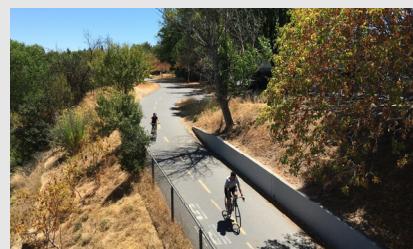
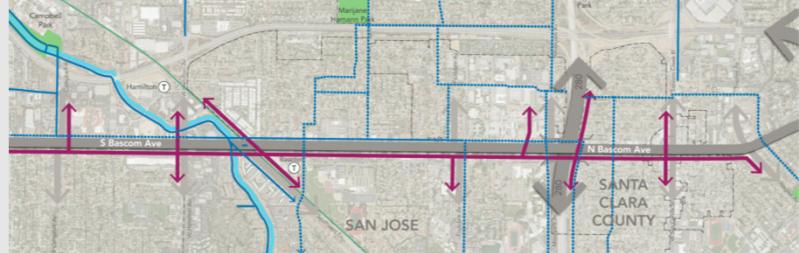





BASCOM AVENUE
COMPLETE STREETS STUDY



ATTACHMENT A EXISTING TRAFFIC ENVIRONMENT

EXISTING CONDITIONS AND OPPORTUNITIES REPORT

Public Review Draft | December 2017

a partnership of



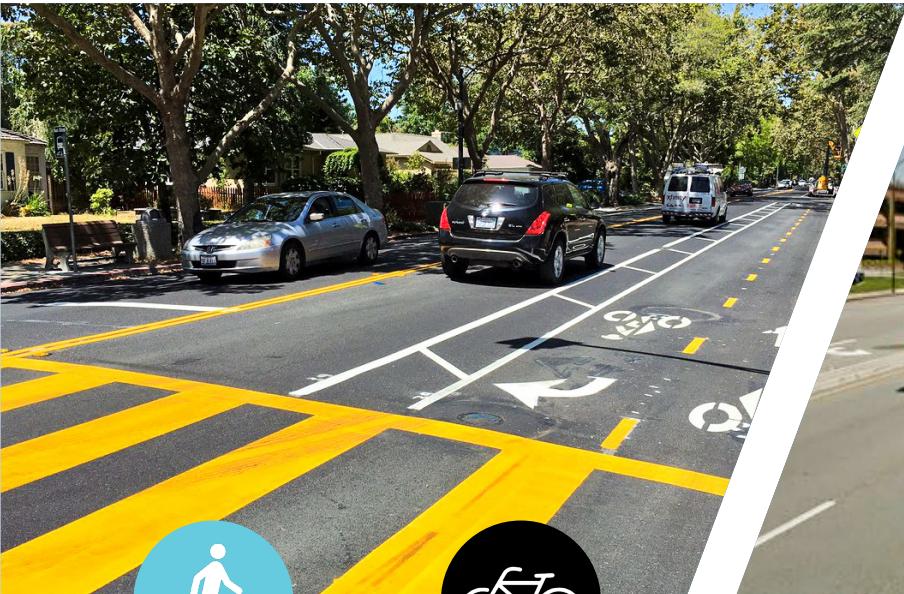
Bascom Avenue Complete Streets Study

Existing Data Review: Traffic Environment



FINAL

November 28, 2017



FINAL-Bascom Corridor Complete Streets Study Existing Data Review: Traffic Environment

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Appendix

Appendix A. Study Intersection Level of Service Output Sheets

1. PURPOSE & COMPLETE STREET STUDY CONTEXT

This report summarizes existing street and traffic conditions on the Bascom Avenue corridor between Interstate 880 (I-880) and State Route 85 (SR-85) as relevant to the key goals of the *Bascom Corridor Complete Streets Study* planning effort. The term "Complete Streets" generally refers to a balanced, multimodal transportation network that meets the needs of all users of streets, including bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, public transportation, and seniors. A "Complete Street" is one that provides safe and convenient travel in a manner that is suitable to the local context. **Figure 1** shows examples of "complete street" amenities.

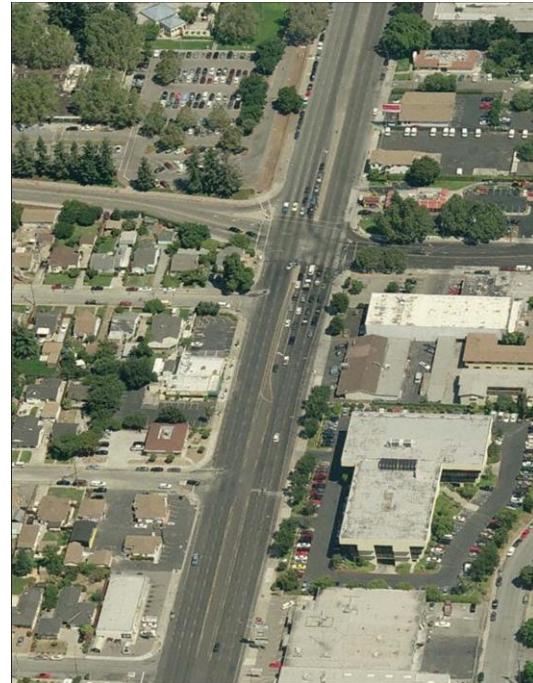
Figure 1. Examples of Complete Street Amenities



Land Use & Mobility Context

The roughly five-mile study area includes segments within the cities of San Jose and Campbell, as well as several segments within the jurisdiction of Santa Clara County. **Figure 2** provides a map of the study area and segments. General characteristics of the surrounding land use patterns include:

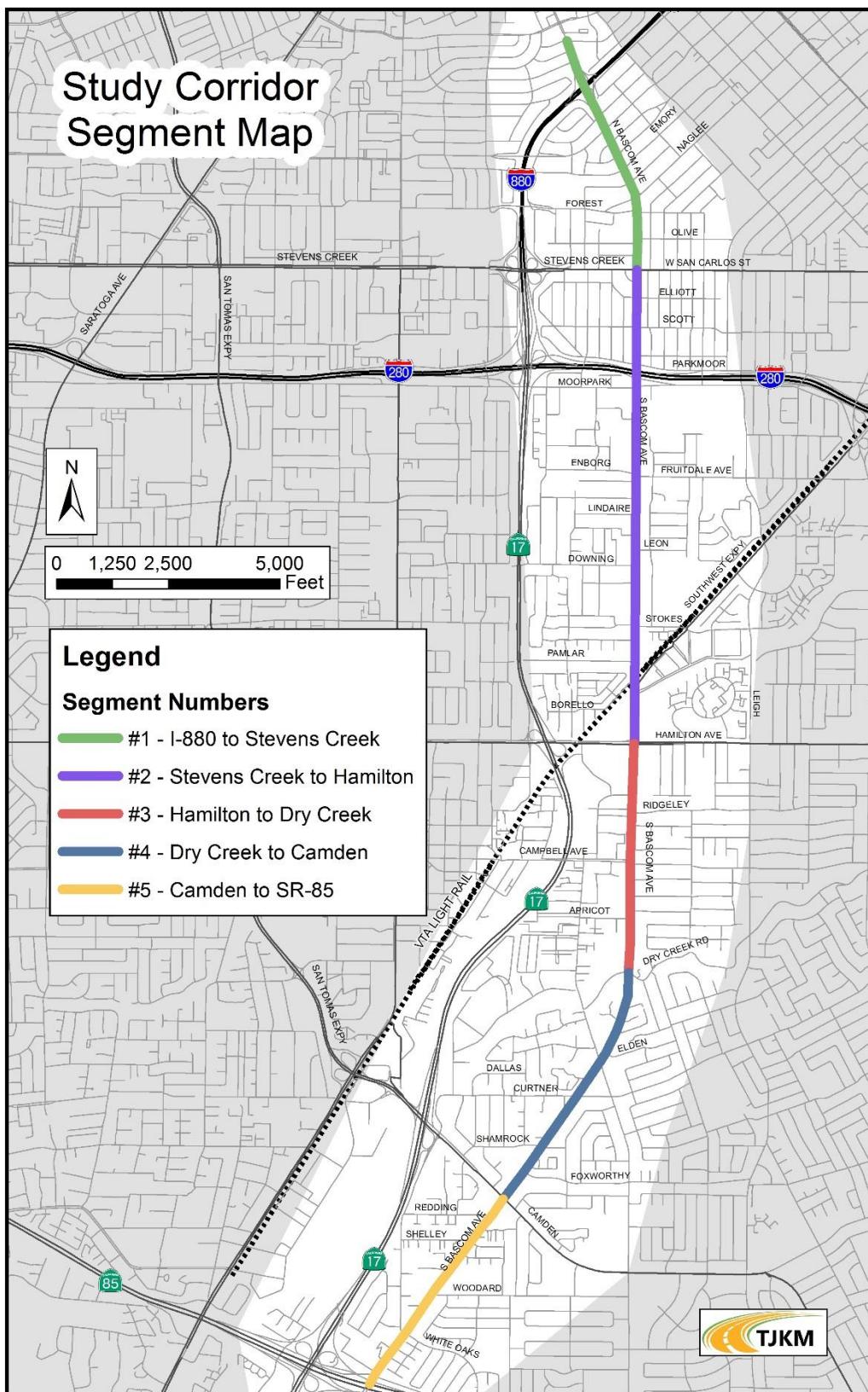
- Relatively low-density land use pattern, with one to two story buildings bordering much of the corridor, with the exception of higher-density nodes near Santa Clara Valley Medical Center/San Jose City College and some newer apartment buildings south of Hamilton Avenue.
- Internally focused site development pattern, as most adjacent properties were developed with buildings that are oriented towards on-site surface parking lots, generally not oriented towards street access by pedestrians or bicyclists.
- Minimal demand for on-street parking, except for some segments near the Santa Clara Valley Medical Center and San Jose City College. Most land uses bordering the corridor have an abundant supply of off-street parking.



