MEMORANDUM

Date: March 8, 2012

To: Linda Heineck, City of Menlo Park
    Thomas Rogers, City of Menlo Park

Copy: Mark Hoffheimer, Perkins + Will

From: Jane Bierstedt

Subject: Task A – El Camino Real Street Sections Revisions

PURPOSE

This memorandum discusses the rationale for recommending bulbouts (or curb extensions) on El Camino Real to improve east-west pedestrian connectivity. It also presents alternative roadway cross-sections for the portion of El Camino Real in downtown Menlo Park (between Valparaiso/Glenwood Avenues on the north and Menlo/Ravenswood Avenues on the south) with removal of the bulbouts, including adding bicycle lanes and providing six travel lanes, per City Council direction. The transportation implications of each of these options are addressed, and the pedestrian and retail environment ramifications, provided by Perkins + Will, have been incorporated.

As with other Specific Plan analyses, in particular Tasks O, P, and Q (Bicycle-Related Comments), this discussion and analysis has occurred at a relatively high level. While specific findings and recommendations are presented, future detailed design would need to occur to establish with certainty the feasibility of various improvements.

KEY FINDINGS

- Bulbouts (or curb extensions) were included in the Draft Menlo Park El Camino Real/Downtown Specific Plan for the downtown intersections on El Camino Real because they improve pedestrian safety by slowing down vehicles turning across the crosswalk, create a larger sidewalk area for pedestrians at the intersection corner, and shorten the pedestrian crossing distance and exposure time to moving traffic. In addition, they are consistent with intersection crossing improvements identified in the Grand Boulevard Multimodal Transportation Corridor Plan.

- The existing curb-to-curb width on the downtown portion of El Camino Real can accommodate alternative cross-sections, including six travel lanes and four travel lanes with on-street parking and bicycle lanes, with some minor curb and median adjustments.
• Adding bicycle lanes would enhance bicycle travel, especially if the bicycle lanes extend beyond the downtown area, and would not alter the traffic operations of the intersections. Please see the bicycle network memorandum regarding the feasibility of bicycle lanes on other portions of El Camino Real.

• With the six-lane cross-section, approximately 40 parking spaces would be removed. Intersection operations will improve slightly, with overall peak-hour delay decreasing approximately 8 percent compared to a four-lane cross-section (with or without bicycle lanes but no bulbouts).

• The six-lane alternative creates a worse pedestrian environment than the four-lane alternative as it moves traffic closer to the pedestrians, and increases the overall volume of traffic and associated impacts, such as noise.

• The sidewalk width of the four-lane alternative is closer to its preferred width than the six-lane alternative, especially if the sub alternative with no on-street parking but with wider sidewalks is considered.

• The four-lane alternative has reduced retail environment ramifications compared to the six-lane alternative.

• The four-lane alternative with on-street parking, and bicycle lanes is the preferred alternative, subject to consideration in relation to the overall El Camino Real bicycle route/lane analysis and future detailed design, in order to establish its physical feasibility.

RECOMMENDATIONS FOR SPECIFIC PLAN REVISIONS

It is recommended that the four-lane alternative with on-street parking and bicycle lanes be the preferred alternative. The six-lane alternative will be addressed in the revised Specific Plan text. It is recommended that the curb extensions and the corresponding Specific Plan language be retained. However, the Specific Plan language will be modified per City Council direction to delete references to the curb extensions/bulbouts within this central El Camino Real section (bulbouts in other sections of El Camino Real could be implemented if they do not conflict with 6-lane travel sections or bicycle lanes). Figure D17 should be modified so the existing curb-to-curb width and dimensions match the attached figure. Figure D18 should be modified to reflect the cross-section with four lanes, on-street parking, and bicycle lanes. Figure D20 should be modified to be consistent with the revised Figure D18.

METHODOLOGY

The existing curb-to-curb width was determined via Google Maps and verified during a field visit. The alternative cross-sections were developed using engineering standards for travel lane widths and bicycle facilities. Intersection level of service calculations were conducted to evaluate the intersection operational improvements with the six-lane alternative.
DISCUSSION OF FINDINGS

Rationale for Bulbouts

There are numerous treatments that can be implemented to enhance pedestrian crossings. A table summarizing several of them plus a recent publication from America Walks, “Signalized Intersection Enhancements that Benefit Pedestrians” are attached to the memorandum with the subject Task N – East-West Connectivity and dated February 10, 2012. One option to enhance pedestrian access at signalized crossings is curb extensions. This option works well at locations with a high volume of traffic and on-street parking because they can be installed without reducing the number of travel lanes. Curb extensions calm or slow down vehicles turning across the crosswalk, thus improving pedestrian safety. They also create a larger sidewalk area for pedestrians at the intersection corner. Of primary importance for El Camino Real is that curb extensions shorten the pedestrian crossing distance and exposure time to moving traffic. Curb extensions were included in the Draft Specific Plan because of their numerous benefits; plus they are consistent with intersection crossing improvements identified in the Grand Boulevard Multimodal Transportation Corridor Plan. It should be noted that full implementation of the identified curb extensions would require removal of selected right-turn lanes on El Camino Real at the intersections (partial implementation of curb extensions on only the “receiving” end of an intersection would not necessary require any lane removal).

