9 percent higher than the statewide average for similar facilities is not statistically significant and is considered to be within a normal and expected range. The increase in traffic, in combination with the LOS A conditions and the

modern roadway, is not expected to significantly increase the rate of collisions. *Less than significant* impacts would occur in this regard. No mitigation measures are required.

- *Deschutes Road (Boyle Road to SR-44).* The section of Deschutes Road between Boyle Road and SR-44 maintains sufficient horizontal alignment, vertical alignment and sight distances. However, the shoulders are narrow, the roadside environment has numerous obstructions and there are numerous driveways and low-volume road connections. The collision rate is 38 percent higher than the statewide average for similar roadway facilities.

  Approximately 85 percent of the collisions occurred during daylight conditions and 56% were rear-end collisions. The combination of unsafe speed and the congested roadside with numerous driveways and minor road connections results in a high number of rear-end collisions. Just south of Boyle Road, it is estimated that 15 percent of the project traffic will use this section of roadway which will increase the ADT by 5 percent in both the *Existing Plus Project* and *Year 2035 Plus Project* conditions. Immediately north of SR-44, it is estimated that 7 percent of the project traffic will use this section of roadway which will increase the ADT by 1 percent in both the *Existing Plus Project* and *Year 2035 Plus Project* conditions. The installation of intersection warning signs at various locations along Deschutes Road between Boyle Road and SR-44 would serve to notify drivers of upcoming driveways. Implementation of **MM 5.16-2** would reduce impacts for both *Existing*, *Existing Plus Project,* and *Year 2035 Plus Project* conditions to *less than significant* levels.

Mitigation Measures:

MM 5.16-2: Prior to issuance of a building permit that would allow construction of the first residence, the project applicant shall install the following intersection warning signs to the satisfaction of the Shasta County Public Works Department:

- Install Caltrans standard W2 intersection warning signs with W16-8P advance street name plaques at Lassen View Drive, Beryl Drive, Sunny Oaks Drive, Wesley Drive, Robledo Road, Oak Meadow Road, Oak Tree Lane, and Coloma Drive.

Level of Significance After Mitigation: Impacts would be *less than significant* with mitigation incorporated.

IMPACT 5.16-3	***Implementation of the proposed project may result in inadequate emergency access.***

Significance: Less Than Significant Impact.

Impact Analysis: The following provides an assessment of short-term construction and long-term traffic impacts related to emergency access.

Short-Term Construction

Some traffic delays can be expected during project construction; however, the traffic impacts during construction are temporary in nature and will cease upon completion of construction activities. A Traffic Management Plan (TMP) is required to be developed by the project applicant and approved by the Shasta

County Public Works Department prior to the initiation of any construction activities to minimize disruption to existing traffic flow conditions. The TMP addresses details regarding road closures, provisions to maintain access to any adjacent properties, prior notices, adequate sign-posting, detours (including for bicyclists), and permitted hours of construction activity as determined appropriate by the County. Adequate local and emergency access to adjacent uses is required to be provided at all times. The TMP shall be reviewed and approved by the County Sheriff, Shasta Fire Department, and other emergency service providers so that construction does not interfere with any emergency response or evacuation plans. Short-term impacts would be *less than significant* in this regard.

Long-Term Operation

Primary access to and from the proposed project would be from Boyle Road at the southern end of the project site, with a north-south oriented internal arterial roadway (Tierra Robles Parkway) that connects with Old Alturas Road (via Chatham Ranch Drive) at the north end of the project site. Tierra Robles Parkway would be constructed to run northerly from Boyle Road beginning approximately 1.25 miles east of the intersection of Boyle Road and Old Alturas Road. Tierra Robles Parkway turns into Chatham Ranch Drive approximately mid-way through the subdivision. This new road would be located within an 84-foot wide right-of-way which would traverse the proposed project site, and ultimately tie into Seven Lakes Road, adjacent to its intersection with Old Alturas Road. Approximately ½ mile of Chatham Ranch Drive, from its intersection at Old Alturas Road south to the subdivision, would be constructed offsite within a previously dedicated roadway easement. The internal street network consists of approximately 15 roadway segments and would be designed and constructed to meet applicable County street standards.

A series of internally looped roads with right-of-way ranging between 50 feet to 60 feet in width would be connected to Tierra Robles Parkway which would provide access to the internal lots of the proposed project. The southerly terminus of Tierra Robles Lane is located at the northerly terminus of Northgate Drive. The proposed connection with Northgate Road would be gated per County fire standards and used for reciprocal emergency access only. Potential long-term impacts related to emergency access would *be less than significant*.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: No mitigation measures are required. Impacts would be *less than significant*.

IMPACT 5.16-4	***Implementation of the proposed project would not conflict with adopted policies, plans or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks).***

Significance: Less Than Significant Impact.

Impact Analysis: The proposed project includes a total of 6 miles of shared bike/pedestrian trails with minimal road crossings. This includes a paved 4-foot bike path and a 4-foot paved shoulder adjacent to the travel way. The proposed project would connect the Boyle Road neighborhood with the Old Alturas Road/Seven Lakes Road neighborhood, a distance of approximately 2 miles.

