4.7 TRANSPORTATION

This section describes the existing transportation environment in the project vicinity, including pedestrian and bicycle facilities. This transportation impact assessment has been conducted in a manner consistent with the requirements and methodologies of the City of Belmont, San Mateo County, the State of California, and applicable provisions of CEQA. The traffic analysis describes the operational characteristics of the existing study area circulation system, determines the circulation system needs based on future traffic demand, and summarizes the potential circulation impacts associated with project development.

4.7.1 Environmental Setting

The existing vehicular circulation, bicycle and pedestrian facilities, and transit service in the project vicinity are described below.

4.7.1.1 Roadway Network

To assess changes in traffic conditions associated with the project, the following intersections, which all lie within the City's jurisdiction, were selected by the City for evaluation in this traffic study:

1. Ralston Avenue/ El Camino Real
2. Ralston Avenue/ Sixth Avenue
3. Ralston Avenue/ South Road
4. Ralston Avenue/Notre Dame de Namur University Driveway
5. Ralston Avenue/Chula Vista Drive
6. Ralston Avenue/ Notre Dame Avenue
7. Ralston Avenue/ Alameda de las Pulgas
8. Ralston Avenue/ Cipriani Boulevard
9. Ralston Avenue/ Davis Drive
10. Ralston Avenue/ Ralston Middle School Exit Driveway
11. Ralston Avenue/ Ralston Middle School Entrance Driveway
12. Ralston Avenue/ Tahoe Drive
13. Ralston Avenue/ Belmont Canyon Road
14. Ralston Avenue/ Hallmark Drive

Figure 4.7-1 shows analyzed roadways and intersections.

Alameda de las Pulgas is a two-lane, north-south arterial serving residential areas north and south of Ralston Avenue. South of Ralston Avenue, Alameda del Las Pulgas provides access to Carlmont High School, Tierra Linda Middle School, San Carlos Charter Learning Center and Edison Montessori School. Alameda de las Pulgas has bike lanes south of Carlmont Drive. The

posted speed limit on Alameda de las Pulgas is 25 mph north of Ralston Avenue and 30 mph south of Ralston Avenue.

Belmont Canyon Road is a two-lane local street serving residential areas north of Ralston Avenue. The posted speed limit is 25 mph.

Chula Vista Drive is a two-lane major collector serving residential areas south of Ralston Avenue. The posted speed limit is 25 mph.

Cipriani Boulevard is a two-lane major collector serving residential areas north and south of Ralston Avenue. The posted speed limit is 25 mph.

Davis Drive is a two-lane local roadway serving several office buildings south of Ralston Avenue. The roadway has no outlet, but contains two cul-de-sac turnaround points. A sidewalk currently exists along the eastern side of Davis Drive connecting Ralston Avenue to the inner-most cul-de-sac for pedestrian access. There is currently no continuous sidewalk along the western side. The existing cross-section is approximately 40 feet. There are two travel lanes and on-street parking for most of the street's extent; this also allows room for bicyclists who choose to use this local street and share the road with vehicular traffic. The speed limit is 25 mph.

El Camino Real is a four-lane divided north-south arterial road that runs parallel to US-101. The roadway mostly serves commercial uses within the study area. The Belmont Caltrain station is located at the northeast corner of the El Camino Real and Ralston Avenue intersection. The posted speed limit is 35 mph.

Hallmark Drive is a two-lane, north-south major collector roadway servicing residential areas and Fox Elementary School south of Ralston Avenue. The posted speed limit is 30 mph.

Notre Dame Avenue is a two-lane, north-south major collector serving residential areas north of Ralston Avenue. Notre Dame Avenue also provides access to Notre Dame Elementary School. The posted speed limit is 25 mph.

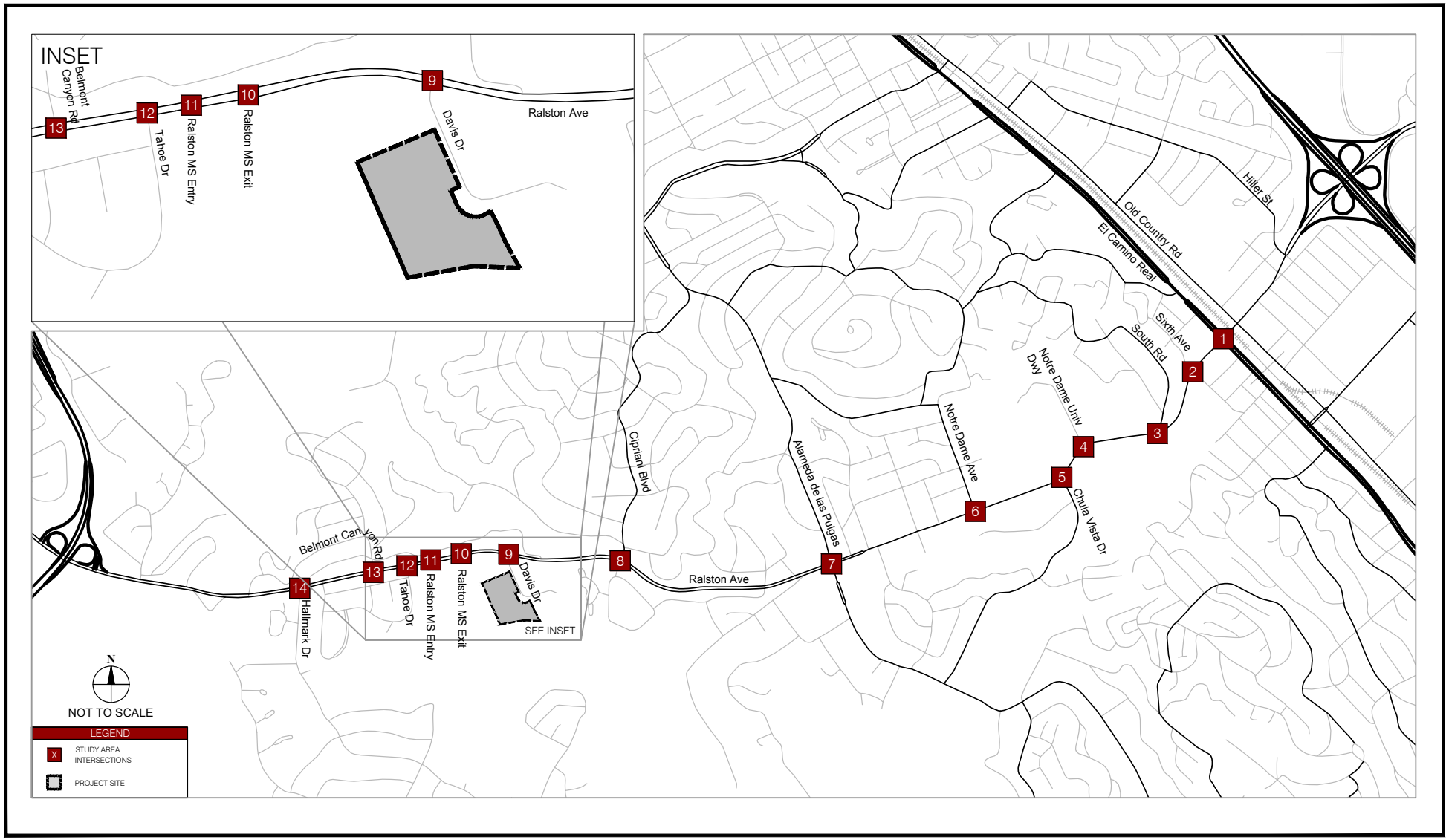
Notre Dame University Road is a two-lane local street, which provides access to Notre Dame de Namur University. The posted speed limit is 25 mph.

Ralston Avenue is a four-lane, east-west arterial connecting SR-92 in the west to US-101 in the east. Ralston Avenue has a two-way left turn lane (TWLTL) between Alameda de las Pulgas and South Road. The roadway serves residential areas west of Sixth Avenue and commercial areas east of Sixth Avenue. Ralston Middle School is located along the south frontage of Ralston Avenue between Davis Drive and Tahoe Drive. The posted speed limit on Ralston Avenue is 30 mph east of Alameda de las Pulgas and 40 mph to the west.

Sixth Avenue is a two-lane collector street, serving residential areas north of Ralston Avenue and city offices and commercial areas south of Ralston Avenue. The posted speed limit is 25 mph.

South Road is a two-lane local street, serving residential areas north of Ralston Avenue. The posted speed limit is 25 mph.

Tahoe Drive is a two-lane local street serving residential areas south of Ralston Avenue and is west of Ralston Middle School. The posted speed limit is 25 mph.



Source: Kimley Horn, 2015

Figure 4.7-1
Project Location and Study Area

4.7.1.2 Transit

Caltrain provides transit services between San Jose and San Francisco. In Belmont, the Belmont Caltrain station is located at the intersection of El Camino Real and Ralston Avenue. During the AM peak, northbound trains to the San Francisco Caltrain Station include the 211 and 221 limited-stop trains and southbound trains to Tamien Station in San Jose include the 208 and 218 limited-stop trains. During the PM peak, northbound trains include the 263 and 273 limited-stop trains and the PM peak southbound trains include the 258, 264, and 274 limited-stop trains.

SamTrans provides transit services within Belmont and San Mateo County. Within the vicinity of the project, there are five transit lines that operate along Ralston Avenue. The five routes are described below:

- Route 62 operates from Hillsdale Caltrain Station to Carlmont Village Shopping Center. The route runs along Ralston Avenue, Cipriani Boulevard, Notre Dame Avenue, Alameda de las Pulgas and El Camino Real within the study area. The route operates weekdays from 7:11 a.m. to 8:40 a.m. and 2:10 p.m. to 4:11 p.m.
- Route 67 operates from Ralston Middle School to Bridge Parkway and Bowsprit Drive. The route runs along Ralston Avenue, Alameda de las Pulgas, and Chula Vista Drive within the study area. The route operates only on Belmont-Redwood Shores Elementary School District school days from 7:03 a.m. to 8:10 a.m.on Mondays through Fridays, 12:36 p.m. to 4:07 p.m. on Wednesdays, and 3:09 p.m. to 4:07 p.m. on Mondays, Tuesdays, Thursdays and Fridays.
- Route 68 operates from Ralston Middle School to Wessex Way and Hiller Street. The route runs along Ralston Avenue, Cipriani Boulevard, Alameda de las Pulgas, and Notre Dame Avenue within the study area. The route operates only on Belmont-Redwood Shores Elementary School District school days from 7:39 a.m. to 8:10 a.m. on Mondays through Fridays, 12:36 p.m. to 1:08 p.m. on Wednesdays and 3:09 p.m. to 3:43 p.m. on Mondays through Fridays.
- Route 260 operates from San Carlos Caltrain station to College of San Mateo. The route runs along Ralston Avenue within the study area. The route operates on weekdays from 5:59 a.m. to 7:14 p.m. on a frequency of 30- to 35- minute headways.
- Route 261 operates from San Carlos Caltrain station to Continental and Lyall Way in Belmont. The route runs along Ralston Avenue within the study area. The route operates on weekdays from 8:28 a.m. to 7:31 p.m. on a frequency of 60-minute headways.

4.7.1.3 Bicycle and Pedestrian Facilities

There are multiple existing bikeway facilities in Belmont. Class I bicycle facilities are bike paths or trails, Class II bicycle facilities are defined as bike lanes, and Class III bicycle facilities are bike routes.

Class I bike paths located within the project study area include Lake Road Trail and the Ralston School Trail. The Lake Road Trail is located south of Ralston Avenue and runs east-west. The trail begins at Hallmark Drive and terminates at Lyall Way. The Ralston School Trail begins south of Ralston Middle School and continues south until it connects with the Lake Road Trail.

Class II bike lanes are located within the project study area on Ralston Avenue and on Alameda de las Pulgas. On Ralston Avenue, bike lanes are located on the north side of roadway between Pullman Avenue and Cipriani Boulevard and on both sides of the roadway between Maywood Drive and South Road. On Alameda de las Pulgas bike lanes are located on both sides of the roadway between Garden Court and Cranfield Avenue.

Class III bike routes are located within the project study area on Ralston Avenue and Alameda de las Pulgas. No Class II facilities exist with the project study area.

Sidewalks and crosswalks are mostly provided throughout the study area in Belmont to allow for pedestrians to access nearby transit stops, residential uses, and commercial uses. There are no sidewalks along the north side of Ralston Avenue between Hallmark Drive and Davis Drive.

4.7.1.4 Existing Lane Configurations and Traffic Control

Existing intersection lane configurations and traffic controls are illustrated in Figure 4.7-2. The study intersections are also listed below with existing traffic control:

<u>Signalized Intersections</u>

#1 – Ralston Avenue and El Camino Real

#2 – Ralston Avenue and Sixth Avenue

#7 – Ralston Avenue and Alameda de las Pulgas

#8 – Ralston Avenue and Cipriani Boulevard

#9 – Ralston Avenue and Davis Drive

#13 – Ralston Avenue and Belmont Canyon Road

#14 – Ralston Avenue and Hallmark Drive

<u>All-Way Stop Controlled (AWSC) Intersections</u>

#3 – Ralston Avenue and South Road

<u>Two-Way / Side Street Stop Controlled (TWSC / SSSC) Intersections</u>

#4 – Ralston Avenue and Notre Dame University Road

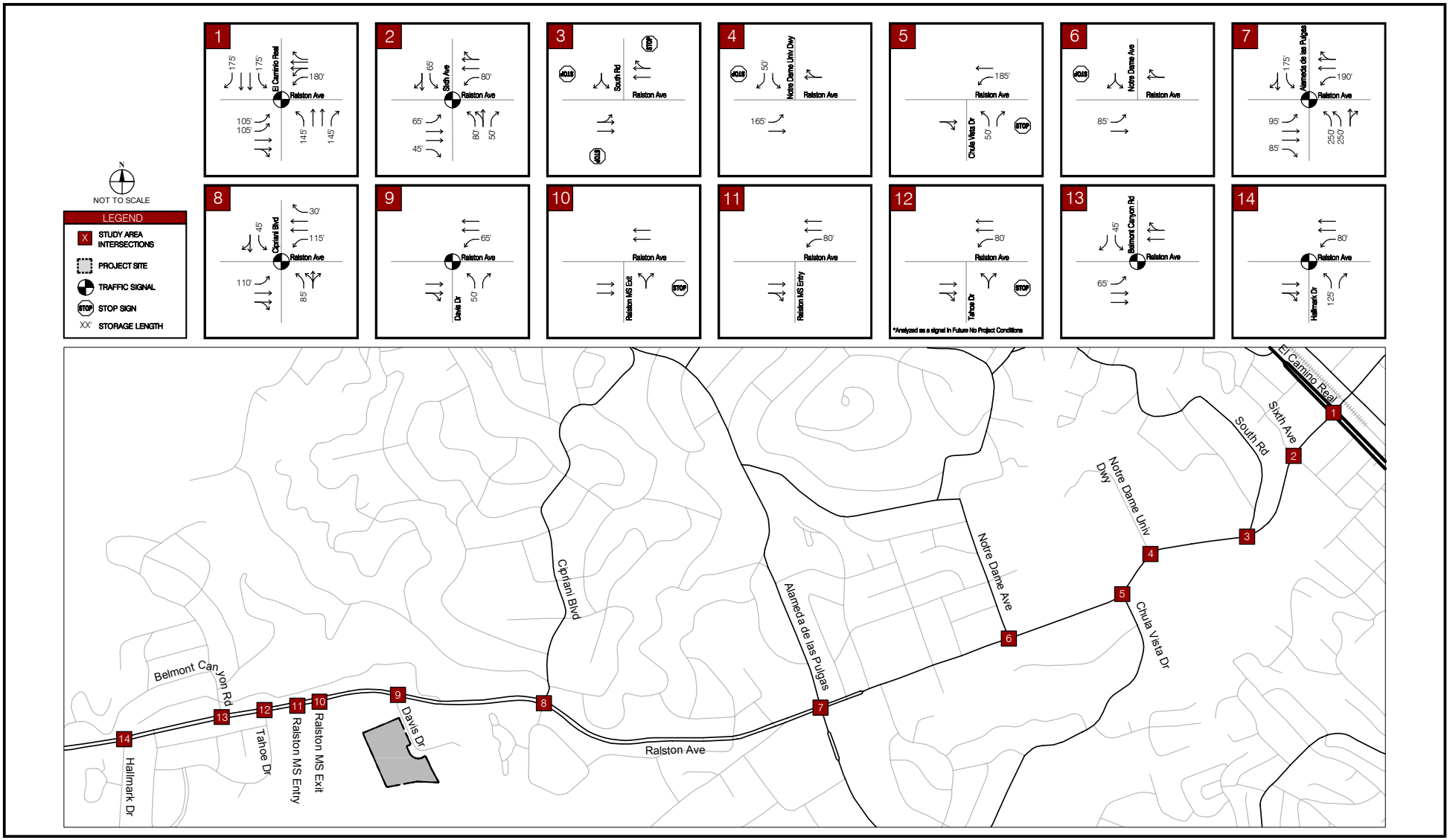
#5 – Ralston Avenue and Chula Vista Drive

#6 – Ralston Ave and Notre Dame Avenue

#10 – Ralston Avenue and Ralston MS Exit

#11 – Ralston Avenue and Ralston MS Entrance

#12 – Ralston Avenue and Tahoe Drive



Source: Kimley Horn, 2015

Belmont Crystal Springs School
Belmont, CA

Figure 4.7-2
Intersection Lane Geometrics & Traffic Control

4.7.1.5 Existing Peak-Hour Turning Movement Volumes

Weekday intersection turning movement volumes for the 14 existing study intersections, not including the project driveways, were collected in February 2014. Volumes were collected during the AM (7-9 a.m.) and PM (4-6 p.m.) peak periods of adjacent street traffic and during the analysis' defined Midday peak (2-4 p.m.) during the weekday when local schools were in session.

