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## **4.3 TRANSPORTATION AND CIRCULATION**

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### 4.3.1 SUMMARY

The new project results in the following changes to the previous traffic and circulation of the Draft EIR:

- o The project trip generation changed slightly due to the adjustment in the type of housing units as exhibited in **Table 3.0-2**. Compared to the December 2007 TIAR (Appendix 4.3-1), the new project reduces the number of trips by 60 daily, 1 AM peak and 7 PM). While this is a reduction in traffic, it is not significant and the conclusions and recommendations within the December 2007 TIAR remain valid, with the exception of those noted in this section of the EIR and discussed in **Appendix 4.3-2**.
- o The project trip distribution changed slightly, resulting in slightly more (3%) project traffic utilizing Montcrest Drive/Whet Owl Way and slightly less (3%) project traffic utilizing Mission De Oro Drive. A traffic analysis was completed for Whet Owl Way and Mission De Oro Drive was re-analyzed as a result of this change in distribution and results are included in this section of the RDEIR.
- o Traffic counts were conducted at 6 study area intersections to compare with the 2005 traffic counts. All intersection volumes were less in 2008 compared to 2005 with the exception of Churn Creek Road/Bodenhamer Boulevard PM peak hour operations.

The new project does not result in any new or increased impacts. The only traffic mitigation measure affected by the revised project is the timing of Mitigation Measure 4.3.2(c).

This section is based on the *Highland Park Subdivision Traffic Impact Analysis Report* and four technical memorandums prepared by Omni-Means. Excerpts from the full report are included in this section. Please see **Appendix 4.3-1** for the full text of the *Traffic Impact Analysis Report*. **Appendix 4.3-2** contains the *Highland Park Subdivision Traffic Impact Analysis Report Final Report Supplement* that reflects the project redesign as proposed in this Revised Draft EIR and addresses traffic and circulation concerns raised during the public review period for the Draft EIR.

### 4.3.2 EXISTING SETTING

The proposed project is located in the north-central portion of the City of Redding within approximately 95 acres of vacant land. The project site is bounded by Interstate 5 (I-5) to the west, and by a few hundred feet of Hilltop Drive at the southwest corner of the site. The project site is in the midst of existing residential development, including the Vista Ridge and Tanglewood Subdivision to the south and Hidden Hills Subdivision to the east. Vacant land, and abandoned sewage ponds and the Boulder Creek drainage are to the north (See **Figure 3.0-2 Project Location**).

The revised project includes 420 residential units, consisting of 56 apartments, 110 town homes, 48 cluster single-family and 206 traditional single-family units. The project also includes a 7.5 acre neighborhood park.

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### *Project Site Access and On-Site Circulation*

As illustrated on the tentative map shown in **Figure 3.0-5A**, access to the proposed site will be via the extension of five existing local roadways, and an additional project access into the southernmost apartment complex. The following five roadways will provide project access:

- Reddington Drive
- Rollingview Drive
- Montcrest Drive
- Domain Way
- Tanglewood Drive
- New project access will extend into the southernmost apartment complex off of Mission De Oro Drive.

Of the five roadways noted above the project roadway system will require Tanglewood Drive to be extended west from its current location and intersect with the proposed Mission De Oro Drive extension/re-alignment. The northern section of the Mission De Oro Drive will be extended northwest past Domain Way and terminate as the north bound approach to a "T" intersection within the residential subdivision. As a result, a new re-aligned Mission De Oro Drive (North)/Tanglewood Drive will be created approximately 100 feet west of the existing Mission De Oro Drive/ Tanglewood Drive intersection.

### EXISTING TRANSPORTATION NETWORK

#### *Roadways*

Roadways that provide primary circulation in the vicinity of the project site are described below:

- **Hilltop Drive** is for the most part a four-lane arterial roadway with a central left-turn lane and fronting commercial developments on either side. The speed limit on the roadway is 35 mph with posted bike route signs and pedestrian sidewalks. The road narrows from 4-lanes to two-lanes as it approaches Browning Street and remains two-lanes until it crosses over I-5 and intersects Palisades Avenue. Past the Palisades Avenue intersection, Hilltop widens to a 4-lane arterial, with posted speed limits of 40 mph. South of the I-5 overcrossing the roadway operates as an arterial with low access control (over 4 stops/mile) and to the north of I-5 overcrossing Hilltop Drive operates as an arterial with moderate access control (2-4 stops per mile). Although, the City of Redding General Plan Transportation Element calls for the northerly extension of Hilltop Drive from E. Lake Boulevard to Twin View Boulevard as a two-lane arterial, the extension is not assumed to be in place for the cumulative analysis.
- **Churn Creek Road** is a two-lane arterial, which generally traverses in the north south direction and is located parallel to and east of the project site. The posted speed limit on the roadway is 45 mph with exclusive bike lanes in the northbound direction. South of Old Alturas Road the roadway operates as an arterial with low access control (over 4 stops/mile) and to the north of Old Alturas Road Churn Creek Road operates as an arterial with moderate access control, with 2-4 stops per mile. The General Plan calls for improving the segment of Churn Creek Road between Old Alturas Road and College View Drive to four-lane arterial standards.
- **Canby Road** is a two-lane collector, which runs in the north-south direction. The roadway is aligned parallel to Hilltop Drive and Churn Creek Road and traverses in between the roadways. The posted speed limit on the roadway is 30 mph and fronts commercial developments like Office Max, J.C. Penneys and Home Depot. The roadway curves in a

north-easterly direction as it approaches Tanglewood Drive, and past Churn Creek Road it transitions into Whistling Drive.

- **Browning Street** is a two-lane collector that runs in the east-west direction with a posted speed limit of 30 mph. The roadway begins at its western terminus at View Avenue and continues east past Hilltop Drive, Canby Road and Churn Creek Road, eventually terminating as the eastbound approach to the T intersection with Old Alturas Road.
- **Dana Drive** is a four-lane arterial that runs in the east-west direction with a posted speed of 35 mph. The roadway begins at its western end as a "T" intersection with Hilltop Drive, continues east fronting commercial developments on either side of the roadway and eventually terminates as the eastbound approach to Victor Avenue. The roadway operates as an arterial with low access control (over 4 stops/mile) along the entire stretch of the segment between Hilltop Drive and Victor Avenue.
- **Lake Boulevard** to the west of SR 273 is a four-lane arterial with a posted speed limit of 45 mph and connects into the City of Shasta Lake. The roadway has a central left-turn lane and fronts both commercial and residential developments with posted bike route signs all along the segment. East of SR 273 the roadway becomes SR 299. The segment of roadway between SR 273 and Churn Creek Road is also known as Lake Boulevard East. The Lake Boulevard East/SR 299 segment operates as a four-lane arterial to the west of the I-5 interchange and as a four-lane freeway to the east of the interchange. Past the Old Oregon Trail interchange, the roadway operates as a rural two-lane highway. In the vicinity of the project, the roadway operates as an arterial with low access control (over 4 stops/mile). The City of Redding General Plan Transportation Element calls for widening Lake Boulevard between North Point Drive and Hilltop Drive to a six-lane arterial.
- **North Market Street (SR 273)** operates as an arterial from the north end of the Central Business District to Benton Drive and as an expressway from Benton Drive to I-5. SR-273 merges/diverges with Interstate 5 in north Redding, and continues south through downtown Redding to the City of Anderson, where it again connects directly to Interstate 5. The facility is primarily a 4-lane divided roadway north and south of the downtown core with a speed limit ranging from 55-60 mph at its northern and southern sections near Interstate 5, reducing incrementally to 25-35 mph within the downtown core.
- **Bodenhamer Boulevard** is a two-lane collector that runs in a north-west south-east direction. The roadway begins as the southbound approach to the T intersection with Churn Creek Road and travels in a north-westerly direction and dead-ends approximately 300 feet north of Greenbriar Court. Although the City of Redding General Plan Transportation Element calls for the northerly extension of Bodenhamer Boulevard from its current terminus to College View Drive, no such connection is assumed for year 2025 conditions.<sup>1</sup>
- **Tanglewood Drive** is a two-lane east-west residential/collector road with residential driveways fronting the roadway and a posted speed of 25 mph. The roadway begins at

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<sup>1</sup> Although Bodenhamer Boulevard is not within the project boundaries a connection to the boulevard from the project was analyzed in the traffic report and [this RDEIR](#) (see [page 4.3-36](#) and page 69 of Appendix 4.3-1).

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its eastern end at a T intersection with Canby Road and travels west eventually terminating at Mission De Oro Drive.

- **Mission De Oro Drive** is a two-lane north-south residential collector with neighborhood driveways fronting the roadway and a posted speed of 25 mph. The roadway begins at its southern end at a T intersection with Browning Street and travels north eventually terminating as a northbound approach to the "L" – shaped intersection with Tanglewood Drive.
- **Reddington Drive, Rollingview Drive and Whet Owl Way** are two-lane residential/local roads with sidewalks on both sides and a posted speed limit of 25 mph.

Regional roadways that provide circulation in the vicinity of the project site include:

- **Interstate 5 (I-5)** is a major interstate freeway facility that traverses in the north-south direction through the State of California. In northern California, Interstate 5 serves as the primary inter-regional auto and truck travel route that connects the northern counties with the Sacramento Valley. Within Shasta County, Interstate 5 serves as a major commuter and truck route linking the Cities of Shasta Lake, Redding and Anderson. According to 2004 Caltrans count data (published on the Caltrans website) the Annual Average Daily Traffic (AADT) volumes on Interstate 5 between the State Route (SR) 44 and SR 299 interchanges is 56,000 vehicles. I-5 has a divided four-lane cross-section within the vicinity of the project study area. The City of Redding General Plan Transportation Element calls for widening the segment of I-5 between Knighton Road and E. Lake Boulevard to six-lanes and ramp improvements at the SR 44 and Cypress Avenue interchanges (**Appendix 4.3.1**).
- **State Route 299 (SR 299)** is an interregional state highway that begins at SR 101, on the California coast, and terminates in at the Nevada state line, near the City of Cedarville. Within the City of Redding, SR299 operates as both an urban arterial and a full freeway. SR299 enters Redding from the west as a 2-lane 55-MPH highway and transitions to a 5-lane arterial street in downtown Redding. Turning northerly, from downtown Redding, SR299 coincides with SR273 as a 5- and 7-lane arterial, providing connections between SR273 and SR44. At the intersection with Lake Boulevard, SR299 continues easterly as a 5-lane arterial until the junction with Interstate 5. At Interstate 5, SR299 has a full-access interchange. Easterly of Interstate 5, SR299 is a 4-lane divided freeway within the City of Redding City limits. At Churn Creek Road, SR299 has a full-access interchange.
- **State Route 44 (SR 44)** is a state highway that runs in an east-west direction linking the City of Redding with Lassen County. SR 44 begins at 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 Victor Avenue, connects with Friendly Road via hook ramps (both on and off) in the westbound direction, and connects to Hilltop Drive via a loop-off ramp and a direct on-ramp. According to 2004 Caltrans count data published on the Caltrans website, the ADT on SR 44 just east of the Hilltop Drive is 44,000 vehicles and just west of Victor Avenue interchange the ADT is 34,500 vehicles. SR 44 has a four-lane divided cross-section in the vicinity of the proposed project.

#### *Transit*

Transit service is provided 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

greater Redding Area. RABA operates 14 fixed routes within the Cities of Redding, Shasta Lake and Anderson. RABA "Route 4" operates in the vicinity of the project site. On a sixty (60) minute headway between 6:15 a.m. and 7:15 p.m. during weekdays and Saturday hours 9:15 a.m. to 7:15 p.m. The nearest bus stops to the project site along "Route 4" are at the intersection of Churn Creek Road/Canby Road and at the Pilgrim House located along Canby Road approximately half a mile from the project site. Information regarding the bus routes and stops can be obtained from the RABA website: <http://www.ci.redding.ca.us/raba/routesnmaps.htm>.