The Shasta County *2010 Bicycle Transportation Plan* identifies a Class II bike lanes along Deschutes Road and Old Alturas Road. The County's *Major Road Impact Fee Program* identifies the following improvements to be constructed when the individual improvements become a priority:

- *Boyle Road.* Add shoulders and some realignment from Old Alturas Road to Deschutes Road.
- *Old Alturas Road.* Realign and add shoulders from north of Boyle Road to State Route 299 East.
- *Deschutes Road.* Widen and add two-way left turn pockets and shoulders from Berkeley Drive to Boyle Road; install signal at Rhonda Road.

The following discussion evaluates the proposed project's impact on pedestrian, bicycle, and transit operations within the immediate vicinity of the site.

Pedestrian Facilities

County roadways including Old Alturas Road, Boyle Road and Deschutes Road in the immediate project vicinity do not have existing pedestrian facilities. The pedestrian activities are anticipated to be very light on the above-mentioned roadways due to the lack of commercial and employment centers in the immediate project vicinity and the distances to area schools are more than 2 miles. Shasta County collects fees through its *Major Road Impact Fee Program* at the time of development and are used to implement local roadway improvements as necessary throughout the County. Improvements noted above and implemented by the County for Boyle Road, Old Alturas Road, and Deschutes Road would include shoulder improvements that would serve to enhance existing and future pedestrian movement within the area. *Less than significant* impacts would occur.

Bicycle Facilities

County roadways including Old Alturas Road, Boyle Road and Deschutes Road in the immediate project vicinity do not have existing bicycle facilities. As previously mentioned above, the Shasta County *2010 Bicycle Transportation Plan* shows that Class II bike lanes are proposed on Deschutes Road and Old Alturas Road within unincorporated Shasta County.

The bicycle activities in the project area are anticipated to be light on the above-mentioned roadways due to the lack of commercial and employment centers in the immediate project vicinity and the distances to area schools are more than 2 miles. Shasta County collects fees through its *Major Road Impact Fee Program* at the time of development and are used to implement local roadway improvements as necessary throughout the County. Improvements noted above and implemented by the County for Boyle Road, Old Alturas Road, and Deschutes Road would include shoulder improvements that would serve to enhance existing and future bicycle movement within the area. *Less than significant* impacts would occur.

Transit Facilities

Existing transit service is provided primarily by the Redding Area Bus Authority (RABA). RABA provides fixed route service, express route service and demand response service to the general public within the urbanized area of Shasta County. RABA operates 14 fixed routes within the cities of Redding, Shasta Lake, and Anderson, none of which operate in the immediate vicinity of the project site. The nearest RABA bus stop is located approximately 3 miles west of the project site at the intersection of Old Alturas Road and Shasta View Drive.

Development of the proposed project could increase the need for transit services to serve the South-Central Region. However, development of this project alone would not result in an increase in demand that would create a significant impact that would necessitate changing current transit operation. Considering the type of development, a semi-rural single-family residential development, the number of potential new transit riders would be relatively small.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: No mitigation measures are required. Impacts would be *less than significant*.

5.16.9 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

IMPACT 5.16-5	***Implementation of the proposed project could result in increased traffic volumes at study area intersections under Year 2035 cumulative plus project conditions.***

Significance: Potentially Significant Impact.

Cumulative Setting: The cumulative setting for traffic and circulation consists of traffic generated by all existing and future (cumulative) development in the project area. For the purposes of this analysis, the planning horizon for future traffic condition considers cumulative conditions in the Year 2035. *Year 2035* conditions were developed using the current SCRTDF Model. *Year 2035 Plus Project* conditions were subsequently developed by superimposing the proposed project-generated traffic on top of the *Year 2035* base traffic volumes.