Given the development pattern, wide curb-to-curb width (seven lanes across, with three through lanes per direction on most segments), and lack of uninterrupted bicycle and pedestrian facilities, Bascom Avenue is not currently thought of as a “complete street” corridor. Nonetheless, the north-south orientation of Bascom Avenue could allow for a reconfigured street that would serve as a multi-modal counterpart to State Route 17 (SR-17) between Los Gatos, Campbell and downtown San Jose. Actual traffic volumes are relatively low compared to its capacity, as described on the following pages.



Figure 2. Study Corridor Segment Map

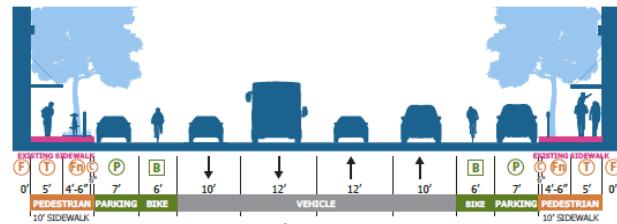


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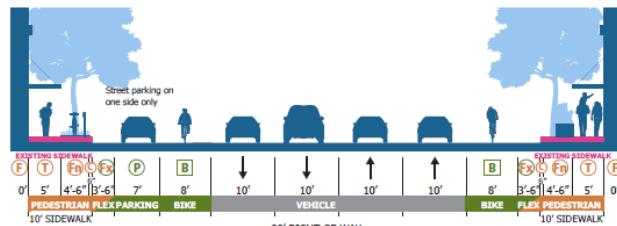
Planning Goals

A number of adopted plans are relevant to the study area and the goals of the complete streets planning effort including the following:

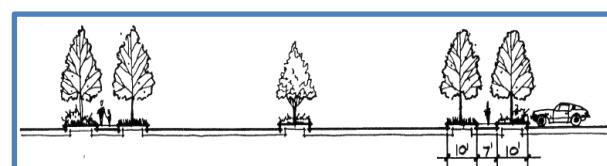
- **General Plan Street Classifications** for the cities of San Jose and Campbell, as well as Santa Clara County, provide designations for Bascom Avenue within their General Plan street classifications and typologies:
- **"Main Street" segments (San Jose) -** the San Jose General Plan classifies Bascom Avenue as a "Main Street" between Stevens Creek Boulevard-West San Carlos Street and Hamilton Avenue.
- **Connector Street segments (San Jose)** – remaining segments of Bascom Avenue within the City of San Jose study area are classified as a "Connector Street" north of Stevens Creek Boulevard-West San Carlos Street to Interstate 880 (I-880), as well as portions of Bascom Avenue south of Hamilton Avenue that are within the City of San Jose.
- **Arterial with "Parkway" concept (Campbell) –** Some southern segments south of Hamilton Avenue to Dry Creek Road are within the City of Campbell, while the segment from Camden Avenue to near SR-85 is bordered by City of Campbell on the west and City of San Jose on the east side. The Campbell General Plan classifies Bascom Avenue as a Class I Arterial with a parkway concept that would include trees along both sides and in the median, landscaping to screen parking, and buffered sidewalks.
- **Urban Commuter Arterial (County of Santa Clara) –** Bascom Avenue between Olive Avenue and Bailey Avenue, and between Elliot Street and 0.04 mile south of Fruitdale Avenue are under the jurisdiction of Santa Clara County (See Official County Road Book 2017 for details). The desirable design accommodates bicycle travel on a paved shoulder, a buffer between the shoulder bikeway and adjacent motor vehicle travel lanes, with 2 or 3 motor vehicle lanes in each direction.



Example of San Jose "Main Street" Potential Design including recommended lane widths.

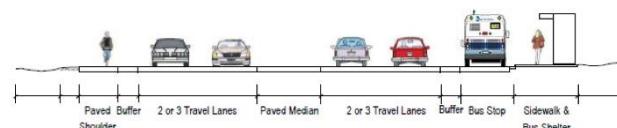


Example of San Jose "Connector Street" Potential Design including lane widths.



City of Campbell "Parkway" concept for Bascom Avenue – including 10' landscape strip between sidewalk and roadway.

a



"Urban Commuter Arterial" designation specifies a "desirable design" that includes bicycle accommodations on a paved shoulder, with a buffer between the bicycle travelway. Although not specified, the County segments of Bascom Avenue provide sidewalks on both sides, consistent with typical urban streets.

- **City of San Jose Complete Street Guidelines** identifies complete streets design guidelines intended to ensure that streets are comfortable and welcoming to all modes of travel, as well as supporting the City's goal to eliminate traffic-related deaths and severe injuries (San Jose Vision Zero). The guidelines include an emphasis on minimizing pedestrian crossing distance and exposure to conflicts, minimizing traffic stress and conflicts; and providing a continuous, connected system of bicycle facilities.
- **City of Campbell General Plan** includes adopted goals and policies aimed at achieving accommodating all users (General Plan Goal LUT-2), and implementing a safe and balanced multi-modal transportation network with strategies for concrete improvements in bicycle facilities, pedestrian design, transit access, and roadway efficiency (General Plan Policy LUT 2.1).
- **Vision Zero San Jose** was prepared in accordance with an international goal of reducing traffic-related injuries and fatalities to zero. It is the most recent annual traffic safety study completed by the San Jose DOT and SJPD, with a shift in focus from motorist convenience to the safety and accessibility of other modes.
- **South Bascom Urban Village Plan**, prepared in 2014 and pending adoption, focuses on a 1.3-mile segment of Bascom Avenue between Interstate 280 (I-280) and Southwest Expressway (which serves the Bascom VTA Light Rail Station). A key design element includes a proposed reduction in the motor vehicle travel-way to two lanes per direction, in order to accommodate bicycle and pedestrian facility improvements.