Existing Cross-Section for El Camino Real in Downtown Menlo Park

El Camino Real in downtown Menlo Park has two travel lanes in each direction and a median with left-turn lanes. The areas near the curb are used for on-street parking, bus stops, and right-turn lanes at the intersections. The existing cross-section with a (generalized) curb-to-curb width of 84 feet is shown on an attached figure. (The curb-to-curb width, median width, and lane widths vary by a few feet throughout the downtown area.)

Existing Pedestrian Environment

The existing pedestrian environment in the downtown area comprises 7- to 8-foot wide sidewalks with adjacent on-street parking. The preferred sidewalk widths are 15 feet with adjacent on-street parking or bicycle lanes and 18 feet with an adjacent traffic lane.

Existing Parcel Configuration

There are numerous small parcels per block in the downtown area with the exception of Menlo Center (1010-1090 El Camino Real). The parcel widths vary from 25 to 160 feet. The parcel depths vary from 75 to 140 feet, with typical depths of 75 or 100 feet. With the exception of the ECR NW zoning district, service is provided both from El Camino Real and from the rear streets or alley ways.
ALTERNATIVE CROSS-SECTIONS FOR EL CAMINO REAL IN DOWNTOWN MENLO PARK

Three alternative cross-sections are addressed:

1. Six travel lanes (Option 1)
   a. Six travel lanes at all times (no on-street parking and no bicycle lanes)
   b. Six travel lanes with two lanes converted to on-street parking during off-peak hours

2. Four travel lanes with on-street parking and bicycle lanes (Option 2)

3. Four travel lanes with bicycle lanes (no parking) (Option 3)

There has been some discussion of another option with six travel lanes with the two outside travel lanes converted to bicycle lanes during off-peak hours. This option was not considered further because of safety concerns with temporary and discontinuous bicycle lanes and due to traffic operational considerations. To create off-peak bicycle lanes, special non-standard striping and signage would need to be added to communicate to vehicle drivers when to stay out of the outside lanes. El Camino Real has six travel lanes north and south of the downtown area. It is a regional route and carries traffic from areas outside of Menlo Park. Therefore some of the drivers may not be familiar with the unique circumstances in Menlo Park and could continue to drive in the outside lane thus negating the bicycle/vehicle separation provided by bicycle lanes. With the driver confusion/distraction caused by the unusual treatment of this section of El Camino this option was deleted from further consideration.

Six Lanes (Option 1)

A cross-section with six travel lanes is shown on an attached figure. This option would add a vehicular travel lane in each direction by converting the outside lanes used for parking and right-turn lanes to travel lanes. Approximately 40 parking spaces would be removed. Minor modifications to the median and outside curbs would also be required as the cross-section on El Camino Real is not consistent through the downtown area. The existing right-turn lanes at the intersections would become shared through/right-turn lanes. The per-lane through volumes are generally heavier than the right-turn volumes so the result would be an increase in the north-south vehicle carrying capacity of the four downtown intersections.

Intersection Operations

Changes in intersection operations were evaluated with intersection level of service calculations using the Traffix software program. The results for both a four-lane cross-section (with or without bicycle lanes but without bulbouts) are presented in Table 1. The volumes used in the calculations represent Cumulative plus Project conditions from the Specific Plan Draft Environmental Impact Report. They do not include induced demand or volume increases caused by traffic diverting from parallel roadways or other time periods in response to the roadway capacity increase. Intersection delays with the six-lane option are lower than with the four-lane alternative. Peak-hour delay is
reduced by 0 to 20 percent at each intersection for an average overall reduction of 8 percent. The improvement is not greater because the added through lanes are caused by converting existing right-turn lanes and not by adding new lanes. Plus the intersection operations are based on the average delay for all approaching vehicles, including those on the side streets where no lanes are being added. With induced demand, the delay reduction would be less and operations would likely mimic the four-lane alternative.