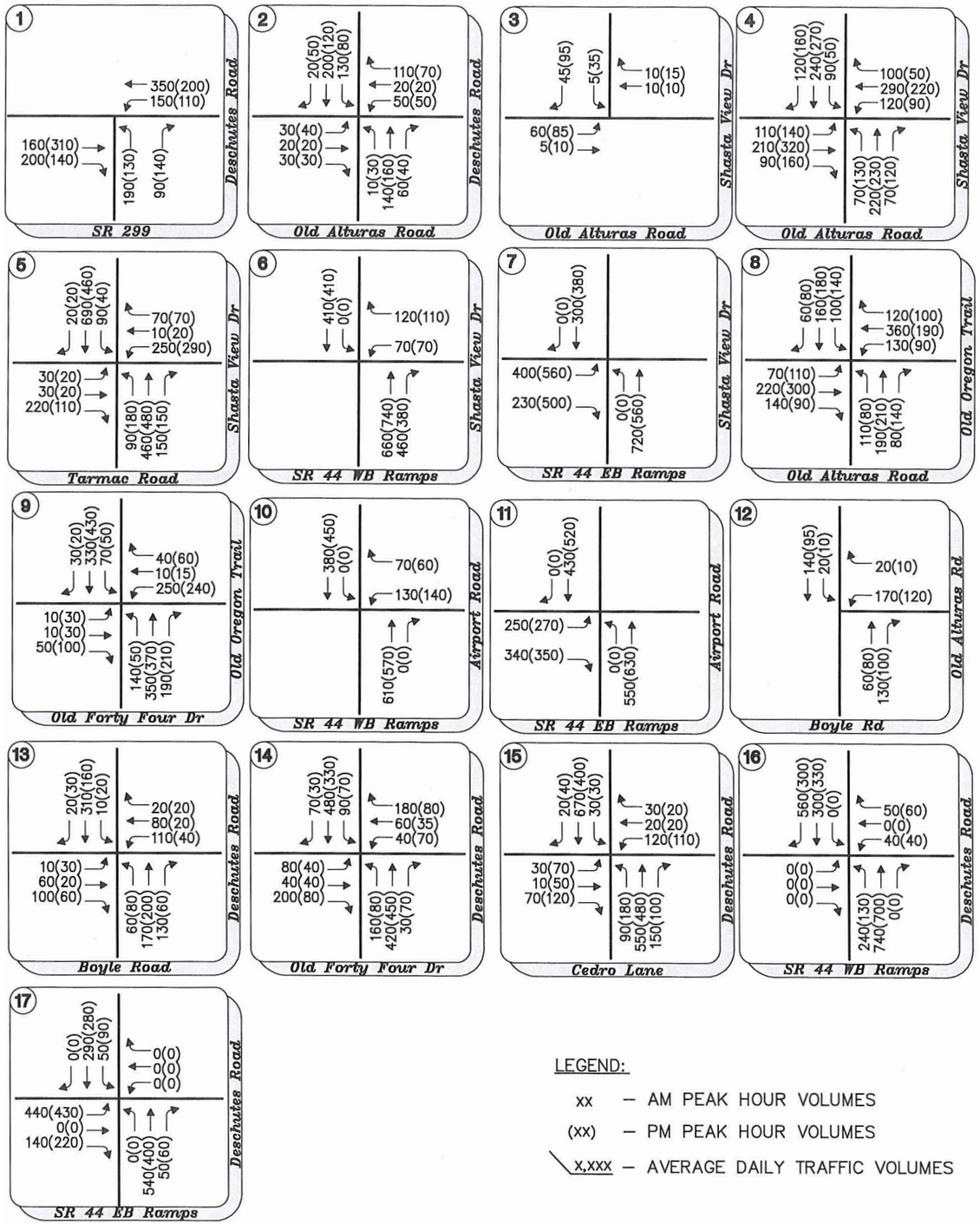
Impact Analysis: *Year 2035* conditions refer to future long-term condition where buildout of all remaining vacant *General Plan* land uses are developed, even though this is highly unlikely given the projected rate of growth, along with supporting circulation system improvements. *Year 2035 No Project* conditions refers to a cumulative *No Project* condition scenario in which all remaining vacant *General Plan* land uses are developed, also highly unlikely, except for the proposed project.