### *Bikeways*

The City of Redding's Transportation Element contains the following policy regarding a City bicycle system:

*"Policy T9E - Require new development to provide bicycle facilities or pay in-lieu fees based on the fair share of that development's impacts on the bikeway system and needs identified on the Comprehensive Bikeway Plan."*

The City does not currently have in-lieu fees for bicycle routes, but does include cycling as part of the overall trail system serving the community. In the vicinity of the project, posted bike route signs (without designated bike lanes) currently exist along Hilltop Drive and Lake Boulevard. Exclusive bike lanes are present along Churn Creek Road in the northbound direction. The City's Parks, Trails and Open Space Master Plan depicts a future trail along Boulder Creek between Churn Creek and College View Drive. The Plan indicates a goal of completing this trail by 2015. The trail alignment does not enter the proposed project site as Boulder Creek itself lies to the north on the other side of the sewer ponds located on the City's property. Community Services has not indicated a desire for construction of any part of the Boulder Creek Trail as part of the proposed project as the focus is on completing the neighborhood park. The proposed project is designed to offer two future internal pedestrian connections to the future trail.

### *Pedestrian*

The City of Redding's Transportation Element contains the following policy regarding pedestrian facilities:

*"Policy T6B - Require new development to provide sidewalks or other pedestrian-dedicated facilities on both sides of new public streets. Exceptions may be appropriate where topography is difficult, proposed lots are of a rural or semi-rural nature or where the development plan illustrates that pedestrians will be accommodated by alternative means."*

Sidewalks exist along Tanglewood Drive, Reddington Drive, Montcrest, Domain, and Rollingview Drive within the immediate vicinity of the project site. Intermittent sidewalks are also present along Hilltop Drive, Churn Creek Road and along other City Streets in the study area. As noted above, City policies require the construction of new sidewalks with the development of new streets.

## 4.3 TRAFFIC AND CIRCULATION

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### TRAFFIC STUDY AREA

The study area for the traffic analysis was developed by the City to determine those intersections and roadway segments most likely to be impacted by traffic from the proposed project. Generally, the closer an intersection or roadway is to the project the larger the impact will be as traffic from the project is concentrated. As a result most of the study intersections and roadway segments are near the proposed project. As traffic moves away from the proposed project site the impacts of project-related traffic represent a smaller percentage of the existing traffic which means the impacts are smaller overall. In a few instances existing intersections or roadway segments that are distant from the project are already working at or below an acceptable level of service and any traffic added by the project needs to be analyzed.

The majority of the traffic counts were conducted in May of 2005 (Appendix 4.3-3), and included in the December 2007 traffic study (Appendix 4.3-1). Due to the considerable time that has passed since the counts were initially obtained traffic engineers conducted counts at six critical intersections in the immediate vicinity of the project in October 2008. The objective of comparing the counts at the critical intersections was to ascertain if the counts need to be updated at all of the study locations. Figure 1 of Appendix 4.3-2 provides comparison of 2005 and 2008 traffic volumes. All intersections that were studied in 2008 demonstrated volumes lower than 2005 volumes, with the exception of the Churn Creek Road/Bodenhamer Boulevard intersection PM peak hour operations. Therefore the City determined that it was not necessary to update all the traffic counts and analysis contained in the December 2007 traffic study. The 2008 traffic volumes for Churn Creek Road/Bodenhamer Boulevard are included in the tables and analysis in this section of the RDEIR. The volumes for all other intersections are those maximum volumes identified by the 2005 counts.

The following intersections and roadway segments were included in the traffic analysis for the proposed project (See also **Figure 4.3-1**).

#### Intersections (AM and PM peak hour operations)

1. North Market Street(SR 273)/Lake Blvd.(SR 299)
2. Lake Blvd.(SR 299)/Hilltop Drive
3. SR 299 WB Ramps/Churn Creek Road
4. SR 299 EB Ramps/Churn Creek Road
5. Churn Creek Road/College View Drive
6. Hilltop Drive/Peppertree Lane
7. Tanglewood Drive/Buckthorn/Mission De Oro Drive
8. Tanglewood Drive/Whet Owl Drive
9. Tanglewood Drive/Canby Road
10. Churn Creek Road/Whistling Drive/Canby Road
11. Churn Creek Road/Bodenhamer Blvd.
12. Rollingview Drive/Bodenhamer Blvd.
13. Hilltop Drive/Browning Street
14. Browning Street/Mission De Oro Drive
15. Browning Street/Canby Road
16. Browning Street/Churn Creek Road
17. Hilltop Drive/Dana Drive
18. Dana Drive/Mt. Shasta Mall Driveway/Discovery Village Driveway
19. Dana Drive/Canby Road
20. Dana Drive/Churn Creek Road

21. Dana Drive/Friendly Road/SR 44 WB Ramps
22. Hilltop Drive/SR 44 EB Ramps
23. Hilltop Drive/I-5 NB Ramp

### Roadway Segments (daily operations)

1. Hilltop Drive – just south of Lake Blvd.
2. Hilltop Drive – just north of Dana Drive
3. Churn Creek Road – just south of College View Drive
4. Churn Creek Road – just north of Dana Drive
5. Canby Road – just north of Dana Drive
6. Tanglewood Drive – just west of Whet Owl Drive
7. Greenbriar Court – between Reddington Drive and Bodenhamer Blvd.
8. Reddington Drive – between Rollingview Drive and Tulare Court
9. Rollingview Drive – between Reddington Drive and Fairhill Dr.
10. Rollingview Drive – between Reddington Drive and Bodenhamer Blvd.
11. Lake Boulevard – between Market St. and Hilltop Dr.
12. Mission de Oro – north of Browning Street
13. Whet Owl Way- north of Tanglewood Drive

*Since the project Traffic Impact Analysis was prepared, improvements to two study area intersections were completed as a part of adjacent development: Hilltop/Browning (#13) and Browning/Canby (#15). The improvements include the widening of Hilltop Drive, the addition of turning lanes from Browning Street to Hilltop Drive and signalization of the Browning/Canby intersection. These improvements were indicated as mitigation in the traffic analysis provided for this RDEIR under short term conditions. Some of the tables in this section reflect conditions before the improvements were made.*

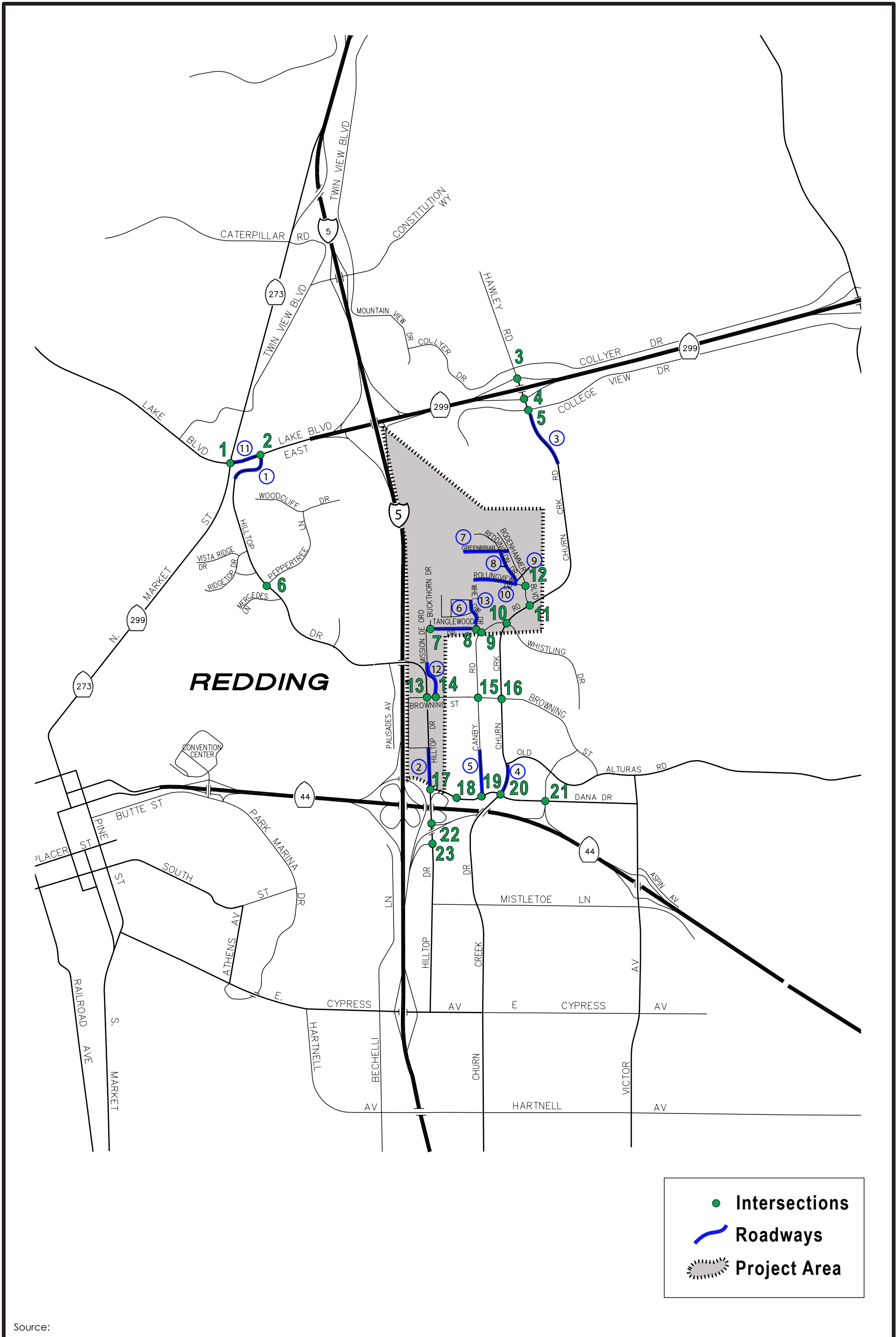
### Caltrans Highway Facilities:

1. Lake Blvd.(SR 299) – Between Market Street (SR 299) and Hilltop Drive

The following traffic scenarios are analyzed as a part of this report:

- Existing Conditions
- Short Term No Project (Year 2006) Conditions (Existing + Approved/Pending Projects Scenario)
- Short Term Plus Project (Year 2006) Conditions (Existing + Approved/Pending + Project Scenario)
- Cumulative No Project (Year 2025) Conditions
- Cumulative Plus Project (Year 2025) Conditions

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**FIGURE 4.3-1**  
**PROJECT AREA INTERSECTIONS/ROADWAYS**

### LEVEL-OF-SERVICE METHODOLOGIES

Traffic operations are quantified as "Level of Service" (LOS) determination that assigns a letter "A" through "F" representing a progressive increase in traffic. The City establishes LOS goals in the General Plan and applies the adopted standard to each study intersection and roadway segment. (See **Table 4.3-5**) Traffic engineers determine the LOS by comparing the design capacity of a roadway with the actual and/or estimated traffic. Intersection LOS is determined by measuring the length of time (delay) that an existing traffic movement takes and comparing that to projected delays with and without project related traffic. For example, if the volume of traffic (typically expressed as Average Daily Traffic or ADT) exceeds the capacity of a roadway, the LOS is reduced. (See **Table 4.3-6**) A roadway operating at "full capacity" would have an LOS of "C". Similarly, if delays at intersections become too long, then the LOS is reduced.

In some instances an intersection or roadway may already be operating at an unacceptable LOS. In these cases the City must determine if the increase in length of delay or change in volume is sufficient to trigger improvements. This determination is explained in **Standards of Significance** portion of this section.

