JOINT MEETING OF THE CAPITOLA PLANNING COMMISSION AND THE TRAFFIC AND PARKING COMMISSION THURSDAY, FEBRUARY 3, 2011 7:00 P.M. – COUNCIL CHAMBERS

1. ROLL CALL AND PLEDGE OF ALLEGIANCE

Planning Commissioners Ron Graves, Ed Newman, Mick Routh, Linda Smith and Chairperson Gayle Ortiz

Traffic and Parking Commission Members: Ed Bottorff, Carin Hanna, Linda Hanson, Margaret Kinstler, Vicki Muse, Anne Nicol, Molly Ording, Peter Roddy, Nels Westman, Gary Wetsel (Note: Mick Routh sits on the Traffic and Parking Commission as the Planning Commission representative)

Staff: Community Development Director Derek Johnson
Public Works Director Steven Jesberg
Minute Clerk Danielle Uharriet

2. ORAL COMMUNICATIONS

A. Additions and Deletions to Agenda

B. Public Comments
Short communications from the public concerning matters not on the Agenda.
All speakers are requested to print their name on the sign-in sheet located at the podium so that their name may be accurately recorded in the Minutes.

C. Commission Comments

D. Staff Comments

3. PRESENTATION

Capitola Village Parking Structure Planning Project Report by Watry Design Inc. and Traffic Impact, Circulation, and Congestion Relief Study by RBF Consulting

4. ADJOURNMENT

Adjourn the Planning Commission to a Regular Meeting of to be held on Thursday, March 3, 2011 at 7:00 p.m., in the City Hall Council Chambers, 420 Capitola Avenue, Capitola, California.

Adjourn the Traffic and Parking Commission to Wednesday, March 9, 2011 at 6:30 p.m. in the Community Room, 420 Capitola Avenue, Capitola, California

Notice regarding Planning Commission meetings: The Planning Commission meets regularly on the 1st Thursday of each month at 7:00 p.m. in the City Hall Council Chambers located at 420 Capitola Avenue, Capitola.

Notice regarding Traffic and Parking Commission meetings: The Traffic and Parking Commission meets regularly on the 2nd Wednesday of each month at 6:30 p.m. in the Community Room located at 420 Capitola Avenue, Capitola.

Agenda and Agenda Packet Materials: The Meeting Agenda and complete Agenda Packet are available on the Internet at the City's website: www.ci.capitola.ca.us. Agendas are also available at the Capitola Branch Library, 2005 Wharf Road, Capitola, on the Monday prior to the Thursday meeting. Need more information? Contact the Community Development Department at (831) 475-7300.

Agenda Materials Distributed after Distribution of the Agenda Packet: Materials that are a public record under Government Code § 54957.5(A) and that relate to an agenda item of a regular meeting of the Planning Commission or the Traffic and Parking Commission that are distributed to a majority of all the members of the Planning Commission or the Traffic and Parking Commission more than 72 hours prior to that meeting shall be available for public inspection at City Hall located at 420 Capitola Avenue, Capitola, during normal business hours.

Americans with Disabilities Act: Disability-related aids or services are available to enable persons with a disability to participate in this meeting consistent with the Federal Americans with Disabilities Act of 1990. Assisted listening devices are available for individuals with hearing impairments at the meeting in the City Council Chambers. Should you require special accommodations to participate in the meeting due to a disability, please contact the Community Development Department at least 24 hours in advance of the meeting at (831) 475-7300. In an effort to accommodate individuals with environmental sensitivities, attendees are requested to refrain from wearing perfumes and other scented products.

Televised Meetings: Traffic and Parking Commission meetings are not televised. Planning Commission meetings are cablecast "Live" on Charter Communications Cable TV Channel 8 and are recorded to be replayed at 12:00 Noon on the Saturday following the meetings on Community Television of Santa Cruz County (Charter Channel 71 and Comcast Channel 25). Meetings can also be viewed from the City's website: www.ci.capitola.ca.us

CITY OF CAPITOLA ***Department of Public Works***

M E M O R A N D U M

TO: Joint Meeting of the
Traffic and Parking Commission and Planning Commission

FROM: Steven Jesberg, Public Works Director

DATE: February 3, 2011

SUBJECT: Capitola Village Parking Structure Planning Project and
Traffic Impact, Circulation, and Congestion Relief Study

Recommended Actions

1. Facilitate presentation of the Capitola Village Parking Structure Planning Project and Traffic Impact, Circulation, and Congestion Relief Study reports.

2. Provide comments to staff and the consultants on these reports for preparation of a City Council presentation tentatively scheduled for March 10, 2011.

Background

On January 14, 2010 the City Council accepted a $40,000 grant from the U.S. Department of Commerce Economic Development Administration (EDA) for the preparation of a Village Parking Structure Planning Project study that analyzed parking structure layouts and options for a new Pacific Cove Parking Lot site analysis of the City Hall/Pacific Cove sites. The purpose of this study was to provide conceptual plans for the Pacific Cove site along with construction cost estimates. The study also looked at the potential long term uses for City Hall/Pacific Cove sites to make sure any parking structure is compatible with these uses.

Following a detailed selection process a contract was awarded on May 13, 2010 to Watry Design Inc. to complete the study. On May 27, 2010, based on the recommendation of the Traffic and Parking Commission, the City Council awarded a contract to RBF Consulting to complete a traffic impact analysis for the proposed parking structure.

Discussion

Both studies have now been completed and the consultants will be presenting the findings at this joint meeting. Much of the design work was based on the needs analysis prepared by the Traffic and Parking Commission in their report to the City Council dated April 14, 2010. (Attachment C)

This report identifies the following current and future parking needs for the Village area:

Demand	Low	High
Current Shortfall	176	390
Village Hotel	60	120
Replace Theater Spaces	39	39
Esplanade Pedestrian Walk	0	100
Valet Parking Program	0	50
Other New Development	50	100
Total Long Term Parking Needs	**325**	**799**

Parking Structure Report Summary (Attachment A):

Based on the above needs and the existing dimensions of the Pacific Cove Parking Lot Watry looked at parking structures with both two driving aisles and three driving aisles. The two aisle design was narrower than the existing property and required a minimum of four levels to meet the minimum needs. The three aisle designs are slightly wider than the existing Pacific Cove Parking Lot, but can be built without encroaching into the coaches in the Pacific Cove Mobile Home Park and can meet minimum needs with three levels and mid-level needs with four levels. Options 1 and 2 in the Watry report detail the three aisle designs. Option 1 is three levels and adds 320 new stalls at a cost of $12.8 million. Option 2 is four levels and adds 430 new stalls at a cost of $18.8 million. Both options have a maximum height that is equal to the level of the railroad south of the site. Option 1 includes one level below the existing grade, while Option 2 includes two below grade levels.

Traffic Impact Report Summary (Attachment B):

A new structure in the Pacific Cove Parking Lot will require some intersection improvements in the Village to maintain levels of service consistent with the City policies. Most notably, the intersection of Bay Avenue and Capitola Avenue, and the intersection of Monterey Avenue and Park Avenue will need either signalization or roundabouts. The intersection of Monterey Avenue and Capitola Avenue will most likely require a traffic signal. Additionally, the intersection of Capitola Avenue and Stockton Avenue will see a slight reduction in the level of service, but improvements to this intersection are not recommended at this time.

The previously reviewed one-way traffic proposal with a counter clockwise traffic circulation was also analyzed, and determined that it was no longer feasible without the proposed roadway through the Pacific Cove Parking Lot property. Without this road, the impacts at the Bay Avenue and Capitola Avenue intersection and other intersections along Capitola Avenue are greater than can be mitigated.

Attachments

A. Capitola Village Parking Structure Planning Project by Watry Design Inc., dated December 16, 2010
B. Traffic Impact, Circulation and Congestion Relief Study for the Pacific Cove Village Parking Structure by RBF Consulting dated January 26, 2011
C. Report on Parking Expansion Alternatives by the Traffic and Parking Commission dated April 14, 2010

FINAL
TRAFFIC IMPACT, CIRCULATION AND CONGESTION RELIEF STUDY FOR THE PACIFIC COVE VILLAGE PARKING STRUCTURE

Prepared for the City of Capitola Public Works Department

Illustration courtesy of Watry Design, Inc. & Field Paoli

Prepared By
RBF Consulting, Monterey Bay

January 26, 2011

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

EXECUTIVE SUMMARY

The City of Capitola is proposing to construct a three-level parking structure at the Pacific Cove parking lot. The parking garage would provide an additional 320 parking spaces for a total of 554 spaces.

The impacts of the proposed garage were evaluated for the summer Friday peak hour under Existing and Village Buildout scenarios. The following intersections were studied:

1. Monterey Avenue and Park Avenue
2. Monterey Avenue and Capitola Avenue
3. Stockton Avenue and Capitola Avenue
4. Stockton Avenue and Esplanade
5. Capitola Avenue and Riverview Drive-Garage Driveway
6. Monterey Avenue and Bay Avenue
7. Capitola Avenue and Bay Avenue
8. Capitola Avenue and San Jose Avenue

The above scenarios and study locations were evaluated under two circulation patterns: existing traffic circulation and one-way counter clockwise circulation. The one-way counter-clockwise pattern reflects the recommended direction of travel (counter-clockwise travel on Monterey Avenue and Capitola Avenue) from the *One-Way Traffic Analysis for the Capitola Village Area* (RBF Consulting, March 2008) with adjustments to route the traffic up to the Capitola Avenue/Bay Avenue intersection because the Pac Cove lot will be occupied by the parking structure and no through traffic can use the lot.

With the existing vehicular circulation pattern evaluation, improvements are recommended at four locations under Village Buildout Conditions with the garage due to adverse operating conditions. Installation of roundabouts at Monterey Avenue/Park Avenue and Capitola Avenue/Bay Avenue would provide acceptable operations. A traffic signal would be required at the Monterey Avenue/Capitola Avenue intersection to provide acceptable operations. A traffic signal and closure of the southbound approach at the Stockton Avenue/Capitola Avenue intersection was considered, but withdrawn due to secondary impacts (extensive queuing and potential diversion of traffic into the adjacent neighborhood).

Under the counter-clockwise vehicular circulation pattern evaluation, a roundabout is also recommended at Monterey Avenue/Park Avenue to provide acceptable operations. However, a roundabout at Capitola Avenue/Bay Avenue was considered but withdrawn due to extensive queues that would result from increased vehicles due to the counter-clockwise circulation. Similar to the existing geometry evaluation, a traffic signal was also not considered at the Stockton Avenue/Capitola Avenue intersection due to secondary impacts. No feasible improvements were identified at the Capitola Avenue/Riverview Drive intersection which is projected to operate at LOS F. This location was recently upgraded to all-way stop control. The projected volumes do not meet the peak-hour warrant for a traffic signal. The counter-clockwise one-way vehicle circulation pattern

is not feasible without the proposed roadway through the Pacific Cove parking lot. It is recommended that this alternative be withdrawn.

Traffic and parking management strategies were evaluated to improve circulation within Capitola Village. The following strategies are recommended:

- Guidance or information signs at entrances to the Village Area notifying drivers of the most direct route to the parking structure
- Development of website providing parking information, directions, and real-time parking information on variable message signs on the roadways to the village and at the garage
- Variable message signs at entrances to the city showing the number of available spaces in the Village and in the garage
- Variable message signs at the garage entrance indicating the availability of spaces on each floor

A qualitative evaluation was also conducted to analyze the impacts of modifying circulation within the Village Area. The following alternatives were considered:

- Conversion of lower San Jose Avenue to northbound direction only
- Conversion of Monterey Avenue between Capitola Avenue and Esplanade Avenue for travel in both directions with a cul-de-sac on the south end of Monterey Avenue
- Closure of Esplanade Avenue east of lower San Jose Avenue

The conversion of lower San Jose Avenue to northbound traffic will alleviate congestion at Monterey Avenue/Capitola Avenue but will worsen congestion at Capitola Avenue/Stockton Avenue.

The two-way Monterey Avenue with Cul-de-Sac alternative would provide improved access for some local residents/businesses. However, this requires northbound Monterey Avenue traffic to use San Jose Avenue thus resulting in congestion at the intersections of both San Jose Avenue and Monterey Avenue with Capitola Avenue.

The closure of Esplanade would divert more traffic onto San Jose Avenue (compared to the northbound San Jose Alternative), thus requiring additional improvements at San Jose Avenue/Capitola Avenue such as all-way stop control or a traffic signal. Traffic conditions would be worse compared to the cul-de-sac option at Monterey Avenue.

1 INTRODUCTION

The City of Capitola Village Area is a highly sought destination for local and regional visitors, especially during the summer season. The Village Area provides a kaleidoscope of recreational activities for tourists, including the beach, specialized retail, and restaurants. During the summer months the roadways are often congested and parking demand exceeds the capacity causing visitors to overflow into nearby residential neighborhoods or circulating continuously in the Village, resulting in congestion and gridlock.

The City of Capitola is proposing to construct a parking garage in place of the existing Pacific Cove surface lot located behind City Hall, approximately one quarter mile (4 blocks) from downtown and the beach. The city retained RBF Consulting to evaluate the traffic and circulation impacts of the proposed parking structure and to recommend measures to manage the congestion. In addition, several circulation alternatives were evaluated for roadways within the Village Area.

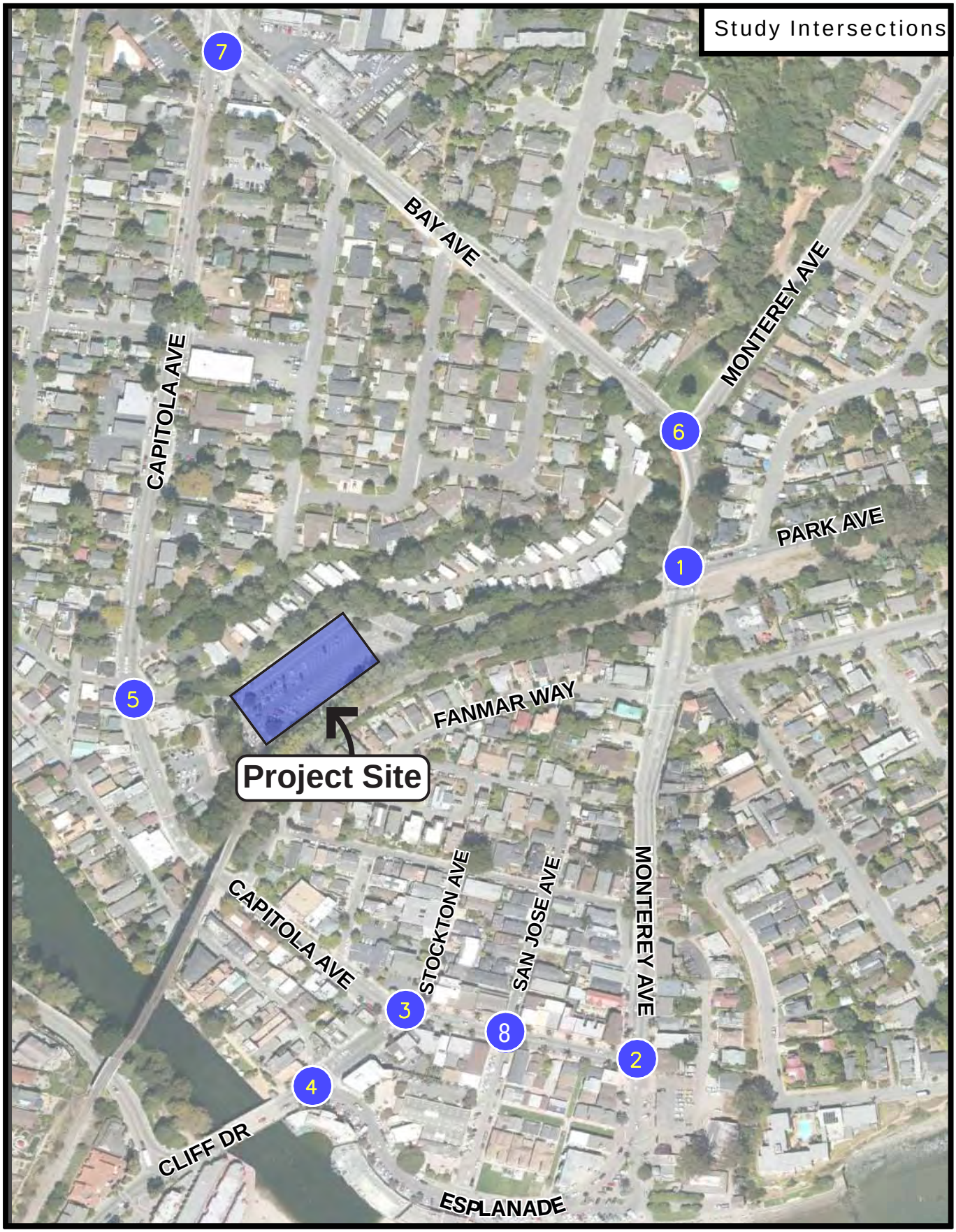
1.1 Project Description

Figure 1 presents a map of the study area which includes the Village between the Esplanade in the south and Bay Avenue in the north, and Monterey Avenue in the east and Capitola Avenue in the west. The project site is located on Riverview Drive east of Capitola Avenue.

The proposed 3-level parking structure would provide a total of 554 spaces, an increase of 320 spaces over the existing 234-space surface lot. **Figures 2A through 2D** present the floor plans for each level. Vehicular access on the ground floor is provided via Riverview Drive to Capitola Avenue. Vehicular access on the second level is provided via an existing road that connects to the Monterey Avenue/Park Avenue intersection.