2. EXISTING PHYSICAL CHARACTERISTICS

Roadway Characteristics

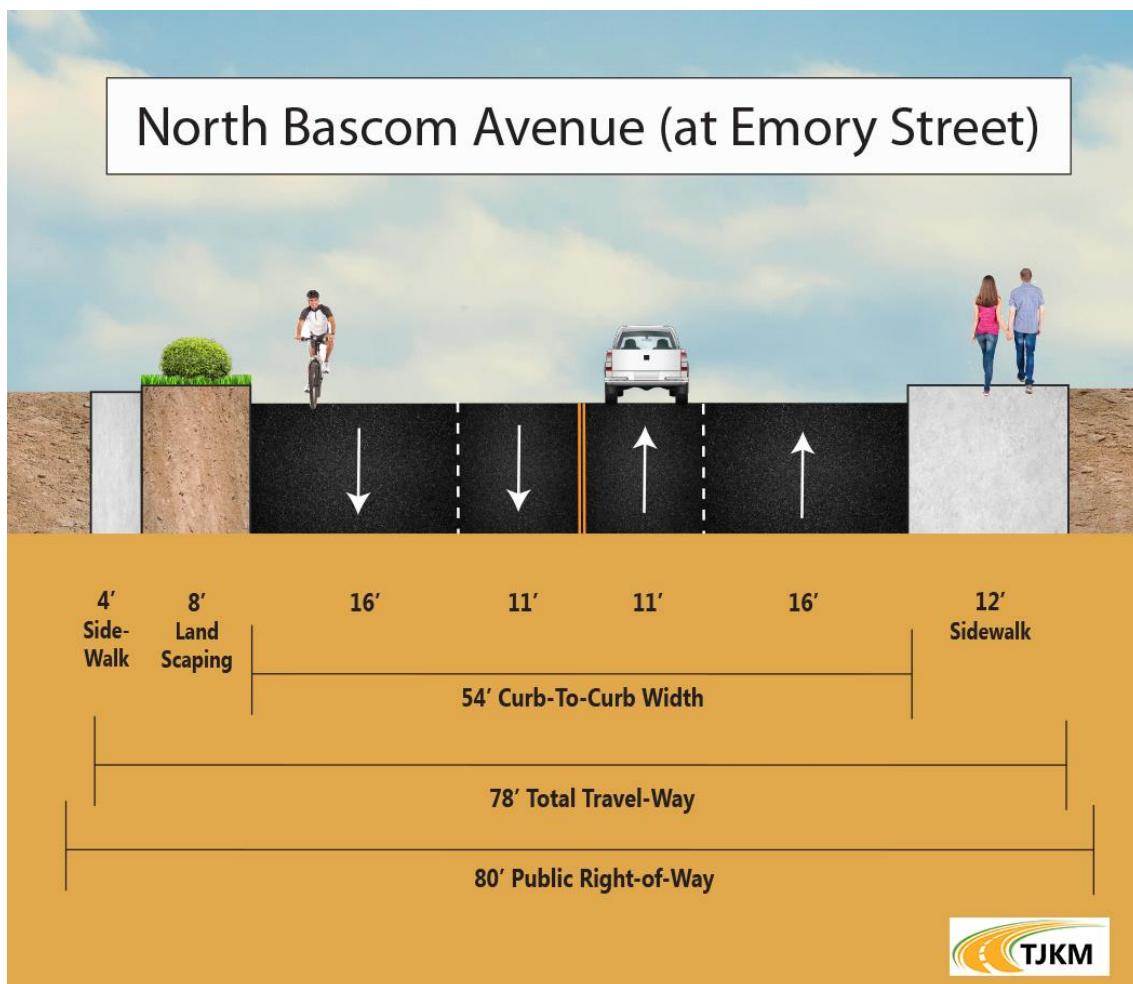
Table 1 summarizes the typical roadway characteristics on segment, from north to south, between I-880 and SR -85. Additional left-turn and right-turn lanes are provided at key intersections. **Figures 3 to 5** show typical roadway characteristics including travel lane, bicycle lane and sidewalk widths, as well as total curb-to-curb width (relevant to pedestrian crossing distances).

Table 1. Typical Roadway Characteristics by Segment

#	From	To	Motor Vehicle Lanes	Bicycle Lanes	Sidewalks	Traffic Capacity (Daily Vehicles)	Pedestrian Crossing Distance (feet)
1	I-880	Stevens Creek Blvd- West San Carlos St	4 lanes (4 through without left-turn pocket) 13' avg lane	No Bicycle Lanes	12' (or 4' with 8' landscape strip)	32,000	54'
2	Stevens Creek Blvd- West San Carlos St	Hamilton Ave	7 lanes (6 through + 1 left-turn) 11' avg lane	2 bicycle lanes.	10' each	54,000	96'
3	Hamilton Ave	Dry Creek Rd	7 lanes (6 through + 1 left-turn) 14' avg lane	No Bicycle Lanes	Varies	54,000	100'
4	Dry Creek Rd	Camden Ave	7 lanes (6 through + 1 left-turn) 14' avg lane	No Bicycle Lanes	Varies	54,000	100'
5	Camden Ave	SR-85	7 lanes (6 through + 1 left-turn) 14' avg lane	No Bicycle Lanes	6' each	54,000	100'

Note: daily capacity estimate based on 9,000 per through lane where continuous left-turn pockets are provided (also taking into account the current signal pattern), or 8,000 per lane without left-turn pockets.

Figure 3. Typical Cross-section: North Bascom Avenue

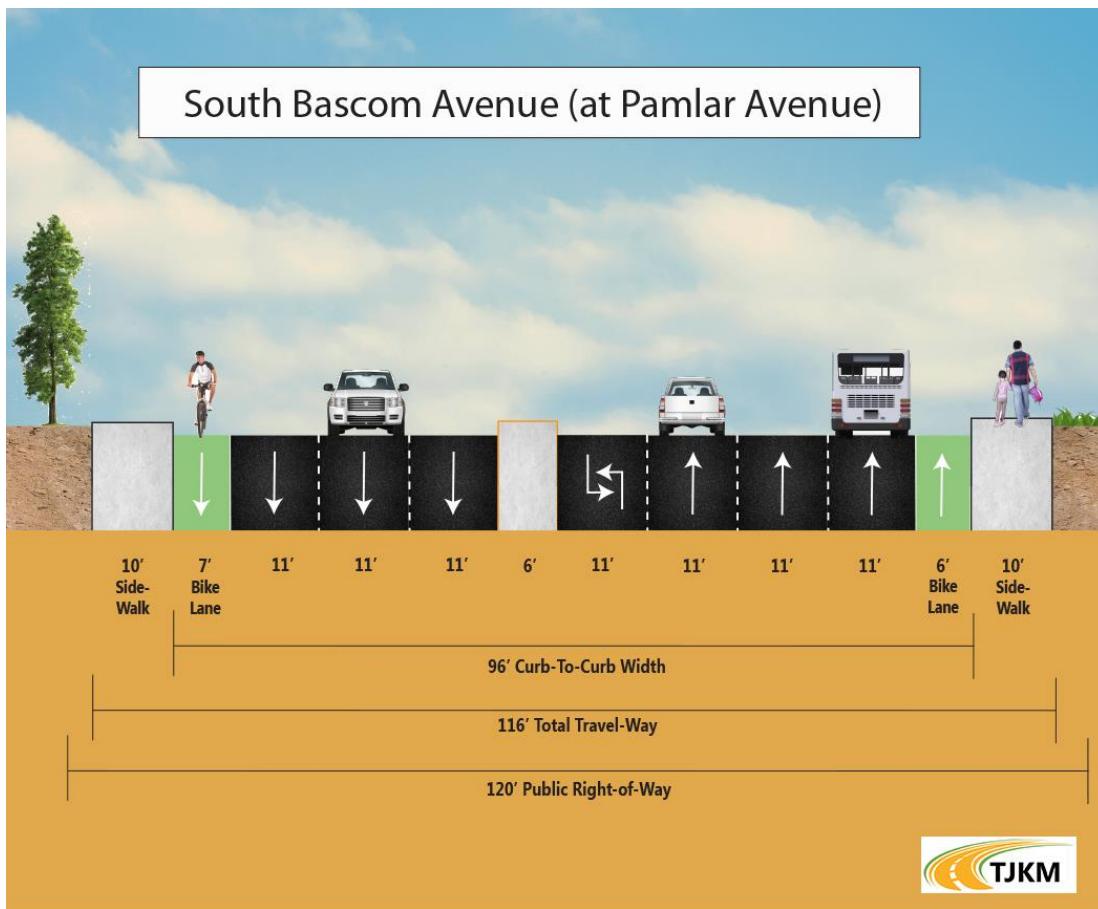


- North of Stevens Creek Boulevard-West San Carlos Street, segments of North Bascom Avenue have two lanes per direction with a curb-to-curb width of approximately 54 feet at mid-block locations and at most intersections (thus much narrower than most segments of Bascom Avenue where existing crossing distances are approximately 100 feet).
- Based on the traffic volume of 19,000 daily vehicles, this segment could be an ideal candidate for a “four to three road diet” – conversion to one motor vehicle lane per direction with center turn-lane – which would provide space for bicycle lanes in both directions. On-street parking could be accommodated on one side of the street, if desired, with such a configuration, while pedestrian crossing distances could be reduced to approximately 46 feet with corner bulbouts.