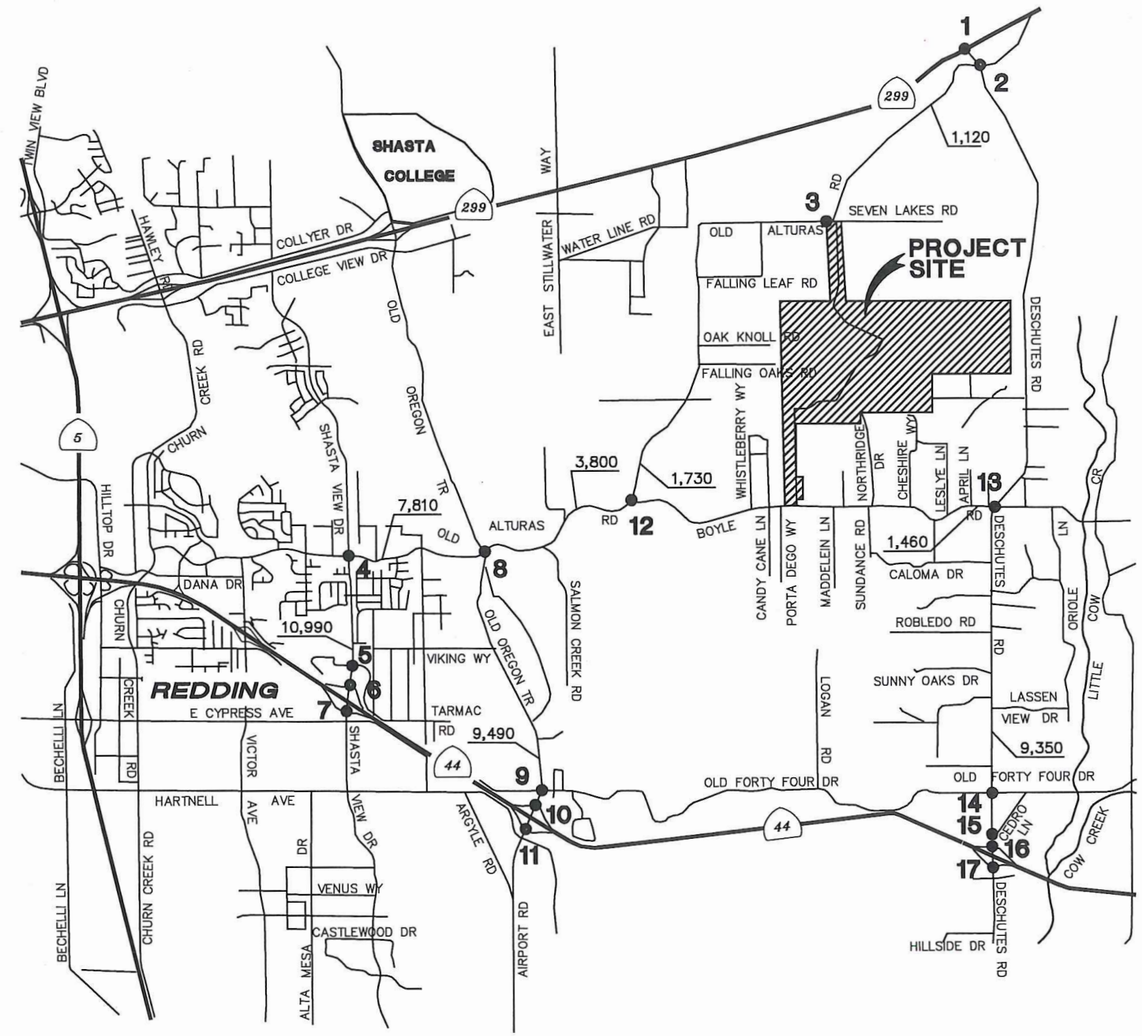
Year 2035 No Project

The *Year 2035 No Project* condition is the analysis scenario in which future operations at study locations, assuming no project development, are analyzed. *Year 2035 No Project* condition intersection traffic volumes are illustrated in Figure 5.16-6, YEAR 2035 NO PROJECT INTERSECTION TRAFFIC VOLUMES.

Year 2035 No Project Roadway Operations

Table 5.16-13, YEAR 2035 NO PROJECT ROADWAY LEVEL OF SERVICE, contains a summary of the *Year 2035 No Project* roadway segment ADT volumes compared to the ADT-based LOS thresholds that corresponds to the roadway type assumed for the *Existing* conditions. As shown in Table 5.16-13, the study roadway segments are projected to operate at acceptable LOS under *Year 2035 No Project* conditions.





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Year 2035 No Project Intersection Traffic Volumes

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Figure 5.16-6

Table 5.16-13
YEAR 2035 NO PROJECT ROADWAY LEVEL OF SERVICE

#	Roadway Segment	Capacity Configuration	Target LOS	Average Daily Traffic (ADT)	Year 2035 No Project ADT	LOS
1	Old Alturas Road (west of Deschutes Road)	Two Lane Collector	E	1,046	1,250	A
2	Old Alturas Road (north of Boyle Road)	Two Lane Collector	E	1,750	1,950	A
3	Old Alturas Road (east of Shasta View Drive)	Two Lane Collector	C	5,982	8,390	C
4	Old Alturas Road (between Old Oregon Trail & Boyle Road)	Two Lane Arterial	E	4,197	4,600	A
5	Boyle Road (west of Deschutes Road)	Two Lane Collector	E	1,456	1,510	A
6	Shasta View Drive (north of Tarmac Road)	Three Lane Arterial	C	11,952	12,060	B
7	Old Oregon Trail (north of Old 44 Drive)	Two Lane Collector	E	8,031	10,840	E
8	Deschutes Road (north of Old 44 Drive)	Two Lane Collector	E	8,495	9,800	C

Source: Omni-Means Engineering Solutions. *Tierra Robles Traffic Impact Study*. May 2015.

Year 2035 No Project Intersection Operations

Table 5.16-14, YEAR 2035 NO PROJECT INTERSECTION LEVEL OF SERVICE, contains a summary of the *Year 2035 No Project* study intersection LOS conditions.

Table 5.16-14
YEAR 2035 NO PROJECT INTERSECTION LEVEL OF SERVICE

#	Intersection	Control Type	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?	Delay	LOS	Warrant Met?
1	Deschutes Road & SR-299	Signal	C	19.2	B	-	16.8	B	-
2	Deschutes Road & Old Alturas Road	TWSC	E	19.5	C	-	16.1	C	-
3	Old Alturas Road & Seven Lakes Road	TWSC	E	8.5	A	-	8.5	A	-
4	Old Alturas Road & Shasta View Drive	RDB	C	8.3	A	-	26.4	C	-
5	Shasta View Drive & Tarmac Road	Signal	C	20.8	C	-	8.7	A	-
6	**Shasta View Drive & SR-44 WB Ramps**	**TWSC**	**C**	24.6	C	-	**28.5**	**D**	**Yes**
7	Shasta View Drive and SR-44 EB Ramps	Signal	C	16.5	B	-	15.9	B	-
8	**Old Alturas Road & Old Oregon Trail**	**AWSC**	**E**	**180.2**	**F**	**Yes**	**137.2**	**F**	**Yes**
9	Old Oregon Trail & Old 44 Drive	Signal	C	26.5	C	-	26.9	C	-
10	**Airport Road & SR-44 WB Ramps**	**TWSC**	**C**	**104.0**	**F**	**Yes**	**OVR**	**F**	**Yes**
11	Airport Road & SR-44 EB Ramps	Signal	C	16.0	B	-	18.0	B	-
12	Old Alturas Road & Boyle Road	TWSC	E	11.7	B	-	10.6	B	-
13	**Boyle Road & Deschutes Road**	**TWSC**	**E**	**64.2**	**F**	**No**	17.7	C	-
14	**Deschutes Road & Old 44 Drive**	**AWSC**	**E**	**56.2**	**F**	**Yes**	39.5	E	-
15	**Deschutes Road & Cedro Lane**	**AWSC**	**E**	**96.4**	**F**	**Yes**	**56.4**	**F**	**Yes**
16	**Deschutes Road & SR-44 WB Ramps**	**TWSC**	**C**	**53.2**	**F**	**No**	**26.5**	**D**	**No**
17	Deschutes Road & SR-44 EB Ramps	AWSC	C	22.6	C	-	18.9	C	-

Notes:
TWSC = Two Way Stop Control AWSC = All Way Stop Control OVR = >300 Seconds Delay RDB = Roundabout
LOS = Delay based on worst minor street approach for TWSC intersections.
Warrant = Based on California MUTCD Warrant 3.
Source: Omni-Means Engineering Solutions. *Tierra Robles Supplemental Traffic Impact Analysis Technical Memorandum*. August 2017.