## 4.3 TRAFFIC AND CIRCULATION

### EXISTING TRAFFIC OPERATIONS

#### Intersections

**Table 4.3-1** provides a summary of the *Existing* peak hour intersection levels of service.

**TABLE 4.3-1**  
**EXISTING CONDITIONS: INTERSECTION LEVELS-OF-SERVICE**

#	Intersection	Control Type <sup>1,2</sup>	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met? <sup>3</sup>	Delay	LOS	Warrant Met? <sup>3</sup>
1	N. Market St. (SR273)/Lake Blvd. (SR299)	Signal	D	29.9	C	-	50.6	D	-
2	Lake Blvd. (SR299)/Hilltop Dr.	Signal	D	22.3	C	-	26.3	C	-
<b>3</b>	<b>SR 299 WB Ramps/Churn Creek Rd.</b>	<b>TWSC</b>	<b>D</b>	<b>55.3</b>	<b>F</b>	<b>No</b>	<b>90.8</b>	<b>F</b>	<b>No</b>
4	SR 299 EB Ramps/Churn Creek Rd.	TWSC	D	12.8	B	No	17.6	C	No
5	Churn Creek Rd./College View Dr.	Signal	C	22.4	C	-	22.2	C	-
6	Hilltop Dr./Peppertree Ln.	Signal	C	15.4	B	-	17.8	B	-
7	Tanglewood Dr./Buckthorn/Mission De Oro	TWSC	C	8.9	A	No	9.0	A	No
8	Tanglewood Dr./Whet Owl Dr.	TWSC	C	9.2	A	No	9.1	A	No
9	Tanglewood Dr./Canby Rd.	TWSC	C	12.6	B	No	11.3	B	No
<b>10</b>	<b>Churn Creek Rd./Whistling Dr./Canby Rd.</b>	<b>Signal</b>	<b>C</b>	<b>43.3</b>	<b>D</b>	<b>-</b>	<b>31.9</b>	<b>C</b>	<b>-</b>
11	Churn Creek Rd./Bodenhamer Blvd.	TWSC	C	12.8	B	No	<u>23.1</u>	C	No
12	Rollingview Dr./Bodenhamer Blvd.	TWSC	C	8.7	A	No	8.5	A	No
<b>13</b>	<b>Hilltop Dr./Browning St.*</b>	<b>Signal</b>	<b>C</b>	<b>27.3</b>	<b>C</b>	<b>-</b>	<b>150.8</b>	<b>F</b>	<b>-</b>
14	Browning St./Mission De Oro Dr.	TWSC	C	10.8	B	No	14.3	B	No
15	Browning St./Canby Rd.*	AWSC	C	9.3	A	No	21.1	C	No
16	Browning St./Churn Creek Rd.	Signal	C	20.5	C	-	25.6	C	-
17	Hilltop Dr./Dana Dr.	Signal	C	10.8	B	-	29.4	C	-
18	Dana Dr./Mt. Shasta Mall/Discovery Village	Signal	C	18.8	B	-	20.4	C	-
19	Dana Dr./Canby Rd.	Signal	C	23.9	C	-	29.4	C	-
<b>20</b>	<b>Dana Dr./Churn Creek Rd.</b>	<b>Signal</b>	<b>C</b>	<b>27.5</b>	<b>C</b>	<b>-</b>	<b>40.4</b>	<b>D</b>	<b>-</b>
21	Dana Dr./Friendly Rd./SR 44 WB Ramps	Signal	D	25.1	C	-	34.6	C	-
22	Hilltop Dr./SR 44 EB Ramps <sup>4</sup>	Signal	D	11.4	B	-	20.2	C	-
23	Hilltop Dr./I-5 NB Ramps <sup>4</sup>	Signal	D	10.1	B	-	10.0	A	-

Source: *Omni Means Highland Park Subdivision GPA Traffic Impact Study, December 11, 2007, Appendix 4.3-1 (Table 3) and Traffic Impact Analysis Supplement, December 2008, Appendix 4.3-2 (Table 1)*

Notes: **Bolded entries indicate intersections operating at deficient LOS**

1) TWSC = Two-Way-Stop Control (LOS and delay are based on LOS and delay for worst approach)

2) AWSC = All-Way-Stop Control (LOS and delay are based on average LOS and delay for the intersection)

3) Warrant = MUTCD peak hour-volume based signal warrant (Urban Areas for all unsignalized intersections)

4) Although not a part of study intersections analyzed within the study, the intersection of Hilltop Drive with the shopping complex to the south of the Hilltop Drive/I-5 NB Ramps intersection would influence the operations at these intersections due to signal coordination among all the intersections. As such, the intersection operations may be under estimated at these two intersections.

\* Hilltop VI commercial development – Project has since modified Hilltop Drive/Browning Intersection lane geometrics (intersection #13) and installed a signal at Canby and Browning (Intersection #15).

As shown in **Table 4.3-1**, all of the study intersections were found to be currently operating acceptably during both AM and PM peak hour periods, with the following four exceptions:

- #3 SR 299 WB Ramps / Churn Creek Road
- #10 Churn Creek Road / Whistling Drive / Canby Road
- #13 Hilltop Drive / Browning Street
- #20 Dana Drive / Churn Creek Road

These intersections currently fail to meet the adopted LOS during either the morning or afternoon peak hours. As a result, project impacts at these intersections will be explained in terms of an increase in delay to determine if the impact is significant (See Standards of Significance on page 4.3-15 of this EIR section).

Roadways

The existing level of service for study area roadway segments was determined by comparing the existing average daily traffic (ADT) to the threshold ADT. As shown in **Table 4.3-2**, based on the existing ADT at the study roadway sections, all of the segments currently operate at, or better than, the acceptable LOS.

**TABLE 4.3-2  
EXISTING CONDITIONS: ROADWAY LEVELS-OF-SERVICE**

#	Roadway Segment	Capacity Configuration	Threshold <sup>1</sup>		Existing	
			ADT <sup>2</sup>	LOS	ADT	LOS
1	Hilltop Dr. - South of Lake Blvd.	4-Lane Divided Arterial	29,000	C	13,540	A
2	Hilltop Dr. - North of Dana Dr.	4-Lane Divided Arterial	29,000	C	21,480	A
3	Churn Creek Rd. - South of College View Dr.	2-Lane Divided Arterial	14,500	C	14,420	C
4	Churn Creek Rd. - North of Dana Dr.	4-Lane Divided Arterial	29,000	C	19,620	A
5	Canby Rd. - North of Dana Dr.	2-Lane Collector	9,000	C	7,830	C
6	Tanglewood Dr. - West of Whet Owl Dr.	2-Lane Collector <sup>3</sup>	2,000	C	1,300	C
7	Greenbriar Ct.- Reddington Dr. to Bodenhamer Blvd.	2-Lane Residential/Local	2,000	C	230	A
8	Reddington Dr. - Rollingview Dr. to Tulare Ct.	2-Lane Residential/Local	2,000	C	390	A
9	Rollingview Dr. - Reddington Dr. to Fairhill Dr.	2-Lane Residential/Local	2,000	C	550	A
10	Rollingview Dr. - Reddington Dr. to Bodenhamer Blvd.	2-Lane Residential/Local	2,000	C	940	B
11	Lake Blvd.(SR 299) - Market St. to Hilltop Ave.	4-Lane Divided Arterial	32,500	D	28,880	C
12 <sup>4</sup>	Mission de Oro Dr. – north of Browning Street	2-Lane Collector	6,000	A	1,430	A
13 <sup>5</sup>	Whet Owl Way- north of Tanglewood	2-lane Residential/Local	2,000	C	798	B

Source: Omni Means Highland Park Subdivision GPA Traffic Impact Study, December 2007, Appendix 4.3-1 (Table 4)

Although Hilltop Drive south of Lake Boulevard is a two lane facility, the location of several signals controls the capacity of Hilltop Drive, due to which it can be assumed as a four-lane facility for roadway analysis.

<sup>1</sup>See Table 2, Level of Service Criteria For Roadways in Appendix 4.3-1.

<sup>2</sup>ADT = Average Daily Traffic

<sup>3</sup>Although this section of Tanglewood Drive provides access to a number of single family homes, the roadway functions as a collector by collecting traffic from residential development to the north and south and directing it to Mission De Oro Drive and Canby Road. To be conservative, the Residential Local ADT was used to evaluate project impacts.

<sup>4</sup>In the absence of actual count data for road segment 12, Mission de Oro Drive, ADT was extrapolated from counts in the immediate vicinity. See January 10, 2008, Appendix 4.3-4 (Table 2) for traffic counts of Mission de Oro Drive – north of Browning Street

<sup>5</sup>See December 2008, Appendix 4.3-2 (page 7) for traffic counts of Whet Owl Way – north of Tanglewood and December 2007 Traffic Impact Study, Appendix 4.3-1 (page 14) for level of service.

## 4.3 TRAFFIC AND CIRCULATION

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### APPROVED/PENDING PROJECTS

*Existing Conditions* traffic ignores previously approved projects that might affect the intersections and roadways within the study area.<sup>2</sup> To correct for this, the traffic analysis includes traffic from approved/pending projects to create an *Existing Plus Approved/Pending* scenario. This scenario also assumes that all of the projects approved get constructed. While this is not always the case, the assumption is conservative. The following land development projects are within the vicinity of the proposed project and are included in the “short term” scenario of the traffic analysis in this EIR.

<sup>2</sup> Note that some of the approved/pending projects have been built and occupied since the traffic analysis for this project was initiated. This scenario includes the projected traffic from these projects.

- Womack Apartments – This approved/pending project is located at the end of Mission Sierra Court, and is comprised of 30 townhouse units, which are currently under construction.
- Senior housing at Peppertree Lane – Assisted living development consisting of 40 units. This development is completed and occupied. Access to the development is from Peppertree Lane and Hilltop Drive.
- Apartments on College View near Churn Creek Road (now called College View Townhomes) – This approved/pending project is located on College View Drive, east of Churn Creek Road. Thirty-two (32) townhouse units were constructed in 2007.
- Hilltop VI commercial development – This approved pending project which fronts Hilltop Drive, Canby Road and Browning Street, proposes to construct 177,430 square feet of retail type land uses (per Hilltop VI, Traffic Impact Study, Whitlock and Weinberger Transportation, Inc. dated July 2006). Approximately 96,400 square feet of this development, consisting of the Kohl's Department store, was completed in November 2007. This project modified the Hilltop Drive/Browning Street intersection lane geometrics (#13) and installed a signal at Browning Street/Canby Road (#15).
- Short Term buildout of undeveloped parcels within Walgreens site on Lake Blvd. near Hilltop Drive – This approved/pending project located at the southwest quadrant of the Lake Boulevard/Hilltop Drive intersection proposes to develop 11,760 square feet of office/retail/restaurant type land uses adjacent to the current Walgreens Store and Starbucks Coffee shop. Although potential for additional development at the site does exist (approximately 72,000 square feet, per Traffic Impact Study For The Proposed Lake-Hilltop Commercial Center In The City of Redding, Final Report, Omni-Means, June 2000), for the purposes of the study, full site buildout will not be assumed to be in place for short term conditions. The Walgreens Drug Store itself opened in November 2004 and the Starbucks Coffee Shop in Year 2006.
- Hilltop Landing – This approved/pending project located at the northwest quadrant of the Browning Street/Hilltop Drive intersection, consists of a Chuck-E-Cheese restaurant (9,000 square feet) and 17,990 square feet of retail type land uses. There is not any information within the Institute of Traffic Engineers (ITE) trip generation manual that corresponds to Chuck-E-Cheese restaurant type of land use. “High Turn Over (Sit Down) Restaurant” bearing ITE use code 932 is the closest land use within ITE which is comparable to Chuck-E-Cheese. Note that although visitors to Chuck-E-Cheese typically stay for longer periods of time than typical stays at a “high turnover” restaurant, the “High Turn Over (Sit Down) Restaurant” rates are utilized since they will provide for a conservative analysis. Considering the nature of the facility (Chuck-E-Cheese restaurant), reduction in trip rates (pass-by reduction) was not

## 4.3 TRAFFIC AND CIRCULATION

applied to the facility. The project was constructed in Year 2007 with the majority of the development occupied by the end of Year 2007.

### Approved/Pending Project Trip Generation

The amount of traffic expected from a development is called “trip generation”. Assumptions concerning trip generation are an important component of any traffic analysis. The trip generation used for the approved/pending project list shown in **Table 4.3-3** is based on studies reported in the Institute of Transportation Engineers (ITE) Trip Generation Manual (7<sup>th</sup> Edition) which reports on measured traffic from a number of similar projects.