Intersection volume data sheets for all traffic counts are provided in the Appendix H. The existing peak-hour turning movement volumes are shown in Figure 4.7-3.

Data was collected during good weather conditions and no incidents were recorded that may result in discrepancies from a "typical" day of travel along Ralston Avenue. Typically, the AM, Midday, and PM peak hour, which are the single hours in the peak periods where traffic volumes entering and exiting an intersection are the highest, were found to be from 7:30-8:30 a.m., 2:30-3:30 p.m., and 5:00-6:00 p.m. for the study intersections, respectively[1].

Five-day 24-hour tube counts were collected in March 2014 on Ralston Avenue east and west of Ralston Middle School. The tube count data is provided in the Appendix H.

4.7.1.6 Existing Intersection Level of Service

Traffic operations were evaluated at the study intersections under existing traffic conditions. Results of the analysis are presented in Table 4.7-1.

As shown, the following study intersections do not function within acceptable standards under the existing analysis scenario:

#1 – Ralston Avenue and El Camino Real - Signal

- Midday and PM Peak Hours

#3 – Ralston Avenue and South Road - AWSC

- AM, Midday, and PM Peak Hours

#4 – Ralston Avenue and Notre Dame de Namur University Driveway - SSSC

- AM, Midday, and PM Peak Hours

#5 – Ralston Avenue and Chula Vista Drive - SSSC

- AM and Midday Peak Hours

#6 – Ralston Avenue and Notre Dame Avenue - SSSC

- AM and Midday Peak Hours

#8 – Ralston Avenue and Cipriani Boulevard - Signal

- AM Peak Hour

[1] Peak hours were different for some intersections. For instance, Intersection #1: Ralston Avenue and El Camino Real had an AM peak hour of 8:00-9:00 AM and Intersection #12: Ralston Avenue and Tahoe Drive had a Midday peak hour from 3:00-4:00 PM. The hours for which the intersection contained the highest vehicular volumes for the period were used for the analysis.

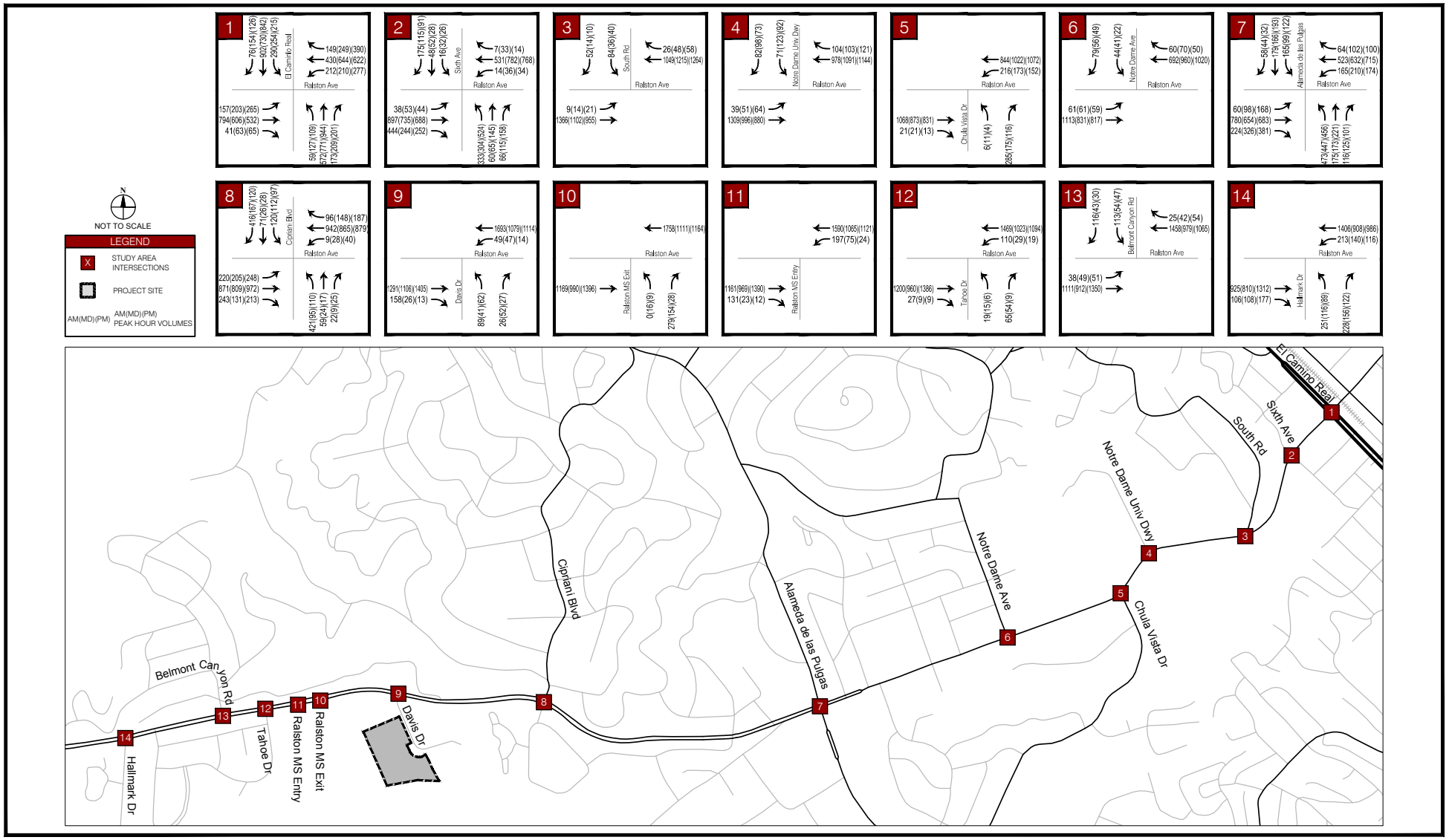
#10 – Ralston Avenue and Ralston MS Exit - SSSC

- AM and Midday Peak Hours

#12 – Ralston Avenue and Tahoe Drive - SSSC

- Midday and PM Peak Hours

These are preexisting deficiencies and are not a result of the project. Analysis sheets are provided in Appendix H.



Source: Kimley Horn, 2015

Figure 4.7-3
Existing Peak Hour Turning Movements

Table 4.7-1: Existing (2014) Intersection Level of Service Summary

Int #	Intersection	Jurisdiction	Control	Existing								
				AM Peak			Mid-Day Peak			PM Peak		
				LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c
1	Ralston Ave and El Camino Real	City	Signal	D	49.9	0.93	E	60.9	0.88	E	56.2	0.93
2	Ralston Ave and Sixth Ave	City	Signal	C	27.8	0.66	C	27.8	0.63	C	29.3	0.62
3	Ralston Ave and South Rd	City	AWSC	F	212.0	-	F	139.4	-	F	127.3	-
4	Ralston Ave and Notre Dame de Namur University Dwy	City	SSSC	A	9.9	-	E	37.7	-	B	10.4	-
	Worst Approach			*F*	*109.6*	-	*F*	*307.0*	-	*F*	*105.3*	-
5	Ralston Ave and Chula Vista Dr	City	SSSC	F	52.3	-	A	4.3	-	A	2.2	-
	Worst Approach			*F*	*370.2*	-	*E*	*38.4*	-	*C*	*23.4*	-
6	Ralston Ave and Notre Dame Ave	City	SSSC	A	3.1	-	A	2.5	-	A	1.7	-
	Worst Approach			*E*	*40.4*	-	*E*	*38.6*	-	*D*	*32.9*	-
7	Ralston Ave and Alameda de Las Pulgas	City	Signal	D	44.1	0.83	D	46.0	0.83	D	41.8	0.80
8	Ralston Ave and Cipriani Blvd	City	Signal	E	74.2	1.00	C	27.5	0.67	C	27.6	0.72
9	Ralston Ave and Davis Dr	City	Signal	B	13.4	0.72	A	9.2	0.54	A	7.3	0.62
10	Ralston Ave and Ralston MS Exit	City	SSSC	A	5.0	-	A	3.8	-	A	0.5	-
	Worst Approach			*E*	*40.9*	-	*E*	*35.5*	-	*C*	*23.1*	-
11	Ralston Ave and Ralston MS Entrance	City	SSSC	A	1.1	-	A	0.4	-	A	0.1	-
	Worst Approach			*A*	*2.1*	-	*A*	*0.7*	-	*A*	*0.3*	-
12	Ralston Ave and Tahoe Dr	City	SSSC	A	1.5	-	A	2.8	-	A	0.5	-
	Worst Approach			*D*	*26.0*	-	*E*	*49.0*	-	*F*	*51.3*	-

13	Ralston Ave and Belmont Canyon Rd	City	Signal	B	14.4	0.72	A	8.5	0.51	A	7.1	0.55
14	Ralston Ave and Hallmark Dr	City	Signal	C	23.8	0.79	B	15.1	0.58	B	15.2	0.69

Notes: Intersections that are operating below (worse than) LOS D are shown in **BOLD**. Intersection delay, LOS, and v/c ratios calculated with Highway Capacity Manual (HCM) 2000 methodology using Synchro software.

It should be noted that calculations of delay at saturated conditions (i.e., LOS F) are less reliable than at LOS E or better. Therefore, delay in excess of 80 seconds is reported in the table to allow a relative comparison of without and with project conditions and should not be interpreted as an exact representation of actual delay.

Source: Kimley-Horn and Associates, Inc., 2014

4.7.1.7 Signal Warrants Analysis

Signal warrant calculations were conducted at the non-signalized study intersections as per the City's Guidelines using Signal Warrant #3: Peak Hour. The Peak Hour Volume Warrant (Warrant #3) is satisfied when traffic volumes on the major and minor approaches exceed thresholds for only one hour of the day and is generally the first warrant to be satisfied. Other warrant criteria exists but are less conservative than the peak hour evaluation, therefore the peak hour warrant was used. It should be noted that the AM peak hour presents the worst case (or most likely case) for which the signal warrant would be met as side street volumes are typically higher during this peak in the study area. To present a worst case, only the AM peak hour results are displayed in this report. The PM peak hour results are shown in the Appendix H. Aside from those shown in the AM peak, no additional intersection locations trigger a signal warrant. As shown in the signal warrant tables within the Appendix H, all of the unsignalized intersections meet the peak-hour warrant under existing conditions (i.e. without the project) in the AM peak hour except Intersection #12: Ralston Avenue / Tahoe Drive. Below in Table 4.7-2 is the list of the signal warranted intersection's v/c ratios for the worst approach.

Table 4.7-2: Existing (2014) Intersection v/c Ratios

Int. #	Intersection Description	Existing AM
3	Ralston Ave / South Rd	1.11
4	Ralston Ave / Notre Dame Univ.	0.79
5	Ralston Ave / Chula Vista Dr.	0.65
6	Ralston Ave / Notre Dame Ave.	0.64
10	Ralston Ave / Ralston MS Exit	0.55
11	Ralston Ave / Ralston MS Entrance	0.51

Notes: Intersection delay, LOS, and v/c ratios calculated with Highway Capacity Manual (HCM) 2000 methodology using Synchro software.

Source: Kimley-Horn, Inc. 2014.

4.7.1.8 Existing Traffic Conditions within Vicinity of Project Site

Daily Traffic

Tube counts were taken in March 2014 on Ralston Avenue between Cipriani Drive and Davis Drive; this is adjacent to both the Ralston Middle School, which is west of Davis Drive, and the project, which is located on Davis Drive. The vehicle classifications contain a strong majority (99 percent) of passenger cars with a small minority (1 percent) of in-town delivery trucks, buses, and large trucks. The majority of speeds along Ralston Avenue at this segment fluctuate between 36 and 45 mph for both eastbound and westbound traffic. During the AM peak hour, speeds are typically lower in the westbound direction with traffic destined for local schools. During the PM peak hour, speeds are typically lower in the eastbound direction with traffic destined for the local residential neighborhoods. The CSUS project proposes to include an electronic speed feedback sign for eastbound traffic on Ralston Avenue between the intersections

of the RMS exit driveway and Davis Drive. This element is proposed as part of the project to help reduce vehicular speeds on Ralston Avenue.

Collision History

According to data reviewed by W-Trans in the Ralston Corridor Study (RCS), from January 1, 2010 to May 27, 2013,[2] there were a reported 174 crashes at the 14 study intersections, with 33 percent of the crashes involving injuries. Ralston Avenue and Alameda de Las Pulgas has the largest number of incidents with a total of 60 crashes involving 20 injuries. Following that, the four next worst intersections along Ralston Avenue were El Camino Real (with one crash fatality), Notre Dame Avenue, 6th Avenue, and South Road. Ralston Avenue and Davis Drive had 13 crashes reported with 7 injuries during this 41 month period. The most common reason for crashes cited at Davis Drive was speeding; other causes were turning movement crashes, unsafe parking/backing, and causes other than driver fault.

The collision rate per million vehicle miles was calculated for the roadway segments on Ralston Avenue adjacent to Davis Drive based on the total number of collisions studied over three years (April 1, 2010 to March 31, 2013) and ADT counts. The calculated collision rate was compared to the statewide average rate for a four-lane urban divided roadway listed in the 2010 Collision Data on California State Highways. For Davis Drive the collision rate was found to be 0.99 collisions per million vehicle miles, which is less than the statewide average of 1.55. In addition, the specific collision information was reviewed and it was determined that only 2-3 of the collisions during the 3-year period could be identified for eastbound traffic immediately west of the intersection. Consequently, no changes (e.g., right turn lane) are warranted or recommended relative to the east bound right turn at Davis Drive.