As shown in Table 5.16-14, the following study intersections are projected to operate at an unacceptable LOS during the AM and/or PM peak hour:

- *Shasta View Drive & SR-44 WB Ramps (Intersection #6)*
- *Old Alturas Road & Old Oregon Trail (Intersection #8)*
- *Airport Road & SR-44 WB Ramps (Intersection #10)*
- *Boyle Road & Deschutes Road (Intersection #13)*
- *Deschutes Road & Old 44 Drive (Intersection #14)*

- *Deschutes Road & Cedro Land (Intersection #15)*
- *Deschutes Road & SR-44 WB Ramps (Intersection #16)*

Year 2035 Plus Project

The *Year 2035 Plus Project* conditions is the analysis scenario in which traffic impacts associated with the project are comparison to the *Year 2035 No Project* condition scenario. *Year 2035 Plus Project* condition intersection traffic volumes are illustrated in Figure 5.16-7, YEAR 2035 PLUS PROJECT INTERSECTION TRAFFIC VOLUMES.

Year 2035 Plus Project Roadway Operations

Table 5.16-15, YEAR 2035 PLUS PROJECT ROADWAY LEVEL OF SERVICE, contains a summary of the *Year 2035 Plus Project* roadway segment ADT volumes compared to the ADT-based LOS thresholds that corresponds to the roadway type assumed for the *Existing* conditions. As shown in Table 5.16-15, the study roadway segments are projected to operate at acceptable LOS under *Year 2035 Plus Project* conditions.

Table 5.16-15
YEAR 2035 PLUS PROJECT ROADWAY LEVEL OF SERVICE

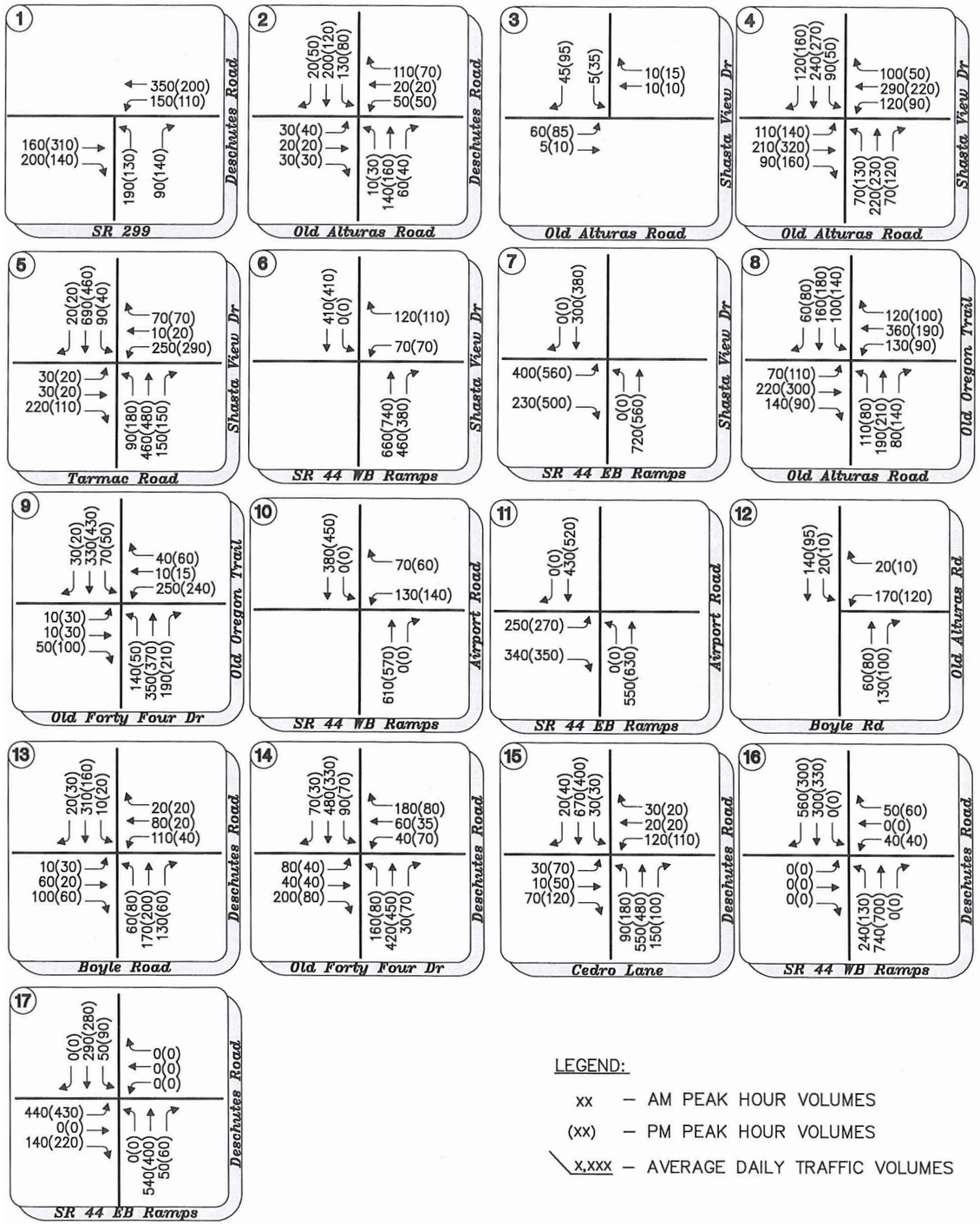
#	Roadway Segment	Capacity Configuration	Target LOS	Year 2035 Plus Project ADT	LOS
1	Old Alturas Road (west of Deschutes Road)	Two Lane Collector	E	1,552	A
2	Old Alturas Road (north of Boyle Road)	Two Lane Collector	E	2,003	A
3	Old Alturas Road (east of Shasta View Drive)	Two Lane Collector	C	8,940	C
4	Old Alturas Road (between Old Oregon Trail & Boyle Road)	Two Lane Arterial	E	5,700	A
5	Boyle Road (west of Deschutes Road)	Two Lane Collector	E	1,847	A
6	Shasta View Drive (north of Tarmac Road)	Three Lane Arterial	C	12,131	B
7	Old Oregon Trail (north of Old 44 Drive)	Two Lane Collector	E	11,195	E
8	Deschutes Road (north of Old 44 Drive)	Two Lane Collector	E	10,066	D