**TABLE 4.3-3  
APPROVED/PENDING PROJECTS TRIP GENERATION**

Land Use Category	Unit <sup>1,2</sup>	Daily Trip Rate	AM Peak Hour Trip Rate			PM Peak Hour Trip Rate		
			Total	In%	Out%	Total	In%	Out%
Residential Condominium/Townhouse	per du	7.7	0.67	17	83	0.73	67	33
Senior Adult Attached Housing	per du	3.48	0.08	45	55	0.11	61	39
Apartment	per du	10.72	0.59	20	80	1.09	65	35
High Turn Over (Sit Down) Restaurant	per ksf	127.15	11.52	52	48	10.92	61	39
Fast Food Restaurant w/ Drive Through	per ksf	496.12	53.11	51	49	34.64	52	48
Retail Shopping Center	per ksf	88.45	2.14	61	39	8.08	48	52
Kohl's	per ksf	22.0	1.9	61	39	1.9	49	51
Land Use Description	Quantity	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
			Total	In	Out	Total	In	Out
<b>Womack Apartments</b> 30 Townhouse Units	30	231	20	3	17	22	15	7
<b>Hilltop Landing<sup>3</sup></b> 9,000 ft Restaurant (High turnover)	9	1144	104	54	50	98	60	38
17,990 ft Retail Shopping Center	17.99	2227	56	34	22	202	97	105
Retail pass-by		-556	-14	-8	-6	-68	-32	-36
<b>Senior Housing at Peppertree Lane</b> 40 attached Houses	40	139	3	1	2	4	2	2
<b>Apts on College View near Churn Creek Rd.</b> 32 Apartments	32	343	19	4	15	35	23	12
<b>Short Term buildout of undeveloped parcels within Walgreens site on Lake Blvd near Hilltop<sup>3,4</sup></b>								
Pad "D" – Fast Food with Drive Through	3.6	1786	191	97	94	125	65	60
Pass by		-893	-95	-48	-47	-62	-32	-30
Pad "E" Retail Center	8.16	1332	35	21	14	120	58	62
Pass by		-333	-8	-5	-3	-40	-19	-21
<b>Hilltop VI Commercial Development<sup>3</sup></b>								
Retail Project	81.1	5927	138	84	54	545	262	283
Pass by		-1482	-34	-21	-13	-185	-89	-96
Kohls	96.33	2119	183	112	71	183	91	92
Pass by		-615	-53	-32	-21	-53	-26	-27
<b>Total</b>		<b>11,369</b>	<b>545</b>	<b>296</b>	<b>249</b>	<b>926</b>	<b>475</b>	<b>451</b>

Source: Omni Means Highland Park Subdivision GPA Traffic Impact Study, December 2007, Appendix 4.3-1 (Table 5)

<sup>1</sup> du = dwelling unit

<sup>2</sup> ksf = 1,000 square feet

<sup>3</sup> Shopping center pass-by rates are 25% on a daily and AM basis and 34% PM peak hour basis

<sup>4</sup> Fast food pass by rates are 50% on a daily, AM and PM peak hour basis.

## 4.3 TRAFFIC AND CIRCULATION

### Short-Term Roadway/Intersection Improvements Projects

Just as there are private projects that will affect traffic in the vicinity of the proposed project, there are also public road and intersection improvements planned that will improve traffic circulation. For short-term analysis purposes, the following roadway improvements were assumed to be in place:

- Hilltop overcrossing widening at State Route 44 (Currently under construction).
- Installation of a Traffic signal at Browning/Old Alturas Road (Constructed in summer 2008).
- Adding an additional northbound lane on Hilltop Drive – just south of Browning Street (Constructed with the Kohl's Development) in 2007.
- Intersection improvements at Hilltop Drive intersections with Browning Street, Mission de Oro Drive and Canby Road (Constructed with the Kohl's Development) in 2007.

### 4.3.3 REGULATORY FRAMEWORK

#### CITY OF REDDING GENERAL PLAN

The *Transportation Element* of the City of Redding General Plan contains the following policies that apply to this EIR:

City of Redding General Plan Objectives & Policies	Consistency with General Plan	Analysis
<b>Transportation</b>		
<p>Policy T1A: Establish the following peak-hour LOS standards for transportation planning and project review. They reflect the special circumstances of various areas of the community:</p> <ul style="list-style-type: none"> <li>• Use LOS "C" – for most arterial streets and their intersections.</li> <li>• Use LOS "D" – for the Downtown area where vitality, activity, and pedestrian and transit use are primary goals.</li> <li>• Use LOS "D" – for streets within the State highway system and interchanges.</li> <li>• Use LOS "D" – for river-crossing street corridors whose capacity is affected by adjacent intersections.</li> </ul>	Yes with mitigation.	The analysis shows that the project can mitigate impacts to a less than significant level.
<p>Policy T1B: Require development projects to construct both on and off-site improvements as necessary to mitigate the effects of increased traffic generated by the project and maintain peak-hour LOS standards established by Policy T1A. The traffic analysis used to establish mitigating measures shall be based on the City's Traffic Model or other City-approved method. Improvements may be deferred by the City upon approval of a</p>	Yes with mitigation.	The analysis shows that the project can mitigate impacts to a less than significant level. As noted in the discussion the City may decide to defer improvements until full interchange improvements are proposed.

City of Redding General Plan Objectives & Policies	Consistency with General Plan	Analysis
Deferral Improvement Plan which identifies improvements needed, costs, funding sources, and other pertinent data required by the City.		
Policy T3F: Assess fees on new development sufficient to cover the fair share portion of that development's impacts on the local and regional transportation system. Exceptions may be when new development generates significant public benefits (e.g., low-income housing, primary-wage-earner employment), and alternative sources of funding for the improvements can be obtained to offset foregone revenues.	Yes with mitigation.	The project is required to pay TIF and/or pay the pro-rata share of improvements per City Policy. See Timing and Funding of Mitigation Measures below.

**4.3.4 IMPACTS AND MITIGATION MEASURES**

STANDARDS OF SIGNIFICANCE

The City of Redding has determined that traffic and circulation impacts are considered to be significant if the following could result from the implementation of the proposed project:

- A. 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).
- B. Exceed, either individually or cumulatively, a level of service standard established by the City of Redding General Plan Transportation Element for designated roads or highways.

*Roadways/Signalized Intersections:* The project is considered to have a significant effect if it would:

- 1. Result in a roadway or signalized intersection currently operating at an acceptable LOS to deteriorate to an unacceptable LOS:
  - a) LOS "C"—"acceptable delays"—for most arterial streets and their intersections.
  - b) LOS "D"—"tolerable delays"—for the Downtown area where vitality, activity, and pedestrian and transit use are primary goals.
  - c) LOS "D"—"tolerable delays"—for streets within the State highway system and interchanges.
  - d) LOS "D"—"tolerable delays"—for river-crossing street corridors whose capacity is affected by adjacent intersections.
- 2. Increase the delay by more than 5 seconds at a signalized intersection that is/will operate at an unacceptable LOS without the project.
- 3. Increases the volume to capacity (V/C) ratio by more than 0.05 (5%) at a roadway segment that is/will operate at an unacceptable LOS without the project.

*Unsignalized Intersections:* The project is considered to have a significant effect if it would:

### 4.3 TRAFFIC AND CIRCULATION

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4. Result in an unsignalized intersection movement/approach currently operating at an acceptable LOS to deteriorate to an unacceptable LOS, and also cause the intersection to meet the peak hour signal warrant; or
5. For an unsignalized intersection that meets the peak hour signal warrant, increase the delay by more than 5 seconds at a movement/approach that is operating at an unacceptable LOS without the project.

Residential Street: The project will be considered to have a significant effect if it would:

6. Result in a residential street currently operating at an acceptable LOS to deteriorate to an unacceptable LOS; or
  7. Increase the V/C by more than 0.05 (5%) at a residential street that is currently operating at an unacceptable LOS without the project.
- C. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- D. Conflict with adopted policies, plans or programs, supporting alternative transportation (e.g., bus turnouts, bicycle racks).

#### Timing and Funding for Mitigation measures

The traffic analysis identifies a number of improvements needed to ensure the transportation system continues to operate at an acceptable level of service. Not all of the improvements are the sole responsibility of the project as there are existing intersections and roadways that are operating at an unacceptable LOS, and other projects may be contributing to the impacts at that location. Also in some instances, parts of the proposed project can be constructed before improvements are needed and **Appendix 4.3-1** provides a calculation of timing for intersection improvements. Noted in **Appendix 4.3-1** (Table 16, page 85), the City has developed the following policy with regard to the timing of transportation improvements.

- If an intersection or roadway facility is significantly impacted by the proposed project for Short Term conditions, and the project's pro-rata share is equal to or above twenty-five (25) percent, then the project will be required to construct the necessary improvements.
- If an intersection or roadway facility is significantly impacted by the proposed project under cumulative conditions and the project's pro rata share of the cumulative traffic growth is above twenty five (25) percent, then the project will be required to construct the mitigation improvements.
- If an intersection or roadway facility is significantly impacted by the proposed project under cumulative conditions and the project's pro-rata share is twenty-five (25) percent or less, then it is assumed that the project's participation in the City Traffic Impact Fee (TIF) program will address the impact and that the fee program will be amended over time to include the affected facility. Full mitigation for the project is assumed by payment of the project's Traffic Impact Fee, and the City will ensure that impacts are reduced to a less than significant level through ongoing implementation of the Capital Improvement Plan (CIP).

#### METHODOLOGY

Traffic counts for all roadways and intersections were collected by OMNI-MEANS and the City of Redding from 2003 through 2005 (**Appendix 4.3-3**). All counts were taken during the time when public schools were in session. Traffic counts for all of the study intersections were collected in May 2005. Counts for roadways 1, 2, 4, 5, 7, 9 and 11 were collected the first week of June 2005. Data for roadway 6 was collected in April of 2004. Data for road segment 3 was provided by the

City and was collected in October 2003. In the absence of actual count data for road segment 12, Mission de Oro Drive, ADT was extrapolated from counts in the immediate vicinity (Appendix 4.3-4). A two percent per year growth rate was applied to these two roadway segments to reflect current conditions expected to occur on these roadway segments. Data for segment 10 was derived based on counts from segments 8 and 9. Data for segment 6 was collected by Omni-Means in July 2006 and data for segment 13 was collected by Omni-Means in October 2008 (See December 2008, Appendix 4.3-2, page 1).

Due to the fact that traffic counts were originally taken in 2005, traffic counts were collected a second time at six study intersections in October 2008 to ascertain if the counts need to be updated at all of the study locations. The 2008 volumes were found to be lower than the 2005 volumes at all of the critical study intersections for both AM and PM peak hour operations with the exception of the Churn Creek Road/Bodenhamer Boulevard intersection PM operations. Figure 1 of Appendix 4.3-2 provides comparison of 2005 and 2008 traffic volumes at these critical intersections.

The AM peak hour is defined as the one continuous hour of peak traffic flow counted between 7:00 a.m. and 9:00 a.m., and the PM peak hour is defined as the one continuous hour of peak traffic flow counted between 4:00 p.m. and 6:00 p.m. under typical weekday conditions.

### Intersections

Levels of Service are calculated for all intersection control types using methods documented in the Transportation Research Board (TRB) Publication Highway Capacity Manual, Fourth Edition, 2000 (HCM-2000). For two-way-stop-controlled (TWSC) intersections, the "worst-case" movement delays and LOS are reported, computed based on HCM-2000. For signalized intersections and all-way-stop-controlled (AWSC) intersections, the intersection delays and LOS reported are average values for the whole intersection, computed based on HCM-2000. The delay-based LOS criteria for different types of intersection control are outlined in **Table 4.3-4**.

### Roadway Segments

The Transportation Research Board's Highway Capacity Manual, Fourth Edition, Year 2000, (HCM-2000) contains the industry standard methods for calculating LOS on Arterials, Highways, Freeways and at intersections. However, the HCM-2000 LOS methodology is not directly applicable to residential streets. Applying the HCM-2000 methodologies to these roadways would yield acceptable LOS's with very high Average Daily Trips (ADT). Although each lane of a residential street could physically carry over 10,000 ADT, the quality of life along a residential street is impacted at far lower traffic levels. Therefore, the HCM-2000 methods for calculating LOS are not applicable to residential streets.

### Project Trip Distribution and Assignment

The directional trip distribution and assignment of project-generated trips was estimated based on an understanding of existing and projected future traffic flows and travel patterns within the vicinity of the project site, location of local and regional housing and employment/commercial centers in relation to the proposed project site, and the Shasta County Regional Travel Demand Model. **Figure 4.3-2** depicts the revised directional trip distribution for the proposed project for the Short Term condition. As a result of the revised tentative map the project trip distribution changed slightly from that presented in the Draft EIR, resulting in slightly more (3%) project traffic utilizing Montcrest Drive/Whet Owl Way and slightly less (3%) project traffic utilizing Mission De Oro Drive.

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**TABLE 4.3-4  
LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS**

LEVEL OF SERVICE	TYPE OF FLOW	DELAY	MANEUVERABILITY	CONTROL DELAY (SECONDS/VEHICLE)		
				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: *Omni Means Highland Park Subdivision GPA Traffic Impact Study, December 2007, Appendix 4.3-1 (Table 1)*

References: 1. *Highway Capacity Manual, Fourth Edition*, Transportation Research Board, 2000.