Field Observations

Field observations were conducted during both the drop-off and pickup periods in the project site vicinity in April and May 2014. There were a few queuing issues and trip behaviors that should be noted along Ralston Avenue, particularly vehicles accessing Ralston Middle School, which is adjacent to the project site. During the morning drop-off period, the queue from vehicles making a westbound left (WBL) off of Ralston Avenue into the Ralston Middle School entrance would exceed the turn pocket and spill into the westbound through (WBT) lane. To avoid this overcapacity queue, through vehicles utilized the right outside lane. The maximum queue for this movement was observed at 8:09 a.m. and extended almost as far east as the Davis Drive intersection. The traffic related to Ralston Middle School dissipates quickly and concludes by approximately 8:20 a.m., consistent with the Ralston Middle School bell schedule. As noted, many drivers not participating in the drop-off activities use the right-most lane to try to bypass the traffic related to Ralston Middle School, but this often causes congestion in that lane as well. Immediately west of the Davis Drive intersection, there is an electronic speed feedback sign in an effort to lower travel speeds on Ralston Avenue.

West of Ralston Middle School, traffic continues to be heavy for the westbound traffic during the morning peak period, with drivers headed to the SR-92 interchange and points beyond. In

[2] Data from 2001-2014 was reviewed and evaluated to confirm if occupancy of the existing buildings on Davis Drive was significantly different as the more recent data. This review found that the collision data with full occupancy does not show a significantly different collision rate at the Davis Drive intersection, nor a high number of collisions specifically attributable to the east bound traffic movement than the data cited above.

addition, vehicular traffic associated with Fox Elementary School (Fox) also impacts the areas along Hallmark Drive. The traffic conditions related to Fox were observed to be immediately following the Ralston Middle School peak traffic condition, which is consistent with Fox's bell schedule starting at 8:25 a.m.

In addition, many parents bypass the allocated Ralston Middle School drop-off area, and instead utilize both Davis Drive and Tahoe Drive to drop-off their children. Parents using Davis Drive would drop their student off on the western curb of Davis Drive and then either make a 3-point turn or a U-turn at the southern end of Davis Drive to get back onto Ralston Avenue. Most parents using Tahoe Drive either made an illegal U-turn on Tahoe Drive after the median south of Ralston Avenue or took Yosemite Drive back to Ralston Avenue to egress.

During the PM pick up from the Ralston Middle School parking lot, queues were observed extending onto Ralston Avenue by one vehicle. Parents arrived as early as 1:54 p.m. to park and wait to pick-up students and the majority of pickup activities ceased by 3:29 p.m. Davis Drive and Tahoe Drive were also utilized for pickups during this timeframe. Along Davis Drive, school-related traffic would peak between 2:45 p.m. and 3:20 p.m., often causing congestion along Davis Drive, in the form of cars parking and making unsafe U-turns too close to the Ralston Avenue / Davis Drive intersection.

Students were seen walking to and from school during both peak hours. They utilized the southern Ralston Avenue sidewalk and the Davis Drive pedestrian crossings. Students who were picked up on Davis Drive would walk down the southern Ralston Avenue sidewalk to Davis Drive and enter the vehicle. For vehicles parked along the west side of Davis Drive, students would walk in the landscaped area or along the street curb. If the vehicle was parked on the east side of Davis Drive, students would utilize the southern crosswalk to cross Davis Drive.

Ralston Middle School is currently undergoing changes to its enrollment and a plan has been completed to more efficiently operate the on-site drop-off and pickup activities. If this change is successful, the use of this informal satellite location for drop-off and pickup may become unnecessary. The City will monitor the operations on Davis Drive to determine if any additional improvements are needed.

Program for Arterial Signal Synchronization (PASS) Observations

The observations for the Ralston Avenue and Davis Drive intersections were included within the Program for Arterial Signal Synchronization (PASS) study. There were high numbers of pedestrians observed on the south crosswalk during the citywide AM and PM peak hours; there were a total of 19 pedestrians observed during the AM peak and 97 during the PM peak. Six (6) and 18 pedestrians were observed crossing the west crosswalk during the AM and PM peak hours, respectively. It is assumed that most of these pedestrians are a product of the nearby Ralston Middle School. There were only 2 bicyclists observed in each of the North and Eastbound directions in the AM peak hour and 5 in each direction during the PM peak indicating lesser bicycling activity at the intersection. The PASS study also made similar observations concerning the AM peak in that westbound volumes were particularly heavy due to vehicles waiting for a sufficient gap in oncoming traffic to make a left turn into Ralston Middle School. As a result, instead of attempting to make a left turn at the school driveway, vehicles were observed driving farther west on Ralston Avenue to Hallmark Drive, at which point they would make U-turns and then turn right into the school.

4.7.2 Regulatory Setting

State and local laws, regulations, and orders that pertain to transportation and traffic resources under the project are presented below.

Federal and State

Highway Capacity Manual (HCM)

The Highway Capacity Manual (HCM) provides transportation practitioners and researchers with a consistent system of techniques for the evaluation of the quality of service on highway and street facilities. Its objectives include providing a logical set of methods for assessing transportation facilities, assuring that practitioners have access to the latest research results. The HCM is an accepted transportation analysis methodology reference tool utilized by transportation engineering professionals.

Manual of Uniform Traffic Control Devices (MUTCD)

The Manual on Uniform Traffic Control Devices (MUTCD) is approved by the Federal Highway Administrator as the National Standard in accordance with Title 23 U.S. Code. The California Department of Transportation has adopted the California MUTCD to provide for uniform standards and specifications for all official traffic control devices in California.

California Environmental Quality Act (Section 21000 et seq.) and CEQA Guidelines (Section 15000 et seq.)

CEQA requires state and local agencies to identify the significant environmental impacts of their actions, including potential significant impacts on transportation and traffic systems.

California Government Code Section 65080

The State of California requires each transportation planning agency to prepare and adopt a regional transportation plan (RTP) directed at achieving a coordinated and balanced regional transportation system.

California Streets and Highways Code (Section 1 et seq.)

The code provides the standards for administering the statewide streets and highways system. Designated State Route and Interstate Highway facilities are under the jurisdiction of the California Department of Transportation (Caltrans), except where facility management has been delegated to the county transportation authority.

Local

City/County Association of Governments (C/CAG) of San Mateo County

The City/County Association of Governments (C/CAG) of San Mateo County acts as the San Mateo County Congestion Management Agency and is charged with monitoring the implementation of all elements of the Congestion Management Program (CMP) and determining conformance with the CMP's requirements and recommendations. The intersection of Ralston Avenue and El Camino Real is included under the CMP roadway network.

C/CAG Capital Improvement Program (CIP)

The Capital Improvement Program (CIP) is a seven-year program of projects expected to maintain or improve traffic levels of service and transit performance within San Mateo County, and to mitigate the impacts of land use decisions. Currently, there are no planned mitigations listed under the capital improvement program that are applicable to this project. In addition, the City of Belmont does not have a current standalone mitigation program in place within its General Plan, which is applicable to this project.

City of Belmont Guidelines for Traffic Impact Studies

In 2012, the City created the City of Belmont Guidelines for Traffic Impact Studies3 (Guidelines) which contain the significance criteria for a proposed project concerning transportation measures of effectiveness. The Guidelines4 were updated in August 2014, and those requirements are utilized for the TIA evaluation and results reported herein.

Ralston Avenue Corridor Study (RCS)

The City Council adopted the Ralston Avenue Corridor Study and Improvements Plan (RCS) in August 2014. The goal of the RCS was to determine the adequacy of existing and future traffic conditions, circulation, physical inventory of the gaps, and a multi-modal evaluation of traffic operations related to signals, pedestrian and bicycle facilities, transit, and parking in the Ralston corridor. Based on the outcome of this analysis, the RCS then developed transportation improvement alternatives—both short term and long term capital improvement projects, with associated budgets and funding strategies.

Program for Arterial Signal Synchronization (PASS)

The Department of Public Works received a grant from the Metropolitan Transportation Commission (MTC) in the Fall of 2013 for traffic signal timing analysis and improvement plans along the Ralston Avenue corridor and adjacent traffic signals along El Camino Real and Old County Road. The project's scope of work included analysis of existing conditions and various measures of effectiveness concerning the development of timing plans and their implementation along Ralston Avenue.

4.7.3 Methodology

4.7.3.1. Approach to Analysis

This analysis was based on the following development conditions:

Existing (2014) Conditions – Based on current traffic counts taken in February and March 2014 and existing roadway geometry and traffic control.

Existing (2014) plus Project Conditions – Based on existing traffic volumes, existing roadway geometry and traffic control and traffic generated by the project.

Future (2020) No Project Conditions – Based on existing traffic volumes and traffic added by approved projects that the City believes will contribute traffic to the study area by year of full

[3] *The City of Belmont Guidelines for Traffic Impact Studies*, The City of Belmont, February 2012.
[4] *The City of Belmont Guidelines for Traffic Impact Studies*, The City of Belmont, August 2014.

project completion (anticipated to be 2020 or earlier). This development condition also includes other regional traffic growth obtained from the San Mateo Countywide gravity demand model, which is maintained by the City/County Association of Governments of San Mateo County (C/CAG) in the form of compounded annual growth rates in addition to assumed growth at Ralston Middle School and Fox Elementary School. The roadway network includes existing conditions plus programmed roadway projects to be in place at the same time the project is anticipated to be complete.

Future (2020) plus Project Conditions – Based on existing traffic volumes, traffic added by approved projects as referenced above, regional traffic growth, and traffic generated by the project. This scenario includes one roadway project programmed to be in place at the same time the project is anticipated to be completed: the signalization of Ralston Avenue and Tahoe Drive.

The peak hours analyzed within each scenario are to be defined as the following:

AM Peak Hour – The adjacent street traffic peak hour for each individual intersection (i.e., one hour between 7:00 a.m. and 9:00 a.m.) plus the traffic generated by CSUS during the school's ingress and egress routes surrounding the AM bell and associated pick-up and drop-off activities.

Midday Peak Hour – The adjacent street traffic peak hour for each individual intersection (i.e., one hour between 2:00 p.m. and 3:00 p.m.) plus the traffic generated by CSUS during the school's ingress and egress routes surrounding the afternoon bell and associated afternoon pick-up and drop-off activities. It is important to note that this does not correlate with the "typical" midday peak hour of adjacent street traffic; typically that peak lies between 11:00 a.m. and 2:00 p.m.

PM Peak Hour – The adjacent street traffic peak hour for each individual intersection (i.e., one hour between 4:00 PM and 6:00 PM) plus the traffic generated by CSUS during the school's ingress and egress routes surrounding the afternoon activities' dismissal time.

4.7.4 Impacts and Mitigation Measures

This subsection analyzes impacts related to transportation that could result from implementation of the project. It begins with the criteria of significance, which establish the thresholds for determining whether an impact is significant and concludes with transportation impacts associated with the project.

4.7.4.1 CEQA Criteria of Significance

The project would have a significant effect on transportation if it would:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;

- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- Result in inadequate emergency access; or
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

4.7.4.2 City of Belmont Criteria of Significance

Intersection Level of Service

Analysis of significant environmental impacts at intersections and roadway segments is based on the concept of Level of Service (LOS). Levels of Service for this study were determined using methods defined in the Highway Capacity Manual, 2000 (HCM) and appropriate traffic analysis software. The LOS of an intersection is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity.

The HCM includes procedures for analyzing side street stop controlled (SSSC), all-way stop controlled (AWSC), and signalized intersections. The SSSC procedure defines LOS as a function of average control delay for each minor street approach movement. Conversely, the AWSC and signalized intersection procedures define LOS as a function of average control delay for the intersection as a whole.

Table 4.7-3 relates the operational characteristics associated with each LOS category for signalized and unsignalized intersections.

Table 4.7-3: Intersection Level of Service Definitions

Level of Service	Description	Signalized (Avg. control delay per vehicle sec/veh.)	Unsignalized (Avg. control delay per vehicle sec/veh.)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream	10	10
B	Stable traffic. Traffic flows smoothly with few delays.	10 – 20	10 – 15
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	20 – 35	15 – 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	35 – 55	25 – 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	55 – 80	35 – 50

F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	80	50
Sources: Transportation Research Board, Highway Capacity Manual 2000, National Research Council, 2000.			

Project impacts are determined by comparing conditions with the project to those without the project. Potentially significant impacts for intersections are created when traffic from the project causes the LOS to fall below (worse than) a specific threshold or when delay and/or v/c ratios are increased beyond certain limits.

According to the potentially significant impact criteria documented in the City's Guidelines, for the project to create a potentially significant impact the project condition would need to meet the criteria listed in either Table 4.7-3 or Table 4.7-4. It should be noted that these guidelines are more stringent than surrounding jurisdictions' criteria, which simply cite an overall LOS standard with potential incremental criteria for cases where the base case is worse than LOS D only.

Table 4.7-4: Potentially Significant Impact Criteria for Signalized Intersections

If the base case (without project) LOS is:	Then the existing control delay is:	The project impact is considered potentially significant if the increase in control delay associated with the project is:	And the demand to capacity ratio (v/c) increased by more than :
A	10 second or less	10 seconds	0.02
B	10.1 to 20.0 seconds	10 seconds	0.02
C	20.1 to 35.0 seconds	7.5 seconds	0.02
D	35.1 to 55.0 seconds	4 seconds	0.01
E	55.1 to 80.0 seconds	4 seconds*	0.01
F	Greater than 80 seconds	4 seconds*	0.01

*If the addition of the project traffic results in a decrease in intersection delay, a project impact is considered potentially significant if 35 or more project trips are added to an intersection operating at LOS E or 20 or more project trips added to an intersection operating at LOS F.

For unsignalized intersections, the City's Guidelines have different criteria for all-way stop controlled intersections and side-street stop controlled intersections.

For all-way stop controlled intersections, project traffic would have a potentially significant impact if project traffic degrades operation of the intersection from acceptable conditions to poorer than LOS D operation. If the existing or Base Case (without project) operation of an all-way-stop intersection is already worse than LOS D, project related traffic would have a

potentially significant impact if the delay or volume thresholds listed in Table 4.7-5 are exceeded.

For side street stop controlled intersections, project traffic would have a potentially significant impact if project traffic degrades operation of stop sign controlled approaches and/or turn movements at a side street stop controlled intersection from acceptable conditions to poorer than LOS D operation (greater than 35 seconds of average control delay). If the existing or Base Case (without project) operation of the stop sign controlled approach or movement is already worse than LOS D (35 seconds control delay), project-related traffic would have a potentially significant impact if the delay or volume thresholds listed in Table 4.7-5 are exceeded.

Table 4.7-5: Potentially Significant Impact Criteria for Unsignalized Intersections

If the existing or base case (without project) LOS is:	Then the existing average control delay experienced by all drivers entering the intersection is:	The project impact is considered potentially significant if the average control delay associated with the project is:
A	10 second or less	10 seconds
B	10.1 to 15.0 seconds	5 seconds
C	15.1 to 25.0 seconds	5 seconds
D	25.1 to 35.0 seconds	4 seconds
E	35.1 to 50.0 seconds	4 seconds*
F	Greater than 50 seconds	4 seconds*

*If the addition of the project traffic results in a decrease in intersection delay, a project impact is considered potentially significant if 25 or more project trips are added to an intersection operating at LOS E or 15 or more project trips are added to an intersection operating at LOS F.

The approach using the City's Guidelines on side-street stop controlled intersections was verified in an email from the City on April 14, 2015.