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Figure 4. Typical Cross-section: South Bascom Urban Village

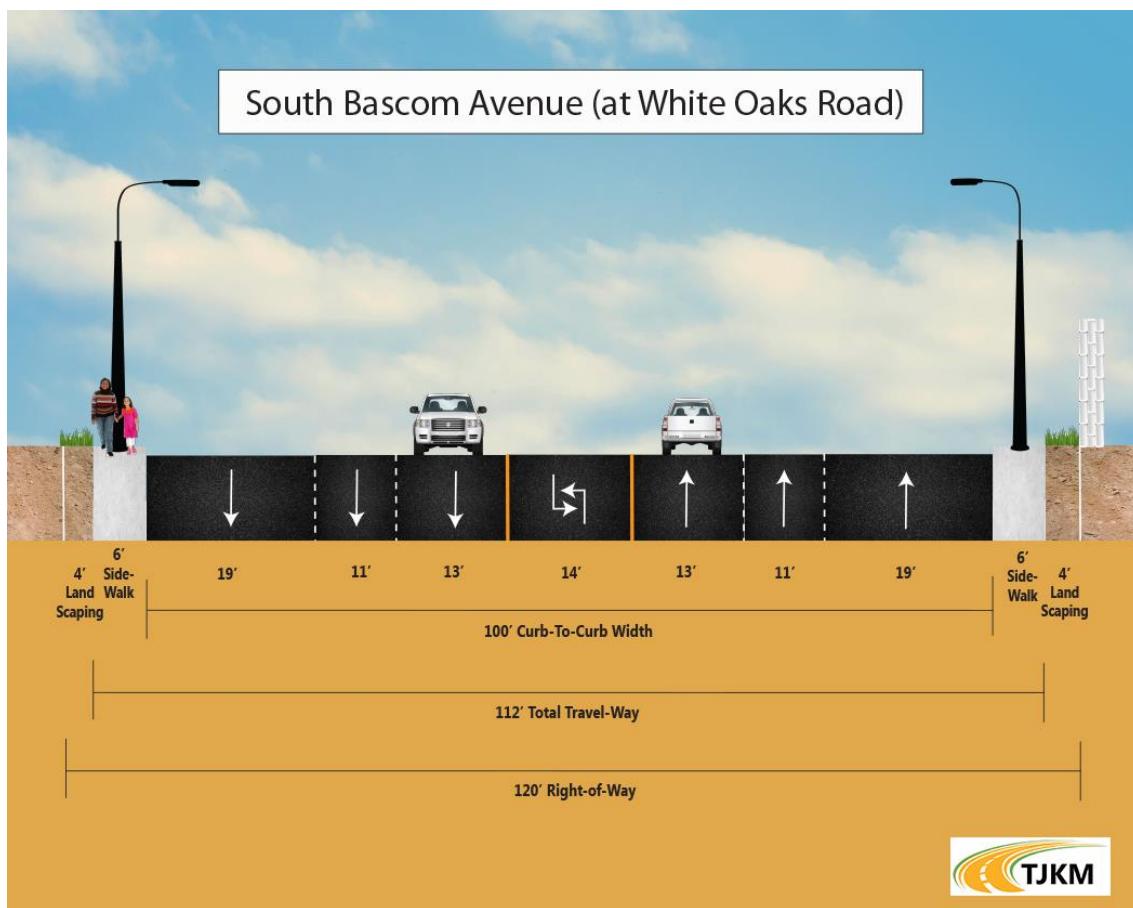


- The segment of South Bascom Avenue between Interstate 280 (I-280) and Southwest Expressway (just north of Hamilton Avenue) is within the boundaries of the South Bascom Urban Village Plan.
- The existing 7-lane motor vehicle travelway includes three motor vehicle travel lanes per direction, plus a center left-turn lane. Bicycle lanes are provided in both directions, with adjacent 10-foot sidewalks. On-street motor vehicle parking is permitted on some limited segments.
- Eliminating one motor vehicle lane per direction is feasible based on traffic volumes, which would reduce the currently lengthy 96-foot crossing distances and allow 22 or more feet to be reallocated for pedestrian and bicyclist enhancements.

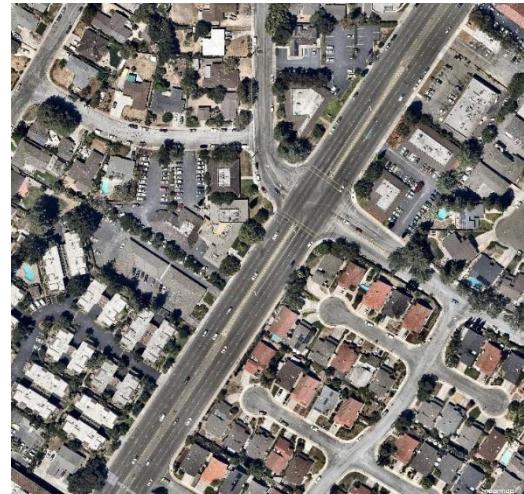


Traffic volumes are much lower than capacity. On most segments, a reduction from seven to five lanes (thus two through lanes per direction) could be implemented to reduce travel speeds and reallocate space to "complete streets" uses. Such uses could include higher quality bicycle lanes or paths and/or pedestrian realm improvements as envisioned in the South Bascom Village Plan.

Figure 5. Typical Cross-section: South Bascom Avenue near SR-85



- This southernmost segment serves as the border between City of Campbell (on the west side) and City of San Jose (on the east side).
- Pedestrian travel on the 6' sidewalk is frequently interrupted at mid-block locations by streetlight poles that were installed in the middle of the sidewalks on both sides.
- City of Campbell anticipates restriping the 19' curbside lane to include a 6' bicycle lane in both directions. In addition, Campbell General Plan streetscape standards call for 10-foot landscape strip between sidewalk and roadway.
- Traffic volumes are relatively low, between 17,000-27,000 vehicles per day. One lane per direction could accommodate volumes near Dry Creek Road, while two lanes per direction may be desirable between Camden Avenue and SR-85. Roadway capacity is discussed further below.



3. MOTOR VEHICLE TRAFFIC VOLUMES & CAPACITIES

Table 2 summarizes the relationship between the existing traffic capacity and existing volume, and identifies potential opportunities for reconfiguration. **Figure 6** provides a map showing estimated daily traffic volumes by segment. As a general rule of thumb, daily volumes of up to 40,000 vehicles can generally be accommodated by two lanes per direction provided left-turn pockets are provided. Up to 22,000 vehicles can often be accommodated by one lane per direction with left-turn pockets. As shown, the traffic volume on the corridor ranges from 17,000 to 37,000 daily.