**TABLE 4.3-5  
LEVEL OF SERVICE (LOS) 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 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
2-Lane Collector	6,000	7,500	9,000	10,500	12,000
2-Lane Residential/Collector with Frontages *	1,600	3,200	4,800	6,400	8,000
2-Lane Residential/Local *	600	1,200	2,000	3,000	4,500

Source: *Omni Means Highland Park Subdivision GPA Traffic Impact Study, December 2007, Appendix 4.3-1 (Table 2)*

ADT = Average Daily Traffic, LOS = Level of Service

Notes: 1. Based on *Highway Capacity Manual, Fourth Edition, Transportation Research Board, 2000.*

2. All volumes are approximate and assume ideal roadway characteristics. Actual threshold volumes for each Level of Service listed above may vary depending on a variety of factors including (but not limited to) roadway curvature and grade, intersection or interchange spacing, driveway spacing, percentage of trucks and other heavy vehicles, lane widths, signal timing, on-street parking, volume of cross traffic and pedestrians, etc.

\* Based on "Traffic Impact Analysis Guidelines," County of Sacramento, July 2004, See Appendix 4.3-1

Project Trip Generation

**Table 4.3.6** provides a summary of revised trip generation characteristics for the proposed Highland Park Subdivision project. As shown in **Table 4.3-6**, the proposed Highland Park Subdivision development project is projected to generate a total of **4,032** Weekday daily trips, **296** of which would occur during the AM peak hour, and **397** of which would occur during the PM peak hour.

When compared to the trip generation information from the December 2007 Traffic Impact Analysis, the project as proposed generates 60, 1 and 7 fewer daily trips (overall daily, AM peak and PM peak trips, respectively). Therefore, the conclusions and recommendations within the December 2007 Traffic Impact Analysis remain valid.

**TABLE 4.3-6  
HIGHLAND PARK SUBDIVISION TRIP GENERATION**

Land Use Category	Unit	Daily Trips Rate / Unit	AM Peak Rate / Unit			PM Peak Rate / Unit		
			Total	In	Out	Total	In	Out
Single family Detached Housing (210)	Per d.u.	9.81	0.75	25%	75%	1.01	63%	37%
Cluster Single Family Units (210)	Per d.u.	11.03	0.90	25%	75%	1.15	63%	37%
Apartments (220)	Per d.u.	8.70	0.55	20%	80%	0.86	65%	35%
Residential Townhouse (230)	Per d.u.	6.33	0.51	17%	83%	0.59	67%	33%
Park	Per acre	50.00	2.00	80%	20%	4.00	41%	59%

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Land Use Category	Unit	Daily Trips Rate / Unit	AM Peak Rate / Unit			PM Peak Rate / Unit		
			Total	In	Out	Total	In	Out
Land Use Description	Quantity	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
			Total	In	Out	Total	In	Out
Single Family Units <sup>1</sup>	206	2,022	154	39	115	205	129	76
Cluster Single Family Units <sup>1</sup>	48	529	43	11	32	55	35	20
Apartments <sup>1</sup>	56	487	31	6	25	48	31	17
Townhouses <sup>1</sup>	110	696	56	9	47	65	44	21
Residential Portion – Totals	420	3,734	284	65	219	373	239	134
City Park <sup>2</sup>	7.0	350	14	11	3	28	11	17
15% Internal Trips Reduction		-52	-2	-1	-1	-4	-2	-2
“Net New” Park Trips		298	12	10	2	24	9	15
<b>Highland Park Subdivision Totals</b>		<b>4,032</b>	<b>296</b>	<b>75</b>	<b>221</b>	<b>397</b>	<b>248</b>	<b>149</b>

Source: Omni-Means Highland Park Subdivision, Technical Memorandum, December 2008, Appendix 4.3-2 (Table5)

<sup>1</sup> Trip distribution for the residential portions was derived using ITE Trip Generation Manual

<sup>2</sup> Trip distribution for the park was derived using SANDAG Trip Generation Manual

15% of the trips associated with the park are assumed to stay within the project site based on Professional Engineering Judgment. The remaining 85% of the park trips (“Net New” park trips) were distributed to the area roadways and intersection.

### Intersections

**Table 4.3-7** represents the *Short Term No Project* and *Short Term Plus Project* scenario. As shown in the table, there are 5 intersections that are already operating at an unacceptable level of service under the *Short Term* scenarios (intersections 1, 3, 10, 15 and 20). Traffic from the proposed project will reduce the LOS at three of these intersections by a sufficient amount to warrant mitigation as shown in **Table 4.3-7A** (intersections 3, 10 and 15). While the project will increase traffic at the other intersections within the study area, the increase will not be sufficient to warrant improvements under the *Short Term Plus Project* scenario (See Standards of Significance).

**Table 4.3-7** also shows that under the *Short Term Plus Project* traffic scenario, one intersection will drop to an unacceptable level of service (Intersection 11). **Table 4.3-7A** shows that traffic from the proposed project will require signalization of intersection 15 (Browning and Canby) to result in an acceptable LOS. Since completion of this traffic analysis, the Hilltop VI commercial development project has signalized the Browning Street/Canby Road intersection (#15), therefore the intersection currently, and under the *Short Term Plus Project* scenario, operates at an acceptable LOS C.

**Table 4.3-7A** includes a summary of the intersections affected by the proposed project, and the recommended improvements needed under the *Short Term Plus Project* scenario to result in an acceptable LOS. The table also includes an indication of funding responsibility for the improvement.



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**TABLE 4.3-7  
SHORT TERM NO PROJECT AND SHORT TERM PLUS PROJECT INTERSECTION ANALYSIS**

Intersection Analysis				Short Term No Project						Short Term Plus Project							
#	Intersection	Control Type <sup>1,2</sup>	Target LOS	AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				
				Delay	LOS	Warrant Met? <sup>3</sup>	Delay	LOS	Warrant Met? <sup>3</sup>	Delay	Change	LOS	Warrant Met? <sup>3</sup>	Delay	Change	LOS	Warrant Met? <sup>3</sup>
1	N. Market St. (SR273)/Lake Blvd. (SR299)	Signal	D	30.2	C	-	64.1	E	-	30.4	0.2	C	-	66.0	1.9	E	-
2	Lake Blvd. (SR299)/Hilltop Dr.	Signal	D	23.0	C	-	30.8	C	-	23.1	0.1	C	-	31.5	0.7	C	-
3	SR 299 WB Ramps/Churn Creek Rd.	TWSC	D	74.2	F	No	173.8	F	No	88.1	13.9	F	No	249.8	76.0	F	No
4	SR 299 EB Ramps/Churn Creek Rd.	TWSC	D	13.1	B	No	18.8	C	No	13.2	0.1	B	No	19.4	0.6	C	No
5	Churn Creek Rd./College View Dr.	Signal	C	24.6	C	-	26.1	C	-	24.8	0.2	C	-	28.2	2.1	C	-
6	Hilltop Dr./Peppertree Ln.	Signal	C	15.8	B	-	19.4	B	-	16.2	0.4	B	-	19.4	0.0	B	-
7	Tanglewood Dr./Buckthorn/Mission De Oro Dr.	TWSC	C	8.9	A	No	9.0	A	No	9.0	0.1	A	No	9.1	0.1	A	No
8	Tanglewood Dr./Whet Owl Dr.	TWSC	C	9.2	A	No	9.1	A	No	9.5	0.3	A	No	9.6	0.5	A	No
9	Tanglewood Dr./Canby Rd.	TWSC	C	12.8	B	No	11.6	B	No	13.4	0.6	B	No	12.3	0.7	B	No
10	Churn Creek Rd./Whistling Dr./Canby Rd.	Signal	C	46.3	D	-	27.9	C	-	53.3	7.0	D	-	30.4	2.5	C	-
11	Churn Creek Rd./Bodenhamer Blvd.	TWSC	C	13.2	B	No	25.4	D	No	15.4	2.2	C	No	46.2	20.8	E	No
12	Rollingview Dr./Bodenhamer Blvd.	TWSC	C	8.7	A	No	8.5	A	No	9.1	0.4	A	No	8.8	0.3	A	No
13	Hilltop Dr./Browning St.	Signal	C	17.6	B	-	24.2	C	-	19.0	1.4	B	-	24.8	0.6	C	-
14	Browning St./Mission De Oro Dr.	TWSC	C	10.4	B	No	12.3	B	No	11.1	0.7	B	No	13.8	1.5	B	No
15	Browning St./Canby Rd.*	AWSC	C	10.6	B	No	43.6	E	Yes	11.0	0.4	B	No	53.7	10.1	F	Yes
16	Browning St./Churn Creek Rd.	Signal	C	18.7	B	-	20.3	C	-	19.3	0.6	B	-	20.8	0.5	C	-
17	Hilltop Dr./Dana Dr.	Signal	C	10.5	B	-	24.8	C	-	10.8	0.3	B	-	29.9	5.1	C	-
18	Dana Dr./Mt. Shasta Mall/Discovery Village Dwy.	Signal	C	18.9	B	-	20.4	C	-	19.1	0.2	B	-	21.0	0.6	C	-
19	Dana Dr./Canby Rd.	Signal	C	23.9	C	-	29.9	C	-	24.1	0.2	C	-	31.3	1.4	C	-
20	Dana Dr./Churn Creek Rd.	Signal	C	22.9	C	-	39.2	D	-	23.0	0.1	C	-	41.3	2.1	D	-
21	Dana Dr./Friendly Rd./SR 44 WB Ramps	Signal	D	25.4	C	-	35.7	D	-	25.4	0.0	C	-	36.5	0.8	D	-
22	Hilltop Dr./SR 44 EB Ramps <sup>4</sup>	Signal	D	10.7	B	-	16.7	B	-	10.7	0.0	B	-	17.5	0.8	B	-
23	Hilltop Dr./I-5 NB Ramps <sup>4</sup>	Signal	D	9.1	A	-	12.2	B	-	10.0	0.9	A	-	12.3	0.1	B	-

Notes:

TWSC = Two Way Stop Control, AWSC = All Way Stop Control, LOS = Worse-case movement for TWSC intersections, Warrant = Caltrans Peak hour volume-based signal warrant.

Shaded and bold entries exceed target LOS. Entries in red exceed adopted thresholds of significance and are eligible for mitigation.

\* Hilltop VI commercial development project has since installed a signal at Canby and Browning (Intersection #15), resulting in an acceptable LOS "C".

**TABLE 4.3-7A  
SHORT TERM PLUS PROJECT INTERSECTION MITIGATION**

#	Intersection	LOS W/O Mitigation	Mitigation Measure	LOS W/ Mitigation	Funding Source
3	SR 299 WB Ramps/Churn Creek Rd.	F	Install signal	B	Project
10	Churn Creek Rd./Whistling Dr./Canby Rd.	D	Provide exclusive right-turn lanes along southbound Churn Creek and westbound Whistling Drive	C	Project
11	Churn Creek Rd./Bodenhamer Blvd.	E	Signalization and intersection improvements	A	Project
15	Browning St./Canby Rd.*	F	Signalization and intersection improvements	C	Project

Source: Highland Park Subdivision, Traffic Impact Analysis Report. December 2007, Appendix 4.3-1 (Table 8A) and December 2008, Appendix 4.3-2 (Table 3)

\* Hilltop VI commercial development project has since installed a signal at Canby and Browning (Intersection #15), resulting in an acceptable LOS "C".

## ROADWAY SEGMENTS

Similar to intersections, roadway segments were analyzed by comparing the *Short Term No Project* and the *Short Term Plus Project* ADT volumes to the ADT-based LOS thresholds that correspond to the roadway type.

As shown in **Table 4.3-8**, there are two roadways that operate at unacceptable levels under *Short Term No Project* conditions (Roadway 3 and 5). Traffic associated with the proposed project will affect these roadways, but not by a sufficient amount to warrant mitigation.

### *Short Term Plus Project*

**Impact 4.3.1** Development of the Highland Park Subdivision/Planned Development could cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system surrounding the project (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). This is considered **less than significant**.