This report utilizes traffic counts, additional analysis, and findings from a recently completed study, *One-Way Traffic Analysis for the Capitola Village Area* (RBF Consulting, March 2008) to evaluate potential traffic impacts on the roadways in the vicinity of the Village Area. The same study intersections are utilized, except for the addition of one new intersection at Capitola Avenue and San Jose Avenue. The study locations are illustrated on **Figure 1**:

1. Monterey Avenue and Park Avenue
2. Monterey Avenue and Capitola Avenue
3. Stockton Avenue and Capitola Avenue
4. Stockton Avenue and Esplanade
5. Capitola Avenue and Riverview Drive-Garage Driveway
6. Monterey Avenue and Bay Avenue
7. Capitola Avenue and Bay Avenue
8. Capitola Avenue and San Jose Avenue



Source: RBF Consulting (2010)

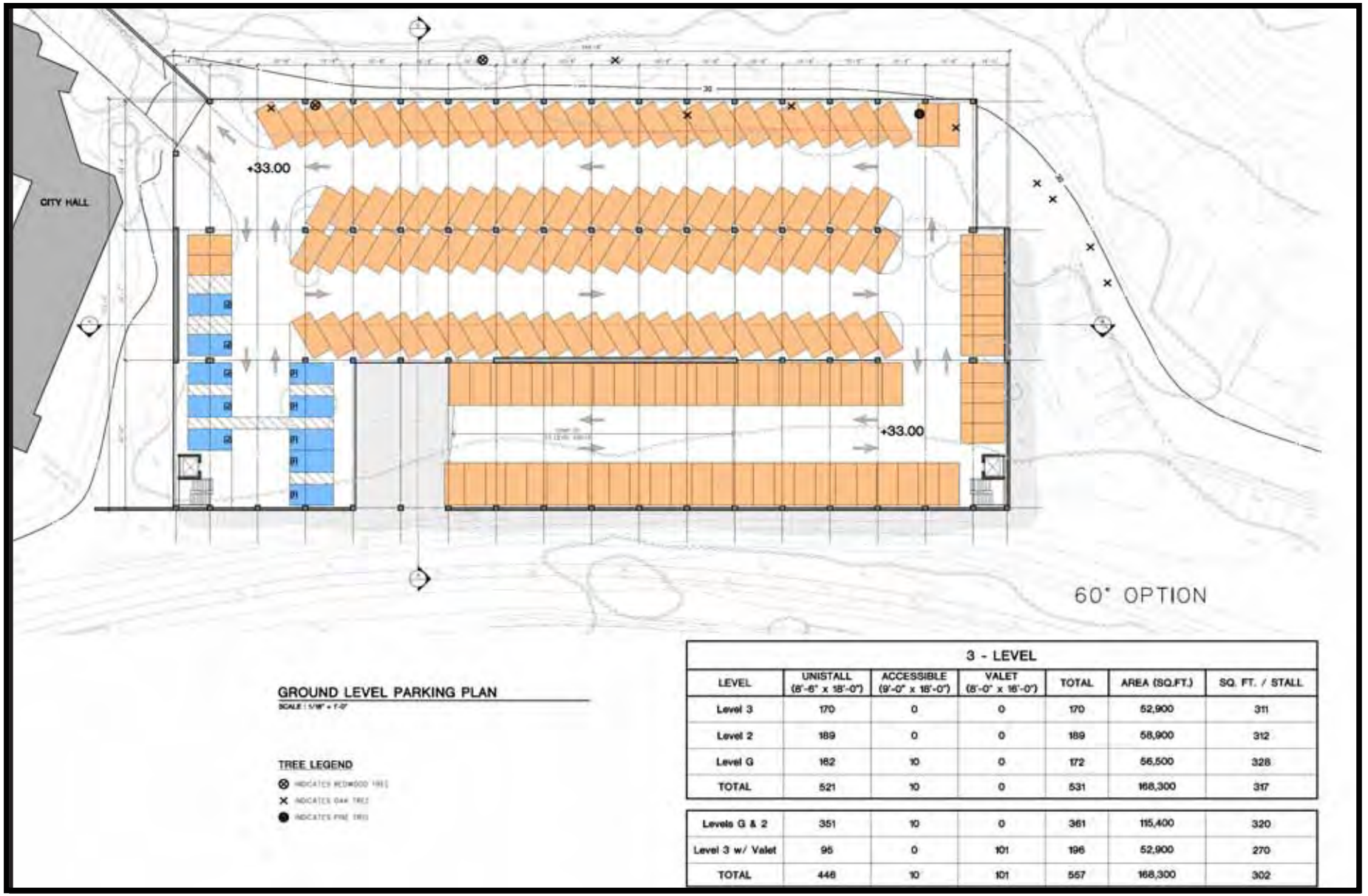
RBF CONSULTING

2/19/08 JN: 70-100117

CAPITOLA VILLAGE PARKING GARAGE TRAFFIC ANALYSIS

Project Study Intersections

Figure 1



GROUND LEVEL PARKING PLAN

SCALE : 1/16" = 1'-0"

TREE LEGEND

⊗ INDICATES REDWOOD TREE

× INDICATES OAK TREE

● INDICATES PINE TREE

3 - LEVEL						
LEVEL	UNISTALL (8'-6" x 18'-0")	ACCESSIBLE (9'-0" x 18'-0")	VALET (8'-0" x 16'-0")	TOTAL	AREA (SQ.FT.)	SQ. FT. / STALL
Level 3	170	0	0	170	52,900	311
Level 2	189	0	0	189	58,900	312
Level G	162	10	0	172	56,500	328
TOTAL	521	10	0	531	168,300	317

Levels G & 2	351	10	0	361	115,400	320
Level 3 w/ Valet	95	0	101	196	52,900	270
TOTAL	446	10	101	557	168,300	302

Source: Watry Parking Consultants (2010)

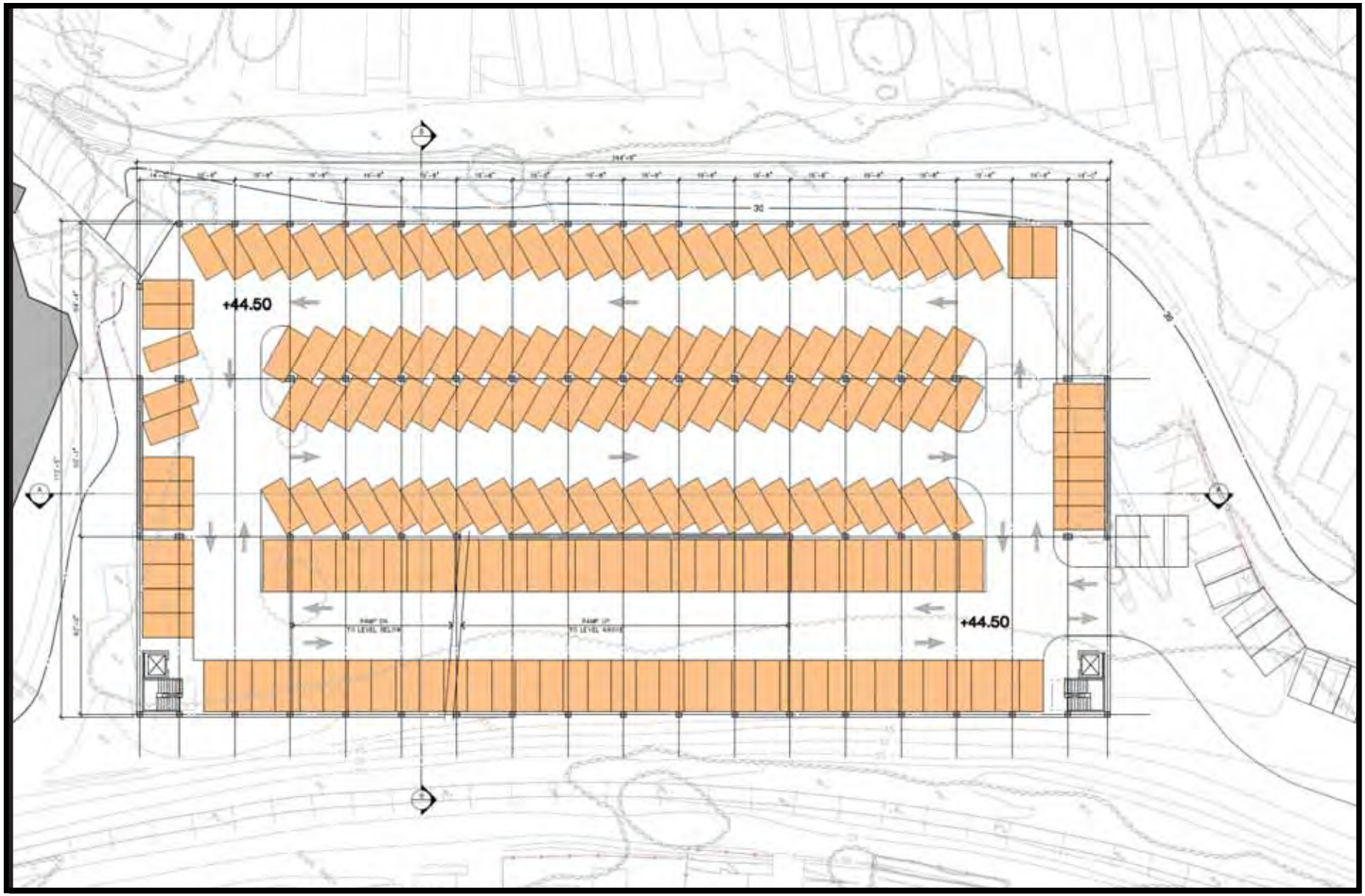
RBF CONSULTING

2/19/08 JN: 70-100117

CAPITOLA PARKING GARAGE TRAFFIC ANALYSIS

Garage Site Plan - Ground Level

Figure 2A



Source: Watry Parking Consultants (2010)

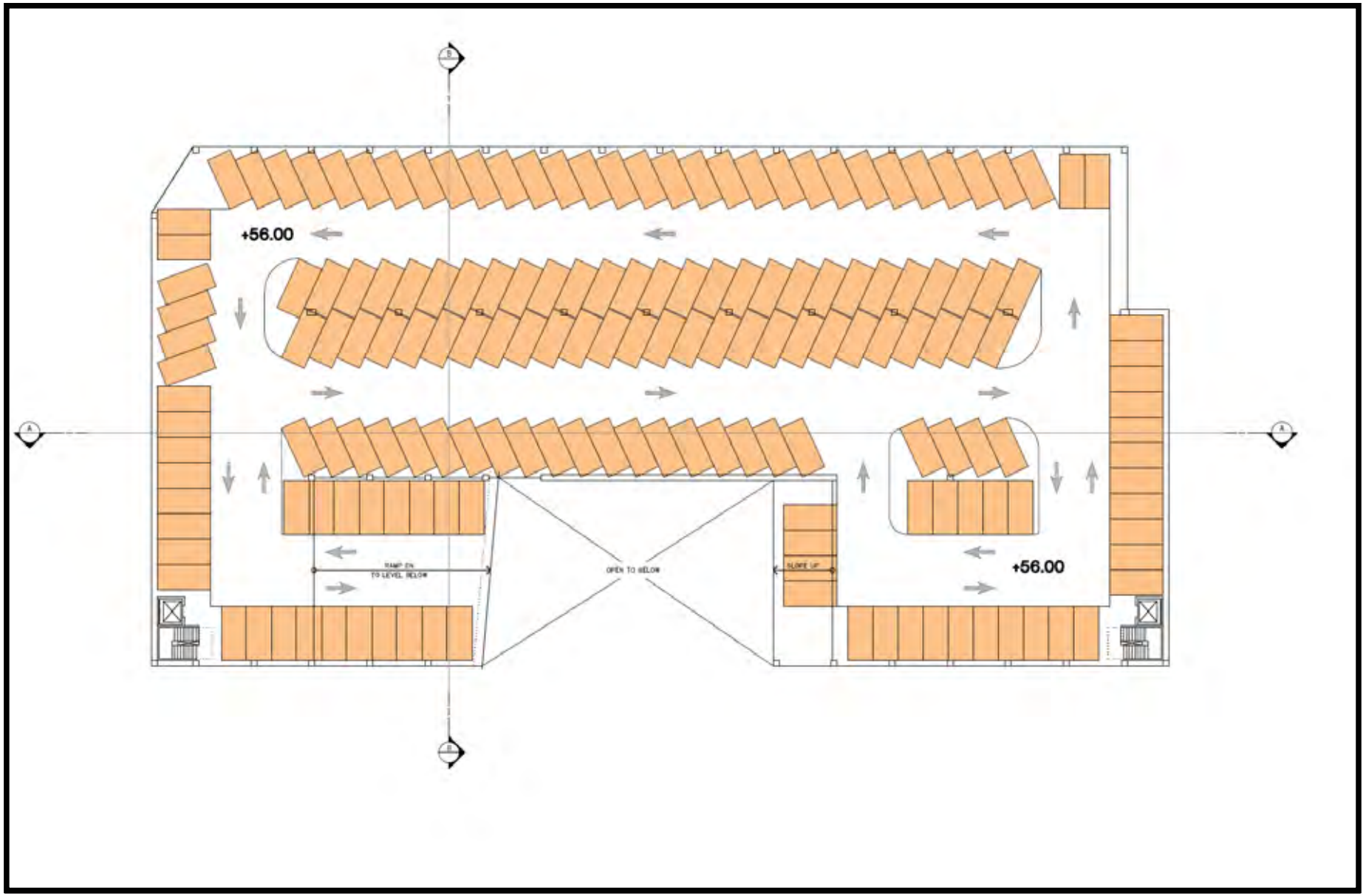
RBF CONSULTING

2/19/08 JN: 70-100117

CAPITOLA PARKING GARAGE TRAFFIC ANALYSIS

Garage Site Plan - 2nd Level

Figure 2B



Source: Watry Parking Consultants (2010)

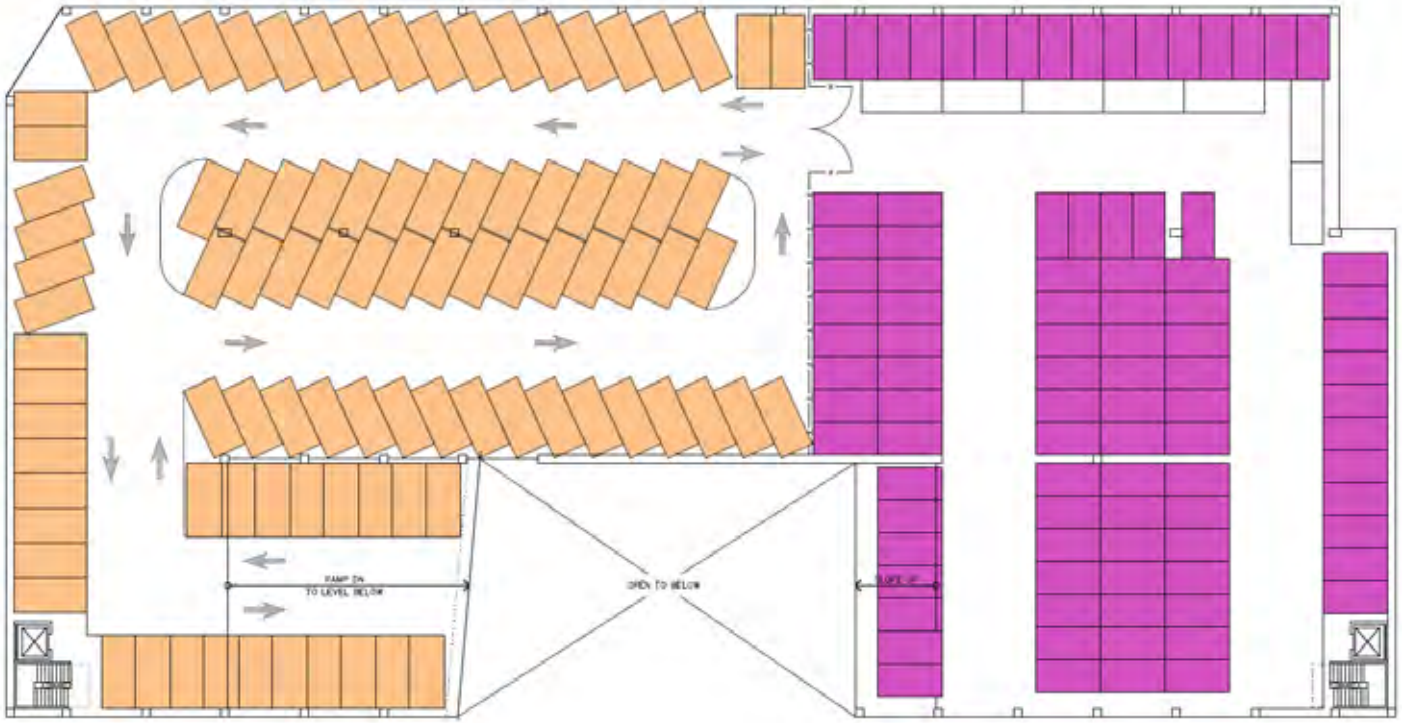
RBF CONSULTING

2/19/08 JN: 70-100117

CAPITOLA PARKING GARAGE TRAFFIC ANALYSIS

Garage Site Plan - 3rd Level

Figure 2C



Source: Watry Parking Consultants (2010)

RBF CONSULTING

2/19/08 JN: 70-100117

CAPITOLA PARKING GARAGE TRAFFIC ANALYSIS

Garage Site Plan - 3rd Parking Plan

Figure 2D

1.2 Project Goals

The scope of services was specifically developed to identify the potential traffic impacts that may be associated with existing and the one-way circulation alternatives analysis and with modified circulation flows around the Esplanade. The City goals with the analysis are as follows:

- Reduce traffic congestion in the Village Area;
- Improve access to the Village Area;
- Recommend traffic and parking management system improvements to enhance vehicular circulation; and
- Optimize parking utilization for the Village Area.

1.3 Scope of Work

The existing traffic data in the *One-Way Traffic Analysis for the Capitola Village Area* report (referenced as the "One-Way traffic study" for the remainder of this document) was utilized for this analysis and supplemented with new peak-hour intersection turning movement counts at the intersection of Capitola Avenue/San Jose Avenue. Those volumes were collected in Year 2007 and included a seasonal factor to reflect summer conditions.

The impacts of the proposed garage at the study intersections were evaluated during the summer Friday peak hour for the following scenarios and circulation patterns:

Existing Circulation
- Existing volumes
- Existing Plus Garage volumes
- Village Buildout Land Use volumes
- Village Buildout Plus Garage volumes

One-Way Counter-Clockwise Circulation
- Existing re-assigned volumes
- Existing Plus Garage volumes
- Village Buildout Land Use volumes
- Village Buildout Plus Garage volumes

For the analysis scenarios with the existing circulation, no changes to the existing lane geometry or traffic controls were made, and improvements identified where operating conditions were not meeting City standards.

For the analysis scenarios with One-Way Counter-Clockwise Circulation, the one-way roadway system was modified to reflect the counter-clockwise circulation on Capitola Avenue and Monterey Avenue between Stockton Avenue to Park Avenue. It should be noted that the one-way counter-clockwise circulation routed traffic through the Pacific Cove parking lot per the parking lot layouts identified previously in the One-Way traffic analysis report. With the new garage, one-way traffic would now be routed to the Capitola Avenue/Bay Avenue intersection, resulting in heavy left turns from Bay Avenue onto Capitola Avenue.

1.4 Traffic Operation Evaluation Methodologies and Level of Service Standards

Intersection traffic operations were evaluated based on the Level of Service (LOS) concept. LOS is a qualitative description of an intersection and roadway's operation, ranging from LOS A to LOS F. Level of service "A" represents free flow un-congested traffic conditions. Level of service "F"

represents highly congested traffic conditions with unacceptable delay to vehicles on the road segments and at intersections. The intermediate levels of service represent incremental levels of congestion and delay between these two extremes.

The City of Capitola has established LOS D as the general threshold for acceptable overall traffic operations at study intersections in the Village Area and LOS C everywhere else.