### TABLE 1:
**PROJECTED DOWNTOWN INTERSECTION OPERATIONS WITH 4 AND 6 TRAVEL LANES ON EL CAMINO REAL**

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Peak Hour</th>
<th>4 Lanes</th>
<th></th>
<th>6 Lanes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Delay</td>
<td>LOS</td>
<td>Delay</td>
<td>LOS</td>
</tr>
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<td>El Camino Real and Valparaiso Ave./Glenwood Ave.</td>
<td>AM</td>
<td>46.9</td>
<td>D</td>
<td>46.7</td>
<td>D</td>
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<tr>
<td></td>
<td>PM</td>
<td>56.8</td>
<td>E</td>
<td>49.1</td>
<td>D</td>
</tr>
<tr>
<td>El Camino Real and Oak Grove Avenue</td>
<td>AM</td>
<td>42.3</td>
<td>D</td>
<td>37.8</td>
<td>D</td>
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<tr>
<td></td>
<td>PM</td>
<td>44.7</td>
<td>D</td>
<td>39.6</td>
<td>D</td>
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<tr>
<td>El Camino Real and Santa Cruz Avenue</td>
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<td>13.0</td>
<td>B</td>
<td>12.9</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>PM</td>
<td>30.0</td>
<td>C</td>
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<tr>
<td>El Camino Real and Menlo Ave./Ravenswood Ave.</td>
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<td>F</td>
<td>70.4</td>
<td>E</td>
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<tr>
<td></td>
<td>PM</td>
<td>157.3</td>
<td>F</td>
<td>157.2</td>
<td>F</td>
</tr>
</tbody>
</table>

Delay – Weighted average control delay per vehicle in seconds
LOS – Level of service
Source: Fehr & Peers

**Pedestrian Environment**

This option worsens the pedestrian environment as it places fast moving traffic near pedestrians. A remedy is to increase the sidewalk width to 18 feet by increasing the building setbacks when parcels redevelop. With numerous small parcels, increased setbacks with an enhanced pedestrian environment would be achieved incrementally over time, assuming that an entire block is not redeveloped at the same time. Therefore implementation would be a long-term prospect. With incremental improvements, the pedestrian environment would be uneven and potentially uninviting as the main pedestrian through zone would remain closest to the street.

**Retail Environment**

This option also worsens the retail environment as it removes on-street parking, which is a customer convenience particularly during time periods when El Camino Real traffic volumes are lower and parking maneuvers are easier to make. Plus the worsened pedestrian environment may reduce the amount of foot traffic. With the incremental improvements and uneven building setbacks, the retail environment could suffer as there would be a lack of a consistent street/retail
wall. The resulting inconsistent sidewalk conditions could create an unappealing shopping experience for those walking along the street and hurt retail sales. However, while resulting in an inconsistent frontage, piecemeal development could allow for more immediate improvements to the sidewalk, while block-wide improvements may take more time to plan, fund, and construct. With increased setbacks, redevelopment is still possible on the existing parcels. With a setback of 10 feet, the most constrained parcel at 25 feet wide and 75 feet deep would have a buildable area of 25 feet by 65 feet or 1,625 square feet.

**Six Lanes with Off-Peak Parking (Option 1 – layout similar)**

Another option is to allow off-peak on-street parking with the six-lane option. (El Camino would function as a six-lane arterial during peak periods and as a four-lane arterial with parking during off-peak periods.) This option would have the same peak hour traffic benefits/intersection operations as the six-lane alternative as it would have the added travel lanes when traffic volumes are high enough to warrant them. When the lanes are not needed for traffic-carrying purposes they would be used for on-street parking. One significant drawback of this option is that it would require the City of Menlo Park to enforce the peak period parking restrictions by towing vehicles (either by operating tow vehicles or by managing the process).

**Pedestrian Environment**

The existing environment would be retained during the off-peak hours. However, the pedestrian environment would be worsened during the peak hours as moving traffic is placed near the pedestrians without the buffer of the parked vehicles. Peak hours for vehicles can coincide when pedestrians themselves are active, so this negative effect could be magnified. The pedestrian environment could be improved by widening the sidewalk through building setback increases as discussed for the six-lane alternative.

**Retail Environment**

This option also worsens the retail environment as it removes on-street parking during peak periods, which is often a time that parking itself is in demand (i.e., quick shopping trips are often conducted on the way to/from work, during peak travel hours). Plus the worsened pedestrian environment may reduce the amount of foot traffic. The incremental improvements and uneven building setbacks would have the same ramifications on the retail environment as the six-lane alternative.

**Four Lanes with Parking and Bicycle Lanes (Option 2)**

The existing curb-to-curb width can accommodate striped bicycle lanes adjacent to the on-street parking with a few modifications, as illustrated on the attached figure. The existing outside 13-foot lane dimension would accommodate a 5-foot bicycle lane adjacent to an 8-foot parking lane. This arrangement is consistent with Grand Boulevard design guidance. Although an 11-foot travel dimension would require an exemption from Caltrans design standards, Caltrans staff has been amenable to 11-foot lanes in similar situations. This alternative does not change the number of vehicular travel lanes. Therefore it will not affect traffic operations compared to the existing cross-
section. Curb extensions could be retained in this layout, as Caltrans and other requirements already limit conflicts with bicycle lanes.