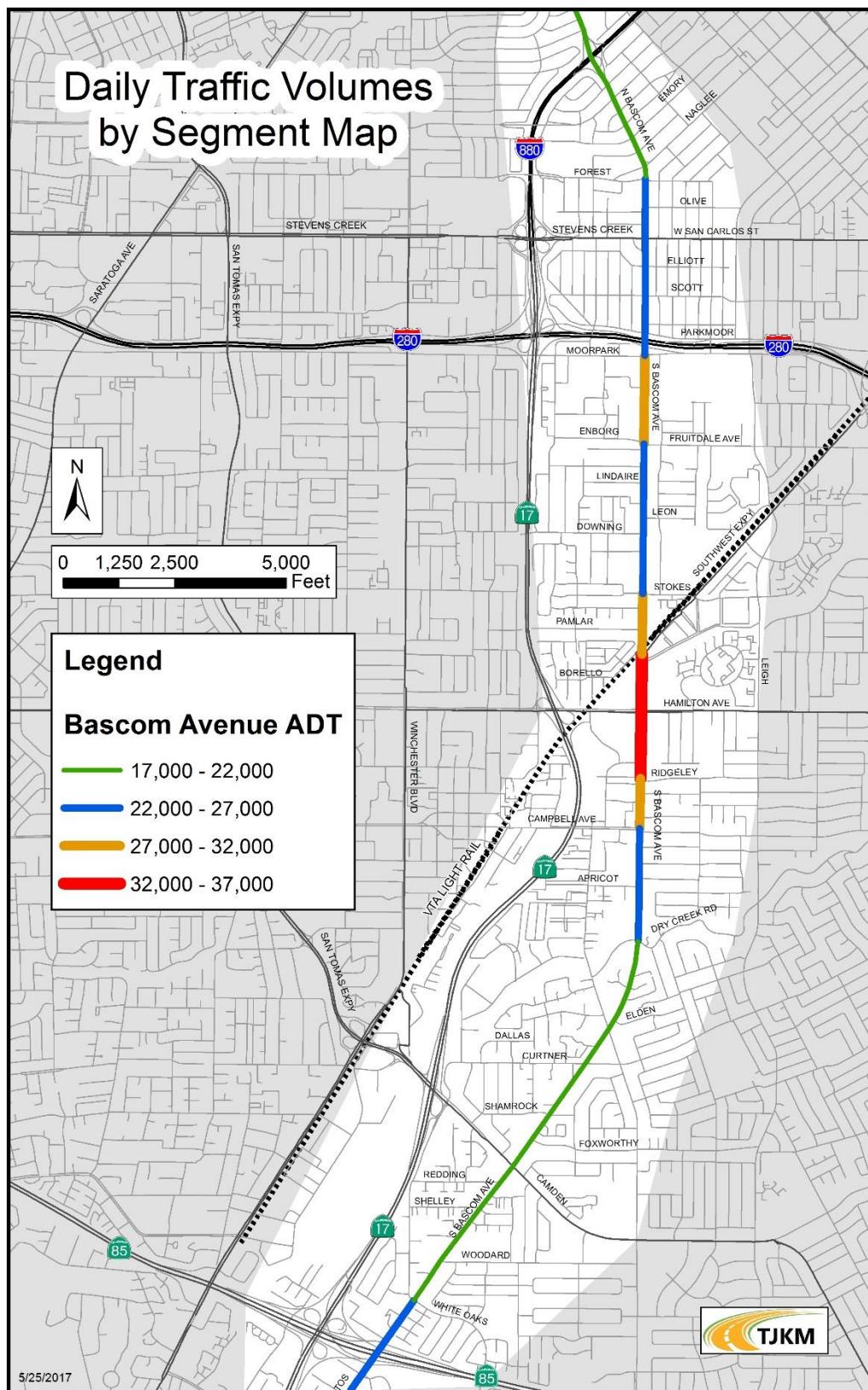
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Table 2. Existing Daily Traffic Volumes & Capacities

#	From	To	Motor Vehicle Lanes	Capacity (Daily Vehicles)	Existing Volume	Potential Street Reconfiguration Opportunities
1	I-880	Stevens Creek Boulevard/ West San Carlos Street	4 lanes (4 through without left-turn pocket) 14' avg lane	32,000	Varies from 17,000 to 27,000	Reduction from 4 to 3 lanes (1 per direction plus center turn-lane) could be feasible on this segment.
2	Stevens Creek Boulevard / West San Carlos Street	Hamilton Avenue	7 lanes (6 through + 1 left-turn) 14' avg lane	54,000	Varies from 22,000 to 37,000	Reduction from 7 to 5 lanes (2 per direction plus center turn-lane) would be feasible.
3	Hamilton Avenue	Dry Creek Road	7 lanes (6 through + 1 left-turn) 14' avg lane	54,000	Varies from 22,000 to 37,000	Reduction from 7 to 5 lanes (2 per direction plus center turn-lane) would be feasible.
4	Dry Creek Road	Camden Avenue	7 lanes (6 through + 1 left-turn) 14' avg lane	54,000	Varies from 17,000 to 22,000	Reduction from 7 to 3 lanes (1 per direction plus center turn-lane) could be feasible on this segment.
5	Camden Avenue	SR-85	7 lanes (6 through + 1 left-turn) 14' avg lane	54,000	Various from 17,000 27,000	Reduction from 7 to 5 lanes (2 per direction plus center turn-lane) would be feasible on this segment.

Note: daily capacity estimate based on 9,000 per through lane where continuous left-turn pockets are provided, or 8,000 per lane without left-turn pockets. Existing daily volumes are based on recent 24-hour counts and/or derived from peak-hour turning movement counts Peak Hour volumes are generally 10 percent of Daily Volumes (consistent with Daily Capacity assumptions).

Figure 6. Daily Traffic Volumes by Segment



Traffic Level of Service at Key Intersections

Motor vehicle traffic operations are often evaluated based on intersection level of service (LOS) standards described in the Highway Capacity Manual (HCM) that focus on average delay to motor vehicles. **Table 3** summarizes the LOS definitions and relative delay to motorists based on HCM methodology.

Table 3. Peak Hour Traffic Level of Service Definitions at Intersections

LOS	Flow Type	Operational Characteristics	Average Delay (seconds per motor vehicle)	
			Signalized Intersection	Stop-sign Controlled
A	Stable Flow	Free-flow conditions with negligible to minimal delays.	< 10	0 – 10
B	Stable Flow	Good progression with slight delays. Short cycle-lengths typical.	> 10 – 20	> 10 – 15
C	Stable Flow	Relatively higher delays resulting from fair progression and/or longer cycle lengths.	> 20 – 35	> 15 – 25
D	Approaching Unstable Flow	Somewhat congested conditions. Longer but tolerable delays may result.	> 35 – 55	> 25 – 35
E	Unstable Flow	Congested conditions. Significant delays result from poor progression, long cycle lengths, and high volume-to-capacity ratios.	> 55 – 80	> 35 – 50
F	Forced Flow	Jammed or grid-lock type operating conditions. Generally considered unacceptable for most drivers.	> 80	> 50

Source: Highway Capacity Manual (HCM) 2010

The cities of San Jose and Campbell both identify LOS D or better as acceptable during the a.m. and p.m. peak hours. Santa Clara County Valley Transportation Authority (VTA) standard for Congestion Management Program (CMP) intersections is LOS E or better during the a.m. and p.m. peak hours. Existing a.m. and p.m. peak hour level of service was reviewed at 18 key intersections on the study corridor based on recent traffic studies in the area. These studies used either TRAFFIX or Synchro software with the Highway Capacity Manual 2000 methodology, as required under VTA study guidelines. The LOS outputs sheets for each intersection are provided in **Appendix A**. As illustrated on **Figures 7 and 8**:

- During the a.m. peak hour, all intersections operate at LOS D or better with the exception of the intersection of South Bascom Avenue with Camden Avenue, that operates at LOS E.
- During the p.m. peak hour, all intersections operate at LOS D or better with the exception of the intersections of South Bascom Avenue with Stevens Creek Boulevard, Moorpark Avenue, and Hamilton Avenue, that both operate at LOS E.

Large intersections with long crossing distances often negatively affect LOS by requiring long crossing distances for pedestrians – and long clearance times for motor vehicles. Large intersections generally require long signal cycles that contribute to delay. Therefore, reducing the width of intersections (such as

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by removing through lanes) can have a positive effect on LOS, while shorter cycle lengths can be particularly beneficial to pedestrians and bicyclists, since pedestrians do not benefit from signal coordination plans that reduce delay to motorists (while cyclists rarely benefit from signal coordination except on urban streets where the coordination plan is based on the typical bicyclist speed). As a result, pedestrians and cyclists are often delayed for roughly half the signal cycle (presuming a random arrival pattern) thus an average delay of roughly 60 seconds in many cases, which is a level of delay that is considered unacceptable for motor vehicle travel (consistent with motor vehicle "LOS E" where average delay is between 55 and 80 seconds).