Intersection operations were evaluated using technical procedures documented in the 2000 Highway Capacity Manual (HCM). For signalized intersections, average control delay per vehicle is utilized to define intersection level of service. Delay is dependent on a number of factors including the signal cycle length, the roadway capacity (number of travel lanes) provided on each intersection approach and the traffic demand. ***Appendix A1*** shows the relationship between vehicle delay and the signalized intersection level of service categories. The Synchro version 6 software program was utilized to calculate the intersection levels of service for most of the study intersections.

At one and two-way stop controlled intersections, the operating efficiency of vehicle movements that must yield to through movements is analyzed. The level of service for vehicle movements on the controlled approaches is based on the distribution of gaps in the major street traffic stream and driver judgment in selecting gaps. ***Appendix A2*** shows the relationship between the vehicle delay and level of service for two-way stop controlled intersections. The 2000 HCM calculates the level of service of the minor street approaches. Using this data, an overall intersection level of service was calculated. Both are reported in this study because traffic on the minor street approaches has the lowest priority of right-of-way at the intersection and are the most critical in terms of delay. Generally, LOS F operations on the side street approach are the threshold warranting improvements. The Synchro version 6 software program was utilized to calculate the intersection levels of service at the study intersections.

For all-way (or four-way) stop intersections, average control delay per vehicle is utilized to define intersection levels of service. Delay is dependent on a number of factors, including the roadway capacity (number of travel lanes) provided on each intersection approach and the traffic demand. ***Appendix A3*** shows the relationship between vehicle delay and the all-way stop intersection level of service categories. The Synchro version 6 software program was utilized to calculate the intersection levels of service at the study intersections.

2 EXISTING CIRCULATION GEOMETRY EVALUATION

This chapter presents a description of the existing traffic network, existing traffic volumes, intersection levels of service, and an overview of traffic flow conditions within the study area.

2.1 Existing Traffic Network

All of the study roadways in the Village Area are currently either one-way or two-way streets and all intersections are Stop controlled. ROW width is restricted and very few opportunities exist for widening the roadways or the intersections.

Monterey Avenue, Capitola Avenue and Stockton Drive provides primary access to the Village Area. The streets are two lane roadways with a 25-mile per hour speed limit. On-street parking is provided along the southerly section of Monterey Avenue, and on Capitola Avenue between Monterey Avenue and the Trestle Bridge. On-street parking spaces alternate between either one side or both sides of Capitola Avenue. No on-street parking is provided along Stockton Avenue.

The Esplanade is a one-way street from Stockton Avenue to Capitola Avenue. From this point northwards the street continues as Monterey Avenue. The Esplanade separates the Village Area from the beach. It also provides access to the local businesses and has angled and parallel parking on both sides of the street. During the summertime it becomes extremely congested due to the fact that it provides the closest parking the beach and there are extensive vehicular and pedestrian conflicts.

Pacific Cove Parking Lot has an access from the intersection off Monterey Avenue and Park Avenue towards the east and a one-way access from Capitola Avenue in the West. This parking lot is heavily utilized during the summer months for overflow traffic from the Village Area. The City of Capitola Staff also uses the parking lot.

Bay Avenue is a two-lane, east-west collector street, providing access to residential, commercial, and retail areas north of the Village Area.

2.2 Existing Vehicular Circulation Pattern – Existing, Existing with Garage, Village Buildout, and Village Buildout with Garage Intersection Operations

The intersection traffic volumes, traffic control, and lane geometry were used as inputs into the level of service calculations. The development of the traffic projections and input assumptions for the four scenarios with existing circulation are described below.

Existing Volumes

As indicated in Section 1.3, the existing and seasonally adjusted summer Friday Peak-Hour volumes were obtained from the One-Way traffic study. **Figure 3** presents the existing volumes at the study intersections.

Table 1 presents the level of service results and the level of service worksheets are contained in **Appendix C**. The majority of the study intersections are operating at acceptable levels of service according to their LOS standard. Two intersections, Monterey Avenue/Park Avenue and Capitola Avenue/Stockton Avenue, are operating at a deficient level of service.

Existing Plus Garage Volumes

Traffic generated by the proposed garage was added to the existing volumes. As noted in the project description, the proposed garage will provide a total of 554 spaces, or 320 additional spaces over the existing supply of 234 spaces.

Table 1: Existing Vehicular Circulation Pattern Levels of Service Summary

North-South Street	East-West Street	LOS Standard	Existing Circulation		Existing Circulation + Garage		Existing Circulation + Garage With Mitigation		Village Buildout		Village Buildout + Garage		Village Buildout + Garage (Mitigation)	
			Friday PM Peak Hour		Friday PM Peak Hour		Friday PM Peak Hour		Friday PM Peak Hour		Friday PM Peak Hour		Friday PM Peak Hour	
			Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1 Monterey Ave. All-Way Stop	Park Ave.	C	**27.4**	**D**	**35.0**	**D**	**10.3** Roundabout	**B**	**34.3**	**D**	**42.7**	**E**	**10.7** Roundabout	**B**
2 Monterey Ave. All-Way Stop	Capitola Ave.	D	**33.4**	**D**	**33.4**	**D**			**40.5**	**E**	**39.6**	**E**	**9.8** Traffic Signal	**A**
3 Stockton Ave. All-Way Stop	Capitola Ave.	D	**38.8**	**E**	**40.3**	**E**	Signal considered but withdrawn due to secondary impacts.		**48.4**	**E**	**50.0**	**E**	Signal considered but withdrawn due to secondary impacts.	
4 Stockton Ave. SB Yield	Esplanade Worst Approach	D	**0.4** 11.2	**A** B	**0.4** 11.3	**A** B			**0.5** 11.5	**A** B	**0.4** 11.4	**A** B		
5 Capitola Ave. All-Way Stop	Riverview Dr.	C	**10.2**	**B**	**11.0**	**B**			**10.5**	**B**	**11.6**	**B**		
6 Monterey Ave. All-Way Stop	Bay Ave.	C	**11.3**	**B**	**11.3**	**B**			**11.7**	**B**	**11.7**	**B**		
7 Capitola Ave. All-Way Stop	Bay Ave.	C	**21.4** Extensive queues	**C**	**24.9** Extensive queues	**C**	**9.4** Roundabout	**A**	**24.1** Extensive queues	**C**	**28.2** Extensive queues	**D**	**9.7** Roundabout	**A**
8 Capitola Ave. EB-WB Yield	San Jose Ave Worst Approach	D	**0.5** 0.9	**A** A	**0.5** 0.9	**A** A			**1.1** 1.7	**A** A	**1.1** 1.7	**A** A		

NOTES:
1. Analysis performed using 2000 Highway Capacity Manual methodologies.
2. Highlighted levels of service (LOS) represent an intersection with failing operations.
3. Roadway Assumptions:
   Existing circulation patterns
   All "With Garage" scenarios includes redirecting of some Esplanade re-circulating traffic to garage

For this analysis, the garage is assumed to operate at 85% occupancy which is the optimum (at capacity) operating efficiency for parking facilities. A higher occupancy results in vehicles circulating multiple times in the Village looking for vacant parking spaces and this results in added congestion and gridlock. To determine the number of new potential spaces that could turnover, the 85% occupancy factor was applied to the total parking supply, resulting in a occupancy of 471 spaces. It should be noted that the parking structure could, and probably would fill up during the busiest summer days. The analysis in this report assumes an average summer Friday PM scenario. To design traffic operations and parking supply in the Village for the busiest day/s would cost too much.

For the purposes of this report, it is assumed that approximately 1/3 of these net new occupied spaces would turnover (one car leaves a space and another car parks) during the Friday peak-hour, resulting in approximately 80 inbound and 80 outbound vehicles as indicated in **Table 2**. This assumption is fairly conservative because it assumes one-third of all spaces would turnover during the Friday peak-hour. Based on the *Parking Analysis for the Capitola Village Area* report (RBF Consulting, December 2008), the average turnover for spaces in the Capitola Village area is approximately 2 vehicles per spaces with an average duration of almost 2 hours during a weekday summer day which indicates that the on-street parking supply does not turnover that quickly. The majority of these trips would travel to and from SR 1 as shown on the trip distribution figure in **Figure 4**.

Table 2: Garage Trip Generation Estimates

Description	Spaces
Net New Occupied Spaces	
Garage Total Spaces	554
Garage @ 85% Occupancy (a)	471
Existing Supply @ 100% Occupancy (b)	234
Net New Occupied Spaces (c) = (a-b)	**237**
Net New Occupied Spaces Trip Generation	
Total Net New Occupied Spaces	237
1/3 net new spaces turnover (each space generating one inbound and one equivalent outbound trip)	**79 Inbound Trips** **79 Outbound Trips**

In addition to traffic diverting and being generated to the new parking structure, it is recommended to also implement a real time parking management system that would manage traffic ancd parking to the Village and the new parking structure. The implementation of such a system would activate changeable message on signs place on Capitola Avenue before Riverside Drive and at Park Avenue before Monterey Avenue. Once parking spaces fill up in the Village Area (at 85% occupancy), the signs would direct visitors that no parking is available in the Village and that they should park in the new parking structure. This would eliminate vehicles driving to the village and then back to the parking garage, and also eliminate circulating vehicles. It should be noted that some drivers will still continue to go to the Village and this occupancy of parking spaces will remain high. Ig occupancy drops to say below 80%, the VMS signs would be turned off and vehicles would continue to the Village until it fills up again. To simulate this traffic scenario, volumes were adjusted as follows:

A review of the license plate survey information from the One-Way report indicated that over 10 percent of vehicles on the roadways (Capitola Avenue, San Jose Avenue, Stockton Avenue, and Monterey Avenue) immediately adjacent to The Esplanade are circulating around to look for available parking. **Appendix B** contains the license plate summary information. Follow-up observations during the peak-hour indicated that the amount of re-circulating vehicles is likely higher than 10 percent. The proposed garage is anticipated to reduce the number of circulating vehicles as parking guidance signs will direct drivers to available spaces. Therefore, the existing turning movements at several intersections (Stockton/Esplanade, Stockton/Capitola, and Capitola/Monterey) were reduced by 20 percent, or 15 vehicles, to reflect the decrease in re-circulating vehicles and reassigned to travel to the proposed garage. These re-circulated trips along with the new garage trips were added to the existing volumes as shown in **Figure 5**.

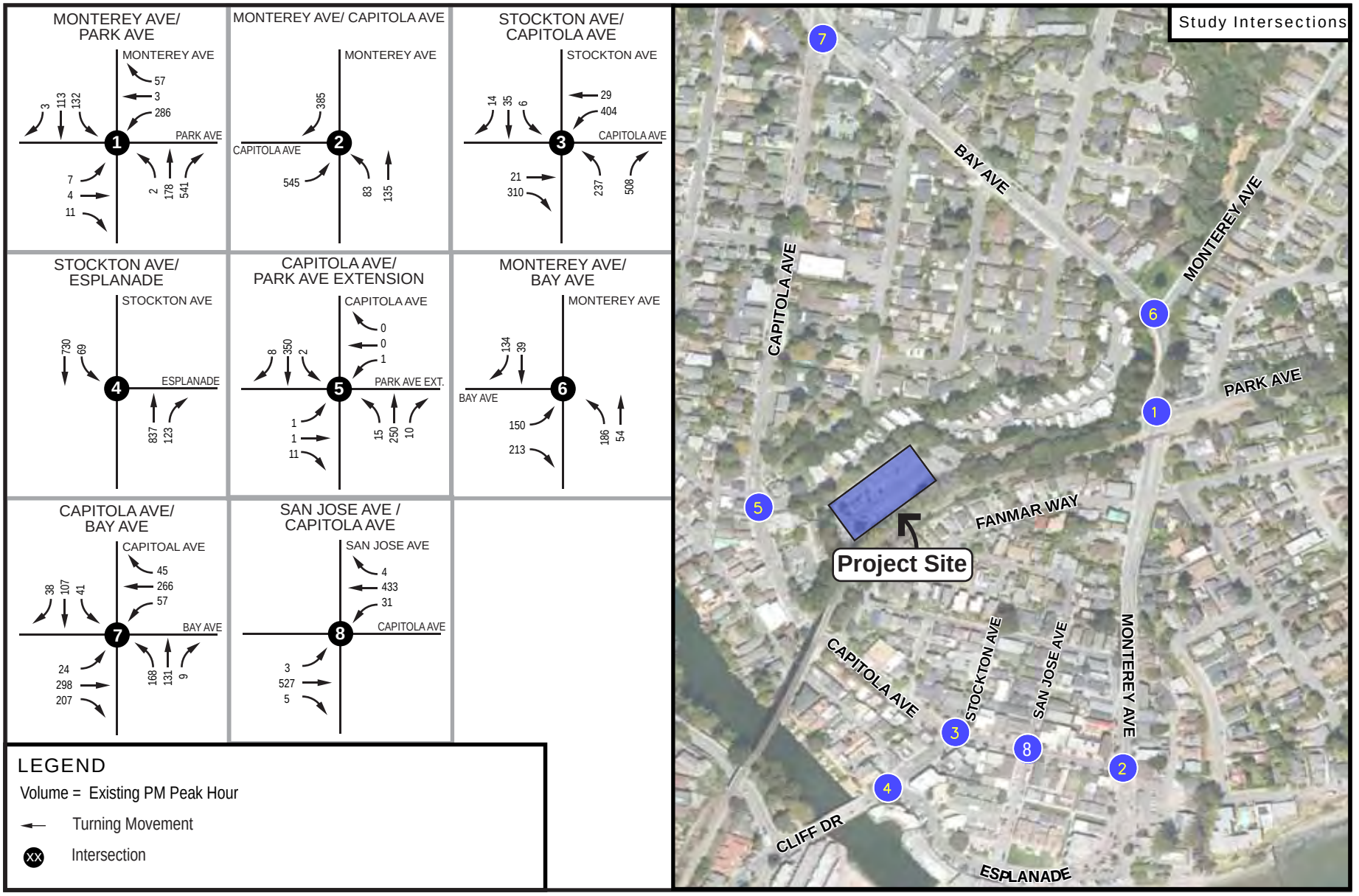
Level of service calculations were conducted for the Existing with Garage volumes. The results, as indicated in **Table 1**, show that the proposed garage would exacerbate unacceptable operations at the Monterey Avenue/Park Avenue and Stockton Avenue/Capitola Avenue intersections. The other remaining intersections are projected to operate at acceptable levels.

Village Buildout Land Use Volumes (No Garage)

City staff identified the following three projects within the Village Area to include in the Buildout Land Use scenario:

- 100 hotel rooms within the Village
- 20,000 s.f. of commercial space on the Esplanade and Capitola Avenue
- 10 mixed use units along Stockton Avenue and San Jose Avenue

The amount of traffic generated by these buildout projects were estimated by applying trip generation rates from *Trip Generation* (Institute of Transportation Engineers, 8th Edition) to the size of the project. The trips were then assigned to the existing roadway network and using a distribution pattern that was adjusted from existing travel patterns. These trips were then added to the existing volumes to reflect Buildout without Garage Conditions as shown in **Figure 5**.



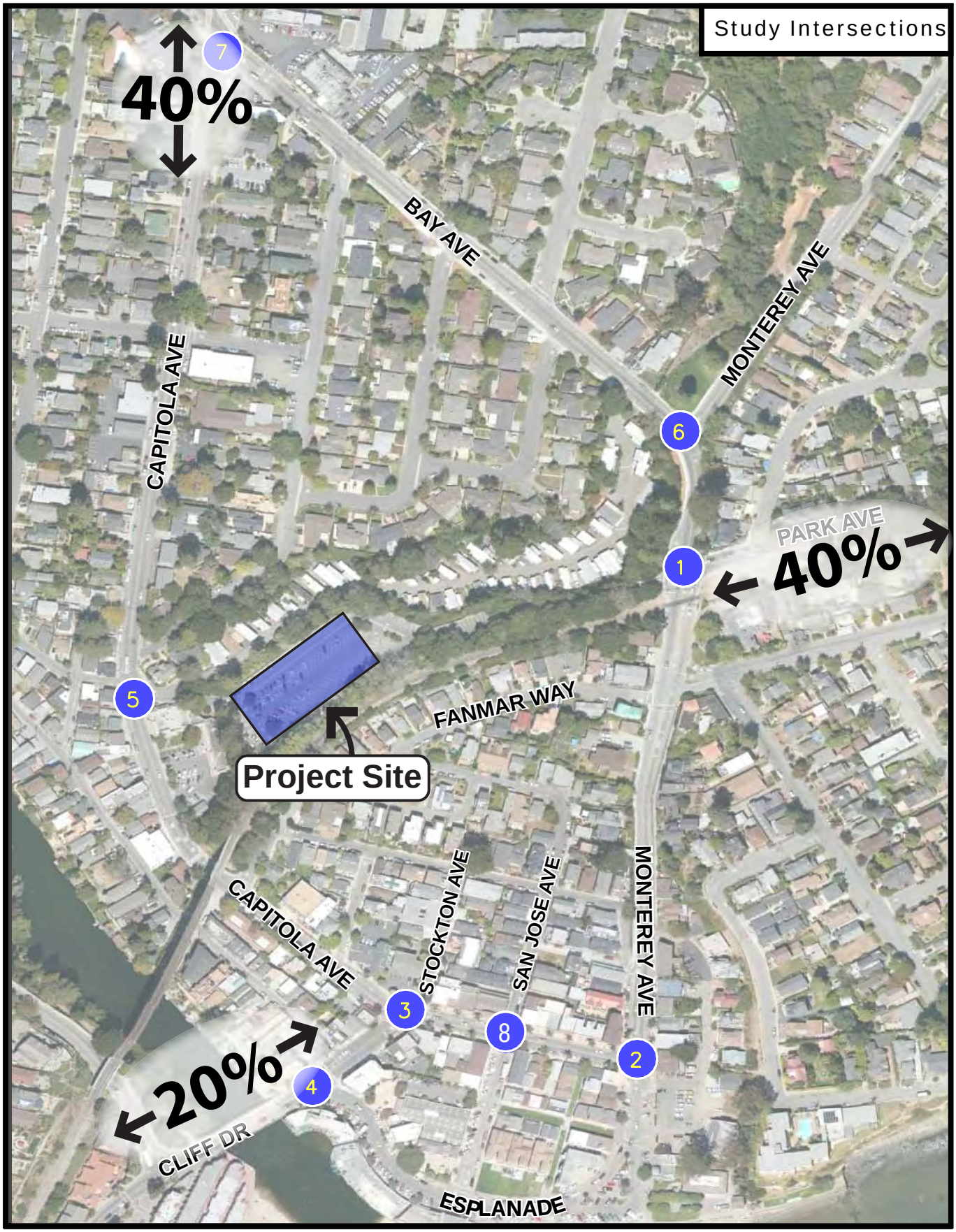
Source: RBF Consulting (2010)

CAPITOLA VILLAGE PARKING GARAGE TRAFFIC ANALYSIS

Existing Circulation (Existing PM Peak Hour Volumes)

12/6/2010 JN: 70-100117

Figure 3



Source: RBF Consulting (2010)