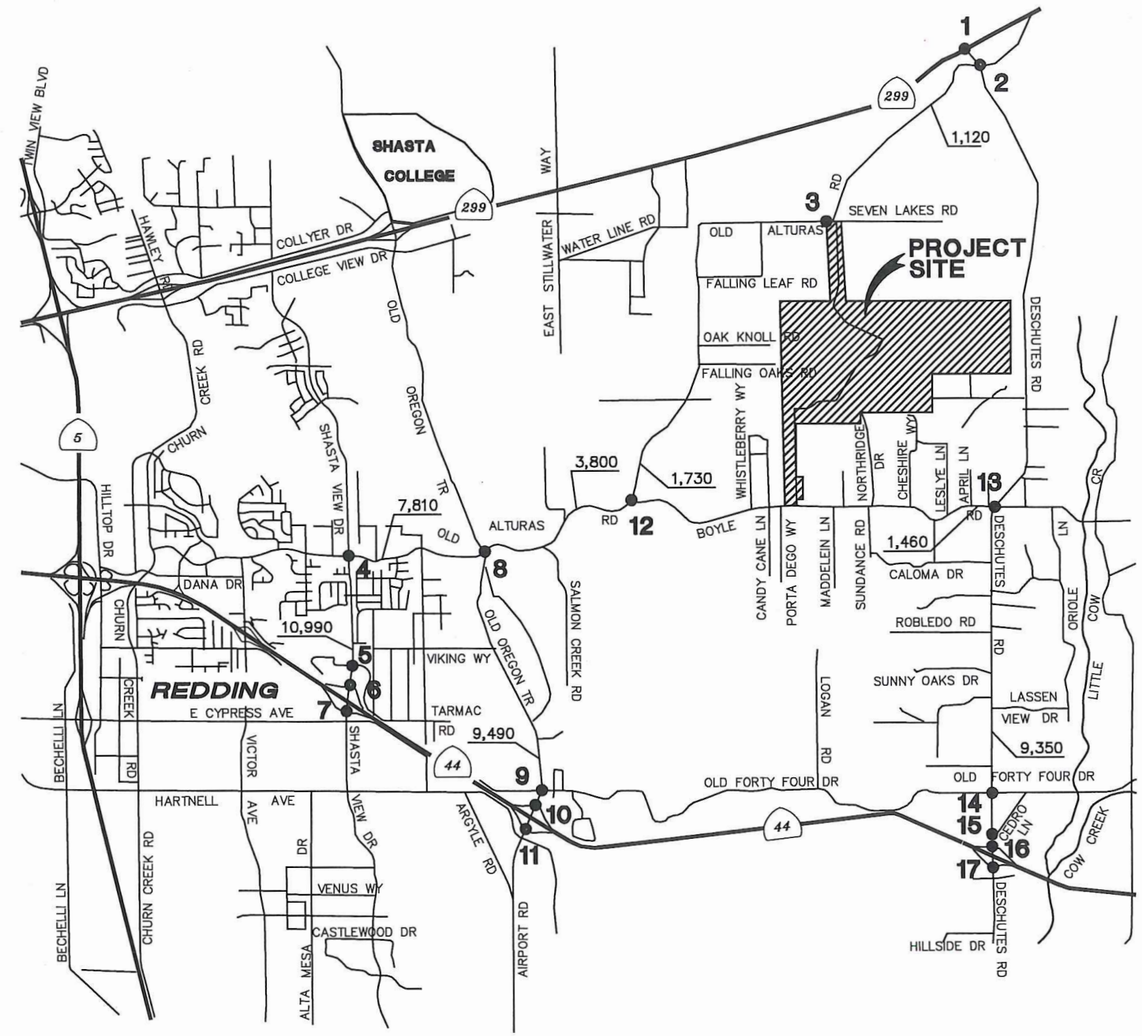
Source: Omni-Means Engineering Solutions. *Tierra Robles Supplemental Traffic Impact Analysis Technical Memorandum*. August 2017.