Signal Warrant Impacts at Intersections

Traffic signals may be justified at unsignalized intersections when traffic operations fall below acceptable thresholds and when one or more signal warrants are satisfied. Traffic volumes at the unsignalized study intersections were compared against the peak hour warrant in the 2000 California Manual on Uniform Traffic Control Devices (CA MUTCD)[5]. Traffic Signal Warrant #3 – Peak Hour Volume Warrant is satisfied when traffic volumes on the major and minor approaches exceed thresholds for one hour of the day. The Peak Hour Warrant is generally the first warrant to be satisfied. Other warrants, such as for minimum vehicle volumes, interruption

[5] *California Manual on Uniform Traffic Control Devices,* (FHWA's MUTCD 2003 Edition, including Revisions 1 and 2, as amended for use in California), January 21, 2010

of continuous traffic, and traffic progression, were not evaluated because they generally require higher traffic volumes to be satisfied. According to the City's Guidelines, a potentially significant impact would occur if a project caused an unsignalized intersection to meet the warrant. For cases where a warrant is met under No Project Conditions, a project would create a potentially significant impact if project traffic increases the volume to capacity ratio (v/c) by 0.01.

Vehicle Queuing Impacts at Intersections

The effects of vehicle queuing were also analyzed and the 95th percentile queue is reported for all study intersections. The "95th percentile queue" length is a best practice metric used in transportation engineering analysis concerning queue lengths and represents a condition where 95 percent of the time during the peak period, traffic volumes and related queuing will be at, or less, than the queue length determined by the analysis; average queuing is generally less.

Queuing is considered a potentially significant impact since queues that exceed the turn pocket length can create potentially hazardous conditions by blocking or disrupting through traffic in adjacent travel lanes. However, these potentially hazardous queues are generally associated with left-turn movements. Locations where the right turn pocket storage is exceeded are not considered potentially hazardous because the right turn movement may go at the same time as the through movement and the additional vehicles that spill out over the turn pocket will not be hindering or disrupting the adjacent through traffic as would be the case in most left turn pockets.

The City's criteria states that there would be a potentially significant impact if project traffic creates vehicle queues exceeding turn lane capacity or causes problematic back-ups of traffic on driveways or roadways on or off the project site. For locations where Base Case volumes already create vehicle queues exceeding turn lane capacity, there would be a potentially significant impact where project traffic increases vehicle queues by 1 percent.

Thus, for purposes of this analysis a potentially significant queuing impact was interpreted and confirmed by the City of Belmont to occur if:

> Project traffic creates vehicle queues exceeding turn lane capacity or causes problematic back-ups of traffic on driveways or roadways on or off the project site. For locations where Base Case volumes already create vehicle queues exceeding turn lane capacity, project traffic increases the Base Case vehicular queue length by 25', the conservative length of one vehicle (e.g., if the Base Case turn pocket storage length is 150' and the Base Case analyzed vehicular queue length is 155', the addition of 25' or one vehicle would cause a potentially significant impact). [6]

Turn Lane Warrant Impacts at Intersections

The City's Guidelines state that there would be a potentially significant impact if project traffic increases volumes to a level meeting or exceeding criteria for the provision of a right or left turn lane on an intersection approach. For locations where Base Case volumes already exceed turn

[6] This interpretation is conservative and was approved by the City of Belmont on March 12, 2015. Given the City's Guidelines, it would require an existing storage pocket of at least 2,500 feet before the addition of more than one vehicle (assuming a vehicle length of 25 feet) would not be considered a potentially significant impact. This is based on the 1 percent threshold set by the City.

lane warrant criteria levels, there would be a potentially significant impact where project traffic increases peak hour volumes by more than 1 percent.

Using Highway Capacity Manual (HCM) 2000 methodology, the presence of exclusive left-turn lanes is determined by the volume of left-turn traffic, opposing volumes, and safety considerations. A single exclusive left-turn lane is warranted when the volume exceeds 100 vehicles per hour, double exclusive left turn lanes are warranted when the turning volume exceeds 300 vehicles per hour.

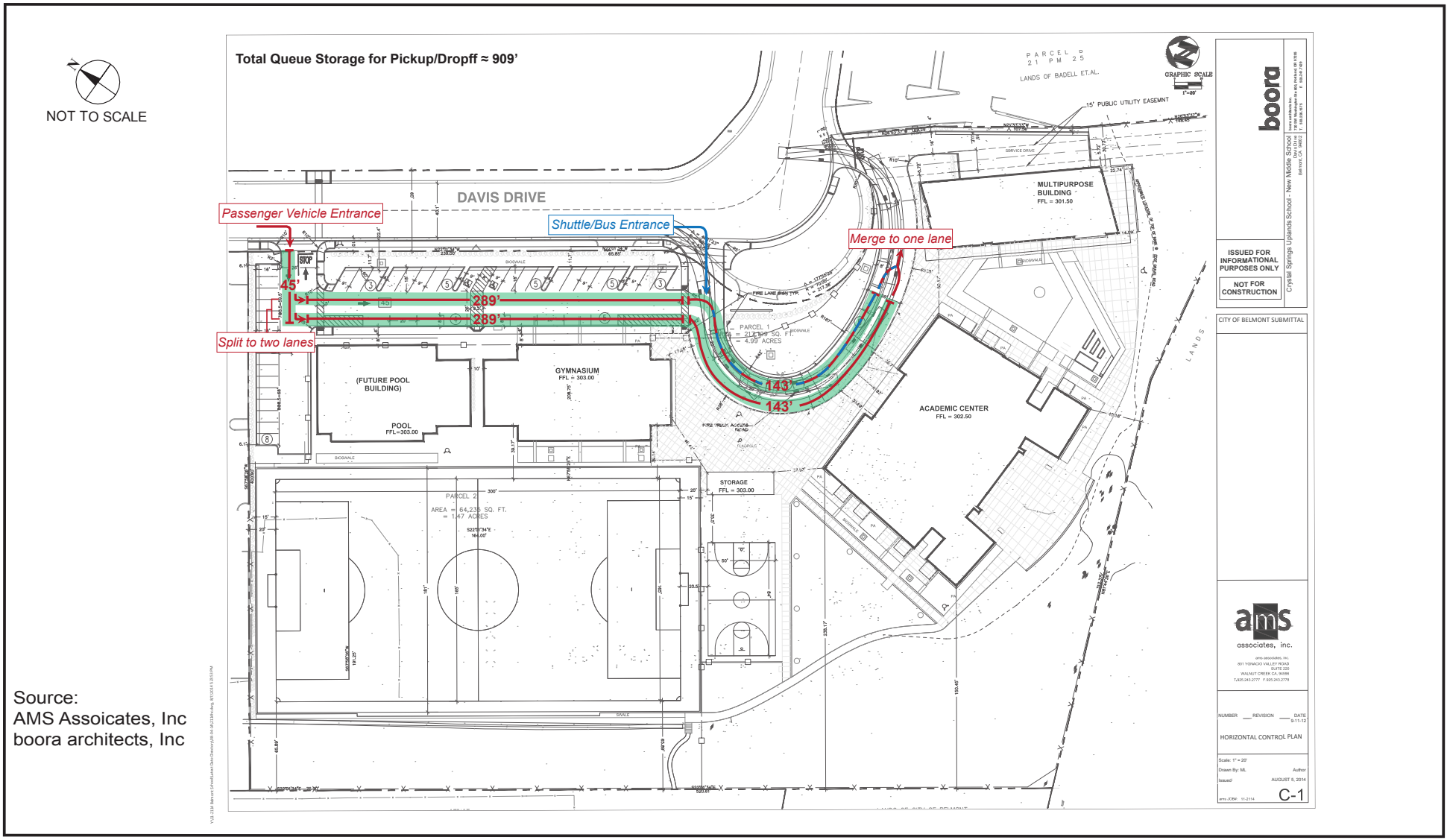
Although right turns are generally made more efficiently than left turns, exclusive right-turn lanes are often provided for many of the same reasons that left-turn lanes are used. Right turns may face a conflicting pedestrian or bicycle flow, but they do not face a conflicting vehicular flow. According to HCM 2000, in general, an exclusive right-turn lane should be considered if the right-turn volume exceeds 300 vehicles per hour and the adjacent mainline volume exceeds 300 vehicles per hour per lane.

4.7.4.3 Proposed Site Use

The project is to be located on 6-8 and 10 Davis Drive. The site is currently occupied by two vacant buildings, which are to be demolished and replaced with new school buildings. The site was previously used as office and warehouse space.

Driving south along Davis Drive from Ralston Avenue, the project site sits on the right/western side of the road. The northern portion of the site is proposed to contain a parking lot (which also serves as the passenger vehicle entrance point for the student drop-off/pickup arc) with a stop sign controlled access point onto Davis Drive for the parking lot egress. Behind the parking lot sits the future pool building and gymnasium while a playing field and outdoor play courts are farther to the west and internal to the site.

Farther south along Davis Drive is a second driveway leading to the drop-off/pickup arc, restricted to busses and shuttle access only. The drop-off/pickup vehicular exit point is farther south and is stop sign controlled. The drop-off/pickup arc lies adjacent to the Academic Center, which contains classrooms and school administration offices. In addition, there is a science court and dining terrace in the building's vicinity. The service court is at the southernmost point of the site and vehicular access for this use is via a shared access point with the student pick-up and drop-off area exit. The project site plan is presented in Figure 4.7-4.



Source:
AMS Assoicates, Inc
boora architects, Inc

Source: Kimley Horn, 2015

4.7.4.4. Transportation Demand Management (TDM) and Project Trip Generation

A recent CSUS commute survey of middle school parents determined that nearly 30 percent of middle school students currently carpool to campus and that approximately 35 percent of them travel to campus by train/shuttle and bus. When queried about how they would transport their students to a Belmont campus, 65 percent of respondents indicated that they would voluntarily utilize carpools, trains/shuttles, buses or local shuttles.

Notwithstanding this high level of voluntary participation, CSUS intends to require as a condition of admission that all middle school families commit to support and participate in trip reduction efforts.

CSUS will implement a Transportation Demand Management (TDM) program as part of the project. The purpose of the TDM program is to reduce the number of vehicular trips to and from the project in order to minimize traffic congestion along the Ralston Avenue corridor and reduce overall vehicle emissions.

CSUS proposes a comprehensive TDM program that requires buses, van shuttles, and carpools to reduce solo vehicle trips to and from the school. The TDM program includes CSUS buses and van shuttles provided free of charge to transport approximately 100 students from the Hillsdale Caltrain station and various other locations in the morning and back again in the afternoon hours. A similar program is currently in effect at the existing CSUS Hillsborough campus.

CSUS also proposes to offer bus service that would pick up students at locations along the I-280 corridor, such as the Foothill Expressway exit in Los Altos, the Sharon Heights Shopping Center in Menlo Park, and Woodside Road in Woodside.

CSUS states that measures implemented as part of the TDM program will include the following;

- On-site TDM outreach coordinator to implement the plan and identify appropriate shuttle loading areas;
- Distribution of TDM program information to all CSUS families;
- On-site shuttle, Caltrain, and BART schedules;
- Subsidized rail passes;
- Guaranteed ride home program; and
- Use of the Highway 92 Park & Ride as a resource for ridesharing.

Other potential measures that could be implemented as part of the TDM plan, as proposed by CSUS, include:

- Use of the Notre Dame de Namur University (NDNU) shuttle service to reduce after school trips (normal hours of operation are 5:00 p.m. – 10:30 p.m.)
- Staff participation in the bus/van shuttle program, subsidized rail passes, and a guaranteed ride home program.

The goal of these programs is to have 70 percent participation in the TDM program, so that approximately 70 percent of CSUS students would arrive by shuttle, van, or carpool. CSUS would provide the City with TDM monitoring reports to: 1) assess the efficacy of the TDM program at reducing vehicle trips to and from the school, and (2) ensure that CSUS continues to implement a successful TDM program. vehicular trips do not exceed those projected in this EIR.

CSUS would provide bi-monthly reports during the school's first year of operation, and annual reports thereafter. These reports would be based upon surveys, which include and traffic counts conducted at the project driveways to quantify school trip generation.

At the City's option, an outside monitor (funded by CSUS), could be hired by the City to conduct unannounced monitorings on intervals to be determined by the City. If needed, as determined by the City, in-pavement counters could be installed for even more frequent monitoring. Further details regarding the TDM program are included in Appendix H in the Proposed Traffic Flow, Parking, and TDM Plans.

Trip generation was calculated based on discussions with the current CSUS staff members and representatives, through discussions with City staff and by the consultant's verifying the CSUS's proposals by review of trip generation data at the existing CSUS Hillsborough campus. The number of students expected to take buses and van shuttles were determined by data obtained from a commute survey of existing CSUS Middle School parents, as well as the school's planned TDM program reductions (i.e., CSUS will require parents of students to sign an agreement indicating that they understand, and will abide by, the requirements and programs presented in the school's Transportation Policies. Parent awareness and participation will be supported by a TDM outreach coordinator and an incentive and rewards program found to be successful in similar sized schools at the Middle School grade level. Routine monitoring and reporting to the City will be a part of the school's TDM program.)[7] Table 4.7-6 presents the trip generation for the project.

School Day

In order to avoid an overlap with the drop-off and pick-up for Ralston Middle School (RMS), classes will begin at 7:45 a.m., 35 minutes before the start time for RMS (8:20 a.m.) and would dismiss at 3:20 p.m., 17 minutes after RMS (3:03 p.m.). Both drop-off and pick-up have been designed to be self-contained on the Campus in order to minimize spillover onto Davis Drive.

The project would generate new trips with up to 240 students and 43 faculty/staff members. Based on survey data and CSUS' required parent participation in a TDM program, it was estimated that sixty-eight students would use van shuttles that would transport 9 students per shuttle. Buses would transport 32 students (with two buses at 16 students per bus). Of the remaining 140 students, approximately half are conservatively assumed to be individual trips with one student per vehicle; carpooling vehicles are assumed as two students per vehicle.

For faculty, based on existing patterns of arrival/departure, it was assumed that approximately 27 of the faculty/staff members would arrive prior to the start of school (i.e., before 7:20 a.m.) and the AM peak period. Thirteen faculty/staff members would arrive during the AM Peak period and three faculty members would arrive throughout the rest of the day. It was assumed that all faculty members would leave during the PM Peak period.

[7] The number of students expected to take buses and van shuttles were determined by data obtained from a commute survey of existing CSUS Middle School parents, as well as the school's planned TDM program reductions (i.e., CSUS will require parents of students to sign an agreement indicating that they understand, and will abide by, the requirements and programs presented in the school's Transportation Policies. Parent awareness and participation will be supported by a TDM outreach coordinator and an incentive and rewards program found to be successful in similar sized schools at the Middle School grade level. Routine monitoring and reporting to the City will be a part of the school's TDM program.)