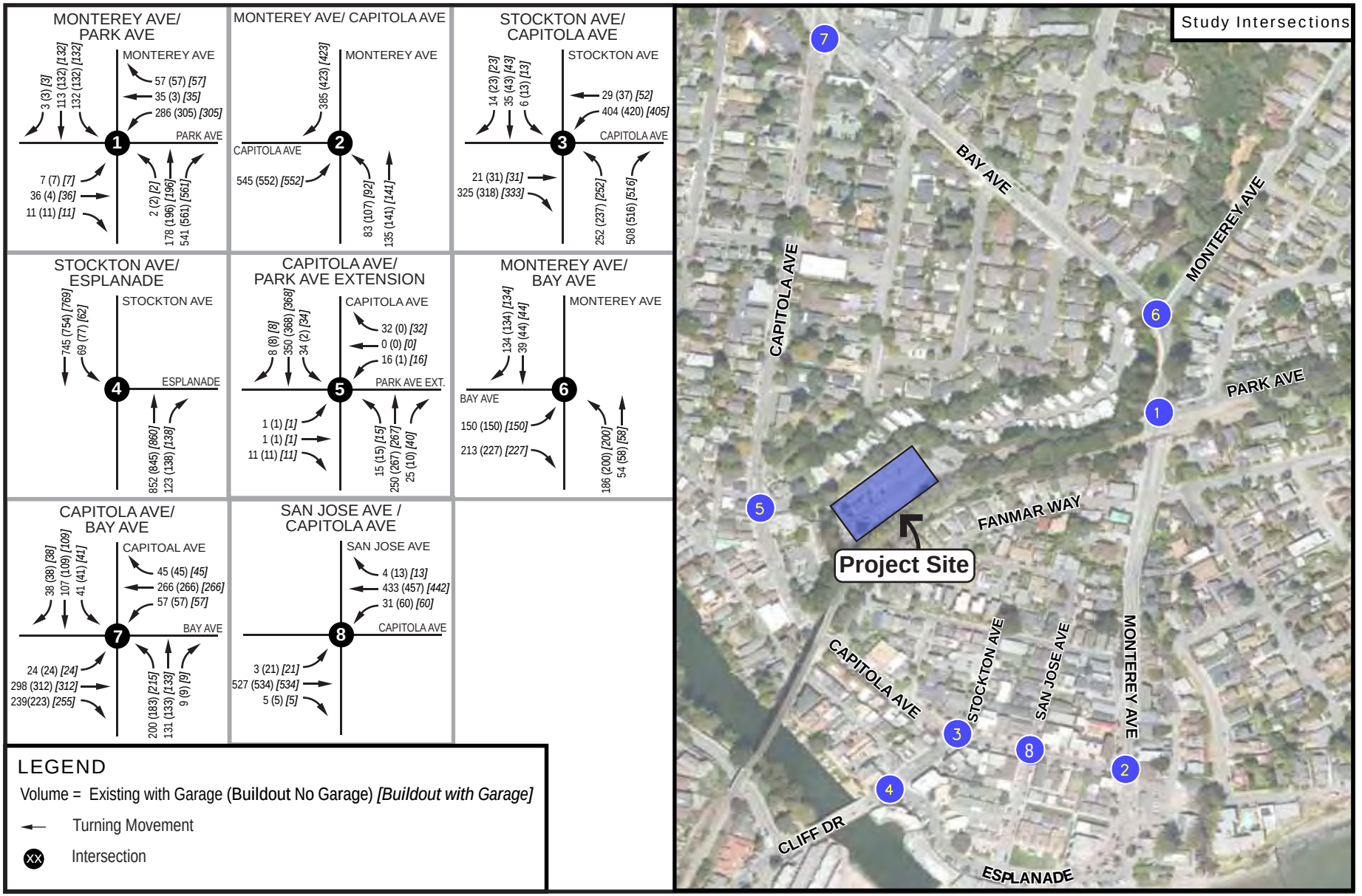
RBF CONSULTING

12/2/2010 JN: 70-100117

CAPITOLA VILLAGE PARKING GARAGE TRAFFIC ANALYSIS

Garage Trip Distribution

Figure 4



Source: RBF Consulting (2010)

CAPITOLA VILLAGE PARKING GARAGE TRAFFIC ANALYSIS

Existing Circulation (Existing with Garage, Buildout No Garage, Buildout with Garage)

12/6/2010 JN: 70-100117

Figure 5

Appendix C contains the level of service calculations under Buildout without Garage volumes. In addition to the two previously identified locations that are operating at an acceptable level, the intersection of Monterey Avenue and Capitola Avenue is projected to degrade to LOS E. **Table 1** presents the level of service results.

Village Buildout Land Use Volumes (With Garage)

The trips associated with the garage and the re-circulating Esplanade traffic were added to the Village Buildout No Garage volumes to reflect Village Buildout With Garage volumes as shown in **Figure 5**. The additional trips are projected to cause a fourth location, Capitola Avenue/Bay Avenue to exceed its level of service standard. This scenario also includes the implementation of a parking management system that would reduce some congestion and possibly grid lock in the Village Area. Volumes were adjusted for this scenario.

2.3 Existing Vehicular Circulation Pattern - Intersection Improvements Required

The following measures were identified to improve intersection operations under the existing vehicular circulation pattern scenarios (Existing or Village Buildout with Garage volumes).

Monterey Avenue/Park Avenue

Installation of a roundabout at this location would provide acceptable operations. This improvement was also recommended in the One-Way traffic report. The northbound queue at the adjacent intersection of Monterey Avenue/Bay Avenue is not projected to extend back to the Monterey Avenue/Park Avenue intersection and impact the proposed roundabout. The mitigated level of service calculation worksheets are contained in **Appendix E**. A traffic signal would also improve the LOS to acceptable conditions.

Monterey Avenue/Capitola Avenue

A traffic signal at this location would improve LOS E operations under Village Buildout with Garage to LOS A operations. This signal would be coordinated with the signal at Park Avenue/Park Avenue and the one at Stockton Avenue/Capitola Avenue.

Stockton Avenue/Capitola Avenue

The proposed garage is estimated to add less than 2 seconds of delay at this location. The closure of the southbound leg (Stockton Avenue) and implementation of a traffic signal would provide LOS C operations. However, this improvement would have detrimental secondary impacts such as extensive queues on westbound Capitola Avenue that would extend past San Jose Avenue. Existing southbound Stockton Avenue traffic would be required to use other roadways including Fanmar Way and Cherry Avenue thus causing further neighborhood intrusion. Operational improvements at this location are being evaluated as part of the on-going General Plan Circulation Element Update. Therefore, improvements at this location are not recommended due to the slight increase in delay, potential secondary impacts, and future study of feasible operational improvements during the General Plan Circulation Element update process.

Capitola Avenue/Bay Avenue

Installation of a roundabout at the Capitola Avenue/ Bay Avenue intersection, also recommended as a mitigation measure in the One-Way traffic report, would provide acceptable LOS A operations. The roundabout would however require the acquisition of right-of-way/landscaping on the southwest corner of the intersection. Alternatively a dual roundabout could be implemented, which would not require ROW, but may take time to get used to and drivers would have to be educated about its operations. The conceptual roundabout design for this intersection is presented in **Figure 6**.

Source: RBF Consulting (2010)

CAPITOLA VILLAGE PARKING GARAGE TRAFFIC ANALYSIS

Capitola Avenue & Bay Avenue Roundabout Alternative 1

RBF CONSULTING

12/6/2010 JN: 70-100117

Figure 6

3 COUNTER-CLOCKWISE CIRCULATION GEOMETRY

This section describes the level of service analysis assuming One-Way Counter-Clockwise circulation on Capitola Avenue and Monterey Avenue between Stockton Avenue to Park Avenue.

3.1 Counter-Clockwise Vehicular Circulation Pattern - Existing, Existing with Garage, Village Buildout, and Village Buildout with Garage Intersection Operations

Existing Re-Assigned Volumes

The existing volumes were adjusted to reflect one-way counter clockwise circulation on Capitola Avenue (between Stockton Avenue and Monterey Avenue) and on Monterey Avenue (between Capitola Avenue and Park Avenue). These revised counter-clockwise volumes differ from those presented in the March 2008 report because that analysis assumed the counter-clockwise traffic would travel through the Pacific Cove parking lot. Since the driveway will maintain ingress and egress from the proposed garage only, the redirected traffic (approximately 300 vehicles) would be required to travel north onto Bay Avenue and turn left at the Capitola Avenue/Bay Avenue intersection.

The counter-clockwise circulation would also result in the creation of 28 new on-street parking spaces in the Village Area as indicated in the One-Way traffic report. These additional spaces would generate new vehicular trips to the area. Using the previous assumption that 1/3 of these new spaces would turnover during the Friday peak-hour, approximately 10 new inbound and 10 outbound trips would be generated to the Village Area. **Figure 7** presents the existing re-assigned volumes plus the trips generated by the new on-street parking.

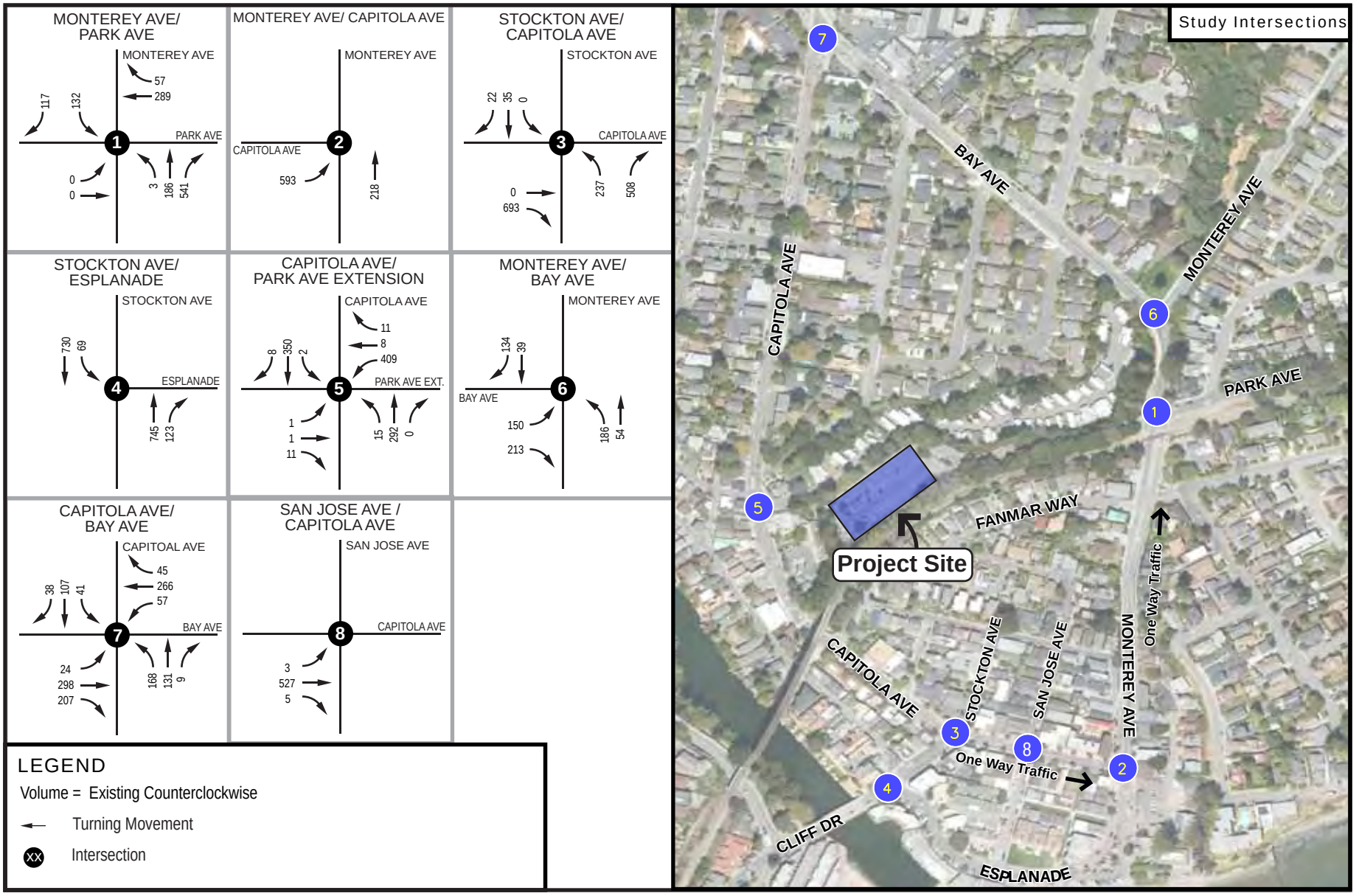
As indicated in **Table 3**, the following three intersections are projected to operate below their level of service standard:

- Stockton Avenue/Capitola Avenue
- Capitola Avenue/Riverview Drive
- Capitola Avenue/Bay Avenue

The cause of these deficient operations is due to the re-assigned traffic to reflect the one-way circulation on Capitola Avenue and Monterey Avenue. **Appendix D** contains the level of service calculation worksheets.

Existing Plus Garage Volumes

The trip generation estimates (see **Table 2**) for the garage do not change under this circulation alternative. The garage trip assignment and the re-circulated Esplanade traffic were added to the Existing re-assigned volumes to reflect Existing Plus Garage Volumes as shown on **Figure 8**. The level of service results, **Table 3**, indicate the garage will exacerbate unacceptable operations at the three locations identified above; however no additional locations are projected to exceed their LOS standard.



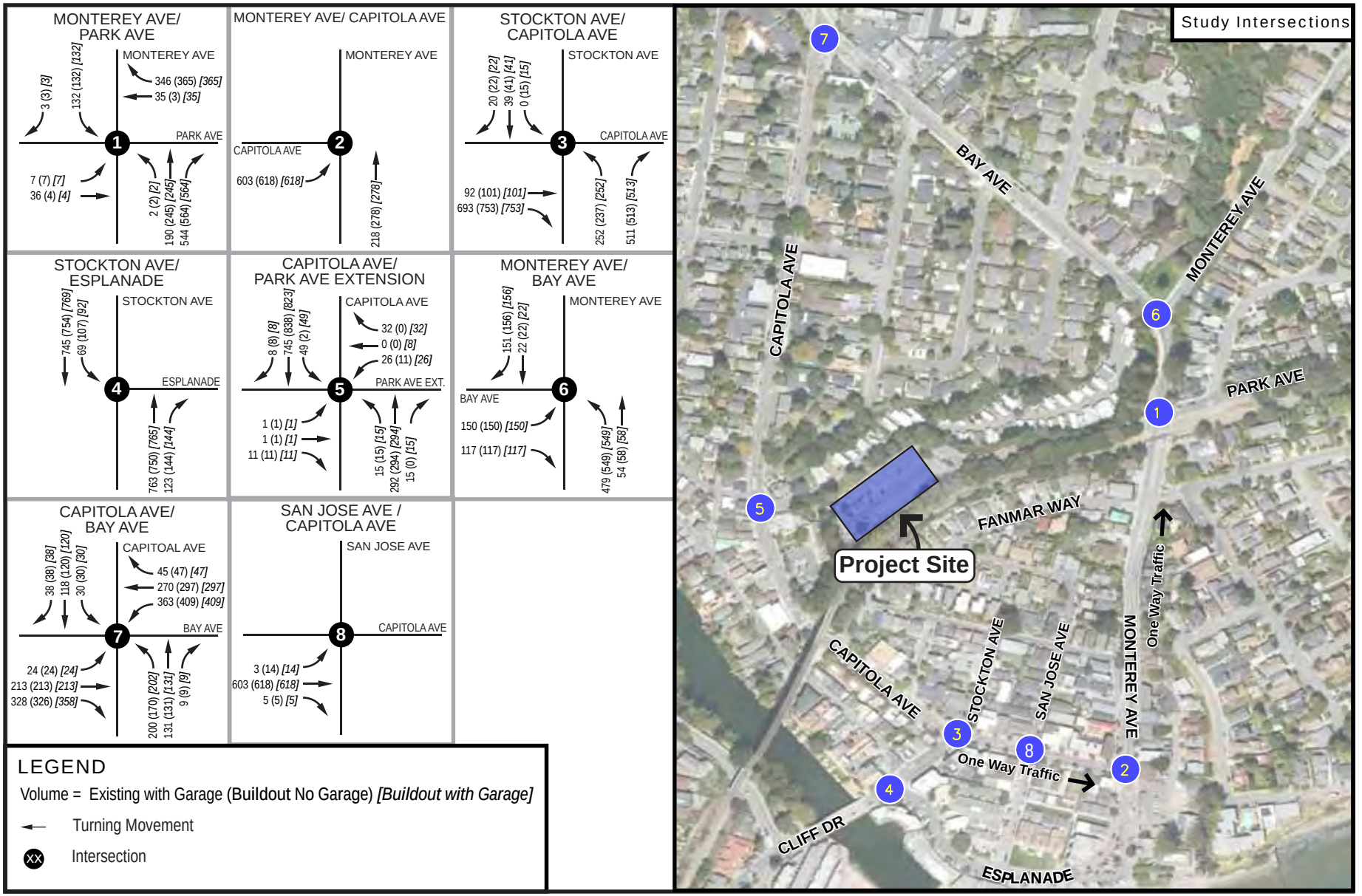
Source: RBF Consulting (2010)

CAPITOLA VILLAGE PARKING GARAGE TRAFFIC ANALYSIS

Counter-Clockwise Circulation (Existing PM Peak Hour Volumes)

12/2/1010 JN: 70-100117

Figure 7



Source: RBF Consulting (2010)

CAPITOLA VILLAGE PARKING GARAGE TRAFFIC ANALYSIS

RBF CONSULTING

Counter-Clockwise Circulation (Existing with Garage, Buildout No Garage, Buildout with Garage)

12/6/2010 JN: 70-100117

Figure 8

Table 3: Counter-Clockwise Vehicular Circulation Pattern Levels of Service Summary

North-South Street	East-West Street	LOS Standard	Counter-Clockwise Existing		Counter-Clockwise Existing + Garage		Counter-Clockwise Existing + Garage With Mitigation		Village Buildout Counter-Clockwise		Village Buildout Counter-Clockwise+ Garage		Village Buildout Counter-Clockwise+ Garage (Mitigation)	
			Friday PM Peak Hour		Friday PM Peak Hour		Friday PM Peak Hour		Friday PM Peak Hour		Friday PM Peak Hour		Friday PM Peak Hour	
			Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1 Monterey Ave. All-Way Stop	Park Ave.	C	**19.8**	**C**	**23.7**	**C**			**22.7**	**C**	**27.8**	**D**	**7.8** Roundabout	**A**
2 Monterey Ave. All-Way Stop	Capitola Ave.	D	**24.1**	**C**	**23.4**	**C**			**30.0**	**D**	**28.7**	**D**		
3 Stockton Ave. All-Way Stop	Capitola Ave.	D	**74.8**	**F**	**74.5**	**F**	Signal considered but withdrawn due to secondary impacts.		**101.4**	**F**	**101.2**	**F**	Signal considered but withdrawn due to secondary impacts.	
4 Stockton Ave. SB Yield	Esplanade Worst Approach	D	**0.4** 10.7	**A** B	**0.3** 10.6	**A** B			**0.7** 11.2	**A** B	**0.6** 11.2	**A** B		
5 Capitola Ave. All-Way Stop	Riverview Dr.	C	**37.2**	**E**	**54.7**	**F**	No mitigation Signal warrants not met.		**58.4**	**F**	**82.0**	**F**	No mitigation Signal warrants not met.	
6 Monterey Ave. All-Way Stop	Bay Ave.	C	**16.5**	**C**	**16.5**	**C**			**22.4**	**C**	**22.4**	**C**		
7 Capitola Ave. All-Way Stop	Bay Ave.	C	**29.3** Extensive queues	**D**	**35.4** Extensive queues	**E**	**22.3** Roundabout considered but withdrawn due to extensive queues.	**C**	**39.0** Extensive queues	**E**	**44.7** Extensive queues	**E**	**36.4** Roundabout considered but withdrawn due to extensive queues.	**D**
8 Capitola Ave. EB-WB Yield	San Jose Ave Worst Approach	D	**0.1** 0.1	**A** A	**0.1** 0.1	**A** A			**0.3** 0.3	**A** A	**0.3** 0.3	**A** A		

NOTES:
1. Analysis performed using 2000 Highway Capacity Manual methodologies.
2. Highlighted levels of service (LOS) represent an intersection with failing operations.
3. Roadway Assumptions:
   Existing volumes are re-assigned to reflect one-way counter-clockwise circulation patterns (traffic shifted to Bay/Capitola and south on Capitola at Riverview)
   All "With Garage" scenarios includes redirecting of some Esplanade re-circulating traffic to garage and include trips due to additional on-street spaces

Village Buildout Land Use Volumes (No Garage)

The trip assignment for the three Village buildout projects were adjusted to reflect the one-way clockwise circulation pattern and these trips were added to the existing re-assigned volumes to reflect Village Buildout Land Use Volumes as indicated in **Figure 8**. **Table 3** presents the level of service summary. Under this scenario, two of the three previously deficient intersections (Stockton Avenue/Capitola Avenue and Capitola Avenue/Riverview Avenue) are now operating at LOS F. The Capitola Avenue/Bay Avenue intersection is projected to operate at LOS E and the other locations are operating at acceptable levels.