Year 2035 Plus Project Intersection Operations

Table 5.16-16, YEAR 2035 PLUS PROJECT INTERSECTION LEVEL OF SERVICE, contains a summary of the *Year 2035 Plus Project* study intersection LOS conditions. As shown in Table 5.16-16, all study intersections, except intersections listed below, are projected to operate at or above threshold LOS:

- *Shasta View Drive & SR-44 WB Ramps (Intersection #6)*
- *Old Alturas Road & Old Oregon Trail (Intersection #8)*
- *Airport Road & SR-44 WB Ramps (Intersection #10)*
- *Boyle Road & Deschutes Road (Intersection #13)*
- *Deschutes Road & Old 44 Drive (Intersection #14)*
- *Deschutes Road & Cedro Land (Intersection #15)*
- *Deschutes Road & SR-44 WB Ramps (Intersection #16)*





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Year 2035 Plus Project Intersection Traffic Volumes

N.T.S.

Figure 5.16-7

Table 5.16-16
YEAR 2035 PLUS PROJECT INTERSECTION LEVEL OF SERVICE

#	Intersection	Control Type	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?	Delay	LOS	Warrant Met?
1	Deschutes Road & SR-299	Signal	C	19.4	B	-	16.9	B	-
2	Deschutes Road & Old Alturas Road	TWSC	E	22.2	C	-	17.0	C	-
3	Old Alturas Road & Seven Lakes Road	TWSC	E	7.3	A	-	7.8	A	-
4	Old Alturas Road & Shasta View Drive	RDB	C	8.8	A	-	9.4	A	-
5	Shasta View Drive & Tarmac Road	Signal	C	20.8	C	-	17.7	B	-
6	**Shasta View Drive & SR-44 WB Ramps**	TWSC	C	24.7	C	-	**28.8**	**D**	**Yes**
7	Shasta View Drive and SR-44 EB Ramps	Signal	C	16.6	B	-	15.9	B	-
8	**Old Alturas Road & Old Oregon Trail**	**AWSC**	**E**	**218.8**	**F**	**Yes**	**171.8**	**F**	**Yes**
9	Old Oregon Trail & Old 44 Drive	Signal	C	26.9	C	-	28.1	C	-
10	**Airport Road & SR-44 WB Ramps**	**TWSC**	**C**	**111.6**	**F**	**Yes**	**OVR**	**F**	**Yes**
11	Airport Road & SR-44 EB Ramps	Signal	C	16.1	B	-	18.6	B	-
12	Old Alturas Road & Boyle Road	TWSC	E	12.7	B	-	11.1	B	-
13	**Boyle Road & Deschutes Road**	**TWSC**	**E**	**76.3**	**F**	**No**	18.4	C	-
14	**Deschutes Road & Old 44 Drive**	**AWSC**	**E**	**58.5**	**F**	**Yes**	40.8	E	-
15	**Deschutes Road & Cedro Lane**	**AWSC**	**E**	**99.0**	**F**	**Yes**	**60.6**	**F**	**Yes**
16	**Deschutes Road & SR-44 WB Ramps**	**TWSC**	**C**	**53.8**	**F**	**No**	**27.0**	D	**No**
17	Deschutes Road & SR-44 EB Ramps	AWSC	C	23.0	C	-	19.3	C	-
18	Boyle Road & Tierra Robles Parkway	TWSC	E	10.3	B	-	10.1	B	-

Source: Omni-Means Engineering Solutions. *Tierra Robles Supplemental Traffic Impact Analysis Technical Memorandum*. August 2017.

No intersections that are projected to operate at an unacceptable LOS in *Year 2035 Plus Project* conditions operated at acceptable LOS in *Year 2035 No Project* conditions. Table 5.16-17, YEAR 2035 PLUS PROJECT SIGNIFICANT IMPACTS, presents the intersections projected to operate at unacceptable levels of service under the *Year 2035 Project* conditions and those intersections that warrant mitigation.

Table 5.16-17
YEAR 2035 PLUS PROJECT SIGNIFICANT IMPACTS

AM Peak Hour									
#	Intersection	Control Type	Target LOS	2035 LOS	2035 Plus Project LOS	2035 Delay (D1)	2035 Plus Project Delay (D2)	D2-D1	Significant Impact?
6	Shasta View Drive & SR-44 WB Ramps	TWSC	C	**C**	**C**	24.6	24.7	0.1	No
8	Old Alturas Road & Old Oregon Trail	AWSC	E	F	F	180.2	218.8	38.6	**Yes**
10	Airport Road & SR-44 WB Ramps	TWSC	C	F	F	104	111.2	7.6	**Yes**
13	Boyle Road & Deschutes Road	TWSC	E	F	F	64.2	76.3	12.1	**Yes**
14	Deschutes Road & Old 44 Drive	AWSC	E	F	F	56.2	58.5	2.3	No
15	Deschutes Road & Cedro Lane	AWSC	E	F	F	96.4	99	2.6	No
16	Deschutes Road & SR-44 WB Ramps	TWSC	C	F	F	53.2	53.8	0.6	No
PM Peak Hour									
#	Intersection	Control Type	Target LOS	2035 LOS	2035 Plus Project LOS	2035 Delay (D1)	2035 Plus Project Delay (D2)	D2-D1	Significant Impact?
6	Shasta View Drive & SR-44 WB Ramps	TWSC	C	D	D	28.5	28.8	0.3	No
8	Old Alturas Road & Old Oregon Trail	AWSC	E	F	F	137.2	171.8	34.6	**Yes**
10	Airport Road & SR-44 WB Ramps	TWSC	C	F	F	OVR	OVR	>5 sec	**Yes**
13	Boyle Road & Deschutes Road	TWSC	E	C	C	17.7	18.4	0.7	No
14	Deschutes Road & Old 44 Drive	AWSC	E	E	E	39.5	40.8	1.3	No
15	Deschutes Road & Cedro Lane	AWSC	E	F	F	56.4	60.6	4.2	No
16	Deschutes Road & SR-44 WB Ramps	TWSC	C	D	D	26.5	27	0.5	No

Source: Omni-Means Engineering Solutions. *Tierra Robles Supplemental Traffic Impact Analysis Technical Memorandum*. August 2017.