Although the layout of 5-foot bicycle lanes to the left of parallel parking would be in compliance with relevant standards and guidelines, it is worth noting that such an arrangement can create the risk of “dooring,” which is when someone in a parked car opens a door into the bicycle lane, potentially injuring a bicyclist. It is also worth noting that Option 2 does not necessarily clearly work in the northbound block between Ravenswood Avenue and Santa Cruz Avenue, where parking is not already present and where bus access/loading movements currently occur. In addition, this block and the following northbound block are identified in the Draft EIR as a possible location for an additional northbound through lane to mitigate intersection impacts, which would likely preclude bicycle lanes. The city would need to consider how to balance the needs of all modes in this section and determine whether a bicycle lane or vehicle travel lane take precedence.

**Intersection Operations**

Projected intersection operations for this four-lane alternative (without bulbouts) are expressed with level of service calculation results and are presented in Table 1. The results are similar to the six-lane alternative, with the exception of Valparaiso Avenue during the PM peak hour, which could go from LOS D to E, and Ravenswood Avenue during the AM peak hour, which could go from LOS E to F.

**Pedestrian Environment**

This option retains the existing pedestrian environment as it retains the existing sidewalk width and on-street parking. The existing sidewalk width of 7 to 8 feet is narrower than the preferred sidewalk width of 15 feet. The preferred sidewalk can be achieved by increasing the building setbacks when parcels redevelop. With numerous small parcels, increased setbacks with an enhanced pedestrian environment would be achieved incrementally over time, assuming that an entire block is not redeveloped at the same time. Therefore implementation would be a long-term prospect. With incremental improvements, the pedestrian environment would be uneven and potentially uninviting as the main pedestrian through zone would remain closest to the street. However, as noted earlier, incremental parcel-specific improvements may allow some benefits to be realized sooner than larger-scale public improvement projects.

**Retail Environment**

This option maintains the existing retail environment. However, there would be a desire to widen the sidewalks through increased building setbacks which would create similar challenges (but to a lesser degree) than the six-lane alternative; there would be a lack of a consistent street/retail wall with the incremental improvements and uneven building setbacks until the preferred sidewalk width is achieved.
Four Lanes with Bicycle Lanes (No Parking) - (Option 3)

Another alternative was developed with four travel lanes and bicycle lanes (no on-street parking) as illustrated on the attached figure. Buffered bicycle lanes (bicycle lanes separated from the adjacent vehicle travel lanes with a striped area of 2 to 3 feet in width) could be provided realizing greater separation between the bicyclists and traffic. Bulbouts could be retained with this option if the existing curb line is retained. Alternatively, the sidewalks could be widened approximately 5 feet with a sub alternative of this option. The potential risk of "dooring" would be eliminated in this option, improving the bicycle environment.

Intersection Operations

Intersection operations (without bulbouts) would be the same as Option 2.

Pedestrian Environment

This option retains the existing pedestrian environment as with Option 2, or allows for improvement with the sub alternative by extending the entire curb lane approximately 5’ toward the street creating a sidewalk width of 12 to 13 feet. The preferred sidewalk can be achieved by increasing the building setbacks when parcels redevelop with similar ramifications as Option 2.

Retail Environment

This option also worsens the retail environment as it removes on-street parking, which is a customer convenience particularly during time periods when El Camino Real traffic volumes are lower and parking maneuvers are easier to make. However, the sub-alternative improvement of widening the entire sidewalk would improve the pedestrian environment such that the retail implications of the parking removal may be offset. If the sidewalk widening sub-alternative is not pursued, there would be a desire to widen the sidewalks through increased building setbacks which would create similar challenges (but to a lesser degree) than the six-lane alternative; there would be a lack of a consistent street/retail wall with the incremental improvements and uneven building setbacks until the preferred sidewalk width is achieved.

Conclusions

Option 2, the four-lane alternative with on-street parking and bicycle lanes, is the preferred alternative, subject to detailed analysis and design, and consideration of implications for the overall El Camino Real corridor. Its improved pedestrian environment, retail environment, and bicycle mobility outweigh the modest traffic operations improvement of the six-lane alternative. Curb extensions can be accommodated with the four-lane alternative. There would be modest increases in intersection delay as reported in the Draft EIR.

REFERENCES

Final Grand Boulevard Multimodal Transportation Corridor Study (October 2010).

Google Maps
Street Section Study

El Camino Real/Downtown Specific Plan
City of Menlo Park

El Camino Real - Existing

El Camino Real - Option 1
6 Travel Lanes
Fit within existing curb-to-curb width

El Camino Real - Option 2
4 Travel Lanes with Bike Lanes and Parking
Fit within existing curb-to-curb width

El Camino Real - Option 3
4 Travel Lanes with Bike Lanes
Narrow down existing curb-to-curb width