Village Buildout Land Use Volumes (With Garage)

The trips associated with the garage and the re-circulating Esplanade traffic were added to the Village Buildout No Garage volumes to reflect Village Buildout With Garage volumes as shown in **Figure 8**. The additional trips are projected to cause a fourth location, Monterey Avenue/Park Avenue to exceed its level of service standard.

3.2 Counter-Clockwise Vehicular Circulation Pattern - Intersection Improvements Required

The following measures were identified to improve intersection operations under the counter-clockwise vehicular circulation pattern scenarios (Existing or Village Buildout with Garage volumes).

Monterey Avenue/Park Avenue

Installation of a roundabout at this location would provide acceptable operations. This improvement was also recommended in the One-Way traffic report. The mitigated level of service calculation worksheets are contained in **Appendix E**. The installation of a signal would also improve the operations to acceptable conditions.

Stockton Avenue/Capitola Avenue

As discussed previously, no improvements are recommended at this location due to the slight increase in delay, potential secondary impacts, and future study of feasible operational improvements during the General Plan Circulation Element update process.

Capitola Avenue/Riverview Drive

The Capitola Avenue/Riverview Drive intersection is not anticipated to meet the peak-hour warrant for signal installation. No other feasible improvements are identified at this location. The resulting delays and congestion will meter the traffic entering and exiting the Village Area, but may discourage visitors to the Village Area.

Capitola Avenue/Bay Avenue

Installation of a roundabout at the Capitola Avenue/ Bay Avenue intersection, also recommended as a mitigation measure in the One-Way report, would provide LOS D operations, however extensive queuing on Bay Avenue is anticipated. The roundabout would however require the acquisition of right–of-way.

4 Impacts to Neighborhood

4.1 Introduction

Changes in traffic patterns, especially when congested roadway conditions prevail, would result in traffic spillover onto adjacent street networks. Implementation of the proposed garage and/or the one-way counter-clockwise street system could have the potential for traffic spillover into the adjacent neighborhoods. These neighborhoods include the Fanmar, Rosedale, Riverview, Cherry and Pilgrim Neighborhoods.

The implementation of one-way counter-clockwise streets results in longer travel times, which also could result in a spillover of cut through traffic onto adjacent streets.

Also, congested traffic conditions at certain intersections could result in cut through traffic. Fanmar Way and Cherry Avenue are candidates for spillover traffic in the Fanmar neighborhood. Pilgrim Drive and Beulah Drive are candidates for spillover traffic in the Pilgrim neighborhood. Rosedale Avenue is a candidate for spillover traffic in the Rosedale neighborhood if congestion would occur at the Capitola Avenue/Bay Avenue intersection. Riverview Avenue is a candidate for spillover traffic in the Riverview neighborhood.

4.2 Fanmar Neighborhood

The congested intersection of Capitola Avenue/Stockton Avenue is projected to operate at unacceptable levels of service under the existing and counter-clockwise circulation patterns with the garage. Congestion at this intersection, combined with congestion on the Esplanade during the summer months, would likely result in traffic spillover onto Fanmar Way. To minimize potential cut-through traffic, the following street design features could be implemented:

Existing Street Network

- Make the intersection of Fanmar Way and Capitola Avenue an inbound only movement onto Fanmar Avenue. This could be accomplished by adding a bulbout curb feature to the intersection, which would only allow traffic to enter Fanmar and prohibit traffic from exiting onto Capitola Avenue.
- Place a "Local Residents Only" sign at the intersection of Monterey Avenue and Fanmar Way.

Counter-Clockwise Street Network

For the counter clockwise scenario, cut-through traffic would enter Fanmar Way from the west at Capitola Avenue and from the east at Monterey Avenue. Traffic entering the Fanmar area would either travel along Fanmar Way as cut-through traffic between Monterey and Capitola Avenues or disperse out into the neighborhood. To discourage the movement of through-traffic through the Fanmar neighborhood, the following measures can be installed to limit access to Fanmar Way:

- Add a "Local Residents Only" sign on Fanmar Way at both the Monterey Avenue and Capitola Avenue intersections.
- Construct a bulbout at Fanmar Way and Monterey Avenue that would prohibit north bound left turns on Fanmar Way.

4.3 Rosedale Neighborhood

The Rosedale neighborhood is situated to the north of Bay Avenue. The analysis indicates that, without the roundabout improvement, the intersection of Capitola Avenue and Bay Avenue is anticipated to operate at LOS D with the existing street network and LOS E with the counterclockwise circulation network which will likely result in cut-through traffic. Closure of Rosedale Avenue at either Hill Street or Plum Street would be required to minimize cut through traffic. This may however not be supported by the community, since it results in traffic diverting onto other streets, which causes new issues. Also, emergency response times would increase and may not be acceptable either. Additional studies would be required to evaluate the impact of the road closure.

Improving the Capitola Avenue/Bay Avenue intersection by constructing a roundabout would most likely discourage traffic cutting through along Rosedale Avenue, since traveling along Bay Avenue and Capitola Avenue would be more convenient and faster.

4.4 Pilgrim Neighborhood

The Pilgrim neighborhood is directly north of the project site. The City has expressed concerns about cut-through traffic onto Pilgrim Drive. It appears to be highly unlikely that traffic would utilize Pilgrim Drive due to the irregular and multiple turn street layout and the indirect path to the adjacent collectors. Should there be significant cut-through traffic after construction of the proposed project, it is recommended to prohibit movements from Pilgrim Drive to Burlingame Avenue. This could be accomplished with the construction of a curb bulb that allows southbound right turn traffic only at the intersection, which would prevent drivers from making a right turn onto Burlingame Avenue.

4.5 Riverview Neighborhood

Riverview Drive provides an alternative to Capitola Avenue. The road is however narrow and only vehicle can pass underneath the Trestle structure. It is not foreseen that cut-troughs traffic will use the roadway regularly, however, if the Stockton Avenue/Capitola Avenue intersection is congested, cut-through traffic could use this road. Should significant cut-through traffic occur, It is recommended that the left turns from eastbound Stockton onto Riverview Drive and left turns out from Riverview Drive onto Stockton Avenue be prohibited.

5 Traffic and Parking Management System

5.1 Introduction

In addition to the roadway improvements identified in the previous sections, the use of traffic and parking management policies and programs were identified which can aid in the efficient use of parking resources. When appropriately applied, traffic and parking management can significantly reduce delays along intersections and corridors, reduce vehicle mile travel thus reducing greenhouse gas emissions, and provide a variety of economic, social, and environmental benefits.

Examples of traffic and parking management system improvements that are applicable to operations of arterials and local streets include:

- Traffic signal improvements
- Interconnected signals
- Turn prohibitions
- Guide or informational signage
- Variable message signs
- Parking management strategies (time restrictions, time duration, meter pricing and variability, shared parking)
- Advanced parking management systems

5.2 Recommended Traffic and Parking Management System Improvements

The recommended closure of the southbound approach at the Capitola Avenue/Stockton Avenue is an example of a traffic management policy where turn prohibitions can improve intersection operations. It is also recommended that guidance signs be installed at key entrances to the Village Area to direct vehicles to the parking garage. For example, a sign can be installed for westbound Park Avenue vehicles to direct vehicles to travel straight to the garage as opposed to turning southbound on Monterey Avenue towards the Village.

In terms of parking management strategies, the following improvements are recommended:

- Development of website providing parking information, directions, and real-time parking information on variable message signs on the roadways to the village and at the garage
- Variable message signs at entrances to the city showing the number of available spaces in the Village and in the garage
- Variable message signs at the garage entrance indicating the availability of spaces on each floor

6 ALTERNATE TRAFFIC CONFIGURATIONS

Figure 9A presents a graphic of the existing circulation patterns within the Village. In addition to analyzing impacts of the proposed garage, the following roadway alternatives were evaluated:

- Conversion of lower San Jose Avenue to northbound direction only
- Conversion of Monterey Avenue between Capitola Avenue and Esplanade Avenue for travel in both directions with a cul-de-sac on the south end of Monterey Avenue
- Closure of Esplanade Avenue east of lower San Jose Avenue

Figures 9B through **9D** illustrate the vehicular flow under each alternate traffic configuration. A qualitative evaluation of existing operations within the Village Area was conducted for each alternative. Also indicated on these figures are bandwidths indicating the total peak vehicular flow during the PM peak hour. For the affected streets, these bandwidths change in thickness to illustrate the potential increase or decrease in traffic due to the roadway alternative. A symbol is also placed over the center of key intersections to indicate whether overall intersection delay would increase or decrease. The anticipated impacts are discussed below.

6.1 Northbound San Jose Avenue (Figure 9B)

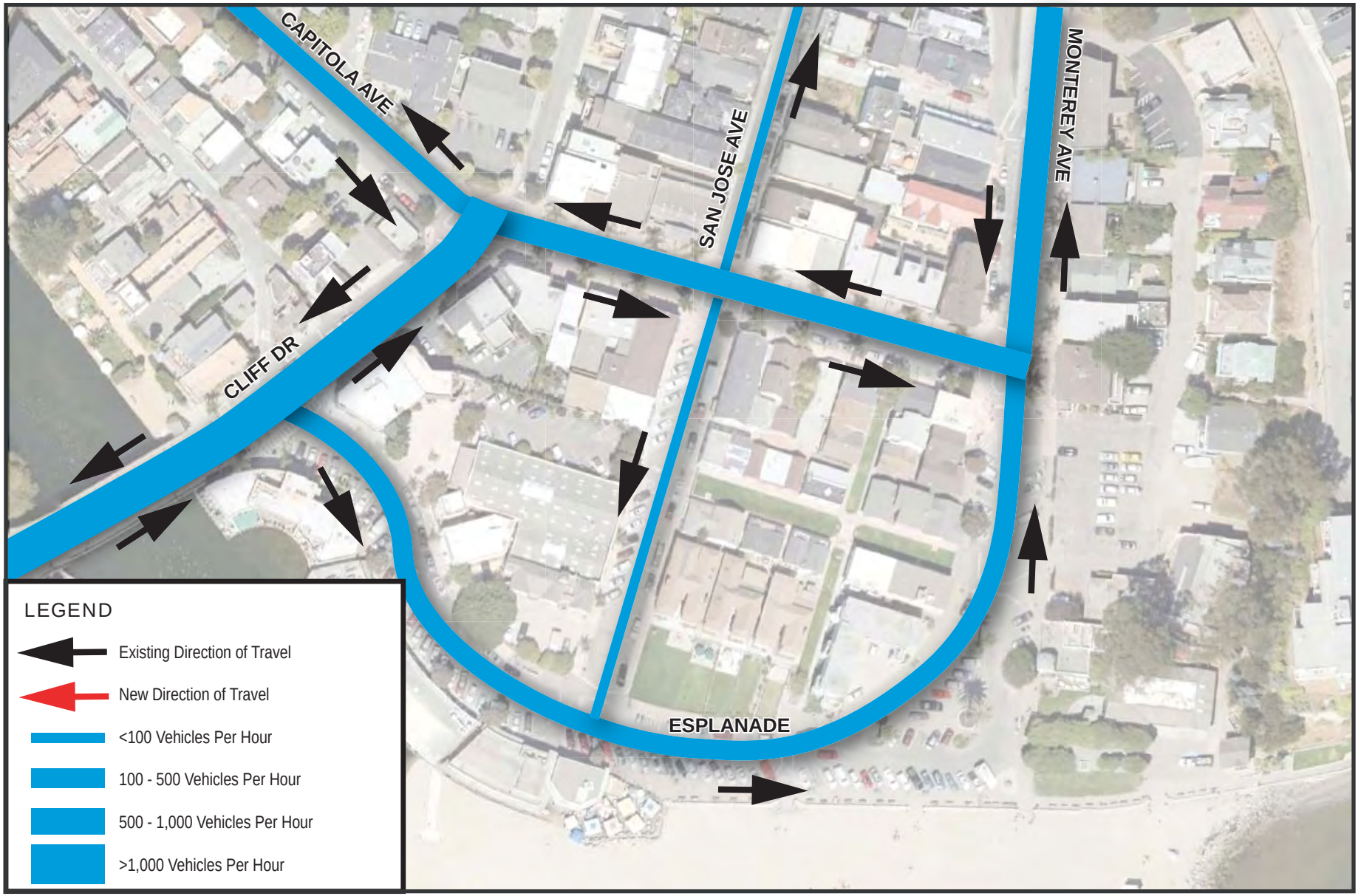
The conversion of northbound San Jose Avenue will divert some traffic from the northbound movement at the Monterey Avenue/Capitola Avenue intersection. Currently, there is no delay on the side street approaches (San Jose Avenue) as vehicles are turning onto San Jose Avenue from Capitola Avenue. The conversion will now require northbound San Jose Avenue vehicles to come to a stop prior to turning onto Capitola Avenue. The northbound San Jose vehicles will experience delays as they wait for gaps in traffic on Capitola Avenue. However, the anticipated delay is not anticipated to be significant. The flow will alleviate congestion at Monterey Avenue/Capitola Avenue but will worsen congestion at Capitola Avenue/Stockton Avenue.

6.2 Two Way Monterey Avenue with Cul-de-sac (Figure 9C)

The conversion of Monterey Avenue to two way traffic would provide improved access for some local residents/businesses. For example, if vehicles are coming from Park Avenue, they would be able to continue to travel south on Monterey Avenue without being forced to make counter-clockwise loop (via Capitola Avenue and San Jose Avenue). The traffic that would use Monterey Avenue northbound would now use San Jose Avenue instead. The intersection of both San Jose Avenue and Monterey Avenue with Capitola Avenue will be congested.

6.3 Closure of Esplanade Avenue (Figure 9D)

This alternative would be similar to the northbound San Jose Avenue alternative except that more traffic would be diverted onto San Jose Avenue. The resulting delays at the San Jose Avenue/Capitola Avenue intersection would then require mitigation such as all-way stop control or a traffic signal. Traffic conditions would be worse compared to the cul-de-sac option at Monterey Avenue.