The following improvements would provide acceptable operations at intersections where a potentially significant project impact has been identified. Refer to Table 5.16-18, MITIGATED YEAR 2035 PLUS PROJECT INTERSECTION LEVEL OF SERVICE.

- *Old Alturas Road & Old Oregon Trail (Intersection #8).* The Old Alturas Road and Old Oregon Trail intersection is projected to operate at an unacceptable LOS F in the weekday AM and PM peak hours. Although this intersection operates at an unacceptable LOS F in the *No Project* condition, the proposed project creates a *potentially significant* impact by causing the delay to increase by more than 5 seconds per vehicle. Implementation of **MM 5.16-3** would mitigate AM and PM peak hour intersection operations to a *less than significant* level (LOS B).

- *Airport Road & SR-44 WB Ramps (Intersection #10).* The Airport Road and SR-44 WB Ramps intersection is projected to operate at an unacceptable LOS F during both the AM and PM peak hours. The proposed project creates a potentially significant impact during both the AM and PM peak hours by causing the LOS to decrease from acceptable to unacceptable. As previously discussed, implementation of **MM 5.16-1** requiring construction of a traffic signal or a roundabout would mitigate the AM and PM peak hour impact at this intersection to a *less than significant* level (LOS C or better) for both *Existing Plus Project* and *Year 2035 Plus Project* conditions. Therefore, no additional mitigation measures beyond implementing **MM 5.16-1** would be required to reduce the impact at this intersection to a *less than significant* level.

- *Boyle Road & Deschutes Road (Intersection #13).* The Boyle Road and Deschutes Road intersection is projected to operate at an unacceptable LOS F during the AM peak hour. Although this intersection operates at an unacceptable LOS F in the *No Project* condition, the proposed project creates a *potentially significant* impact by causing the delay to increase by more than 5 seconds per vehicle. Implementation of **MM 5.16-4** would mitigate AM peak hour intersection operations to an acceptable LOS (LOS C).

Table 5.16-18
MITIGATED YEAR 2035 PLUS PROJECT INTERSECTION LEVEL OF SERVICE

#	Intersection	Control Type	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
8	Old Alturas Road & Old Oregon Trail	RDB	E	12.6	B	10.2	B
10	Airport Road & SR-44 WB Ramps	Signal	C	11.1	B	16.6	B
10	Airport Road & SR-44 WB Ramps	RDB	C	4.3	A	5.7	A
13	Boyle Road & Deschutes Road	AWSC	E	18.6	C	10.6	B

Notes:
TWSC = Two Way Stop Control AWSC = All Way Stop Control OVR = >300 Seconds Delay RDB = Roundabout
LOS = Delay based on worst minor street approach for TWSC intersections.
Warrant = Based on California MUTCD Warrant 3.
Source: Omni-Means Engineering Solutions. *Tierra Robles Supplemental Traffic Impact Analysis Technical Memorandum*. August 2017.

Mitigation Measures:

MM 5.16-3: *Old Alturas Road & Old Oregon Trail (Intersection #8).* Prior to recordation of a final map or issuance of a building permit (whichever occurs first), the project applicant shall pay the pro-rated cost share representing 13 percent of the cost of constructing a single/multi-lane roundabout. The fee shall be established based on an engineer's cost estimate of the improvements prepared by the project applicant and approved by the Shasta County Public Works Department.

MM 5.16-4: *Boyle Road & Deschutes Road (Intersection #13).* Prior to recordation of a final map or issuance of a building permit (whichever occurs first), the project applicant shall pay the pro-rated cost share representing 11 percent of the cost of upgrading the existing two-way-stop-controlled intersection to all-way-stop-controlled intersection. The fee shall be established based on an engineer's cost estimate of the improvements prepared by the project applicant and approved by the Shasta County Public Works Department.

Level of Significance After Mitigation: The improvements identified for the intersections of *Old Alturas Road & Old Oregon Trail (Intersection #8)* and *Boyle Road & Deschutes Road (Intersection #13)* are not currently part of any current Shasta County improvement plan or fee program. As a result, full implementation as described in **MM 5.16-3** and **MM 5.16-4** cannot be assured by the project applicant. This is considered to be a cumulatively considerable and *significant and unavoidable* impact.

The Shasta County Department of Public Works operates a county-wide traffic impact fee program based on residential units or non-residential building square footage. The proposed project may contribute to this program as described in **MM 5.16-3** and **MM 5.16-4**, should Shasta County update the fee program to include the *Old Alturas Road & Old Oregon Trail (Intersection #8)* and *Boyle Road & Deschutes Road (Intersection #13)* intersections. The payment of applicable fair-share costs towards a programmed improvement would result in a cumulatively *less than significant* impact at each intersection.