The project will increase traffic in the adjacent Tanglewood and Hidden Hills neighborhoods. **Table 4.3-8** shows that in some cases the number of vehicle trips on project roadways is expected to more than double (Roadway numbers 7, 9 and 10), while the number of vehicle trips on project roadways is expected to nearly double on two other roadway segments (Roadway numbers 8 and 12). The increase in traffic on these five roadways will be between 1.7 and 3.1 times the existing traffic volumes. While this increase in traffic is mathematically large, in practical terms, this increase results in all five roadways operating below their adopted LOS thresholds. Four of the five roadways will operate at less than 65% of their LOS threshold (Roadway numbers 7, 8, 9 and 12), while one roadway will operate at 96% of the threshold, represented by volume over capacity (V/C) in **Table 4.3-8** (Roadway number 10). Although these roadways may be reaching their adopted LOS thresholds, the amount of traffic is still well below the engineering design capacity of the roadways. This increase in traffic is substantial when measured against existing traffic conditions on these roadway segments as several of the roadway segments have very little current traffic as the proposed project area is undeveloped. Overall, as shown in **Table 4.3-8**, even with the increase in traffic on the study roadway segments, all of the neighborhood roadways will continue to function at an acceptable LOS. As the proposed project develops the last vacant land in the neighborhood, the *Cumulative Plus Project* scenario shows no increase in traffic from the *Short Term Plus Project* scenario on five of these six neighborhood roadway segments (Road segments 7, 8, 9, 10 and 13). Therefore, the projected traffic and associated LOS for *Short Term Plus Project* conditions shown in **Table 4.3-8** represents the total anticipated change in traffic in the neighborhood, with the exception of road segment 12. While the change in traffic will be noticeable to the neighborhood residents, and in terms of numbers of cars per day the change from the very low existing volumes is substantial, the total traffic and resulting LOS is within the design expectations of the roadways and consistent with other residential roads in the City and consistent with the development pattern established with approval of the roadway network of the existing neighborhood. This impact is considered **less than significant**.

**Impact 4.3.2** Development of the Highland Park Subdivision/Planned Development could exceed, either individually or cumulatively, a level of service standard established by the City of Redding General Plan Transportation Element for designated roads or highways. This is considered a **potentially significant impact**.

## 4.3 TRAFFIC AND CIRCULATION

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### *Intersections*

As shown in **Table 4.3-7** there are six intersections that will operate at an unacceptable LOS in the *Short Term Plus Project* condition. Four of these intersections will warrant mitigation to ensure that the traffic from the proposed project will not reduce LOS at the study intersections to a less than significant level. One of these four intersections (Intersection #15) has since been improved. These include:

#### **No. Intersection**

- 3 ***SR 299 WB Ramps / Churn Creek Road:*** The delay at this two-way stop controlled intersection will increase significantly under the *Short Term Plus Project* scenario. While the LOS is currently "F" and will remain "F" under this scenario, the delay increases from 173.8 seconds in the PM peak hour, to 249.8 seconds with the proposed project. The change of 76 seconds is considered significant requiring mitigation. Signalization of the intersection will accommodate traffic from the proposed project and result in a **less than significant impact**.
- 10 ***Churn Creek Road / Whistling Drive / Canby Road:*** This signalized intersection is projected to operate at unacceptable level of service conditions during the AM peak period, with an increase in delay attributed to the proposed project of seven seconds. The recommended improvement is the provision of an exclusive right-turn lane along the southbound Churn Creek Road approach, the eastbound Canby Road approach and the westbound Whistling Drive approach. These improvements would provide sufficient capacities to accommodate *Short Term Plus Project* traffic volumes and result in a **less than significant impact**.
- 11 ***Churn Creek Road / Bodenhamer Boulevard:*** This unsignalized intersection is projected to degrade from a current PM peak hour LOS of "B" to an unacceptable LOS "E" condition during the PM peak hour period under *Short Term Plus Project* conditions. Signalization of the intersection will result in an acceptable LOS under the *Plus Project* conditions resulting in a **less than significant impact**.
- 15 ***Browning Street / Canby Road:*** The traffic report indicates that this unsignalized intersection is projected to degrade from a PM peak hour LOS "E" to operate at an unacceptable LOS "F" during the PM peak hour under *Short Term Plus Project* conditions. ***Since completion of this traffic analysis, the Hilltop VI commercial development project has signalized the Browning Street/Canby Road intersection (#15). With signalization, this intersection operates at an acceptable LOS "C" under the Short Term Plus Project conditions. Therefore no mitigation is required.***

The proposed project also affects intersections 1 and 20 that operate at unacceptable levels under the *Short Term No Project* scenario, but does not increase delay sufficiently to require mitigation at these intersections.

### Mitigation Measures

**MM 4.3.2(a)** Improvements which maintain operational LOS at pre-project levels during the AM peak-hour condition at the State Route 299/Churn Creek Road westbound ramps shall be constructed and in operation prior to occupancy. The scope of the improvements may include minor ramp widening and/or restriping for implementation of a refuge lane in Churn Creek Road from the westbound ramp or signalization of the ramp prior to occupancy of the 35<sup>th</sup> lot within the project. Acceptance of the improvement design is subject to final approval of the City Engineer and shall be based on an operational analysis demonstrating the effectiveness of such improvements.

*Timing/Implementation:* Prior to recordation of the 35<sup>th</sup> lot within the project.

*Enforcement/Monitoring:* City of Redding Development Services Department, Transportation Engineering Department and Caltrans.

This intersection currently operates at an unacceptable level and the project will add substantial delay. Based on the analysis in **Appendix 4.3-1**, construction of the signal is necessary. As noted under Section 4.3.3 Impacts and Mitigation Measures, the threshold for a significant impact at an intersection currently operating at a substandard LOS is an increase in the existing average delay by more than 5 seconds. To further determine the thresholds at which the project traffic impact to this intersection would become significant per City's policy, additional analysis has been performed converting the project traffic to Equivalent Dwelling Units (EDU's) using methodology outlined on page 4.3-15.

It should be noted that the intersection is within State right-of-way and, therefore, implementation of the mitigation will necessitate a Caltrans encroachment permit. The mitigation would result in an acceptable level of service resulting in a **less than significant** impact.

**MM 4.3.2(b)** The applicant, developer or successor in interest shall construct improvements on Churn Creek Road and westbound Whistling Drive and Canby Road including:

1. Provide an exclusive right turn lane along the eastbound Canby Road approach
2. Provide two through lanes along the southbound Churn Creek Road approach
3. Provide two through lanes along the northbound Churn Creek Road approach, of which the outer lane will be a shared through-right lane.

*Timing/Implementation:* Prior to occupancy of unit 230.

*Enforcement/Monitoring:* City of Redding Development Services Department, and Transportation Engineering Department.

This intersection currently operates at an unacceptable level and the project will add substantial delay. Based on the analysis in **Appendix 4.3-1**, construction of the improvements will be needed prior to construction of unit 230. Construction of the improvements would result in an acceptable level of service resulting in a **less than significant** impact.

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**TABLE 4.3-8  
SHORT TERM NO PROJECT AND SHORT TERM PLUS PROJECT ROADWAY ANALYSIS**

#	Roadway Segment	Capacity Configuration	Target LOS	Capacity	Short Term No Project			Short Term Plus Project			
					ADT	LOS	V/C	ADT	LOS	V/C	Change
1	Hilltop Dr. - South of Lake Blvd.	4-Lane Divided Arterial	C	29,000	16,510	A	0.5693	16,920	A	0.5834	0.0141
2	Hilltop Dr. - North of Dana Dr.	4-Lane Divided Arterial	C	29,000	23,690	B	0.8169	24,480	B	0.8441	0.0272
<b>3</b>	<b>Churn Creek Rd. - South of College View Dr.</b>	<b>2-Lane Divided Arterial</b>	<b>C</b>	<b>14,500</b>	<b>15,250</b>	<b>D</b>	<b>1.0517</b>	<b>15,800</b>	<b>D</b>	<b>1.0897</b>	<b>0.0379</b>
4	Churn Creek Rd. - North of Dana Dr.	4-Lane Divided Arterial	C	29,000	21,060	A	0.7262	21,570	A	0.7438	0.0176
<b>5</b>	<b>Canby Rd. - North of Dana Dr.</b>	<b>2-Lane Collector</b>	<b>C</b>	<b>9,000</b>	<b>9,180</b>	<b>D</b>	<b>1.0200</b>	<b>9,480</b>	<b>D</b>	<b>1.0533</b>	<b>0.0333</b>
6	Tanglewood Dr. - West of Whet Owl Dr.	2-Lane Residential/Collector	C	2,000	1,390	C	0.6950	1,740	C	0.8700	0.1750
7	Greenbriar Ct.- Reddington Dr. to Bodenhamer Blvd.	2-Lane Residential/Local	C	2,000	230	A	0.1150	720	B	0.3600	0.2450
8	Reddington Dr. - Rollingview Dr. to Tulare Ct.	2-Lane Residential/Local	C	2,000	390	A	0.1950	680	B	0.3400	0.1450
9	Rollingview Dr. - Reddington Dr. to Fairhill Dr.	2-Lane Residential/Local	C	2,000	550	A	0.2750	1,250	C	0.6250	0.3500
10	Rollingview Dr. - Reddington Dr. to Bodenhamer Blvd.	2-Lane Residential/Local	C	2,000	940	B	0.4700	1,930	C	0.9650	0.4950
<b>11</b>	<b>Lake Blvd.(SR 299) - Market St. to Hilltop Ave.</b>	<b>4-Lane Divided Arterial</b>	<b>D</b>	<b>29,000</b>	<b>32,080</b>	<b>D</b>	<b>1.1062</b>	<b>32,480</b>	<b>D</b>	<b>1.1200</b>	<b>0.0138</b>
12	Mission de Oro - north of Browning Street	2-Lane Collector	A	6,000	1,840	A	0.3067	3,650	A	0.6083	0.3017
13	Whet Owl Way- north of Tanglewood	2-Lane Residential/Local	C	2,000	798	B	0.3990	1,324	C	0.6620	0.2630

Source: Highland Park Subdivision, Traffic Impact Analysis Report, December 2007 Appendix 4.3-1 (Tables 6B and 8B), and \*December 2008 Appendix 4.3-2 (Page 7)

**MM 4.3.2(c)** The applicant, developer or successor in interest shall construct a signal and appropriate intersection improvements at the Churn Creek Road /Bodenhamer Boulevard intersection.

*Timing/Implementation:* Prior to occupancy of unit 200.

*Enforcement/Monitoring:* City of Redding Development Services Department, and Transportation Engineering Department.

This intersection currently operates at an unacceptable level and the project will add substantial delay. Based on the analysis in **Appendix 4.3-2**, construction of the improvements will be needed prior to construction of unit 200<sup>1</sup>. Construction of the improvements would result in an acceptable level of service resulting in a **less than significant** impact.

<sup>1</sup> Appendix 4.3-2, page 7, concluded that the signalization of the Churn Creek Road/Bodenhamer Boulevard intersection would be required at occupancy of the 210th dwelling unit. The City has set the threshold at 200 dwelling units.

**Impact 4.3.3** Development of the Highland Park Subdivision/Planned Development could substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). This impact is considered **less than significant**.

The proposed project must construct roadways and intersections to the standards adopted by the City. The site design provides for adequate site ingress and egress, and as mitigated all of the roadways and intersections serving the site will operate at acceptable levels of service. The City has determined that utilization of the parking lane along public streets fronting the park, 'Road A and Road I', to allow for on-street parking, is preferred by the City of Redding and is consistent with City standards for parks of this size (Appendix 4.3-5). The utilization of on-street parking will allow for parking of 55 cars, maximizes the utilization of park acreage for park amenities (since there will not need to be an on-site parking lot, which would reduce the park acreage), reducing the operating costs incurred by the City for maintaining an on-site parking lot and minimizing the impact of light and glare that would be caused by additional lighting of an on-site parking lot. This impact is considered **less than significant**.

**Impact 4.3.4** Development of the Highland Park Subdivision/Planned Development could conflict with adopted policies, plans or programs, supporting alternative transportation (e.g., bus turnouts, bicycle racks). This impact is considered **less than significant**.

Development of the proposed project is consistent with the City's plans for trails and open space. Payment of park fees will help construct the neighborhood park. Design of the proposed project includes two internal connections to the future Boulder Creek Trail planned by the City. This impact is considered **less than significant**.

### 4.3.4 CUMULATIVE SETTING, IMPACTS AND MITIGATION MEASURES

The cumulative condition scenario assumes growth in both population and traffic volumes over the next 20 years. Since Cumulative conditions assume build out over the next 20 years, it includes the development of approved/pending projects as identified under *Short Term* conditions (see **Table 4.3-3**). The cumulative scenario assumes that programmed or planned improvements will be completed, including potentially some project related improvements.