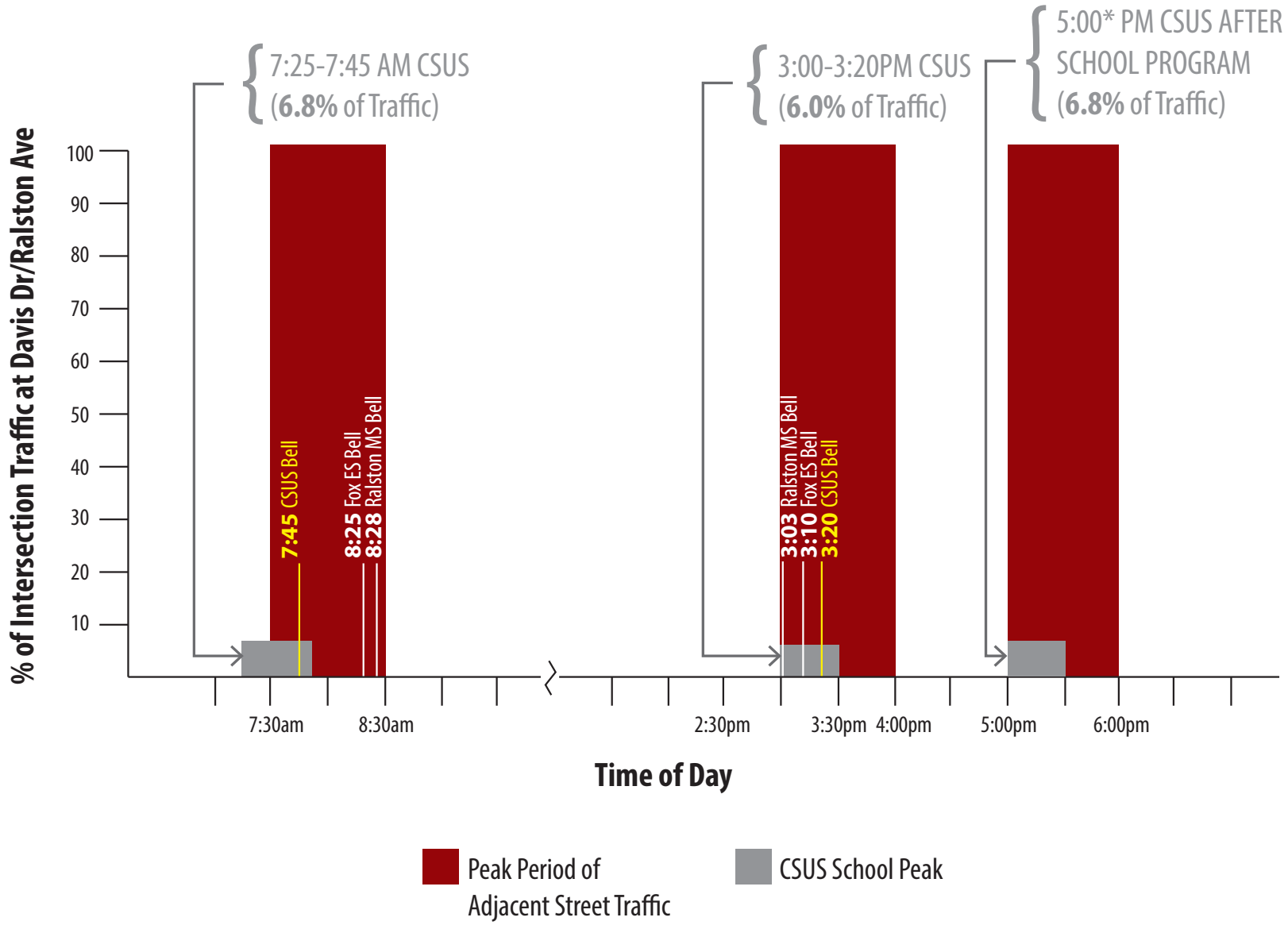
Athletic Events

Trip generation for athletic events has also been calculated as part of the school's typical day. Middle school sports include activities such as flag football, softball, soccer, basketball, volleyball, baseball, cross-country, and track and field. Some games/meets are held at dedicated facilities elsewhere (i.e. cross-country venues, baseball fields, tracks). Home games hosted at the middle school campus would start shortly after the formal school day ends and would usually finish by 6 p.m. The latest time a middle school game would end is 7:30 p.m.

Attendance at CSUS middle school athletic events is usually between 10-25 spectators, so for purposes of the TIA analysis, 25 spectators per game were conservatively assumed. Opposing teams generally travel in vans, buses or parent carpools. It is estimated that the middle school would host an average of three home games per week (approximately 110 total per academic year) clustered during each of the four sports seasons.

In addition, the CSUS upper school swim team would utilize the middle school swim facilities for practices. Students and coaches would travel to the Belmont campus in a bus or shuttles. The bus/shuttle is anticipated to arrive during the school midday peak, wait on-site, and depart after practice during the analyzed PM peak.

Figure 4.7-5 displays the CSUS start and end times in relation to the adjacent street traffic peak and the start and end times of adjacent schools. The analysis assumes that the CSUS drop-off would occur during the adjacent street traffic peaks, which is a conservative approach. The analysis of CSUS traffic occurring at the same time as the adjacent street traffic is conservative for two reasons: 1) it intensifies the analysis given that adjacent schools are in operation at these times, and 2) increases the overall vehicular volume using the intersection.



*Student pick-up is spaced throughout the afternoon (3:20 - 5:00pm) to accomodate after school activities. The CSUS traffic during the 3:00pm block represents the ingress after school activity trips, plus the mid-day school dismissal trips. The CSUS traffic during the 5:00pm block represents the after school activity pick-up trips.

Source: Kimley Horn, 2015

Figure 4.7-5
CSUS Bell versus Peak Traffic

As noted in Table 4.7-6, the project would generate approximately 243 new AM peak period trips, 149 new Midday peak period trips and 186 new PM peak period trips.

For the two afternoon periods, the assumption is that there would be some students arriving and leaving school each day using a different mode of travel, thus creating some flexibility between the modes. Therefore, while most students would likely arrive and depart school in the same manner, some are likely to change their mode of travel in the afternoon due to after school activities, etc. For example, a student may ride the bus in the morning but take a carpool in the afternoon, whereas another student may be dropped-off at school by their parent in the morning but travel via bus or carpool in the afternoon.

Table 4.7-6: Project Trip Generation

Time Period	Trip Type	Trip Rate			Trips		
		In	Out	Total	In	Out	Total
AM Peak	Shuttle (68 Students)	.111	.111	.222	8	8	16
	Bus (32 Students)[A]	.0625	.0625	.125	2	2	4
	Carpool (70 Students)	.5	.5	1	35	35	70
	Single (70 Students)	1	1	2	70	70	140
	Faculty (43 Staff)[C]	1	0	1	13	0	13
	Net New Vehicle Trips				**128**	**115**	**243**
Midday Peak[B]	Shuttle (68 Students)	.0556	.0555	.111	4	4	8
	Bus (32 Students)[A]	.0625	.0625	.125	2	2	4
	Carpool (70 Students)	.25	.25	.5	18	18	36
	Single (70 Students)	.5	.5	1	35	35	70
	Faculty (43 Staff)[C]	0	0	0	0	0	0
	Upper School Swim Practice (1 Shuttle)	1	0	1	1	0	1
	Athletic Event (2 Shuttles)	1	0	1	2	0	2
	Athletic Event (25 Spectators)	1	0	1	25	0	25
	Athletic Event (3 Event Staff)	1	0	1	3	0	3
	Net New Vehicle Trips				**89**	**59**	**149**
PM Peak[B]	Shuttle (68 Students)	.0555	.0556	.111	4	4	8
	Bus (32 Students)[A]	0	0	0	0	0	0
	Carpool (70 Students)	.25	.25	.5	17	17	34
	Single (70 Students)	.5	.5	1	35	35	70
	Faculty (43 Staff)[C]	0	1	1	0	43	43
	Upper School Swim Practice (1 Shuttle)	0	1	1	0	1	1

	Athletic Event (2 Shuttles)	0	1	1	0	2	2
	Athletic Event (25 Spectators)	0	1	1	0	25	25
	Athletic Event (3 Event Staff)[D]	0	1	1	0	3	3
	Net New Vehicle Trips				**56**	**130**	**186**

[A] There are two buses each anticipated to carry 16 students for a total of 32 students traveling via bus. It is not necessarily assumed that all bused students depart immediately after school. Typical daily activities will fluctuate, but the worst case is still presented in that all single and carpool trips are conservatively included in the trip generation for all peaks. In addition, the number of student passengers does not change the generation or frequency of a bus trip.

[B] Approximately 50 percent of student generated trips would occur in the Midday peak period following school and the remainder would occur during the PM Peak period. It is important to note that the Midday peak period analyzed here does not correlate to the typical Midday peak of adjacent street traffic. Instead it correlates with the various local school dismissal times and thus is the worst case "midday" scenario.

[C] Approximately 27 faculty members are assumed to arrive prior to the start of school, before the AM Peak period, 13 faculty members arriving during the AM Peak and the remaining 3 faculty member will arrive throughout the rest of the day. All faculty members are assumed to leave during the PM peak period.

[D] Athletic event staff consists of miscellaneous members of the athletic event that may generate trips beyond the spectators, competing team, and attendees already on-site, such as referees or score keepers.

Trip rates were obtained from information from CSUS staff on the anticipated mode choices of students along with knowledge of after-school activities.

Source: Kimley-Horn and Associates, Inc., 2014

CSUS Special Activities & Events

The school is anticipated to have isolated special activities and programs throughout the course of the school year which may generate trips higher than those indicated during the typical daily school AM, Midday, or PM peak hours shown in the study trip generation. The largest events are listed below and a full list can be seen in Appendix H.

- Curriculum Night – Typically held one evening each Fall (usually early September) where parents attend their children's classes to hear about their curriculum. Parents arrive periodically between 5:30 and 6:30 p.m., spreading out traffic during the evening commute.
- Admission Open House Events – A few events are hosted to show prospective new students and families the middle school campus. They are traditionally held on Saturdays and Sundays, thereby avoiding conflict with local weekday traffic.
- Fine Arts – There are a total of four theatrical, music, and fine arts events throughout the year. CSUS estimates up to 250 attendees for these evening performances, which generally start at 7:00 p.m and end by 10:00 p.m.
- Upper School Athletic Events – CSUS will host a few upper school sporting events (e.g., basketball games, volleyball games) at the middle school gymnasium, approximately ten times per year. These games generally start at 5:00 p.m. and finish by 9:00 p.m. with attendance estimated at 30-40 people. In addition, the school would potentially hold three to four swim meets per year. The meets would take place after school or on weekends. Estimated maximum attendance for the largest meet would be 100 swimmers and coaches, and 25 spectators. The teams would arrive via buses and vans and the spectators would likely

drive individually. Swimmers and coaches would start arriving at 3:00 PM, with spectators arriving by 4pm for weekday meets. The events would be over between 6:00 and 6:30 PM. Weekend meets would be held during the day on Saturdays.

- Graduation – A graduation event for 8th graders is held in early to mid-June from 7:00-9:00 PM. It is estimated there will be 250 attendees for this event.

Through an established parking agreement, all of the above events will have all parking accommodated either on-site or at a neighboring Davis Drive site for overflow parking. While these special events may cause higher trip generation numbers in some isolated cases, they are infrequent, not representative of typical school days, and all efforts by CSUS planning staff are taken to minimize traffic impacts both on and off-site for such events. If the parking agreement is terminated for any reason, CSUS shall provide all parking for special events onsite, or shall secure alternative parking arrangements to the satisfaction of the Director of Community Development before holding any special events requiring additional parking.

4.7.4.5 Proposed Traffic Flow and Parking

On-site circulation was evaluated at the project's two driveways and within the project site based on information provided by CSUS in the form of a preliminary site plan.

There are two primary entrances to the project along Davis Drive and one additional access point that serves as a service vehicle access point. The northernmost curb cut would enter the northern half of the parking lot leading to the main parking area, serving the passenger vehicle entrance point for drop-off/pickup activities, and also serving as a parking lot exit point. The second curb cut would lead to the student drop-off/pickup arc in front of the Academic Center and would be for shuttles and buses only during drop-off/pickup activities. The third curb cut at the southernmost part of the site would be a shared student pickup/drop-off arc exit and service access point for vehicles to utilize the service court. All exits would be side street stop sign controlled intersections with signage and striping for pedestrian crossings.

On-Site Queuing

A queuing analysis was done for the student pickup/drop-off area for both the AM and midday peak periods, which are the times assumed for most student arrivals and departures, respectively. The majority of students would arrive within a 15-minute period in the AM (7:30 – 7:45 a.m.) and will depart within a 30-minute period in the midday (3:20 – 3:50 p.m.). These peaks, specifically the AM peak, are anticipated to be the worst case arrival and departure times for the CSUS campus, as all other times have anticipated minimal trips in terms of queuing. It is assumed that most staff is expected to arrive prior to the start of the morning queue before the AM peak hour. The rest of the staff would arrive during the 15-minute peak and access the on-site parking instead of utilizing the student pickup/drop-off storage area. All faculty members are assumed to leave during the PM peak hour after the student departures during the midday peak hour.

In total, there are 115 vehicle trips arriving for the queue in the AM and 59 vehicle trips arriving for the midday queue; this is inclusive of bus and shuttle trips for each peak period. Based on engineering and professional judgment, conservative estimates for pickup and drop-off dwelling times of 60 seconds and 30 seconds, respectively, were used in the analysis. The pick-up and drop-off time is the assumed amount of time it takes for a vehicle to enter a dedicated pick-

up/drop-off space within the driveway arc and for children to safely enter or exit the car. The conservative estimates used in this analysis are higher than those typically used for middle-school age children.

Information contained in the proposed site plan indicates approximately 909 feet of overall curb storage from Davis Drive through the student pickup/drop-off area, and a four vehicle utilization of the exclusive pickup/drop-off zone directly in front of the Academic Center.

In the AM, it is estimated the average arrival rate of drop-off time would be 7.67 veh/min; therefore, the total queue would be accommodated according to the site plan. In the midday, it is estimated the average arrival rate of pickup time is 1.97 veh/min, thus there would be no anticipated queue. This indicates that all vehicles would be served given the queue storage provided according to the site plan.

There is an adequate pedestrian crossing within the pickup/drop-off area to safely provide student access to two lanes of queued vehicular traffic. The queue analysis calculations can be found in Appendix H and more detail of pickup and drop-off protocols can also be found within Appendix H in the Preliminary Traffic, Parking, and TDM Plans.

On-Site Parking

On-site parking is provided on the project site. The site plan accommodates 53 parking spaces (two being ADA accessible), with 21 diagonal spaces, 15 perpendicular spaces, 9 spaces along the gymnasium building, and 8 spaces along the student drop-off/pickup area.

Evaluation of the project site was observed to provide a combined entrance/exit for 15 ninety degree parking spaces on the northern end of the lot. To access the additional 30 (21 angled and 9 parallel) parking spaces on the western edge, drivers must enter via the northerly driveway and exit to the south. Signage shall be placed to indicate the one-directional (southerly) traffic flow on the western side of the parking lot containing the angled spaces. Given the angled parking and lane width, vehicles are not allowed to enter this section via the southern entrance driveway.

Pedestrian Circulation

Internal pedestrian connections would link the multiple uses associated with the CSUS facility, such as the Academic Center, Science Court, playing fields, and gymnasium. These on-site elements would allow students, visitors, and faculty to conveniently walk from one destination to the next. A sidewalk will be constructed on the western side of Davis Drive as part of the project connecting Ralston Avenue to the project site. In addition, there are adequate pedestrian crossings at the site access point intersections and along the student drop-off/pickup area. South of the drop-off/pickup area, the campus is a pedestrian-only zone.

4.7.4.6 Project Trip Distribution and Assignment

For student generated trips, it was assumed that students would be transported to and from school via three different methods: (1) Bus, (2) Shuttle, or (3) Passenger car. For buses, the commute trips would be to and from remote pickup spots along the Peninsula, such as Menlo Park and Palo Alto, and one bus would access the Belmont/Hillsdale Caltrain. A shuttle would operate between the proposed site and the current CSUS campus located on Uplands Drive in Hillsborough to the north, and another between the project site and another offsite Park-n-Ride facility. For passenger car trips, carpooling or individual student trips would occur from various

locations throughout the area. This distribution was based on current student residency information and the likely travel routes taken from these residences.