Figure 7. Existing Traffic Level of Service Map – AM Peak Hour

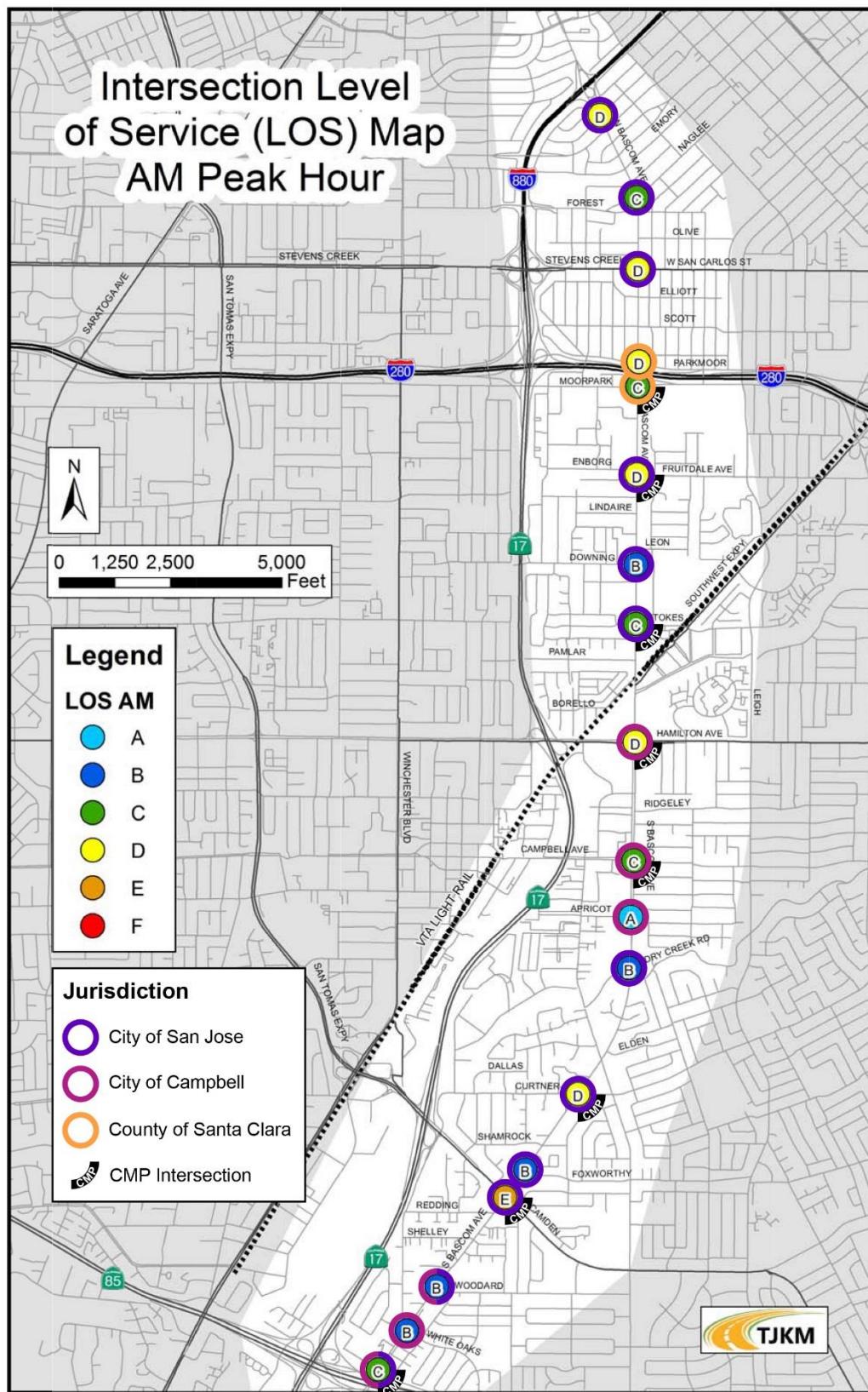
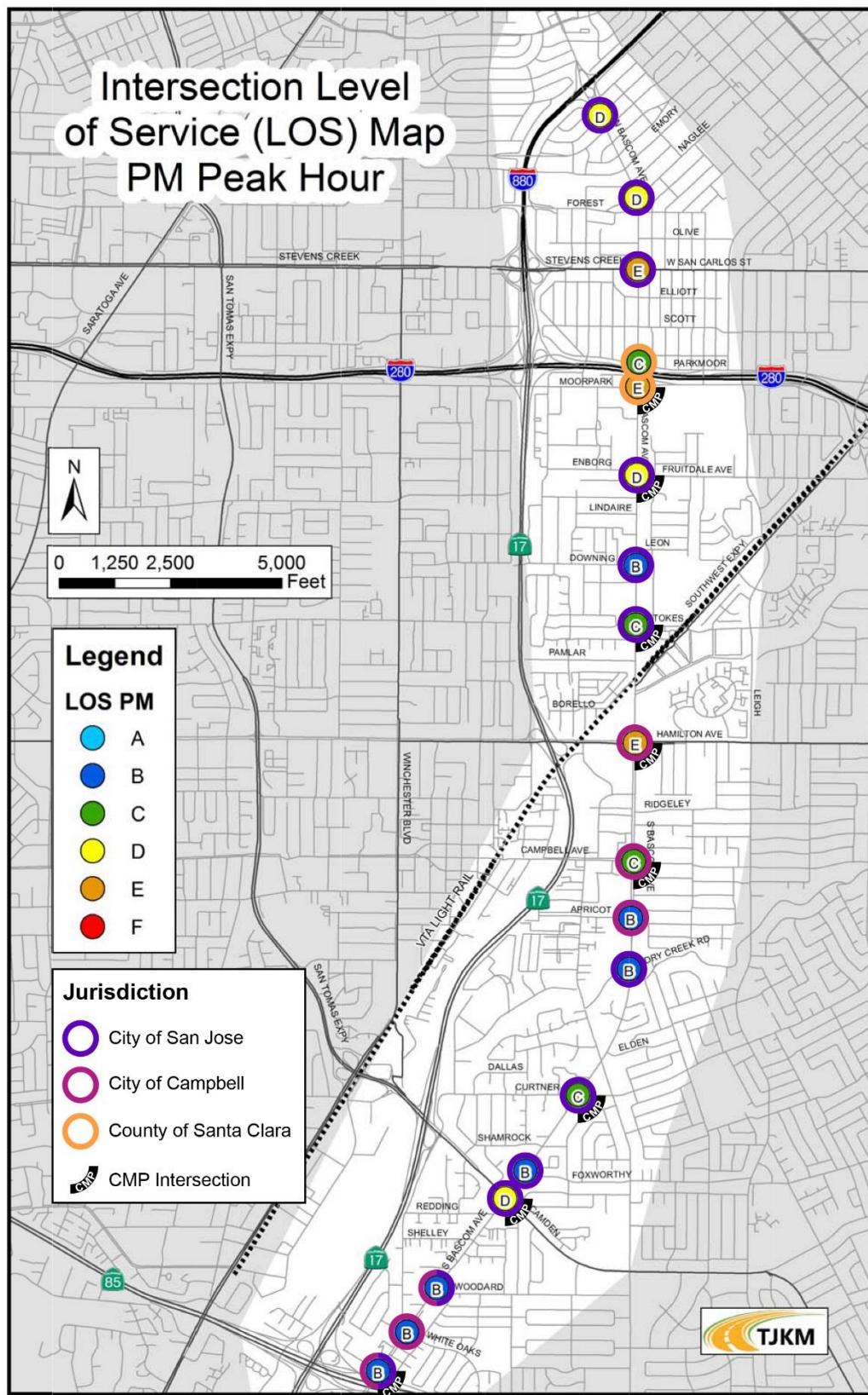


Figure 8. Existing Traffic Level of Service Map – PM Peak Hour



4. TRAFFIC SAFETY

Collision Data Review

Available collision data was reviewed for a six-year period from January 1, 2008 to December 31, 2013. The data review indicates 329 reported motor vehicle collisions that involved injuries, including 83 with serious injuries and five fatalities. **Table 4** summarizes collision characteristics by travel mode. Key findings are summarized below:

1. Bicyclists and pedestrians are disproportionately affected. Although less than 10 percent of existing trips on the corridor are via bicycling or walking, bicyclists and pedestrians were involved in 23 percent of reported injury collisions (11 percent involving pedestrians, and 12 percent involving bicyclists).
2. Furthermore, collisions with serious injuries and fatalities were more likely to involve bicyclists and pedestrians, as the collision data indicates that 56 percent of serious injuries reported to result from collisions on the corridor were to bicyclists or pedestrians (39 percent pedestrians and 17 percent bicyclists), and 60 percent of the fatalities (3 fatalities to pedestrians, none to bicyclists).
3. The most common single cause of collisions on the corridor was "unsafe speed", identified in 28 percent of collision reports on Bascom Avenue.