Source: RBF Consulting (2010)

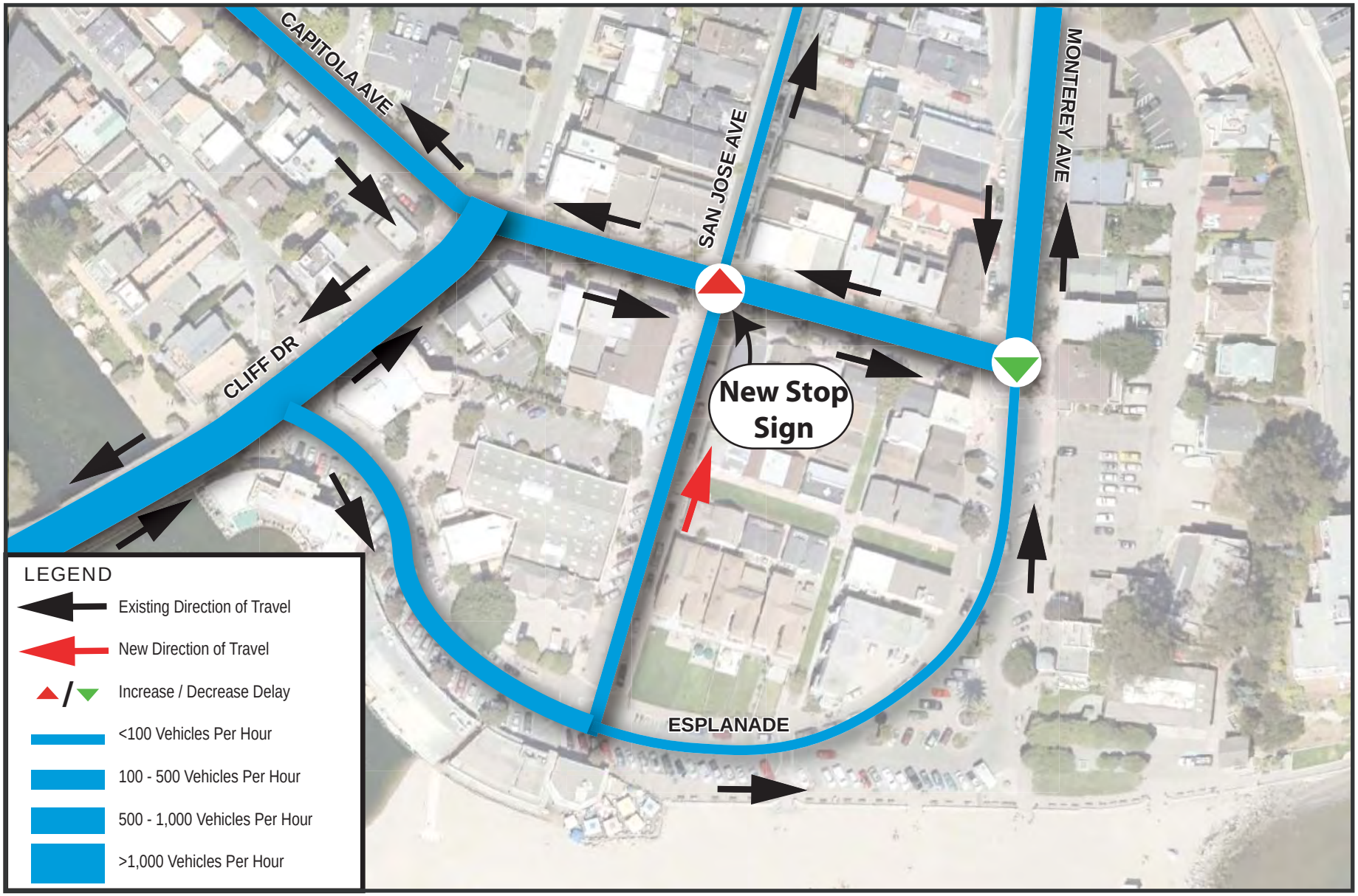
RBF CONSULTING

12/28/2010 JN: 70100323\Traffic\Figures

CAPITOLA VILLAGE PARKING GARAGE TRAFFIC ANALYSIS

EXISTING VILLAGE CIRCULATION

Figure 9A



Source: RBF Consulting (2010)

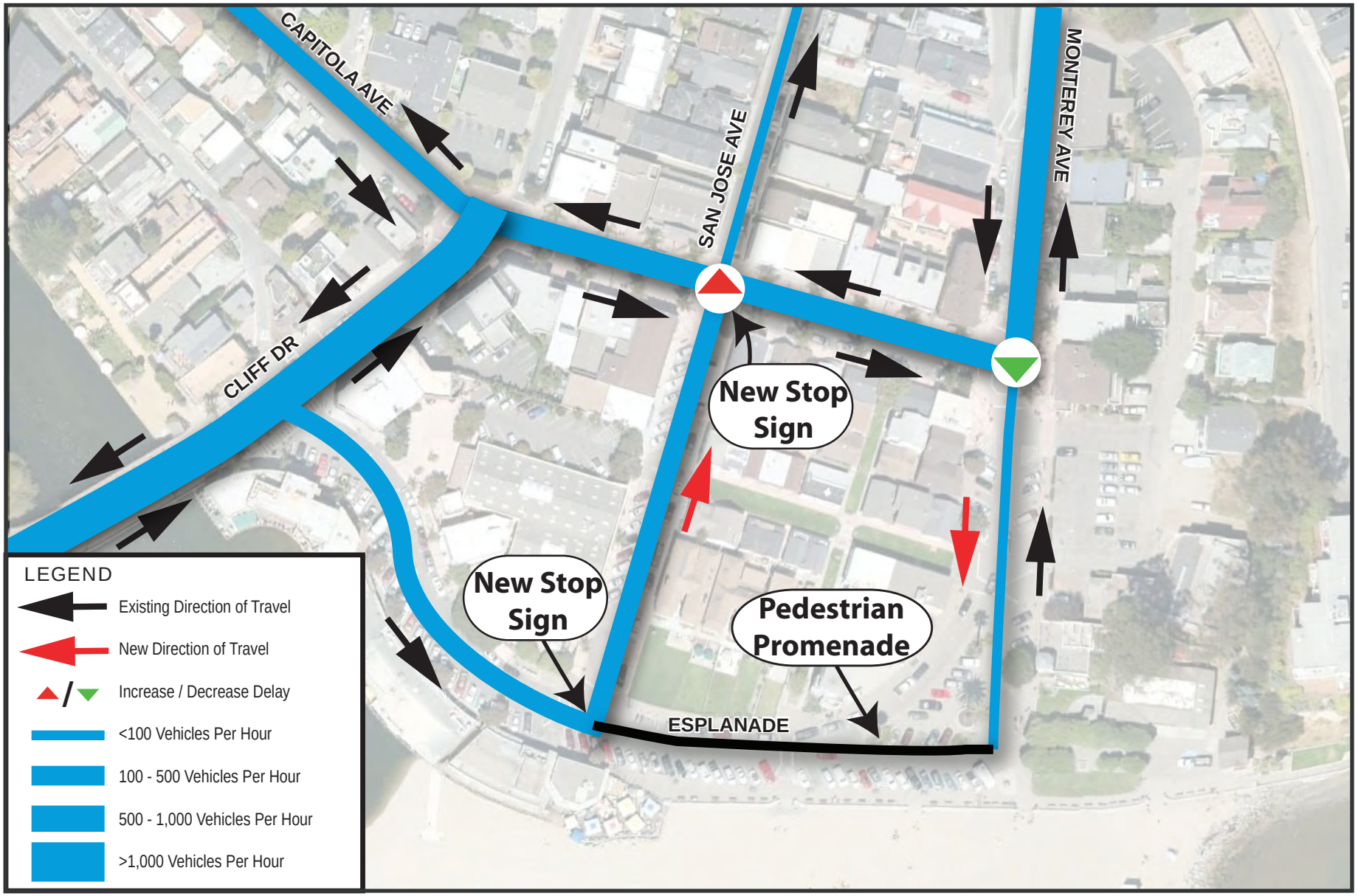
RBF CONSULTING

12/28/2010 JN: 70100323\Traffic\Figures

CAPITOLA VILLAGE PARKING GARAGE TRAFFIC ANALYSIS

NORTHBOUND SAN JOSE ALTERNATIVE

Figure 9B



Source: RBF Consulting (2010)

CAPITOLA VILLAGE PARKING GARAGE TRAFFIC ANALYSIS

TWO WAY MONTEREY ALTERNATIVE

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Figure 9C

Source: RBF Consulting (2010)

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CAPITOLA VILLAGE PARKING GARAGE TRAFFIC ANALYSIS

ESPLANADE CLOSURE ALTERNATIVE

Figure 9D

FINAL
TRAFFIC IMPACT, CIRCULATION AND CONGESTION RELIEF STUDY FOR THE PACIFIC COVE VILLAGE PARKING STRUCTURE TECHNICAL APPENDICES

Prepared for the City of Capitola Public Works Department

Illustration courtesy of Watry Design, Inc. & Field Paoli

Prepared By
RBF Consulting, Monterey Bay

January 26, 2011

APPENDIX A1

LEVEL OF SERVICE DESCRIPTIONS
SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE (LOS) DESCRIPTION
SIGNALIZED INTERSECTIONS

The capacity of an urban street is related primarily to the signal timing and the geometric characteristics of the facility as well as to the composition of traffic on the facility. Geometrics are a fixed characteristic of a facility. Thus, while traffic composition may vary somewhat over time, the capacity of a facility is generally a stable value that can be significantly improved only by initiating geometric improvements. A traffic signal essentially allocates time among conflicting traffic movements that seek to use the same space. The way in which time is allocated significantly affects the operation and the capacity of the intersection and its approaches.

The methodology for signalized intersection is designed to consider individual intersection approaches and individual lane groups within approaches. A lane group consists of one or more lanes on an intersection approach. The outputs from application of the method described in the HCM 2000 are reported on the basis of each lane. For a given lane group at a signalized intersection, three indications are displayed: green, yellow and red. The red indication may include a short period during which all indications are red, referred to as an all-red interval and the yellow indication forms the change and clearance interval between two green phases.

The methodology for analyzing the capacity and level of service must consider a wide variety of prevailing conditions, including the amount and distribution of traffic movements, traffic composition, geometric characteristics, and details of intersection signalization. The methodology addresses the capacity, LOS, and other performance measures for lane groups and the intersection approaches and the LOS for the intersection as a whole.

Capacity is evaluated in terms of the ratio of demand flow rate to capacity (v/c ratio), whereas LOS is evaluated on the basis of control delay per vehicle (in seconds per vehicle). The methodology does not take into account the potential impact of downstream congestion on intersection operation, nor does the methodology detect and adjust for the impacts of turn-pocket overflows on through traffic and intersection operation.

LEVEL OF SERVICE (LOS) CRITERIA FOR SIGNALIZED INTERSECTIONS

(Reference Highway Capacity Manual 2000)

Level of Service	Control Delay (seconds / vehicle)
A	<10
B	>10 - 20
C	>20 - 35
D	>35 - 55
E	>55 - 80
F	>80

APPENDIX A2

UNSIGNALIZED INTERSECTIONS
TWO-WAY STOP CONTROL

LEVEL OF SERVICE (LOS) DESCRIPTION
UNSIGNALIZED INTERSECTIONS WITH TWO-WAY STOP CONTROL (TWSC)

TWSC intersections are widely used and stop signs are used to control vehicle movements at such intersections. At TWSC intersections, the stop-controlled approaches are referred to as the minor street approaches; they can be either public streets or private driveways. The intersection approaches that are not controlled by stop signs are referred to as the major street approaches. A three-leg intersection is considered to be a standard type of TWSC intersection if the single minor street approach (i.e. the stem of the T configuration) is controlled by a stop sign. Three-leg intersections where two of the three approaches are controlled by stop signs are a special form of unsignalized intersection control.

At TWSC intersections, drivers on the controlled approaches are required to select gaps in the major street flow through which to execute crossing or turning maneuvers on the basis of judgement. In the presence of a queue, each driver on the controlled approach must use some time to move into the front-of-queue position and prepare to evaluate gaps in the major street flow. Capacity analysis at TWSC intersections depends on a clear description and understanding of the interaction of drivers on the minor or stop-controlled approach with drivers on the major street. Both gap acceptance and empirical models have been developed to describe this interaction.

Thus, the capacity of the controlled legs is based on three factors:

- the distribution of gaps in the major street traffic stream,;
- driver judgement in selecting gaps through which to execute the desired maneuvers; and
- the follow-up time required by each driver in a queue.

The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, in the absence of incident, control, traffic or geometric delay. Average control delay for any particular minor movement is a function of the capacity of the approach and the degree of saturation and referred to as level of service.

LEVEL OF SERVICE (LOS) CRITERIA FOR TWSC INTERSECTIONS

(Reference Highway Capacity Manual 2000)

Level of Service	Control Delay (seconds / vehicle)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

APPENDIX A3

LEVEL OF SERVICES DESCRIPTION
UNSIGNALIZED INTERSECTIONS
ALL-WAY STOP CONTROL

APPENDIX

LEVEL OF SERVICE (LOS) DESCRIPTION
UNSIGNALIZED INTERSECTIONS WITH ALL-WAY STOP CONTROL (AWSC)

AWSC intersections require every vehicle to stop at the intersection before proceeding. Since each driver must stop, the judgement as to whether to proceed into the intersection is a function of traffic conditions on the other approaches. While giving priority to the driver on the right is a recognized rule in some areas, it is not a good descriptor of actual intersection operations. What happens is the development of a consensus of right-of-way that alternates between the drivers on the intersection approaches, a consensus that depends primarily on the intersection geometry and the arrival patterns at the stop line.

If no traffic is present on the other approaches, a driver can proceed immediately after the stop is made. If there is traffic on one or more of the other approaches, a driver proceeds only after determining that there are no vehicles currently in the intersection and that it is the driver's turn to proceed. Since no traffic signal controls the stream movement or allocates the right-of-way to each conflicting stream, the rate of departure is controlled by the interaction between the traffic streams themselves.

For AWSC intersections, the average control delay (in seconds per vehicle) is used as the primary measure of performance. Control delay is the increased time of travel for a vehicle approaching and passing through an AWSC intersection, compared with a free-flow vehicle if it were not required to slow down or stop at the intersection.

The criteria for AWSC intersections have different threshold values than do those for signalized intersections, primarily because drivers expect different levels of performance from different kinds of traffic control devices (i.e traffic signals, two way stop or all way stop, etc.). The expectation is that a signalized intersection is designed to carry higher traffic volumes than an AWSC intersection and a higher level of control delay is acceptable at a signalized intersection for the same LOS.

For AWSC analysis using the HCM 2000 method, the LOS shown reflects the weighted average of the delay on each of the approaches.

LEVEL OF SERVICE (LOS) CRITERIA FOR AWSC INTERSECTIONS

(Reference Highway Capacity Manual 2000)

Level of Service	Control Delay (seconds / vehicle)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

APPENDIX B

LICENSE PLATE SUMMARY OF

ESPLANADE CIRCULATING VEHICLES

Legend:

1 = Survey Location

= Path of Circulation

License Plate Survey Summary

12:00 to 3:00 PM	From Location 1 Esplanade (E)	To Location 1 Esplanade (E)
Total Unique Plate #'s	687	
Total Duplicate Plate #'s		75
% Total Plates that are Duplicates		11%

Source: RBF Consulting (2010)

RBF CONSULTING

2/19/08 JN: 70-100117

CAPITOLA VILLAGE PARKING GARAGE TRAFFIC ANALYSIS

License Plate Survey Data

Figure B-1

APPENDIX C

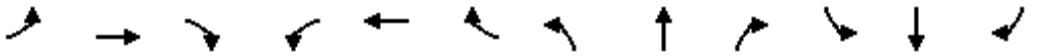
INTERSECTION LEVEL OF SERVICE CALCULATIONS

EXISTING VOLUMES

INTERSECTION LEVEL OF SERVICE CALCULATIONS

EXISTING VOLUMES

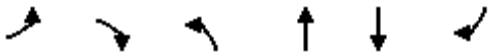
(EXISTING CIRCULATION GEOMETRY WITHOUT GARAGE)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	7	4	11	286	3	57	2	178	541	132	113	3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	8	4	12	308	3	61	2	191	582	142	122	3

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	24	372	194	582	263	3
Volume Left (vph)	8	308	2	0	142	0
Volume Right (vph)	12	61	0	582	0	3
Hadj (s)	-0.20	0.10	0.04	-0.67	0.14	-0.57
Departure Headway (s)	7.4	6.5	6.4	5.7	6.6	3.2
Degree Utilization, x	0.05	0.67	0.35	0.92	0.49	0.00
Capacity (veh/h)	422	538	551	615	527	1121
Control Delay (s)	10.8	21.9	11.6	42.3	15.7	6.2
Approach Delay (s)	10.8	21.9	34.6		15.6	
Approach LOS	B	C	D		C	

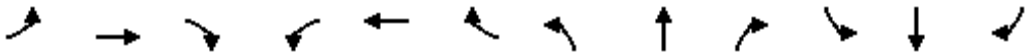
Intersection Summary				
Delay	27.4			
HCM Level of Service	D			
Intersection Capacity Utilization	60.1%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	545	0	83	135	0	385
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	574	0	87	142	0	405

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	574	229	405
Volume Left (vph)	574	87	0
Volume Right (vph)	0	0	405
Hadj (s)	0.23	0.11	-0.57
Departure Headway (s)	6.0	6.7	5.7
Degree Utilization, x	0.96	0.43	0.64
Capacity (veh/h)	589	528	619
Control Delay (s)	51.4	14.6	18.5
Approach Delay (s)	51.4	14.6	18.5
Approach LOS	F	B	C

Intersection Summary			
Delay	33.4		
HCM Level of Service	D		
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	21	310	404	29	0	237	0	508	6	35	14
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	22	323	421	30	0	247	0	529	6	36	15

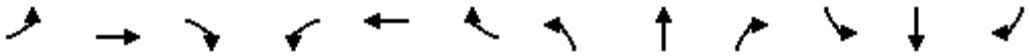
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	345	451	247	529	57
Volume Left (vph)	0	421	247	0	6
Volume Right (vph)	323	0	0	529	15
Hadj (s)	-0.53	0.22	0.53	-0.67	-0.10
Departure Headway (s)	6.7	7.1	7.9	6.7	8.6
Degree Utilization, x	0.64	0.89	0.54	0.98	0.14
Capacity (veh/h)	527	507	443	529	380
Control Delay (s)	21.0	44.3	18.6	58.1	12.9
Approach Delay (s)	21.0	44.3	45.5		12.9
Approach LOS	C	E	E		B

Intersection Summary			
Delay	38.8		
HCM Level of Service	E		
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	837	123	69	730	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	930	137	77	811	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1067		1963	998
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1067		1963	998
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		100	100
cM capacity (veh/h)			653		61	296

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	1067	77	811
Volume Left	0	77	0
Volume Right	137	0	0
cSH	1700	653	1700
Volume to Capacity	0.63	0.12	0.48
Queue Length 95th (ft)	0	10	0
Control Delay (s)	0.0	11.2	0.0
Lane LOS		B	
Approach Delay (s)	0.0	1.0	
Approach LOS			

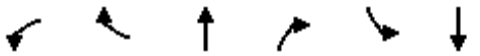
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	1	11	1	0	0	15	250	10	2	350	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	1	12	1	0	0	16	263	11	2	368	8

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	14	1	289	379
Volume Left (vph)	1	1	16	2
Volume Right (vph)	12	0	11	8
Hadj (s)	-0.46	0.23	0.02	0.02
Departure Headway (s)	4.9	5.6	4.3	4.3
Degree Utilization, x	0.02	0.00	0.35	0.45
Capacity (veh/h)	644	564	813	829
Control Delay (s)	8.0	8.6	9.6	10.6
Approach Delay (s)	8.0	8.6	9.6	10.6
Approach LOS	A	A	A	B

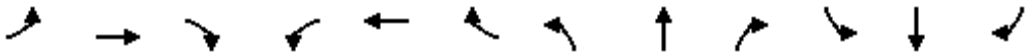
Intersection Summary			
Delay	10.2		
HCM Level of Service	B		
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	39	134	186	54	150	213
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	41	141	196	57	158	224

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	182	253	382
Volume Left (vph)	41	0	158
Volume Right (vph)	141	57	0
Hadj (s)	-0.39	-0.10	0.12
Departure Headway (s)	5.0	4.8	4.8
Degree Utilization, x	0.25	0.33	0.51
Capacity (veh/h)	649	720	720
Control Delay (s)	9.7	10.1	12.7
Approach Delay (s)	9.7	10.1	12.7
Approach LOS	A	B	B

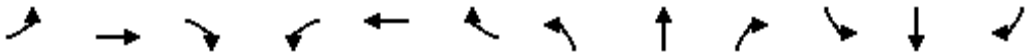
Intersection Summary			
Delay		11.3	
HCM Level of Service		B	
Intersection Capacity Utilization		53.0%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	24	298	207	57	266	45	168	131	9	41	107	38
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	25	307	213	59	274	46	173	135	9	42	110	39

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	332	213	59	321	308	9	192
Volume Left (vph)	25	0	59	0	173	0	42
Volume Right (vph)	0	213	0	46	0	9	39
Hadj (s)	0.07	-0.67	0.53	-0.07	0.31	-0.67	-0.04
Departure Headway (s)	7.5	6.8	8.2	7.6	8.1	7.1	8.1
Degree Utilization, x	0.69	0.40	0.13	0.67	0.69	0.02	0.43
Capacity (veh/h)	462	511	417	452	424	474	403
Control Delay (s)	24.6	13.0	11.3	23.7	26.4	9.0	17.0
Approach Delay (s)	20.1		21.8		25.9		17.0
Approach LOS	C		C		D		C