Figure 4.7-6 presents the trip distribution assumed for this analysis, specific to the passenger vehicle trips. Point-to-point shuttle and bus trips were distributed separately and using the assumed origin/destination of the multi-passenger vehicles.

Based on the trip distribution, new vehicle trips generated by the project were assigned to the street network as shown in Figure 4.7-7, where total trips generated by the project are presented.

4.7.4.7 Less Than Significant Impacts

Project implementation would result in the following potentially significant transportation impacts.

Impact TRANS-1: The project would not conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation. (LTS)

The project would not conflict with adopted policies, plans, or programs supporting alternative transportation (including bicyclists and pedestrians); therefore, impacts would be ***less than significant*** and no mitigation measures would be required.

Impact TRANS-2: The project would not conflict with policies, plans, or programs regarding public transit services. (LTS)

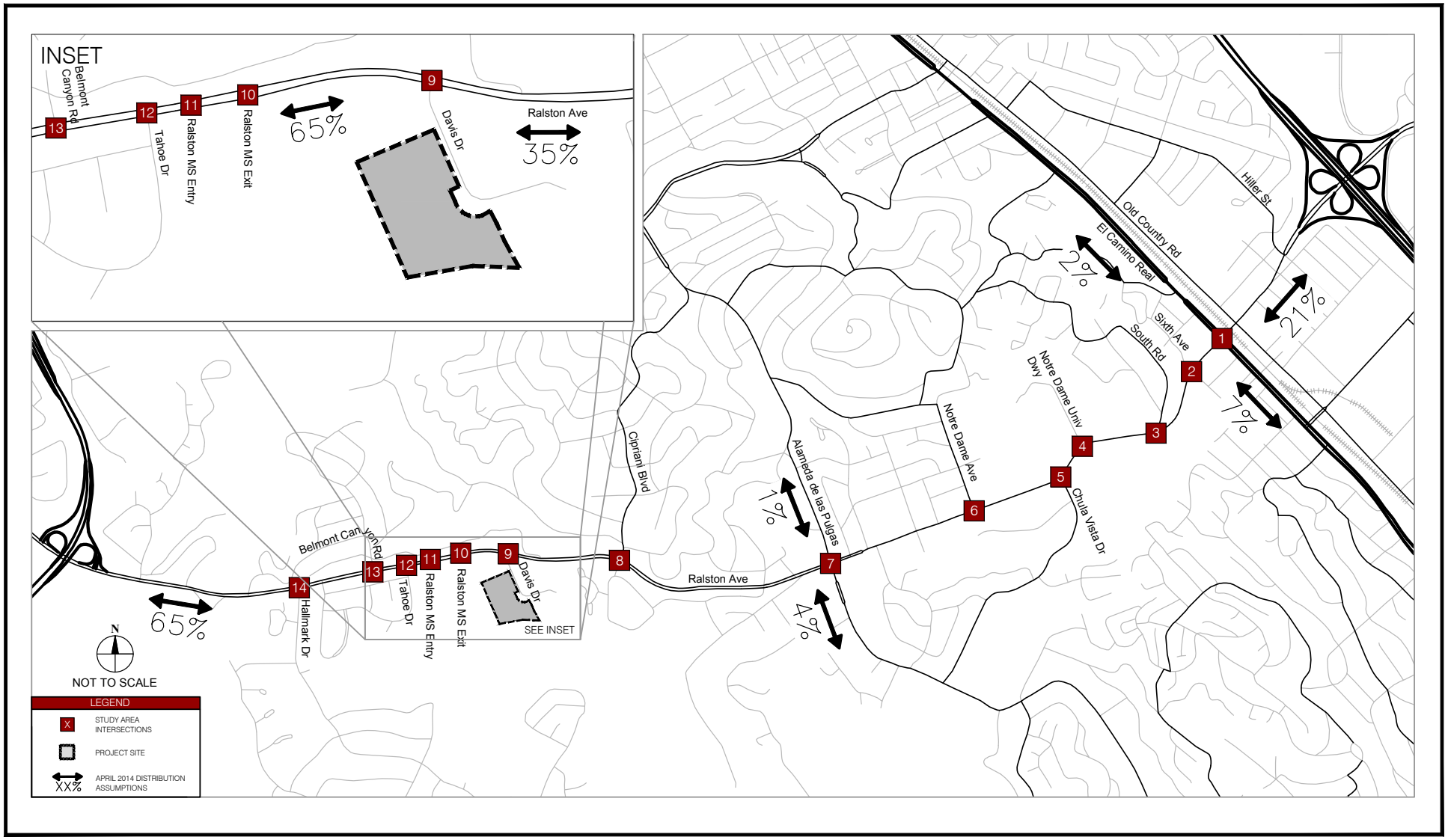
The project would not conflict with any planned public transit services. Students and employees of CSUS would have the option of driving, taking transit, walking, bicycling, or using either the bus or shuttle service provided. Those who choose to take transit have the option of taking the Belmont Caltrain (and subsequently utilizing the shuttle service provided by the school) or bus routes provided by SamTrans. CSUS is projected to use transit options, however, the proposed shuttle and bus operations serving the project would be private rather than public. The project's potential impact on public transit services would be ***less than significant***.

Impact TRANS-3: The project would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in a substantial safety risks. (LTS)

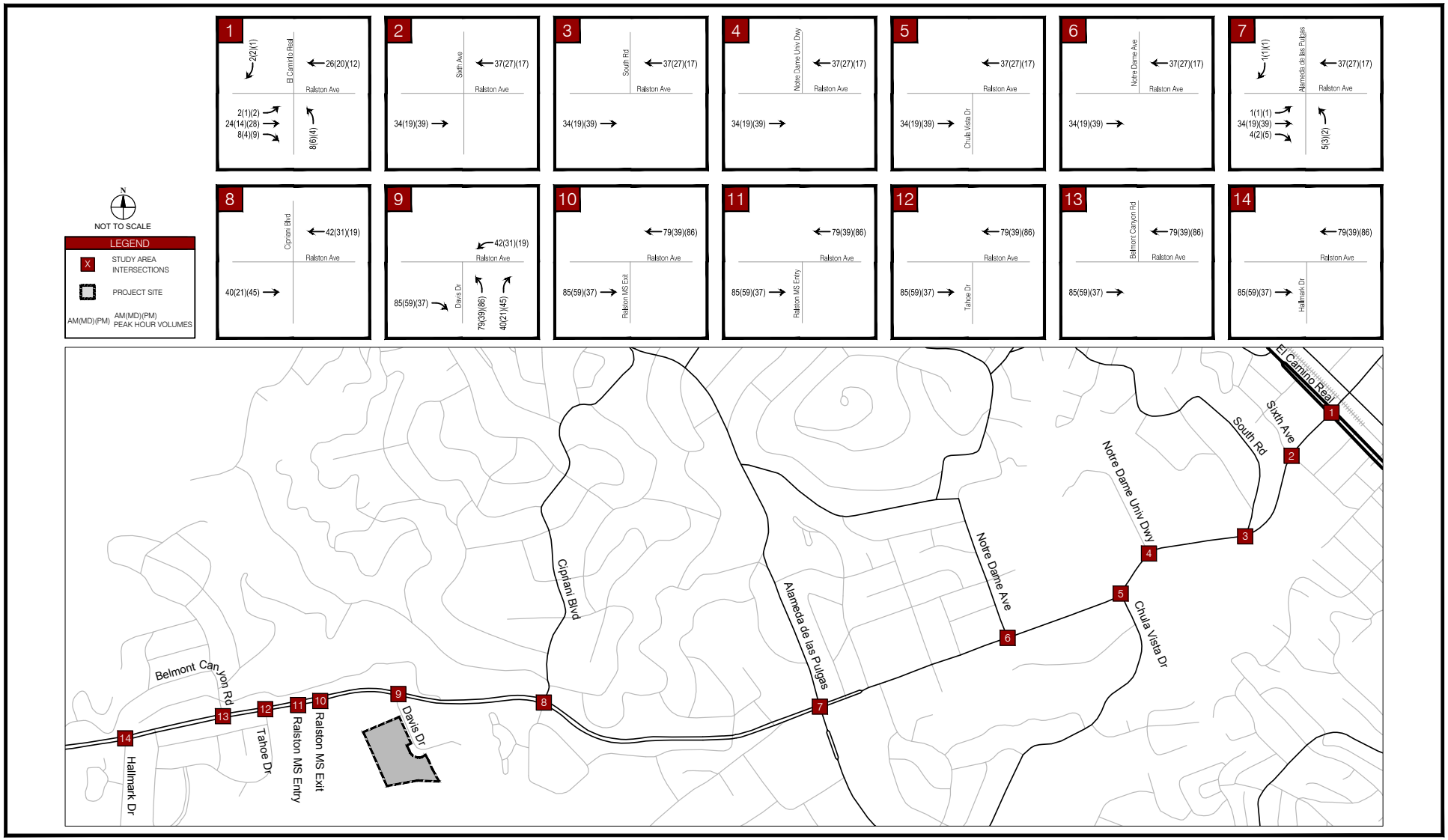
The project would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks. Due to the nature and scope of the project, project implementation would not have the potential to result in a change in air traffic patterns at any airport in the area. Therefore, the potential impact on air traffic patterns would be ***less than significant*** and no mitigation measures would be required.

Impact TRANS-4: The project would not result in inadequate emergency access. (LTS)

The project would not result in inadequate emergency access during construction or upon project completion. During construction, no roads would be closed that would impede emergency access. Emergency access to the project site is currently adequate and would only improve with the service roads proposed as part of the site plan. Therefore the project would not result in inadequate emergency access; impacts would be ***less than significant*** and no mitigation measures would be required.



Source: Kimley Horn, 2015



Source: Kimley Horn, 2015

Figure 4.7-7
Project Volume Increment

Impact TRANS-5: The project would not conflict with policies, plans, or programs regarding public bicycle and pedestrian facilities. (LTS)

The project was evaluated to determine if it would conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks) or generate pedestrian, bicycle, or transit travel demand that would not be accommodated by transit, bicycle, or pedestrian facilities and plans.

Sidewalks are already installed along Ralston Avenue near Davis Drive and exist on the eastern side of Davis Drive across from the project site. The project would construct a sidewalk on the western side of Davis Drive, adjacent to the project site, in order for CSUS to provide a safe pedestrian option for users. These proposed frontage improvements would extend the existing sidewalk along the western side of Davis Drive from the currently stopped sidewalk south of the Ralston Avenue / Davis Drive intersection to the main Academic Center access point to the south. There are existing crosswalks at the intersection of Ralston Avenue and Davis Drive providing pedestrian access to Davis Drive. Signage would be placed at the northern parking lot entrance/exit and around the student pickup/drop-off point to indicate pedestrian crossings.

A Class III bicycle facility currently exists along Ralston Avenue near the project site. In addition, a bicycle trail network exists immediately south of the site near Ralston Middle School for the Lake Road Trail.

The project would construct necessary on-site sidewalks, walkways, bicycle parking, and other amenities in compliance with the City's adopted policies, plans and programs; thus, the project's impact on transit, pedestrian and bicycle facilities is determined to be ***less than significant.***

Impact TRANS-6: The project would not result in existing-plus-project turn lane warrants being met at study intersections, and would not add traffic to locations where existing warrants are met. (LTS)

HCM 2000 methodology was used to determine if the addition of exclusive turn lanes were warranted at intersections. According to the City's Guidelines, there would be a potentially significant impact if exclusive turn lanes are warranted at an intersection after inclusion of the project. For locations where Base Case volumes already exceed turn lane warrant criteria levels, there would be a potentially significant impact where project traffic increases peak hour volumes by more than 1 percent. Turn lane warrants were considered during the AM, Midday, and PM peak. However, the AM and PM peak are assumed to be critical periods for vehicular volume and queuing activity within the study area in relation to adjacent street traffic and project specific traffic. As a result, only the AM and PM peak hour results are presented within this report.

The analysis showed that there are two (2) baseline deficiencies for Existing No Project Conditions at the study intersections in terms of turn lane warrant criteria, as shown below:

- Ralston Avenue / Sixth Avenue – Existing
- Ralston Avenue / Cipriani Boulevard – Existing

After inclusion of the project, these turns remain deficient but the project does not add any vehicles to the movements. Thus, according to the City's Guidelines, these are ***less than significant*** impacts.

Full analysis tables can be seen in Appendix H.

4.7.4.8 Significant Impacts

Impact Overview in the Context of the Ralston Corridor Study and Improvements Plan

This traffic analysis and evaluation of the proposed site plan has identified potential impacts as defined by the City's Guidelines' significance criteria that require mitigation under the California Environmental Quality Act (CEQA). Although CEQA requires all significant impacts to be mitigated, most of the locations with unacceptable operations and identified potential impacts already exist under baseline conditions (i.e. Existing Condition - 2014).

The Ralston Corridor Study and Improvements Plan (RCS) was approved by the City Council on August 26, 2014 and is intended to address existing and future impacts and constraints along the Ralston Avenue corridor. The project's impacted intersections overlap with a number of areas identified in the RCS; therefore, the mitigations listed below are discussed in the context of the RCS and the recommended improvements in the RCS.

Since the City does not currently have an established traffic impact fee (TIF) program, the City must determine project-related traffic impacts and mitigations on a case-by-case basis. The City must demonstrate that the required mitigation has a "nexus" to the impact of the development and is "roughly proportional" to these impacts. Consequently, when a project has an impact under the City's CEQA thresholds, but the cost of a physical improvement may be excessive, the City may determine a "fair share" cost contribution toward specific improvements based on a percentage of peak hour or daily trips that the project contributes to the roadway or intersection and other factors.

The RCS recognizes that there are instances where traffic signal warrants may be satisfied under the City's Guidelines triggering the need for signalization, but the RCS also acknowledges that other traffic improvements could provide equal or better operations and that traffic signals are not desired at certain intersections. As a consequence, the RCS requires that any determination the City makes regarding appropriate traffic mitigation measures for a development project along the Ralston Avenue corridor should be consistent with the RCS. This allows for the necessary flexibility to ensure both operational improvements and preservation of community character along the corridor.

Accordingly, this traffic analysis addresses mitigations for the project's identified impacts within the context of the RCS' anticipated improvements for the Ralston Avenue corridor.

Impact TRANS-7: The project could fail to meet its TDM vehicle trip reduction goals, or conflict with applicable congestion management program standards, and City of Belmont standards pertaining to maintaining acceptable intersection levels of service and/or adding to the need for intersection signalization (i.e., meeting signal warrants) and/or increase vehicle queues exceeding turn lane capacity, resulting in a potentially significant impact. (S)

Traffic operations were evaluated at the study intersections under existing conditions plus project volumes, as seen on Figure 4.7-8. Results of the analysis are presented in Table 4.7-7 Existing (2014) Plus Project Intersection Level of Service Summary, Table 4.7-8 Existing Plus Project (2014) Signal Warranted Intersection v/c Ratios and Table 4.7-9 Summary of Vehicle Queuing.