Table 4. Collision Characteristics by Mode & Type of Injury

Motor Vehicle collisions with:	Reported Collisions including Minor Injuries	Collisions with Serious Injuries	Fatalities
Motor Vehicles	77%	44%	40%
Bicyclists	12%	17%	0%
Pedestrians	11%	39%	60%
Total – Bicyclists & Pedestrians Share of Collisions	23%	56%	60%

Source: January 2008-December 2013 Statewide Integrated Traffic Record Service (SWITRS)

Figure 9 to 11 provide maps showing each of the collision locations by mode, and highlights "hot spots" where the frequency of reported collisions exceeded that of other areas on the corridor. As shown, three such "hot spot" locations are evident:

- **Collision Hot Spot 1:** Bascom Avenue from Fruitdale Avenue to Stevens Creek Boulevard/East San Tomas Avenue, particularly including the portion of Bascom Avenue that borders the San Jose City College and Santa Clara Valley Medical Center campus.
- **Collision Hot Spot 2:** Bascom Avenue from Hamilton Avenue to Southwest Expressway, which borders the VTA light-rail station.
- **Collision Hot Spot 3:** Bascom Avenue near the intersection with Camden Avenue.

Figure 9. Collision Map

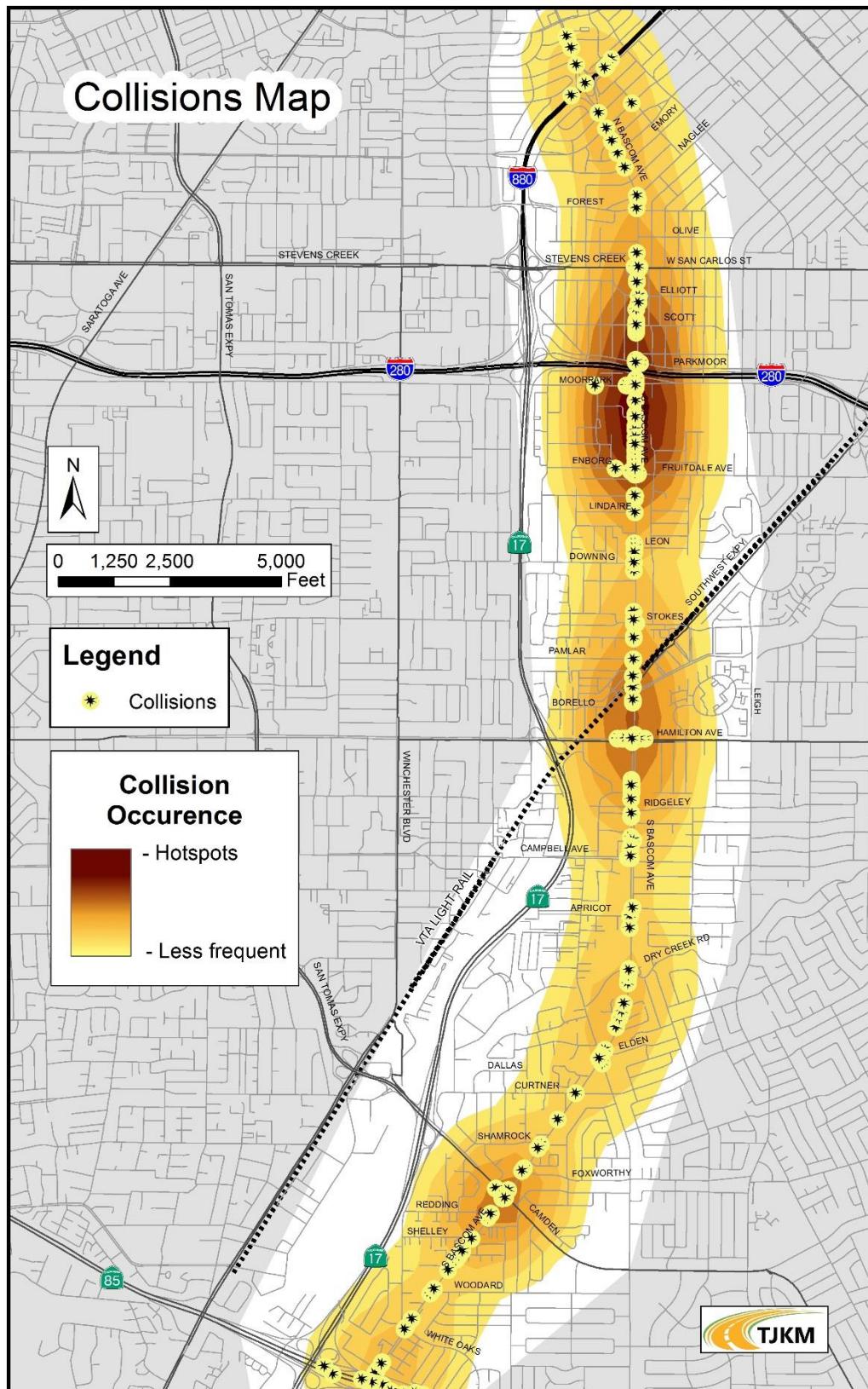


Figure 10. Pedestrian Collisions

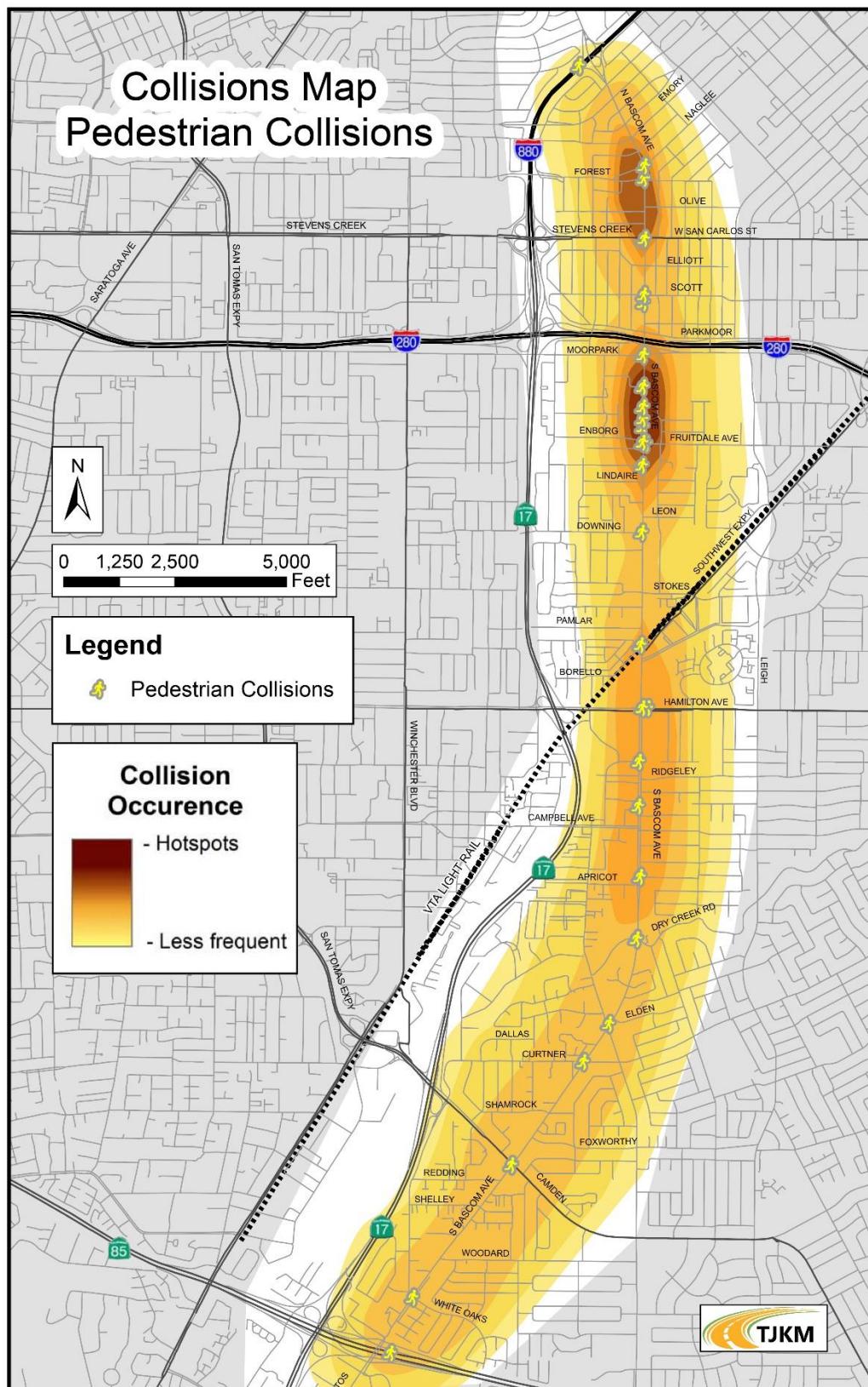
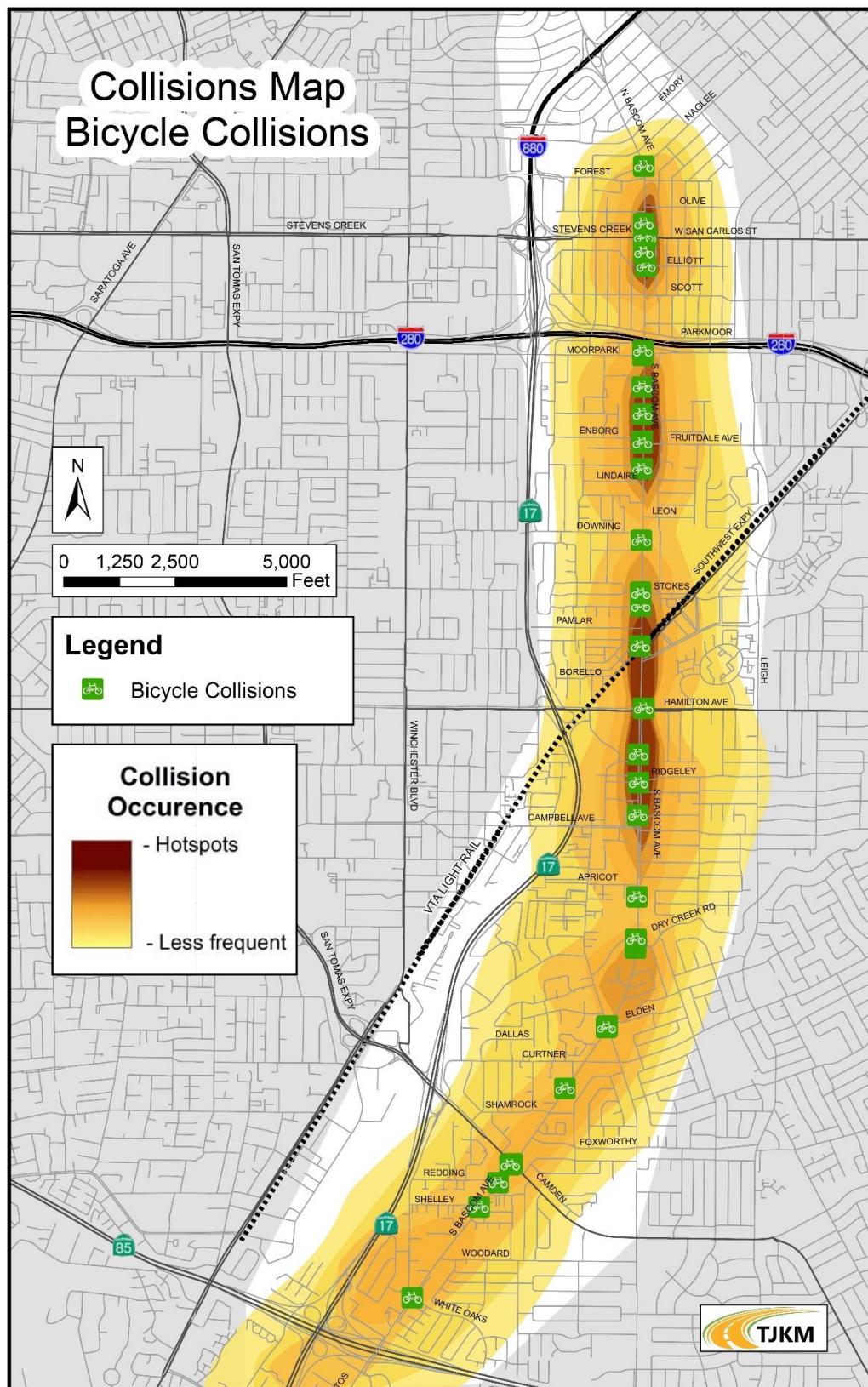


Figure 11. Bicycle Collisions



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Average Travel Speeds

Based on a review of City planning documents and travel speed data for the corridor, key findings are that:

- City of San Jose Complete Streets Guidelines identify a desirable "target speed" of 25 to 30 miles per hour (mph) on Main Street segments (applicable to the segments between Stevens Creek Boulevard and Hamilton Avenue), and 25 to 35 miles on City Connector Streets (applicable to remaining segments within the City of San Jose).

Street Type	Target Speed (mph)
Grand Boulevards	25-30
Primary Bicycle Facility Streets	20-30
Main Streets	25-30