Intersection Summary				
Delay	21.4			
HCM Level of Service	C			
Intersection Capacity Utilization	74.1%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	3	527	5	31	433	4	0	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	3	561	5	33	461	4	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	465			566			1098	1101	563	1098	1101	463
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	465			566			1098	1101	563	1098	1101	463
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			100	100	100	100	100	100
cM capacity (veh/h)	1096			1006			185	204	526	185	204	599

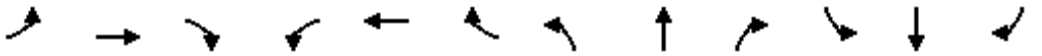
Direction, Lane #	EB 1	WB 1
Volume Total	569	498
Volume Left	3	33
Volume Right	5	4
cSH	1096	1006
Volume to Capacity	0.00	0.03
Queue Length 95th (ft)	0	3
Control Delay (s)	0.1	0.9
Lane LOS	A	A
Approach Delay (s)	0.1	0.9
Approach LOS		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

INTERSECTION LEVEL OF SERVICE CALCULATIONS

EXISTING VOLUMES

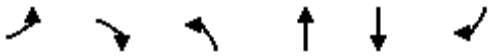
(EXISTING CIRCULATION GEOMETRY + GARAGE)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	7	36	11	286	35	57	2	178	541	132	113	3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	8	39	12	308	38	61	2	191	582	142	122	3

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	58	406	194	582	263	3
Volume Left (vph)	8	308	2	0	142	0
Volume Right (vph)	12	61	0	582	0	3
Hadj (s)	-0.06	0.09	0.04	-0.67	0.14	-0.57
Departure Headway (s)	7.9	6.8	6.8	6.1	7.1	3.2
Degree Utilization, x	0.13	0.77	0.37	0.99	0.52	0.00
Capacity (veh/h)	404	406	520	582	487	1121
Control Delay (s)	12.0	28.5	12.5	57.2	17.5	6.2
Approach Delay (s)	12.0	28.5	46.1		17.4	
Approach LOS	B	D	E		C	

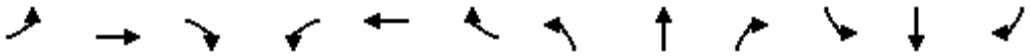
Intersection Summary				
Delay	35.0			
HCM Level of Service	D			
Intersection Capacity Utilization	60.6%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	545	0	83	135	0	385
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	574	0	87	142	0	405

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	574	229	405
Volume Left (vph)	574	87	0
Volume Right (vph)	0	0	405
Hadj (s)	0.23	0.11	-0.57
Departure Headway (s)	6.0	6.7	5.7
Degree Utilization, x	0.96	0.43	0.64
Capacity (veh/h)	589	528	619
Control Delay (s)	51.4	14.6	18.5
Approach Delay (s)	51.4	14.6	18.5
Approach LOS	F	B	C

Intersection Summary			
Delay	33.4		
HCM Level of Service	D		
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	21	325	404	29	0	252	0	508	6	35	14
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	22	339	421	30	0	262	0	529	6	36	15

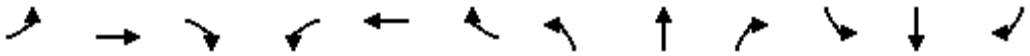
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	360	451	263	529	57
Volume Left (vph)	0	421	263	0	6
Volume Right (vph)	339	0	0	529	15
Hadj (s)	-0.53	0.22	0.53	-0.67	-0.10
Departure Headway (s)	6.7	7.2	8.0	6.7	8.7
Degree Utilization, x	0.67	0.90	0.58	0.99	0.14
Capacity (veh/h)	528	504	441	529	376
Control Delay (s)	22.6	45.8	20.2	60.6	13.1
Approach Delay (s)	22.6	45.8	47.2		13.1
Approach LOS	C	E	E		B

Intersection Summary			
Delay	40.3		
HCM Level of Service	E		
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	852	123	69	745	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	947	137	77	828	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1083		1996	1015
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1083		1996	1015
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		100	100
cM capacity (veh/h)			644		58	289

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	1083	77	828
Volume Left	0	77	0
Volume Right	137	0	0
cSH	1700	644	1700
Volume to Capacity	0.64	0.12	0.49
Queue Length 95th (ft)	0	10	0
Control Delay (s)	0.0	11.3	0.0
Lane LOS		B	
Approach Delay (s)	0.0	1.0	
Approach LOS			

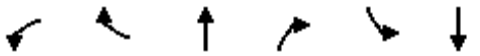
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	1	11	16	0	32	15	250	25	34	350	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	1	12	17	0	34	16	263	26	36	368	8

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	14	51	305	413
Volume Left (vph)	1	17	16	36
Volume Right (vph)	12	34	26	8
Hadj (s)	-0.46	-0.30	-0.01	0.04
Departure Headway (s)	5.1	5.2	4.5	4.4
Degree Utilization, x	0.02	0.07	0.38	0.51
Capacity (veh/h)	598	601	775	789
Control Delay (s)	8.2	8.6	10.3	12.0
Approach Delay (s)	8.2	8.6	10.3	12.0
Approach LOS	A	A	B	B

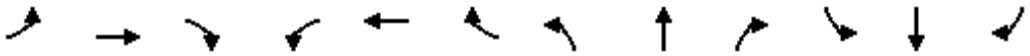
Intersection Summary			
Delay	11.0		
HCM Level of Service	B		
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	39	134	186	54	150	213
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	41	141	196	57	158	224

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	182	253	382
Volume Left (vph)	41	0	158
Volume Right (vph)	141	57	0
Hadj (s)	-0.39	-0.10	0.12
Departure Headway (s)	5.0	4.8	4.8
Degree Utilization, x	0.25	0.33	0.51
Capacity (veh/h)	649	720	720
Control Delay (s)	9.7	10.1	12.7
Approach Delay (s)	9.7	10.1	12.7
Approach LOS	A	B	B

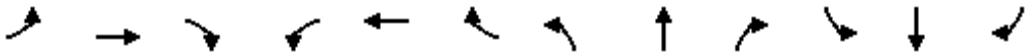
Intersection Summary			
Delay		11.3	
HCM Level of Service		B	
Intersection Capacity Utilization		53.0%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	24	298	239	57	266	45	200	131	9	41	107	38
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	25	307	246	59	274	46	206	135	9	42	110	39

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	332	246	59	321	341	9	192
Volume Left (vph)	25	0	59	0	206	0	42
Volume Right (vph)	0	246	0	46	0	9	39
Hadj (s)	0.07	-0.67	0.53	-0.07	0.34	-0.67	-0.04
Departure Headway (s)	7.8	7.1	8.5	7.9	8.3	7.3	8.4
Degree Utilization, x	0.72	0.48	0.14	0.70	0.79	0.02	0.45
Capacity (veh/h)	448	483	402	436	421	470	391
Control Delay (s)	27.3	15.3	11.7	26.3	34.6	9.2	17.9
Approach Delay (s)	22.1		24.1		34.0		17.9
Approach LOS	C		C		D		C

Intersection Summary				
Delay	24.9			
HCM Level of Service	C			
Intersection Capacity Utilization	75.9%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	3	527	5	31	433	4	0	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	3	561	5	33	461	4	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	465			566			1098	1101	563	1098	1101	463
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	465			566			1098	1101	563	1098	1101	463
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			100	100	100	100	100	100
cM capacity (veh/h)	1096			1006			185	204	526	185	204	599

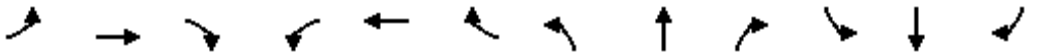
Direction, Lane #	EB 1	WB 1
Volume Total	569	498
Volume Left	3	33
Volume Right	5	4
cSH	1096	1006
Volume to Capacity	0.00	0.03
Queue Length 95th (ft)	0	3
Control Delay (s)	0.1	0.9
Lane LOS	A	A
Approach Delay (s)	0.1	0.9
Approach LOS		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

INTERSECTION LEVEL OF SERVICE CALCULATIONS

EXISTING VOLUMES

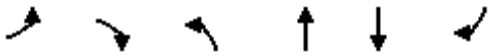
(COUNTER-CLOCKWISE CIRCULATION GEOMETRY WITHOUT GARAGE)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	7	4	0	0	3	346	2	190	544	132	0	3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	1.00
Hourly flow rate (vph)	8	4	0	0	3	372	2	204	585	142	0	3

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	12	375	206	585	142	3
Volume Left (vph)	8	0	2	0	142	0
Volume Right (vph)	0	372	0	585	0	3
Hadj (s)	0.16	-0.56	0.04	-0.67	0.23	-0.57
Departure Headway (s)	7.0	5.4	5.9	5.2	6.3	3.2
Degree Utilization, x	0.02	0.56	0.34	0.84	0.25	0.00
Capacity (veh/h)	468	634	599	683	535	1121
Control Delay (s)	10.1	15.0	10.7	28.3	11.4	6.2
Approach Delay (s)	10.1	15.0	23.7		11.3	
Approach LOS	B	C	C		B	

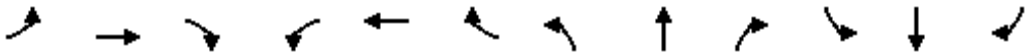
Intersection Summary			
Delay	19.8		
HCM Level of Service	C		
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	603	0	0	218	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	635	0	0	229	0	0

Direction, Lane #	EB 1	NB 1
Volume Total (vph)	635	229
Volume Left (vph)	635	0
Volume Right (vph)	0	0
Hadj (s)	0.23	0.03
Departure Headway (s)	4.8	5.6
Degree Utilization, x	0.85	0.36
Capacity (veh/h)	736	615
Control Delay (s)	28.6	11.6
Approach Delay (s)	28.6	11.6
Approach LOS	D	B

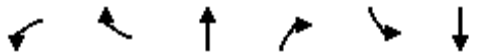
Intersection Summary			
Delay	24.1		
HCM Level of Service	C		
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	92	693	0	0	0	237	0	511	0	39	20
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	96	722	0	0	0	247	0	532	0	41	21

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	818	247	532	61
Volume Left (vph)	0	247	0	0
Volume Right (vph)	722	0	532	21
Hadj (s)	-0.50	0.53	-0.67	-0.17
Departure Headway (s)	5.3	7.0	5.8	6.8
Degree Utilization, x	1.20	0.48	0.86	0.12
Capacity (veh/h)	668	507	610	515
Control Delay (s)	124.2	15.2	33.8	10.7
Approach Delay (s)	124.2	27.9		10.7
Approach LOS	F	D		B

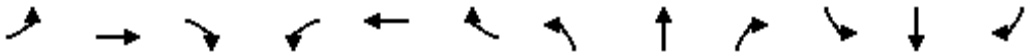
Intersection Summary				
Delay		74.8		
HCM Level of Service		F		
Intersection Capacity Utilization		92.6%	ICU Level of Service	F
Analysis Period (min)		15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	748	123	69	730
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	831	137	77	811
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1864	899			968	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1864	899			968	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			89	
cM capacity (veh/h)	71	337			712	

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	968	77	811
Volume Left	0	77	0
Volume Right	137	0	0
cSH	1700	712	1700
Volume to Capacity	0.57	0.11	0.48
Queue Length 95th (ft)	0	9	0
Control Delay (s)	0.0	10.7	0.0
Lane LOS		B	
Approach Delay (s)	0.0	0.9	
Approach LOS			

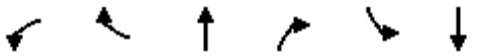
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	1	11	11	0	0	15	292	0	2	760	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	1	12	12	0	0	16	307	0	2	800	8

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	14	12	323	811
Volume Left (vph)	1	12	16	2
Volume Right (vph)	12	0	0	8
Hadj (s)	-0.46	0.23	0.04	0.03
Departure Headway (s)	5.9	6.6	4.9	4.4
Degree Utilization, x	0.02	0.02	0.44	0.99
Capacity (veh/h)	581	516	737	819
Control Delay (s)	9.1	9.8	11.5	48.3
Approach Delay (s)	9.1	9.8	11.5	48.3
Approach LOS	A	A	B	E

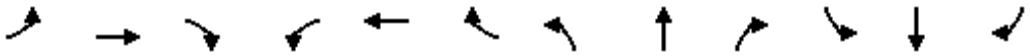
Intersection Summary			
Delay	37.2		
HCM Level of Service	E		
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	22	151	479	54	150	117
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	23	159	504	57	158	123

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	182	561	281
Volume Left (vph)	23	0	158
Volume Right (vph)	159	57	0
Hadj (s)	-0.46	-0.03	0.15
Departure Headway (s)	5.5	4.8	5.3
Degree Utilization, x	0.28	0.75	0.41
Capacity (veh/h)	589	732	651
Control Delay (s)	10.5	20.6	12.0
Approach Delay (s)	10.5	20.6	12.0
Approach LOS	B	C	B

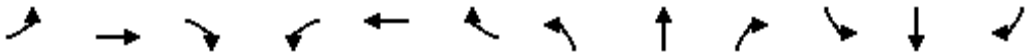
Intersection Summary			
Delay	16.5		
HCM Level of Service	C		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	24	213	296	363	270	45	168	131	9	30	118	38
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	25	220	305	374	278	46	173	135	9	31	122	39

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	244	305	374	325	308	9	192
Volume Left (vph)	25	0	374	0	173	0	31
Volume Right (vph)	0	305	0	46	0	9	39
Hadj (s)	0.08	-0.67	0.53	-0.07	0.31	-0.67	-0.06
Departure Headway (s)	8.2	7.5	8.5	7.8	8.9	7.8	8.7
Degree Utilization, x	0.56	0.63	0.88	0.71	0.76	0.02	0.46
Capacity (veh/h)	424	461	418	448	394	435	396
Control Delay (s)	20.0	21.3	46.8	26.4	33.5	9.8	19.0
Approach Delay (s)	20.7		37.3		32.8		19.0
Approach LOS	C		E		D		C

Intersection Summary				
Delay	29.3			
HCM Level of Service	D			
Intersection Capacity Utilization	73.0%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	3	603	5	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	3	641	5	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			647			651	651	644	651	653	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			647			651	651	644	651	653	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1623			939			381	387	473	381	386	1085

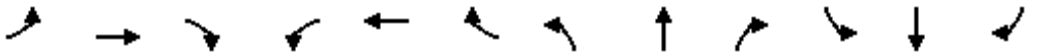
Direction, Lane #	EB 1
Volume Total	650
Volume Left	3
Volume Right	5
cSH	1623
Volume to Capacity	0.00
Queue Length 95th (ft)	0
Control Delay (s)	0.1
Lane LOS	A
Approach Delay (s)	0.1
Approach LOS	

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		

INTERSECTION LEVEL OF SERVICE CALCULATIONS

EXISTING VOLUMES

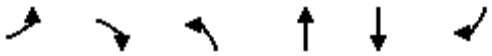
(COUNTER-CLOCKWISE CIRCULATION GEOMETRY + GARAGE)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	7	36	0	0	35	346	2	190	544	132	0	3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	1.00
Hourly flow rate (vph)	8	39	0	0	38	372	2	204	585	142	0	3

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	46	410	206	585	142	3
Volume Left (vph)	8	0	2	0	142	0
Volume Right (vph)	0	372	0	585	0	3
Hadj (s)	0.07	-0.51	0.04	-0.67	0.23	-0.57
Departure Headway (s)	7.1	5.6	6.2	5.5	6.7	3.2
Degree Utilization, x	0.09	0.64	0.36	0.89	0.27	0.00
Capacity (veh/h)	464	616	571	647	505	1121
Control Delay (s)	10.8	18.1	11.4	36.0	12.2	6.2
Approach Delay (s)	10.8	18.1	29.6		12.0	
Approach LOS	B	C	D		B	

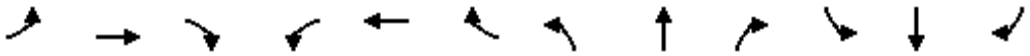
Intersection Summary			
Delay	23.7		
HCM Level of Service	C		
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	603	0	0	203	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	635	0	0	214	0	0

Direction, Lane #	EB 1	NB 1
Volume Total (vph)	635	214
Volume Left (vph)	635	0
Volume Right (vph)	0	0
Hadj (s)	0.23	0.03
Departure Headway (s)	4.8	5.6
Degree Utilization, x	0.84	0.33
Capacity (veh/h)	743	615
Control Delay (s)	27.5	11.3
Approach Delay (s)	27.5	11.3
Approach LOS	D	B

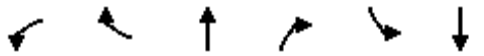
Intersection Summary			
Delay	23.4		
HCM Level of Service	C		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	92	693	0	0	0	252	0	511	0	39	20
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	96	722	0	0	0	262	0	532	0	41	21

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	818	263	532	61
Volume Left (vph)	0	263	0	0
Volume Right (vph)	722	0	532	21
Hadj (s)	-0.50	0.53	-0.67	-0.17
Departure Headway (s)	5.3	7.0	5.8	6.8
Degree Utilization, x	1.20	0.51	0.86	0.12
Capacity (veh/h)	667	507	610	515
Control Delay (s)	124.6	16.0	33.8	10.7
Approach Delay (s)	124.6	27.9		10.7
Approach LOS	F	D		B

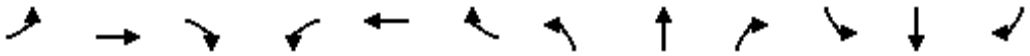
Intersection Summary				
Delay		74.5		
HCM Level of Service		F		
Intersection Capacity Utilization		92.6%	ICU Level of Service	F
Analysis Period (min)		15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	763	123	54	745
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	848	137	60	828
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1864	916			984	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1864	916			984	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			91	
cM capacity (veh/h)	73	330			702	

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	984	60	828
Volume Left	0	60	0
Volume Right	137	0	0
cSH	1700	702	1700
Volume to Capacity	0.58	0.09	0.49
Queue Length 95th (ft)	0	7	0
Control Delay (s)	0.0	10.6	0.0
Lane LOS		B	
Approach Delay (s)	0.0	0.7	
Approach LOS			

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	1	11	26	0	32	15	292	15	49	745	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	1	12	27	0	34	16	307	16	52	784	8

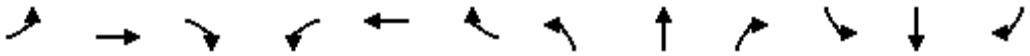
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	14	61	339	844
Volume Left (vph)	1	27	16	52
Volume Right (vph)	12	34	16	8
Hadj (s)	-0.46	-0.21	0.02	0.04
Departure Headway (s)	6.1	6.2	5.0	4.6
Degree Utilization, x	0.02	0.10	0.47	1.08
Capacity (veh/h)	552	549	711	772
Control Delay (s)	9.2	9.9	12.3	75.6
Approach Delay (s)	9.2	9.9	12.3	75.6
Approach LOS	A	A	B	F