Level of Service

As shown in Table 4.7-7, the eight study intersections which currently operate below LOS D (greater than 35 seconds of delay) under Existing Conditions, continue to operate below standards with the inclusion of the project. As noted earlier, under the City's traffic impact thresholds, intersections operating unacceptably or that have specific increases in delay are considered to be potentially significant impacts. Table 4.7-7 shows that the following intersections would operate below LOS D (greater than 35 seconds of delay) in the Existing Plus Project scenario:

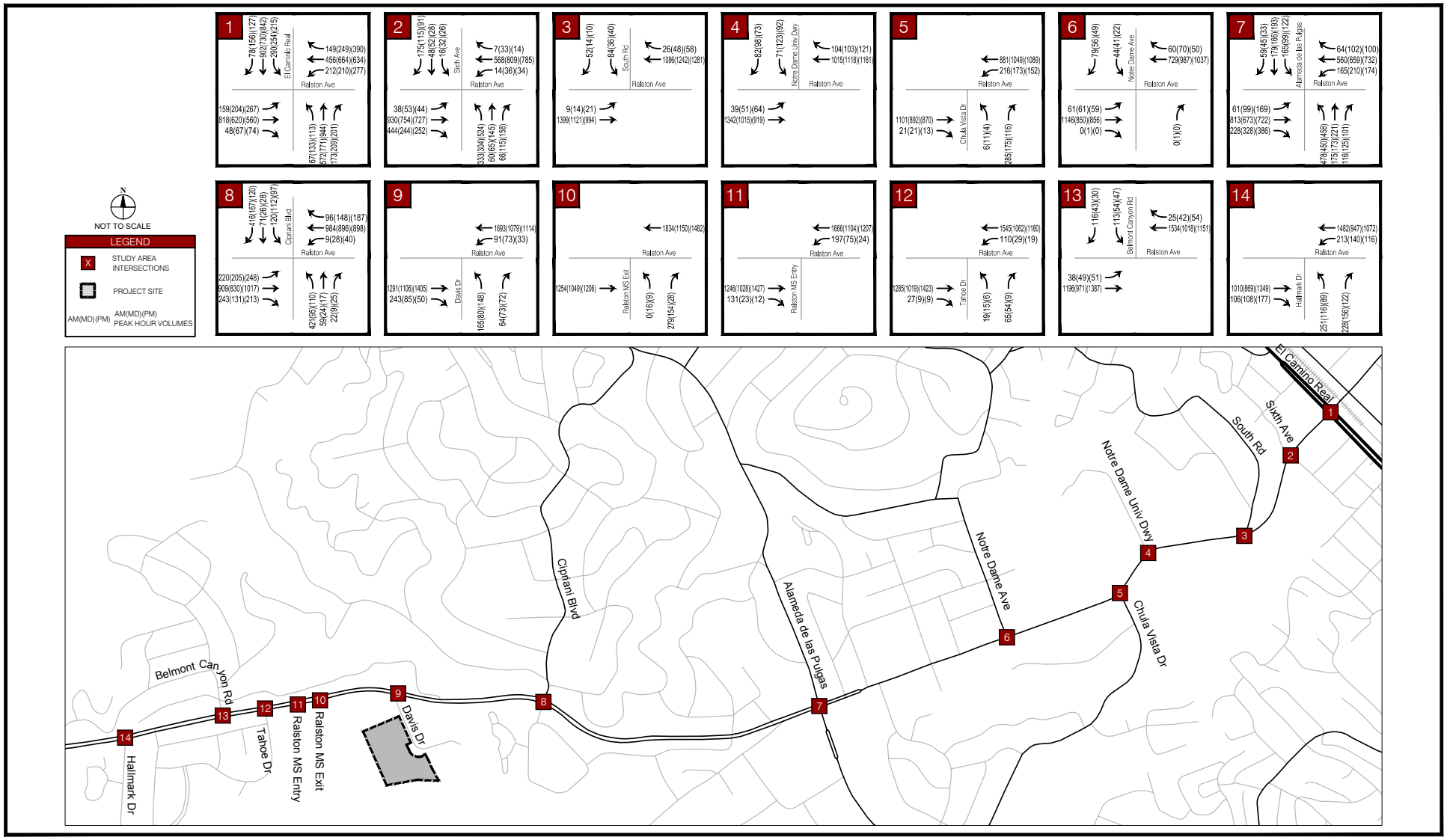
- #1 – Ralston Avenue and El Camino Real - Signal
    - Midday and PM Peak Hours
- #3 – Ralston Avenue and South Road - AWSC
    - AM, Midday, and PM Peak Hours
- #4 – Ralston Avenue and Notre Dame University Road - SSSC
    - AM, Midday, and PM Peak Hours
- #5 – Ralston Avenue and Chula Vista Drive - SSSC
    - AM and Midday Peak Hours
- #6 – Ralston Avenue and Notre Dame Avenue - SSSC
    - AM and Midday Peak Hours
- #8 – Ralston Avenue and Cipriani Boulevard - Signal
    - AM Peak Hour
- #10 – Ralston Avenue and Ralston MS Exit - SSSC
    - AM and Midday Peak Hours
- #12 – Ralston Avenue and Tahoe Drive - SSSC
    - AM, Midday and PM Peak Hours

Intersection Delay & LOS – Potentially Significant Impacts

In addition, the following intersections are considered to have potentially significant impacts according to the City of Belmont Guidelines:

- #3 – Ralston Avenue and South Road - AWSC
    - AM, Midday, and PM Peak Hours
- #12 – Ralston Avenue and Tahoe Drive – SSSC
    - AM Peak Hour

Analysis sheets are provided in Appendix H and were completed using Highway Capacity Manual (HCM) 2000 methodologies in Synchro.



Source: Kimley Horn, 2015

Figure 4.7-8
Existing Plus Project Turning Movements

Table 4.7-7 Existing (2014) Plus Project Intersection Level of Service Summary

Int #	Intersection	Control	Existing									Existing + Project														
			AM Peak			Mid-Day Peak			PM Peak			AM Peak					Mid-Day Peak					PM Peak				
			LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	Δ	v/c	Δ	LOS	Delay	Δ	v/c	Δ	LOS	Delay	Δ	v/c	Δ
1	Ralston Ave and El Camino Real	Signal	D	49.9	0.93	**E**	**60.9**	**0.88**	**E**	**56.2**	**0.93**	D	52.0	2.1	0.95	0.02	**E**	**61.9**	**1.0**	**0.89**	**0.01**	**E**	**57.8**	**1.6**	**0.93**	**0.00**
2	Ralston Ave and Sixth Ave	Signal	C	27.8	0.66	C	27.8	0.63	C	29.3	0.62	C	28.1	0.3	0.67	0.01	C	28.1	0.3	0.64	0.01	C	29.6	0.3	0.63	0.01
3	Ralston Ave and South Rd	AWSC	**F**	**212.0**	-	**F**	**139.4**	-	**F**	**127.3**	-	**F**	**228.4**	**16.4**	-	-	**F**	**149.5**	**10.1**	-	-	**F**	**137.0**	**9.7**	-	-
4	Ralston Ave and Notre Dame de Namur University Dwy	SSSC	A	9.9	-	**E**	**37.7**	-	B	10.4	-	B	11.2	1.3	-	-	**E**	**41.4**	**3.7**	-	-	B	11.3	0.9	-	-
	Worst Approach		***F***	***109.6***	-	***F***	***307.0***	-	*F*	*105.3*	-	***F***	***128.6***	***19.0***	-	-	***F***	***343.8***	***36.8***	-	-	***F***	***117.7***	***12.4***	-	-
5	Ralston Ave and Chula Vista Dr	SSSC	**F**	**52.3**	-	A	4.3	-	A	2.2	-	**F**	**56.1**	**3.8**	-	-	A	4.4	0.1	-	-	A	2.2	0.0	-	-
	Worst Approach		***F***	***370.2***	-	***E***	***38.4***	-	*C*	*23.4*	-	***F***	***408.5***	***38.3***	-	-	***E***	***40.8***	***2.4***	-	-	*D*	*25.2*	*1.8*	-	-
6	Ralston Ave and Notre Dame Ave	SSSC	A	3.1	-	A	2.5	-	A	1.7	-	A	3.4	0.3	-	-	A	2.6	0.1	-	-	A	1.7	0.0	-	-
	Worst Approach		***E***	***40.4***	-	*E*	*38.6*	-	*D*	*32.9*	-	***E***	***45.4***	***5.0***	-	-	***E***	***41.2***	***2.6***	-	-	*D*	*34.3*	*1.4*	-	-
7	Ralston Ave and Alameda de Las Pulgas	Signal	D	44.1	0.83	D	46.0	0.83	D	41.8	0.80	D	44.7	0.6	0.85	0.02	D	46.4	0.4	0.84	0.01	D	42.4	0.6	0.80	0.00
8	Ralston Ave and Cipriani Blvd	Signal	**E**	**74.2**	1.00	C	27.5	0.67	C	27.6	0.72	**E**	**75.4**	**1.0**	**1.01**	**0.01**	C	27.9	0.4	0.68	0.01	C	28.0	0.4	0.74	0.02
9	Ralston Ave and Davis Dr	Signal	B	13.4	0.72	A	9.2	0.54	A	7.3	0.62	C	20.0	6.6	0.82	0.10	B	13.4	4.2	0.63	0.09	B	14.8	7.5	0.74	0.12
10	Ralston Ave and Ralston MS Exit	SSSC	A	5.0	-	A	3.8	-	A	0.5	-	A	4.5	-0.5	-	-	A	3.7	-0.1	-	-	A	0.4	-0.1	-	-
	Worst Approach		***E***	***40.9***	-	***E***	***35.5***	-	*C*	*23.1*	-	***E***	***38.1***	***-2.8***	-	-	***E***	***35.3***	***-0.2***	-	-	*C*	*22.1*	*-1.0*	-	-
11	Ralston Ave and Raltson MS Entrance	SSSC	A	1.1	-	A	0.4	-	A	0.1	-	A	1.2	0.1	-	-	A	0.4	0.0	-	-	A	0.1	0.0	-	-
	Worst Approach		*A*	*2.1*	-	*A*	*0.7*	-	*A*	*0.3*	-	*A*	*2.2*	*0.1*	-	-	*A*	*0.7*	*0.0*	-	-	*A*	*0.3*	*0.0*	-	-
12	Ralston Ave and Tahoe Dr	SSSC	A	1.5	-	A	2.8	-	A	0.5	-	A	1.9	0.4	-	-	A	3.4	0.6	-	-	A	0.6	0.1	-	-
	Worst Approach		*D*	*26.0*	-	***E***	***49.0***	-	***F***	***51.3***	-	***E***	***37.9***	***11.9***	-	-	***F***	***62.0***	***13.0***	-	-	***F***	***61.6***	***10.3***	-	-
13	Ralston Ave and Belmont Canyon Rd	Signal	B	14.4	0.72	A	8.5	0.51	A	7.1	0.55	B	15.0	0.6	0.75	0.03	A	8.5	0.0	0.53	0.02	A	7.2	0.1	0.55	0.00
14	Ralston Ave and Hallmark Dr	Signal	C	23.8	0.79	B	15.1	0.58	B	15.2	0.69	C	25.3	1.5	0.82	0.03	B	15.5	0.4	0.60	0.02	B	15.4	0.2	0.71	0.02

Notes: All intersections are under the jurisdiction of the City.

Intersections that are operating below (worse than) LOS D are shown in BOLD. Potentially significant exceedance levels are highlighted.

Intersection delay, LOS, and v/c ratios calculated with Highway Capacity Manual (HCM) 2000 methodology using Synchro software.

It should be noted that calculations of delay at saturated conditions (i.e., LOS F) are less reliable than at LOS E or better. Therefore, delay in excess of 80 seconds is reported in the table to allow a relative comparison of without and with project conditions and should not be interpreted as an exact representation of actual delay.

Source: Kimley-Horn and Associates, Inc., 2014.

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Intersection Volumes Meeting Signal Warrants – Potentially Significant Impacts

Signal warrant calculations were conducted at the non-signalized study intersections for the Existing Plus Project conditions. While the project causes an increase in Ralston Avenue volumes, it does not increase volume on the side streets. Warrants are met at all unsignalized study intersections for Existing Plus Project Conditions except at Intersection #12: Ralston Avenue / Tahoe Drive, consistent with findings under Existing Conditions.

Table 4.7-8 provides a list of the warranted intersection's v/c ratios for the worst approach. These warranted intersections are potentially significant impacts according to the City's Guidelines, because their v/c ratios increase by more than .01 with the inclusion of the project.

As stated previously, the AM peak hour presents the worst case (or most likely case) for which the signal warrant would be met, as side street volumes are typically higher at this time in the study area. To present a worst case, only, the AM peak hour results are displayed in this report. The PM peak hour results are shown in the Appendix. Aside from those shown in the AM peak hour, no additional intersection locations will trigger a signal warrant at other peak traffic times of day.

Table 4.7-8 Existing Plus Project (2014) Signal Warranted Intersection v/c Ratios

Int. #	Intersection Description	Existing AM	Existing + Project AM	Δ v/c
3	Ralston Ave / South Rd	1.11	1.15	**0.03**
4	Ralston Ave / Notre Dame Univ.	0.79	0.81	**0.02**
5	Ralston Ave / Chula Vista Dr.	0.65	0.67	**0.02**
6	Ralston Ave / Notre Dame Ave.	0.64	0.66	**0.02**
10	Ralston Ave / Ralston MS Exit	0.55	0.57	**0.02**
11	Ralston Ave / Ralston MS Entrance	0.51	0.54	**0.03**

Notes: Intersection delay, LOS, and v/c ratios calculated with Highway Capacity Manual (HCM) 2000 methodology using Synchro software.

Source: Kimley-Horn, Inc. 2014.

As congestion increases, it is common for traffic at signals and stop signs to form lines of stopped (or queued) vehicles. Queue lengths were determined for each turn lane throughout the study. Synchro software calculates the queues based on HCM 2000 methodology.

The 95th percentile queue is calculated by using 95th percentile traffic to account for fluctuations in traffic and represents a condition where 95 percent of the time during the peak period, traffic volumes and related queuing will be at, or less than, that determined by the analysis and is used as the benchmark for impacts as a standard transportation engineering practice. Average queuing is generally less. Ninety-fifth percentile queuing was estimated under the various development conditions.[8] A typical vehicle length of 25 feet is used in the queuing analysis. Vehicle queuing was considered during the AM, Midday, and PM peaks.

[8] Existing queuing was calibrated in the Synchro model based on existing signal timing parameters and field observations.

The City's Guidelines state that there would be a potentially significant impact if project traffic creates vehicle queues exceeding turn lane capacity or causes problematic back-ups of traffic on driveways or roadways on or off the project site. For locations where Base Case volumes already create vehicle queues exceeding turn lane capacity, there would be a potentially significant impact where project traffic increases vehicle queues by 1 percent.

As stated in the methodology section, the criteria was interpreted to mean a potentially significant impact is assumed to occur if the queue exceeds the turn pocket length, the queue causes problematic back-ups of traffic or, in cases where the base case already exceeds turn pocket length, a potentially significant impact would occur if the queue is increased by one or more vehicles after the inclusion of the project.

A summary of the queuing results is included in Appendix H. The results indicated instances where queuing in the dedicated turn lanes may exceed the storage limits of the turn pockets.

The analysis showed that many existing turn bay lengths are exceeded under future traffic volumes. In most cases, these inadequate turn bay lengths are not associated with the project, but rather are a result of pre-existing deficiencies. For example, the southbound left turn queue at the intersection of Ralston Avenue / Alameda de las Pulgas is 177 feet during the AM peak during Existing Conditions and the queue length is also 177 feet during the AM peak in the Existing Plus Project conditions. The turn pocket length is 140 feet long and, because the queue spills out of the turn pocket under Existing Conditions, the result is a pre-existing deficiency not associated with the project. Therefore, since the project does not increase queues by at least one vehicle length, this is not a significant impact.

At the study intersections, the increase in vehicle queuing is typically less than one vehicle, except at the intersections listed in Table 4.7-9 where existing-plus-project queue lengths exceed existing condition queue lengths by two or three vehicles (see bolded text in table), resulting in a potentially significant impact.