City Connector Streets	25-35
Local Connector Streets	25-30
Residential Streets	15-25
Commercial	25-30
Expressways	30-45

- The current average travel speeds is much higher than the City of San Jose's desired target speeds, generally averaging about 40 miles per hour (mph) along the corridor. On some segments, the 85th percentile travel speed was identified as 43 mph based on speed surveys based on City of San Jose 2011 speed survey data.

5. SUMMARY

As described in the preceding pages, key findings relevant to the complete streets study are:

1. Reduction to two motor vehicle lanes per direction would be feasible on all segments, while just one lane per direction may be adequate on some segments. Traffic volumes range from 18,000 to 34,000 daily, well below the capacity of approximately 60,000 provided by the current 7-lane configuration including left-turn pockets. Daily volumes of up to 40,000 vehicles can generally be accommodated by just two lanes per direction provided left-turn pockets are provided, while up to 22,000 vehicles can often be accommodated by just one lane per direction with left-turn pockets.
2. Bicyclists and pedestrians are disproportionately affected by collisions on the corridor. Although less than 10 percent of existing trips on the corridor are via bicycling or walking, bicyclists and pedestrians were involved in 23 percent of reported injury collisions, including 56 percent of serious injury collisions, and 60 percent of fatalities.
3. Travel speeds on Bascom Avenue average about 40 miles per hour (mph), well above the "target speed" goals established by the San Jose Complete Streets Guidelines that aim for 25 to 30 mph (between Moorpark and Hamilton Avenue) and 25 to 35 mph on remaining segments in San Jose.

APPENDIX A

Study Intersection Level of Service Output Sheets

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AM Peak

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PM Peak