## 4.3 TRAFFIC AND CIRCULATION

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### *Planned/Programmed Improvements*

The Transportation Element within the *City of Redding 2000-2020 General Plan* provides a list of street improvements, in the project vicinity, designed to accommodate growth. This list of improvements includes the following roadway segments which have been designated as analysis roadways within the traffic study for the proposed project (*Source – Appendix A, City of Redding, General Plan Transportation Element*):

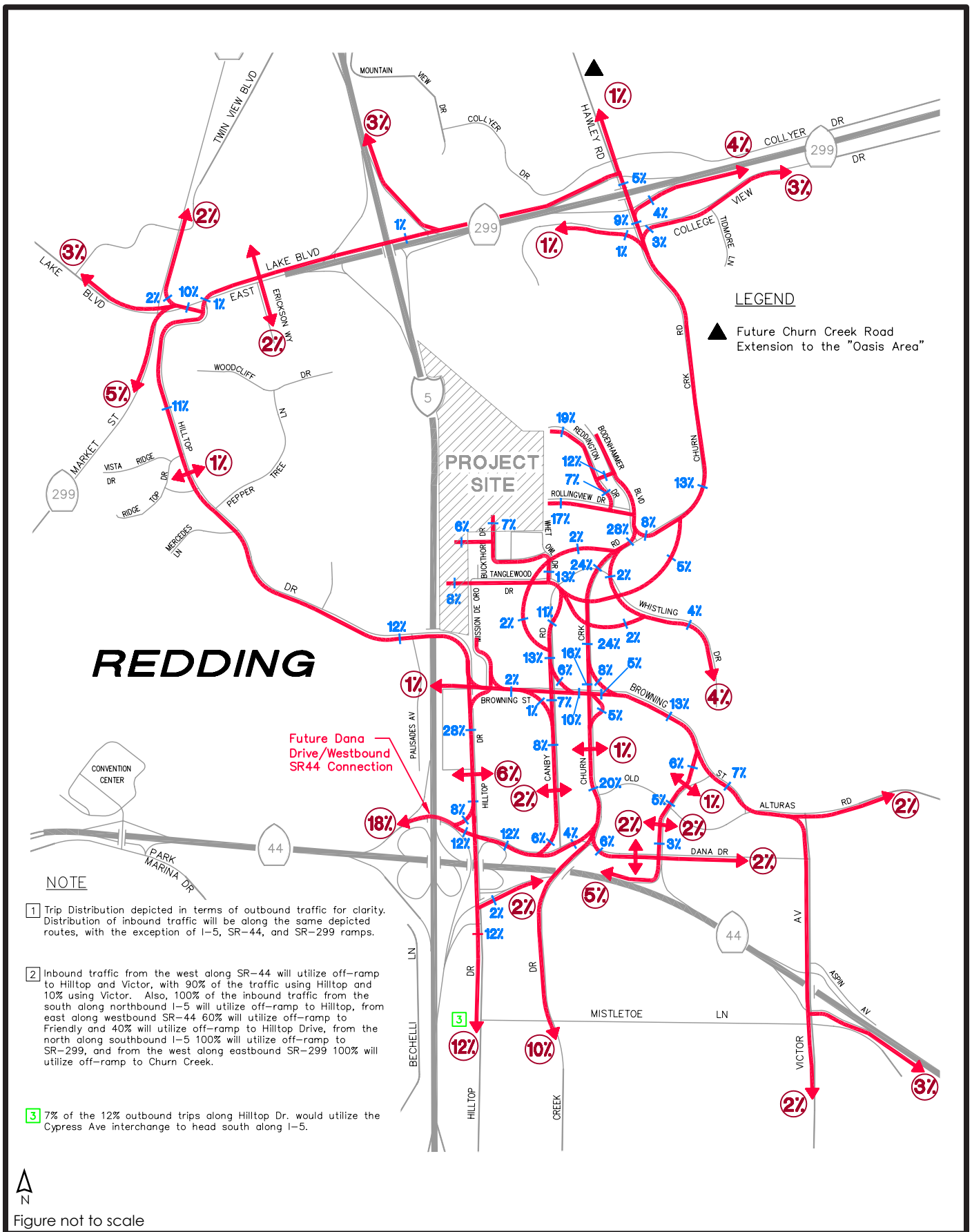
- Bodenhamer Drive extension – Northerly extension of Bodenhamer Drive to connect College View Drive as a two-lane collector.
- Browning Street widening – Widen Browning Street between Churn Creek Road and Hilltop Drive to a four-lane arterial.
- Dana Drive Ramp – Freeway one-lane ramp connecting Hilltop Drive to SR 299 (Recently renamed to SR 44) WB Ramp.
- Hilltop Drive extension – Northerly extension of Hilltop Drive to connect Twin View Boulevard as a two-lane arterial.
- Churn Creek Road widening – Widen Churn Creek Road between Old Alturas Road and College View Drive to a four-lane arterial.
- Hilltop Drive widening – Widen Hilltop Drive between Lake Boulevard and Palisades Avenue to a four-lane arterial (includes widening of Hilltop Drive/I-5 overcrossing).
- Hilltop Drive widening – Add left and right-turn lane between SR 44 ramp to Dana Drive and widen freeway overcrossing.
- Lake Boulevard widening – Widen Lake Boulevard between North Point Drive and Hilltop Drive to a six-lane arterial.

It is not certain that all of the above improvements will be constructed within the 20 year +/- cumulative scenario time period assumed for this analysis. Therefore, the following is a list of roadway/intersection improvements that will be assumed to be in place for Cumulative conditions.

- Hilltop Drive widening to 4-lanes from I-5 to Lake Boulevard (funded primarily by TIF and private development)
- Dana Drive to WB SR 44 2-Lane metered on-ramp (constructed with STIP funds. Construction will start in year 2008 and completion is planned for year 2011)
- Hilltop Drive OC widening at I-5 (funded primarily by TIF & DBDTIF)
- Browning Street widening to 4-lanes from Hilltop Drive to Friendly Road (funded primarily by DBDTIF and private development)

The cumulative scenario also assumes that the traffic roadway improvements under the *Short Term Plus Project* scenario have been constructed.

**Figure 4.3-3** depicts the directional trip distribution for the proposed project for the Cumulative condition.



Source:Omni Means, 2007

**FIGURE 4.3-3**  
**PROJECT TRIP GENERATION,**  
**CUMULATIVE CONDITIONS**  
**PMC**

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TABLE 4.3-9  
CUMULATIVE NO PROJECT AND CUMULATIVE PLUS PROJECT INTERSECTION ANALYSIS

Intersection Analysis				Cumulative No Project						Cumulative Plus Project							
#	Intersection	Control Type <sup>1,2</sup>	Target LOS	AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour				
				Delay	LOS	Warrant Met? <sup>3</sup>	Delay	LOS	Warrant Met? <sup>3</sup>	Delay	Change	LOS	Warrant Met? <sup>3</sup>	Delay	Change	LOS	Warrant Met? <sup>3</sup>
1	N. Market St. (SR273)/Lake Blvd. (SR299)	Signal	D	39.3	D	-	98.2	F	-	39.8	0.5	D	-	102.1	3.9	F	-
2	Lake Blvd. (SR299)/Hilltop Dr.	Signal	D	23.5	C	-	49.9	D	-	23.5	0.0	C	-	50.8	0.9	D	-
3	SR 299 WB Ramps/Churn Creek Rd.	TWSC	D	761.4	F	No	OVR	F	No	857.2	95.8	F	No	OVR	OVR	F	No
4	SR 299 EB Ramps/Churn Creek Rd.	TWSC	D	19.4	C	-	126.6	F	Yes	19.7	0.3	C	No	134.5	7.9	F	Yes
5	Churn Creek Rd./College View Dr.	Signal	C	24.8	C	-	44.7	D	-	27.9	3.1	C	-	54.2	9.5	D	-
6	Hilltop Dr./Peppertree Ln.	Signal	C	14.6	B	-	15.1	B	-	15.2	0.6	B	-	15.1	0.0	B	-
7	Tanglewood Dr./Buckthorn/Mission De Oro	TWSC	C	9.0	A	No	9.2	A	No	9.1	0.1	A	No	9.3	0.1	A	No
8	Tanglewood Dr./Whet Owl Dr.	TWSC	C	9.2	A	No	9.7	A	No	9.5	0.3	A	No	10.2	0.5	B	No
9	Tanglewood Dr./Canby Rd.	TWSC	C	13.2	B	No	13.3	B	No	13.8	0.6	B	No	14.4	1.1	B	No
10	Churn Creek Rd./Whistling Dr./Canby Rd.	Signal	C	149.4	F	-	73.2	E	-	149.4	0.0	F	-	91.0	17.8	F	-
11	Churn Creek Rd./Bodenhamer Blvd.	TWSC	C	20.5	C	No	83.5	F	No	27.8	7.3	D	Yes	383.4	299.9	F	Yes
12	Rollingview Dr./Bodenhamer Blvd.	TWSC	C	8.7	A	No	8.5	A	No	9.1	0.4	A	No	8.8	0.3	A	No
13	Hilltop Dr./Browning St.	Signal	C	21.3	C	-	27.3	C	-	22.2	0.9	C	-	31.8	4.5	C	-
14	Browning St./Mission De Oro Dr.	TWSC	C	11.1	B	No	13.9	B	No	12.1	1.0	B	No	16.1	2.2	C	No
15	Browning St./Canby Rd.*	AWSC	C	11.8	B	No	42.2	E	Yes	13.5	1.7	B	No	50.0	7.8	E	Yes
16	Browning St./Churn Creek Rd.	Signal	C	15.7	B	-	17.4	B	-	18.1	2.4	B	-	18.2	0.8	B	-
17	Hilltop Dr./Dana Dr.	Signal	C	14.0	B	-	17.4	B	-	14.8	0.8	B	-	18.4	1.0	B	-
18	Dana Dr./Mt. Shasta Mall/Discovery	Signal	C	18.7	B	-	20.4	C	-	18.7	0.0	B	-	20.4	0.0	C	-
19	Dana Dr./Canby Rd.	Signal	C	23.3	C	-	33.9	C	-	23.3	0.0	C	-	33.9	0.0	C	-
20	Dana Dr./Churn Creek Rd.	Signal	C	20.4	C	-	43.3	D	-	20.4	0.0	C	-	44.8	1.5	D	-
21	Dana Dr./Friendly Rd./SR 44 WB Ramps	Signal	D	27.2	C	-	44.7	D	-	27.2	0.0	C	-	45.2	0.5	D	-
22	Hilltop Dr./SR 44 EB Ramps <sup>4</sup>	Signal	D	10.5	B	-	22.0	C	-	10.5	0.0	B	-	32.0	10.0	C	-
23	Hilltop Dr./I-5 NB Ramps <sup>4</sup>	Signal	D	8.6	A	-	10.8	B	-	8.6	0.0	A	-	11.5	0.7	B	-

Notes:

TWSC = Two Way Stop Control, AWSC = All Way Stop Control, LOS = Worse-case movement for TWSC intersections, Warrant = Caltrans Peak hour volume-based signal warrant.

Shaded and bold entries exceed target LOS.

Entries in red exceed adopted thresholds of significance and are eligible for mitigation.

\* Hilltop VI commercial development project has since installed a signal at Canby and Browning (Intersection #15), resulting in an acceptable LOS "C".

TABLE 4.3-9A  
CUMULATIVE PLUS PROJECT INTERSECTION MITIGATION

#	Intersection	LOS W/O Mitigation	Mitigation Measure	LOS W/ Mitigation	Funding Source
3	SR 299 WB Ramps/Churn Creek Rd.	F	Install signal	B	Project
4	SR 299 EB Ramps/Churn Creek Rd.	F	Install signal	B	TIF
5	Churn Creek Rd./College View Dr.	D	Provide 2 through lanes along Churn Creek Rd. and additional south bound left lane	C	TIF
10	Churn Creek Rd./Whistling Dr./Canby Rd.	F	Provide exclusive right-turn lanes along southbound Churn Creek and westbound Whistling Drive	C	Project
11	Churn Creek Rd./Bodenhamer Blvd.	F	Signalization and intersection improvements	A	Project
15	Browning St./Canby Rd.*	F	Install signal	C	Project
20	Dana Dr./Churn Creek Rd.	D	Provide additional southbound left turn lane along Churn Creek approach	C	TIF

Source: Highland Park Subdivision, Traffic Impact Analysis Report, December 2007, Appendix 4.3-1 (Table 10A)

\* Hilltop VI commercial development project has since installed a signal at Canby and Browning (Intersection #15), resulting in an acceptable LOS "C".