Table 4.7-9: Summary of Vehicle Queuing

#	Intersection Name	Condition	Movement	Peak Period	Storage Length (ft)	Base Case Vehicle Queue Length (ft)	With Project Vehicle Queue Length (ft)	Exceeds Base Vehicle Queue Length by:
4	Ralston Avenue / Notre Dame University Driveway	Existing	SBR	MD	50	527	554	**27** **(2 vehicles)**
9	Ralston Avenue / Davis Drive	Existing	NBL	AM	50	102	177	**75 feet** **(3 vehicles)**
				MD		45	78	**33** **(2 vehicles)**
				PM		61	129	**68 feet**

								(3 vehicles)
			WBL	AM	65	76	129	**53 feet (2 vehicles)**
				MD		65	91	**26 (2 vehicles)**

Source: Kimley-Horn and Associates, Inc., 2015

Impact TRANS 7-1: Project Trip Generation and TDM Compliance by CSUS Middle School Parents. A less than effective TDM program could result in significant impacts. (S)

The projected trip generation for this project is based on the school's consistent and measurable achievement of a high level of compliance with its Transportation Demand Program (TDM Program). If this program is less effective than expected, trip generation will increase beyond projected levels, resulting in traffic impacts that exceed those addressed in this study.

Mitigation Measure TRANS 7-1: The applicant will maintain monitoring and reporting practices to ensure trip generation at or less than the volumes projected in this study.

The goal of the CSUS TDM program is to have 70 percent participation, so that approximately 70 percent of CSUS students would arrive by shuttle, van, or carpool. CSUS would provide the City with TDM monitoring reports to: 1) assess the efficacy of the TDM program at reducing vehicle trips to and from the school, and (2) ensure that vehicular trips do not exceed those projected in this EIR. CSUS will provide bi-monthly reports during the school's first year of operation, and annual reports thereafter. The frequency of these reports will be changed at the City's discretion. The reports will be based upon unannounced surveys and traffic counts conducted at the project driveways to quantify school trip generation. At the City's option, an outside monitor (funded by CSUS), shall be hired by the City to conduct unannounced monitorings at intervals to be determined by the City. Also at the City's discretion, in-pavement counters funded by CSUS shall be installed to increase the frequency of monitoring and reporting. If trip generation exceeds the analyzed (planned and projected) maximums, measures will be taken to immediately bring trip levels into compliance with the TDM goals. This could require reevaluation of the TDM plan, and could involve imposing additional measures not included in the current plan. This measure would reduce this potentially significant impact to ***less than significant. (LTS)***

Impact TRANS 7-2: Ralston Avenue and South Road (Intersection #3). The intersection of Ralston Avenue and South Road operates at LOS F during the AM, Midday, and PM peak hours under Existing Conditions, with delays of 212, 139, and 127 seconds, respectively. (S)

Because the intersection already is degraded, the addition of the project would cause an increase in delay exceeding the 4 second average control delay threshold. The intersection also meets the signal warrant criteria under Existing and Existing Plus Project conditions. With the inclusion of the project, the v/c ratio increases by more than the .01 threshold set by the City's Guidelines. Together, these result in potentially significant impacts.

Mitigation Measure TRANS 7-2: While it would be appropriate for the applicant to contribute its fair share to the signalization of the intersection based on traffic volume contributed to the

intersection and other factors, the applicant has offered to pay the full cost of a traffic signal at this intersection in lieu of contributing relatively minor fair share contributions for this and other intersections. If the signal is installed, the resultant intersection LOS would be LOS A for the AM, Midday, and PM peak hours with delays of 8.7, 3.8, and 4.2 seconds, respectively. The results can be seen in Appendix H.

The conversion of South Road to a signalized intersection and improvements to the east and westbound approaches are identified in the RCS and, therefore, Mitigation Measure TRANS-7-2 would be consistent with the RCS' anticipated improvements for this intersection. The CSUS payment for the cost of the traffic signal would reduce this potentially significant impact to ***less than significant***. ***(LTS)***

Impact TRANS 7-3: Ralston Avenue and Notre Dame de Namur University Driveway (Intersection #4). The intersection of Ralston Avenue and Notre Dame de Namur University Driveway meets the signal warrant criteria under Existing and Existing Plus Project conditions. (S)

With the inclusion of the project, the v/c ratio increases by more than the .01 threshold set by the City's Guidelines. In addition, the intersection has a SBR 95th percentile queue length of 554 feet in Existing Plus Project Conditions. This value is more than the permitted increase of 1 percent (or an increase in one queued vehicle in most cases as identified in the interpretation of the City of Belmont's Guidelines for Traffic Impact Studies as indicated in section 4.7.4.2 City of Belmont Criteria of Significance). This results in a potentially significant impact.

Mitigation Measure TRANS 7-3: The potentially significant impact at this intersection could be mitigated by the installation of a traffic signal. However, the RCS recommends a modern roundabout at this intersection instead of signalization in order to provide traffic calming benefits along this section of the Ralston Avenue corridor. Payment of the costs of the roundabout by CSUS would be disproportionate to the project's incremental traffic contribution to the intersection. While payment of the Applicant's fair share contribution toward the cost of the improvement at this intersection would be reasonable, instead the Applicant has offered to fully fund Intersection #3: Ralston Avenue / South Road (see Mitigation Measure TRANS-7-2) in lieu of paying a fair share contribution for this intersection. Consequently, this impact would not be mitigated in the near term and, as a result, the impact at this intersection would remain potentially ***significant and unavoidable***. ***(SU)***

Impact TRANS 7-4: Ralston Avenue and Chula Vista Drive (Intersection #5). The intersection of Ralston Avenue and Chula Vista Drive meets the signal warrant criteria in Existing and Existing Plus Project conditions. (S)

With the inclusion of the project, the v/c ratio increases by more than the .01 threshold set by the City's Guidelines.

Mitigation Measure TRANS 7-4: The potentially significant impact at this intersection could be mitigated by the installation of a traffic signal. However, the RCS identifies extensive crossing improvements at this intersection, including the installation of a median, the removal of the WB merge, and the installation of a rectangular rapid flash beacon (RRFB), instead of signalization in order to provide traffic calming benefits along this section of the Ralston Avenue corridor. Payment of the costs of the improvements at this intersection by CSUS would be disproportionate to the project's incremental traffic contribution to the intersection. While

payment of the Applicant's fair share contribution toward the cost of the improvement at this intersection would be reasonable, instead the Applicant has offered to fully fund Intersection #3: Ralston Avenue / South Road in lieu of paying a fair share contribution for this intersection (see Mitigation Measure TRANS-7-2). \Consequently, this impact would not be mitigated in the near term and, as a result, the impact at this intersection would remain potentially ***significant and unavoidable. (SU)***

Impact TRANS-7-5: – Ralston Avenue and Notre Dame Avenue (Intersection #6).The intersection of Ralston Avenue and Notre Dame Avenue meets the signal warrant criteria in Existing and Existing Plus Project conditions. (S)

With the inclusion of the project, the v/c ratio increases by more than the .01 threshold set by the City's Guidelines. This results in a potentially significant impact.

Mitigation Measure TRANS 7-5: The potentially significant impact at this intersection could be mitigated by the installation of a traffic signal. The RCS identifies the signalization of Notre Dame Avenue in addition to striping and crosswalk improvements. Payment of the costs of the improvements at this intersection by CSUS would be disproportionate to the project's incremental traffic contribution to the intersection. While payment of the Applicant's fair share contribution toward the cost of the improvement at this intersection would be reasonable, instead the Applicant has offered to fully fund Intersection #3: Ralston Avenue / South Road in lieu of paying a fair share contribution for this intersection (see Mitigation Measure TRANS-7-2). Consequently, this impact would not be mitigated in the near term and, as a result, the impact at this intersection would remain potentially ***significant and unavoidable***. ***(SU)***

Impact TRANS 7-6: Ralston Avenue and Davis Drive (Intersection #9). The intersection of Ralston Avenue and Davis Drive has a NBL 95th percentile queue length of 177 feet, 78 feet, and 129 feet for the AM, Midday, and PM peak hours, respectively in Existing Plus Project Conditions. In addition, it has a WBL 95th percentile queue length of 129 feet and 91 feet for the AM and Midday peak hours in Existing Plus Project Conditions, respectively. (S)

These values are more than the permitted increase of 1 percent (or an increase in one queued vehicle in most cases as identified in the interpretation of the City of Belmont's Guidelines for Traffic Impact Studies as indicated in the Methodology section). This results in a potentially significant impact. Only the AM peak hour for the WBL was operating over-capacity under Existing Conditions at this intersection.

Mitigation Measure TRANS 7-6: The Applicant shall restripe the NBR turn to a shared NBR/L turn lane. The restriping will likely require a signal modification but is up to the City's discretion. The applicant shall increase of the WBL turn pocket by 85 feet creating a new total storage length of 150 feet. The Applicant will install a new video detection system and updated signal heads at the Ralston/Davis intersection. The Applicant shall fully fund both improvements.

As shown in the Appendix and consistent with the City of Belmont's Guidelines for Traffic Impact Studies, the new intersection geometry allows the 95th percentile queues of the NBL to be 97 feet, 32 feet, and 47 feet for the AM, Midday, and PM peak hours, respectively, and for the WBL queue to be 125 feet and 81 feet in the AM and Midday peak hours, respectively. The potentially significant impact is therefore reduced to ***less than significant***. ***(LTS)***

Impact TRANS 7-7: Ralston Avenue and Ralston Middle School Exit (Intersection #10). The intersection of Ralston Avenue and the Ralston Middle School Exit meets the signal warrant criteria under Existing and Existing Plus Project conditions. With the inclusion of the project, the v/c ratio increases by more than the .01 threshold set by the City's Guidelines. (S)

This results in a potentially significant impact. However, it should be noted that the project adds zero trips to the intersection's critical movement (i.e., the exit driveway) and adds 164 of 3,367 trips (4.9 percent of intersection traffic) in the warranted peak hour.

Mitigation Measure TRANS 7-7: The potentially significant impact at this intersection could be mitigated by the installation of a traffic signal. However, the RCS does not recommend that the driveway be signalized. Rather, the RCS recognizes that, if the Ralston Avenue/Tahoe Drive intersection is signalized, access from the Ralston Middle School driveway could be modified to improve its operations. The Belmont Redwood Shores School District has agreed, as part of its expansion, to fully fund the traffic signal at Tahoe Drive. As a result of this mitigation by the School District, the potentially significant impact would be mitigated to ***less than significant. (LTS)***

Impact TRANS 7-8: Ralston Avenue and Ralston Middle School Entrance (Intersection #11). The intersection of Ralston Avenue and the Ralston Middle School Entrance meets the signal warrant criteria under Existing and Existing Plus Project conditions. With the inclusion of the project, the v/c ratio increases by more than the .01 threshold set by the City's Guidelines. (S)

This results in a potentially significant impact. The project adds zero trips to the intersection's critical movements (i.e., the entrance driveways) and adds 164 of 3,240 trips (5.1 percent of intersection traffic) in the warranted peak hour.

Mitigation Measure TRANS 7-8: The potentially significant impact at this intersection could be mitigated by the installation of a traffic signal. However, the RCS does not recommend that the driveway be signalized. Rather, the RCS recognizes that, if the Ralston Avenue/Tahoe Drive intersection is signalized, access to the Ralston Middle School driveway could be modified to improve its operations. While the School District has agreed to install a traffic signal at the Ralston Avenue/Tahoe Drive intersection, the impacts may not be fully mitigated. As a result, impacts at this intersection would remain potentially ***significant and unavoidable. (SU)***

Impact TRANS 7-9: Ralston Avenue and Tahoe Drive (Intersection #12). The intersection of Ralston Avenue and Tahoe Drive operates at LOS A (1.5 second delay) and the SSSC approach at LOS D (26.0 seconds delay) during the AM peak hour under Existing Conditions. The addition of the project traffic causes the SSSC delay to increase to LOS E (37.9 seconds delay), resulting in a potentially significant impact under the City's Guidelines. (S)

However, it should be noted that the project adds zero trips to the intersection's critical movement (i.e., the northbound approach) and adds 164 of 3,051 trips (5.4 percent of intersection traffic) in the AM peak hour.

Mitigation Measure TRANS-7-9: The signalization of this intersection is currently identified in the BRSSD 5 School Expansions TIA (Hexagon Transportation Consultants, Inc., 2015) and is planned to be implemented under the direction of the City of Belmont, thus, is not a project level mitigation. Consistent with the City of Belmont's Guidelines for Traffic Impact Studies, if the signal were implemented, the resultant LOS would be A, C, and B for the AM, Midday, and PM

peak hours with delays of 6.8, 22.4, and 12.3 seconds, respectively. The results can be seen in the Appendix. After implementation of the signal, impacts at this intersection will be reduced to ***less than significant. (LTS)***

Impact TRANS-8: The project could cause substantial temporary construction traffic-related impacts. (S)

Construction activities would add construction traffic to the street network and could potentially require partial lane closures during street improvements or utility installations. Construction activities are temporary by nature at any one location, and project-related construction activities are not expected to cause a substantial disruption to existing roadway capacity.

The applicant states, as part of its traffic analysis, that the number of trips generated by construction activities are projected to be kept at or less than the trips generated by the project itself, thus, there would be no additional identified potentially significant operational impacts in the study area. The study area roadways do not indicate any additional locations with identified potential geometric impacts or obvious traffic hazards which would cause a potentially significant impact for construction traffic.

The temporary impacts on transportation and traffic during project construction include the potential to disrupt traffic flows, block lanes in area roadways, and contribute to decreased levels of service and/or increased volumes of traffic in fewer lanes. Traffic impacts during project construction can also include disruption of alternative modes of transportation, such as blocking bicycle or pedestrian pathways or public transit lanes on area roadways. Additional impacts may result during project construction when there are heavy-duty construction vehicles sharing the roadway with normal vehicle traffic. This can create impacts due to incompatible uses and hazards. Impacts on transportation and traffic would be temporary in nature; however, this impact would be significant without mitigation.

Mitigation Measure TRANS-8: The Applicant or its contractor shall prepare a construction management plan. The plan shall include at least the following items:

a. Development of a construction truck route that appears on all construction plans to limit truck and auto traffic on nearby streets.

b. Comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak hour traffic hours, detour signs if required, lane closure procedures if required, sidewalk closure procedures if required, cones for drivers, and designated construction access routes.

c. Evaluate the need to provide flaggers or temporary traffic control at key intersections along the haul route.

d. Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur.

e. Location of construction staging areas for materials, equipment, and vehicles if there is insufficient staging area within the project work zone.

f. Identification of haul routes and times for movement of construction vehicles that will minimize impacts on vehicular and pedestrian traffic, circulation and safety, and provision for monitoring surface streets used for haul routes so that any damage and

debris attributable to the haul trucks can be identified and corrected by the City and its contractor.

g. A process for responding to, and tracking, complaints pertaining to construction activity, including identification of an on-site complaint manager.

h. Documentation of road pavement conditions for all routes that would be used by construction vehicles both before and after project construction. Roads found to have been damaged by construction vehicles shall be repaired to the level at which they existed prior to project construction.

Implementation of Mitigation Measure TRANS-10 would reduce the project's temporary construction impacts by informing the public of construction schedules, possible detours, and timing to allow the public to select alternate routes in advance of construction periods. The timing (near-term versus long-term) of the construction is not expected to change the relative impact of construction activities. If truck traffic is expected to be heavier during certain phases of construction then the City shall ensure that the appropriate measures are in place to minimize the impact due to truck traffic. By ensuring adequate advance notice of closures and construction, and providing alternate pedestrian/bicycle routes as necessary to support possible closures and construction, this temporary construction impact would be reduced to levels that are ***less than significant. (LTS)***