### *Cumulative Plus Project*

**Impact 4.3.5** Development of Highland Park Subdivision/Planned Development project and all other short-term and long-term development would increase traffic at sufficient volume to cause LOS to decline below City standards under the *Cumulative Plus Project* scenario. This impact is considered **potentially significant**.

### *Intersections*

As shown in **Table 4.3-9**, eight (8) study intersections are projected to operate at unacceptable levels of service during at least one peak hour period under *Cumulative No Project* conditions. The proposed project results in a sufficient increase in delay (greater than five seconds) to warrant mitigation at seven (7) of the intersections (Numbers 3, 4, 5, 10, 11, 15 and 20). Note that cumulative impacts for four (4) of the intersections (Numbers 10 and 11) will be fully mitigated by implementation of mitigation measures **MM 4.3.2(b)** through **MM 4.3.2(c)**, and one of the intersections (Number 15) has already been signalized as part of an adjacent project, which results in an acceptable LOS under *Cumulative Plus Project* conditions. Intersection 3 will be mitigated either under Short Term Plus Project Conditions as noted in mitigation measure **MM 4.3.2(a)** or under Cumulative Conditions as outlined in mitigation measure **MM 4.3.5** below. Of the remaining intersections, (Numbers 4, 5 and 20) the change in delay is sufficient to warrant mitigation, however the percentage of project impact at the intersection is not more than 25 percent which is the percentage that would require physical improvements. The project applicant, developer, or successor in interest will be required to pay into the City's TIF, and ongoing implementation of the City's Capital Improvement Plan (CIP) would result in a **less than significant** impact under the *Cumulative Plus Project* scenario. The project's share of traffic improvements and timing of these improvements for these intersections are outlined below in **Table 4.3-11**.

### Mitigation Measure

**MM 4.3.5** Payment of a pro-rata cost share representing 6.0 percent of the cost for signalization of the State Route 299/Churn Creek Road westbound ramps shall satisfy the project's responsibility for mitigation in the cumulative condition. The fee shall be established based on an engineer's cost estimate for signalization prepared by the permittee and approved by the City Engineer. The fee shall be deposited with the City of Redding prior to recordation of the 35<sup>th</sup> lot. Should the signal improvements be added to the Citywide Traffic Improvement Fee (TIF) program in the future, the funds shall be deposited in the TIF account. Alternatively, the funds shall be available to supplement funding provided by other development for construction of the signal or related improvements. Should the project be required to install a traffic signal to satisfy the requirements of the Existing Plus Project Mitigation, any funds collected for the purpose of constructing the signal, including Citywide Traffic Impact Fees, shall be made available for reimbursement as set forth in §16.20.150 of the Redding Municipal Code.

*Timing/Implementation: Prior to recordation of the 35<sup>th</sup> lot within the project.*

*Enforcement/Monitoring: City of Redding Development Services Department, and Transportation Engineering Department.*

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**TABLE 4.3-10  
CUMULATIVE NO PROJECT AND CUMULATIVE PLUS PROJECT ROADWAY ANALYSIS**

#	Roadway Segment	Capacity Configuration	Target LOS	Capacity	Cumulative No Project			Cumulative Plus Project			
					ADT	LOS	V/C	ADT	LOS	V/C	Change
1	Hilltop Dr. - South of Lake Blvd.	4-Lane Divided Arterial	C	29,000	18,500	A	0.6379	18,910	A	0.6521	0.0141
<b>2</b>	<b>Hilltop Dr. - North of Dana Dr.</b>	<b>4-Lane Divided Arterial</b>	<b>C</b>	<b>29,000</b>	<b>30,000</b>	<b>D</b>	<b>1.0345</b>	<b>30,850</b>	<b>D</b>	<b>1.0638</b>	<b>0.0293</b>
<b>3</b>	<b>Churn Creek Rd. - South of College View Dr.</b>	<b>2-Lane Divided Arterial</b>	<b>C</b>	<b>14,500</b>	<b>20,000</b>	<b>F</b>	<b>1.3793</b>	<b>20,550</b>	<b>F</b>	<b>1.4172</b>	<b>0.0379</b>
4	Churn Creek Rd. - Nnorth of Dana Dr.	4-Lane Divided Arterial	C	29,000	26,000	C	0.8966	26,760	C	0.9228	0.0262
<b>5</b>	<b>Canby Rd. - North of Dana Dr.</b>	<b>2-Lane Collector</b>	<b>C</b>	<b>9,000</b>	<b>11,000</b>	<b>E</b>	<b>1.2222</b>	<b>11,220</b>	<b>E</b>	<b>1.2467</b>	<b>0.0244</b>
6	Tanglewood Dr. - West of Whet Owl Dr.	2-Lane Residential/Collector	C	2,000	1,450	C	0.7250	1,800	C	0.9000	0.1750
7	Greenbriar Ct.- Reddington Dr. to Bodenhamer Blvd.	2-Lane Residential/Local	C	2,000	230	A	0.1150	720	B	0.3600	0.2450
8	Reddington Dr. - Rollingview Dr. to Tulare Ct.	2-Lane Residential/Local	C	2,000	390	A	0.1950	680	B	0.3400	0.1450
9	Rollingview Dr. - Reddington Dr. to Fairhill Dr.	2-Lane Residential/Local	C	2,000	550	A	0.2750	1,250	C	0.6250	0.3500
10	Rollingview Dr. - Reddington Dr. to Bodenhamer Blvd.	2-Lane Residential/Local	C	2,000	940	B	0.4700	1,930	C	0.9650	0.4950
<b>11</b>	<b>Lake Blvd.(SR 299) - Market St. to Hilltop Ave.</b>	<b>4-Lane Divided Arterial</b>	<b>D</b>	<b>29,000</b>	<b>38,000</b>	<b>F</b>	<b>1.3103</b>	<b>38,400</b>	<b>F</b>	<b>1.3241</b>	<b>0.0138</b>
12	Mission de Oro - North of Browning Street	2-Lane Collector	A	6,000	3,150	A	0.5250	5,120	A	0.8533	0.3283
13	Whet Owl Way- north of Tanglewood*	2-Lane Residential/Local	C	2,000	798	B	0.3990	1,324	C	0.6620	0.2630

Source: Highland Park Subdivision, Traffic Impact Analysis Report, December 2007, Appendix 4.3-1 (Tables 9B and 10B) and \*December 2008, Appendix 4.3-2 (Page 7)

\* Shaded and **bold** entries exceed target LOS.

Roadway Segments

As shown in **Table 4.3-10**, four study roadway segments (Segments 2, 3, 5 and 11) are projected to operate at unacceptable levels of service under *Cumulative Plus Project* conditions. For the Lake Boulevard roadway segment (between Market Street and Hilltop Avenue) the extension of Hilltop Drive to Twin View Boulevard as proposed by the City will provide acceptable operations along this segment. The percentage of project impact at the remaining intersections is not more than 25 percent which would require physical improvements. As a result, payment of the City’s TIF and ongoing implementation of the City’s Capital Improvement Plan (CIP) will be sufficient to ensure mitigation under the *Cumulative Plus Project* scenario resulting in an acceptable level of service and therefore a **less than significant** impact. The project’s share of traffic improvements and timing of these improvements for these roadways are outlined below in **Table 4.3-11**.

**TABLE 4.3-11  
INTERSECTIONS AND ROADWAYS  
PROJECT SHARE OF TRAFFIC IMPROVEMENTS AND TIMING OF IMPROVEMENTS**

No.	Intersection/Roadways	Improvements	Percentage of Project Impact	Timing of Mitigation Implementation*
4	Intersection: SR 299 EB Ramps/Churn Creek Road	Signalize Churn Creek Road/SR 299 EB ramps intersection.	6%	Cumulative No Project
5	Intersection: Churn Creek Road/College View Drive	Additional thru lanes (along Churn Creek Road) and turn lanes for the Churn Creek Road/College View Drive intersection.	8%	Cumulative No Project
20	Intersection: Dana Drive/Churn Creek Road	Additional (2 <sup>nd</sup> ) left turn lane along the SB Churn Creek Road approach.	16%	Existing
2	Roadway: Hilltop Drive, north of Dana Drive	Widen segment between Dana Drive and Browning Street to a six-lane arterial.	10%	Cumulative No Project
3	Roadways: Churn Creek Road, south of College View Drive	Widen Churn Creek Road south of College View Drive to a four-lane arterial, south of College View Drive.	10%	Short Term No Project
5	Roadways: Canby Road, north of Dana Drive	Widen Canby Road south of Dana Drive to include a center left-turn lane. Widen Canby Road south of Dana Drive to include a four-lane collector.	7%	Short Term No Project

Source: *Omni Means Highland Park Subdivision Traffic Impact Study* GPA, *December 2007 Appendix 4.3-1*

\* *Timing of improvements to be based on LOS operational threshold.*

**Impact 4.3.6** The project may increase hazards due to sharp curve or dangerous intersections. This impact is considered **less than significant**.

Given the close spacing between the two Browning Road intersections with Hilltop Drive and Mission De Oro Drive (±225 ft from centerline-to-centerline), there are concerns regarding the stacking distance that would be available on Browning Street between Hilltop Drive and Mission De Oro, which could potentially result in unstable traffic flows in the Cumulative conditions. The traffic analysis evaluated operations of a signal at Mission De Oro Drive and Browning Road to

### 4.3 TRAFFIC AND CIRCULATION

determine if the LOS would be acceptable under the *Cumulative Plus Project* scenario (See **Table 4.3-12**).

**TABLE 4.3-12**  
**BROWNING STREET INTERSECTION ANALYSIS WITH SIGNALS AT BOTH**  
**MISSION DE ORO AND HILLTOP DRIVE**

#	Intersection	Target LOS	AM Peak		PM Peak	
			Delay	LOS	Delay	LOS
13	Hilltop Drive/Browning Street	C	22.1	C	32.5	C
14	Browning St./Mission De Oro Dr.	C	17.5	B	26.9	C

*Source: Omni Means Highland Park Subdivision GPA Traffic Impact Study, December 2007, Appendix 4.3-1 (Table 14, Page 54)*

The project does not trigger any thresholds of significance and therefore signalization of this intersection is not required. This impact is considered to be **less than significant**.

#### *Bodenhamer Boulevard Extension to the Proposed Project*

The traffic analysis also evaluated whether a direct project connection to Bodenhamer Boulevard from the proposed project would substantially reduce project traffic anticipated in the surrounding neighborhoods. Bodenhamer Boulevard is shown in the City's Circulation Element as a collector intended to eventually extend from Churn Creek Road to College View Drive. The Boulevard currently provides access to the Hidden Hills Neighborhood but does not cross the proposed project site.

As shown in **Table 4.3-9**, eight intersections are significantly affected by the proposed project traffic in the cumulative setting. If an extension to Bodenhamer Boulevard is introduced into the traffic assumptions, some traffic would shift to the new roadway but would not affect the LOS at study intersection 12, Rollingview Drive and Bodenhamer Boulevard because Bodenhamer Boulevard only provides access to Churn Creek Road and does not yet extend to College View Drive. The roadway segment that would most benefit from a roadway extension from the project site to Bodenhamer Boulevard would be Greenbrier Court between Reddington Drive and Bodenhamer Boulevard (Road Segment Number 7, **Figure 4.3-1**). As shown in **Table 4.3-8**, this roadway will see a substantially increased volume of traffic from current low volume conditions. The roadway currently has approximately 230 ADT and as proposed the ADT would increase to 720. (See **Table 4.3-11**) With the Bodenhamer Boulevard connection to the proposed project, the ADT on the same roadway segment would increase from 230 ADT to 280 ADT. The percentage of increase is much less than that of the proposed project and the smaller increase would allow the LOS to remain at "A" rather than shifting to "B" at buildout of the project. The City's target LOS for 2-Lane Residential/Local Roadways like Greenbrier Court is "C" which has an ADT of 2,000. (See **Table 4.3-5**)

As Bodenhamer Boulevard does not touch the project site, offsite right of way would need to be acquired in order to support a connection. Further, as shown in **Figure 6.0-1B**, the extension would require crossing of wetlands, obtaining wetland permits and mitigation for the loss. As the extension to Bodenhamer Boulevard is not needed to assure adequate LOS on any intersection or roadway segment, and forcing the extension unnecessarily impacts jurisdictional wetlands, the City is not requiring the extension. The extension of Bodenhamer Boulevard, with a connection to the project area is analyzed in **Section 6.0, Alternatives**, of this RDEIR. As proposed the existing design connecting to existing intersections and roadways is **less than significant**.

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