Intersection Summary			
Delay	54.7		
HCM Level of Service	F		
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	22	151	479	54	150	117
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	23	159	504	57	158	123

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	182	561	281
Volume Left (vph)	23	0	158
Volume Right (vph)	159	57	0
Hadj (s)	-0.46	-0.03	0.15
Departure Headway (s)	5.5	4.8	5.3
Degree Utilization, x	0.28	0.75	0.41
Capacity (veh/h)	589	732	651
Control Delay (s)	10.5	20.6	12.0
Approach Delay (s)	10.5	20.6	12.0
Approach LOS	B	C	B

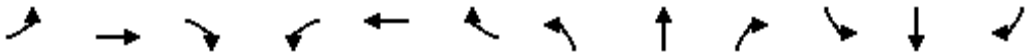
Intersection Summary			
Delay	16.5		
HCM Level of Service	C		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	24	213	328	363	270	45	200	131	9	30	118	38
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	25	220	338	374	278	46	206	135	9	31	122	39

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	244	338	374	325	341	9	192
Volume Left (vph)	25	0	374	0	206	0	31
Volume Right (vph)	0	338	0	46	0	9	39
Hadj (s)	0.08	-0.67	0.53	-0.07	0.34	-0.67	-0.06
Departure Headway (s)	8.5	7.8	8.8	8.2	9.1	8.0	9.1
Degree Utilization, x	0.58	0.73	0.92	0.74	0.86	0.02	0.48
Capacity (veh/h)	411	450	404	430	383	429	376
Control Delay (s)	21.5	27.8	54.8	29.8	46.5	10.0	20.2
Approach Delay (s)	25.1		43.2		45.5		20.2
Approach LOS	D		E		E		C

Intersection Summary			
Delay	35.4		
HCM Level of Service	E		
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	3	603	5	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	3	641	5	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			647			651	651	644	651	653	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			647			651	651	644	651	653	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1623			939			381	387	473	381	386	1085

Direction, Lane #	EB 1
Volume Total	650
Volume Left	3
Volume Right	5
cSH	1623
Volume to Capacity	0.00
Queue Length 95th (ft)	0
Control Delay (s)	0.1
Lane LOS	A
Approach Delay (s)	0.1
Approach LOS	

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX D

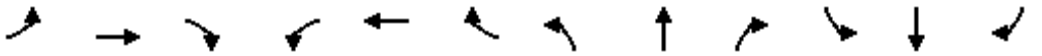
INTERSECTION LEVEL OF SERVICE CALCULATIONS

BUILDOUT CONDITIONS

INTERSECTION LEVEL OF SERVICE CALCULATIONS

BUILDOUT VOLUMES

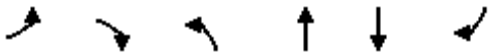
(EXISTING CIRCULATION GEOMETRY WITHOUT GARAGE)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	7	4	11	305	3	57	2	196	561	132	132	3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	8	4	12	328	3	61	2	211	603	142	142	3

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	24	392	213	603	284	3
Volume Left (vph)	8	328	2	0	142	0
Volume Right (vph)	12	61	0	603	0	3
Hadj (s)	-0.20	0.11	0.04	-0.67	0.13	-0.57
Departure Headway (s)	7.7	6.7	6.6	5.9	6.8	3.2
Degree Utilization, x	0.05	0.73	0.39	0.99	0.54	0.00
Capacity (veh/h)	407	392	538	603	511	1121
Control Delay (s)	11.1	25.4	12.6	56.6	17.4	6.2
Approach Delay (s)	11.1	25.4	45.1		17.3	
Approach LOS	B	D	E		C	

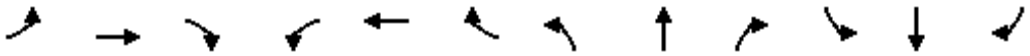
Intersection Summary			
Delay	34.3		
HCM Level of Service	D		
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	552	0	107	141	0	423
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	581	0	113	148	0	445

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	581	261	445
Volume Left (vph)	581	113	0
Volume Right (vph)	0	0	445
Hadj (s)	0.23	0.12	-0.57
Departure Headway (s)	6.3	6.8	5.8
Degree Utilization, x	1.01	0.49	0.72
Capacity (veh/h)	571	522	612
Control Delay (s)	65.4	16.2	22.3
Approach Delay (s)	65.4	16.2	22.3
Approach LOS	F	C	C

Intersection Summary			
Delay	40.5		
HCM Level of Service	E		
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	31	318	420	37	0	237	0	516	13	43	23
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	32	331	438	39	0	247	0	538	14	45	24

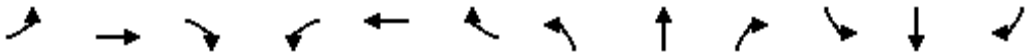
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	364	476	247	538	82
Volume Left (vph)	0	438	247	0	14
Volume Right (vph)	331	0	0	538	24
Hadj (s)	-0.51	0.22	0.53	-0.67	-0.11
Departure Headway (s)	6.9	7.2	8.2	7.0	8.7
Degree Utilization, x	0.70	0.96	0.56	1.04	0.20
Capacity (veh/h)	507	476	427	522	376
Control Delay (s)	24.2	57.2	20.0	75.3	13.8
Approach Delay (s)	24.2	57.2	57.9		13.8
Approach LOS	C	F	F		B

Intersection Summary			
Delay	48.4		
HCM Level of Service	E		
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	845	138	77	754	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	939	153	86	838	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1092		2024	1016
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1092		2024	1016
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			87		100	100
cM capacity (veh/h)			639		55	289

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	1092	86	838
Volume Left	0	86	0
Volume Right	153	0	0
cSH	1700	639	1700
Volume to Capacity	0.64	0.13	0.49
Queue Length 95th (ft)	0	12	0
Control Delay (s)	0.0	11.5	0.0
Lane LOS		B	
Approach Delay (s)	0.0	1.1	
Approach LOS			

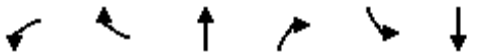
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	1	11	1	0	0	15	267	10	2	368	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	1	12	1	0	0	16	281	11	2	387	8

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	14	1	307	398
Volume Left (vph)	1	1	16	2
Volume Right (vph)	12	0	11	8
Hadj (s)	-0.46	0.23	0.02	0.02
Departure Headway (s)	5.0	5.7	4.4	4.3
Degree Utilization, x	0.02	0.00	0.37	0.47
Capacity (veh/h)	631	553	810	826
Control Delay (s)	8.0	8.7	9.9	11.0
Approach Delay (s)	8.0	8.7	9.9	11.0
Approach LOS	A	A	A	B

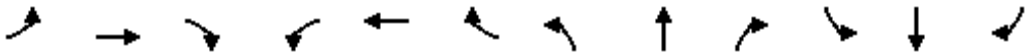
Intersection Summary			
Delay	10.5		
HCM Level of Service	B		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	44	134	200	58	150	227
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	46	141	211	61	158	239

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	187	272	397
Volume Left (vph)	46	0	158
Volume Right (vph)	141	61	0
Hadj (s)	-0.37	-0.10	0.11
Departure Headway (s)	5.1	4.8	4.9
Degree Utilization, x	0.27	0.36	0.54
Capacity (veh/h)	635	713	713
Control Delay (s)	10.0	10.5	13.4
Approach Delay (s)	10.0	10.5	13.4
Approach LOS	A	B	B

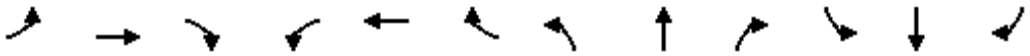
Intersection Summary			
Delay	11.7		
HCM Level of Service	B		
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	24	312	223	57	266	45	183	133	9	41	109	38
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	25	322	230	59	274	46	189	137	9	42	112	39

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	346	230	59	321	326	9	194
Volume Left (vph)	25	0	59	0	189	0	42
Volume Right (vph)	0	230	0	46	0	9	39
Hadj (s)	0.07	-0.67	0.53	-0.07	0.32	-0.67	-0.04
Departure Headway (s)	7.7	7.0	8.4	7.8	8.3	7.3	8.3
Degree Utilization, x	0.74	0.44	0.14	0.70	0.75	0.02	0.45
Capacity (veh/h)	454	502	405	440	420	468	394
Control Delay (s)	28.7	14.2	11.6	25.7	31.0	9.2	17.8
Approach Delay (s)	22.9		23.5		30.4		17.8
Approach LOS	C		C		D		C

Intersection Summary			
Delay	24.1		
HCM Level of Service	C		
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	21	534	5	60	457	13	0	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	22	568	5	64	486	14	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	500			573			1236	1243	571	1236	1239	493
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500			573			1236	1243	571	1236	1239	493
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			94			100	100	100	100	100	100
cM capacity (veh/h)	1064			1000			143	160	520	143	161	576

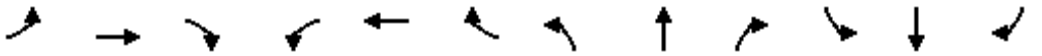
Direction, Lane #	EB 1	WB 1
Volume Total	596	564
Volume Left	22	64
Volume Right	5	14
cSH	1064	1000
Volume to Capacity	0.02	0.06
Queue Length 95th (ft)	2	5
Control Delay (s)	0.6	1.7
Lane LOS	A	A
Approach Delay (s)	0.6	1.7
Approach LOS		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

INTERSECTION LEVEL OF SERVICE CALCULATIONS

BUILDOUT VOLUMES

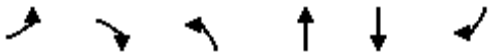
(EXISTING CIRCULATION GEOMETRY + GARAGE)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	7	36	11	305	35	57	2	196	561	132	132	3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	8	39	12	328	38	61	2	211	603	142	142	3

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	58	427	213	603	284	3
Volume Left (vph)	8	328	2	0	142	0
Volume Right (vph)	12	61	0	603	0	3
Hadj (s)	-0.06	0.10	0.04	-0.67	0.13	-0.57
Departure Headway (s)	8.0	6.8	7.0	6.3	7.1	3.2
Degree Utilization, x	0.13	0.80	0.41	1.05	0.56	0.00
Capacity (veh/h)	395	521	510	581	483	1121
Control Delay (s)	12.1	32.0	13.6	74.9	18.8	6.2
Approach Delay (s)	12.1	32.0	58.9		18.6	
Approach LOS	B	D	F		C	

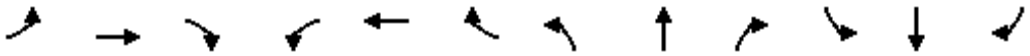
Intersection Summary			
Delay	42.7		
HCM Level of Service	E		
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	552	0	92	141	0	423
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	581	0	97	148	0	445

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	581	245	445
Volume Left (vph)	581	97	0
Volume Right (vph)	0	0	445
Hadj (s)	0.23	0.11	-0.57
Departure Headway (s)	6.2	6.9	5.9
Degree Utilization, x	1.00	0.47	0.73
Capacity (veh/h)	576	522	616
Control Delay (s)	62.6	15.8	22.8
Approach Delay (s)	62.6	15.8	22.8
Approach LOS	F	C	C

Intersection Summary			
Delay	39.6		
HCM Level of Service	E		
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	31	333	405	52	0	252	0	516	13	43	23
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	32	347	422	54	0	262	0	538	14	45	24

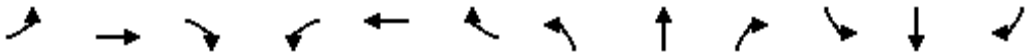
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	379	476	263	538	82
Volume Left (vph)	0	422	263	0	14
Volume Right (vph)	347	0	0	538	24
Hadj (s)	-0.51	0.21	0.53	-0.67	-0.11
Departure Headway (s)	6.9	7.3	8.3	7.0	8.8
Degree Utilization, x	0.73	0.96	0.60	1.05	0.20
Capacity (veh/h)	508	476	425	518	372
Control Delay (s)	26.2	58.7	21.8	78.3	14.0
Approach Delay (s)	26.2	58.7	59.7		14.0
Approach LOS	D	F	F		B

Intersection Summary			
Delay	50.0		
HCM Level of Service	E		
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	860	138	62	769	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	956	153	69	854	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1109		2024	1032
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1109		2024	1032
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		100	100
cM capacity (veh/h)			630		57	283

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	1109	69	854
Volume Left	0	69	0
Volume Right	153	0	0
cSH	1700	630	1700
Volume to Capacity	0.65	0.11	0.50
Queue Length 95th (ft)	0	9	0
Control Delay (s)	0.0	11.4	0.0
Lane LOS		B	
Approach Delay (s)	0.0	0.9	
Approach LOS			

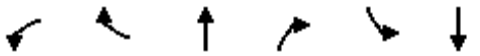
Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		57.0%	ICU Level of Service B
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	1	11	16	0	32	15	267	40	34	368	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	1	12	17	0	34	16	281	42	36	387	8

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	14	51	339	432
Volume Left (vph)	1	17	16	36
Volume Right (vph)	12	34	42	8
Hadj (s)	-0.46	-0.30	-0.03	0.04
Departure Headway (s)	5.2	5.3	4.5	4.5
Degree Utilization, x	0.02	0.07	0.42	0.54
Capacity (veh/h)	580	583	776	783
Control Delay (s)	8.4	8.8	10.8	12.6
Approach Delay (s)	8.4	8.8	10.8	12.6
Approach LOS	A	A	B	B

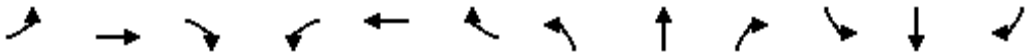
Intersection Summary			
Delay	11.6		
HCM Level of Service	B		
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	44	134	200	58	150	227
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	46	141	211	61	158	239

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	187	272	397
Volume Left (vph)	46	0	158
Volume Right (vph)	141	61	0
Hadj (s)	-0.37	-0.10	0.11
Departure Headway (s)	5.1	4.8	4.9
Degree Utilization, x	0.27	0.36	0.54
Capacity (veh/h)	635	713	713
Control Delay (s)	10.0	10.5	13.4
Approach Delay (s)	10.0	10.5	13.4
Approach LOS	A	B	B

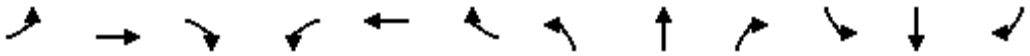
Intersection Summary			
Delay	11.7		
HCM Level of Service	B		
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	24	312	255	57	266	45	215	133	9	41	109	38
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	25	322	263	59	274	46	222	137	9	42	112	39

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	346	263	59	321	359	9	194
Volume Left (vph)	25	0	59	0	222	0	42
Volume Right (vph)	0	263	0	46	0	9	39
Hadj (s)	0.07	-0.67	0.53	-0.07	0.34	-0.67	-0.04
Departure Headway (s)	8.0	7.2	8.7	8.1	8.5	7.4	8.6
Degree Utilization, x	0.77	0.53	0.14	0.72	0.84	0.02	0.46
Capacity (veh/h)	441	475	393	426	409	464	382
Control Delay (s)	31.6	16.8	12.0	28.3	41.5	9.4	18.7
Approach Delay (s)	25.2		25.7		40.7		18.7
Approach LOS	D		D		E		C

Intersection Summary			
Delay	28.2		
HCM Level of Service	D		
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	21	534	5	60	442	13	0	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	22	568	5	64	470	14	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	484			573			1220	1227	571	1220	1223	477
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	484			573			1220	1227	571	1220	1223	477
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			94			100	100	100	100	100	100
cM capacity (veh/h)	1079			1000			147	163	520	147	164	588

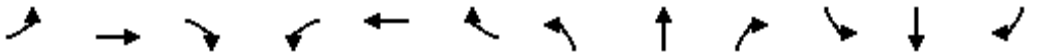
Direction, Lane #	EB 1	WB 1
Volume Total	596	548
Volume Left	22	64
Volume Right	5	14
cSH	1079	1000
Volume to Capacity	0.02	0.06
Queue Length 95th (ft)	2	5
Control Delay (s)	0.6	1.7
Lane LOS	A	A
Approach Delay (s)	0.6	1.7
Approach LOS		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

INTERSECTION LEVEL OF SERVICE CALCULATIONS

BUILDOUT VOLUMES

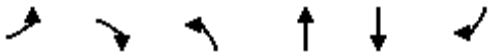
(COUNTER-CLOCKWISE CIRCULATION GEOMETRY WITHOUT GARAGE)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	7	4	0	0	3	365	2	245	564	132	0	3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	1.00
Hourly flow rate (vph)	8	4	0	0	3	392	2	263	606	142	0	3

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	12	396	266	606	142	3
Volume Left (vph)	8	0	2	0	142	0
Volume Right (vph)	0	392	0	606	0	3
Hadj (s)	0.16	-0.56	0.04	-0.67	0.23	-0.57
Departure Headway (s)	7.1	5.5	6.0	5.3	6.5	3.2
Degree Utilization, x	0.02	0.60	0.44	0.89	0.26	0.00
Capacity (veh/h)	462	636	593	675	530	1121
Control Delay (s)	10.3	16.3	12.4	34.3	11.7	6.2
Approach Delay (s)	10.3	16.3	27.7		11.6	
Approach LOS	B	C	D		B	

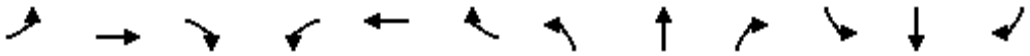
Intersection Summary			
Delay	22.7		
HCM Level of Service	C		
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	618	0	0	278	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	651	0	0	293	0	0

Direction, Lane #	EB 1	NB 1
Volume Total (vph)	651	293
Volume Left (vph)	651	0
Volume Right (vph)	0	0
Hadj (s)	0.23	0.03
Departure Headway (s)	5.0	5.7
Degree Utilization, x	0.91	0.46
Capacity (veh/h)	707	616
Control Delay (s)	37.5	13.5
Approach Delay (s)	37.5	13.5
Approach LOS	E	B

Intersection Summary			
Delay	30.0		
HCM Level of Service	D		
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	101	753	0	0	0	237	0	513	15	41	22
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	105	784	0	0	0	247	0	534	16	43	23

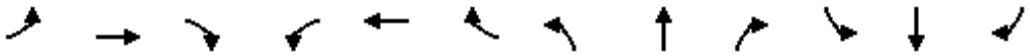
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	890	247	534	81
Volume Left (vph)	0	247	0	16
Volume Right (vph)	784	0	534	23
Hadj (s)	-0.50	0.53	-0.67	-0.10
Departure Headway (s)	5.4	7.1	5.9	6.9
Degree Utilization, x	1.32	0.49	0.87	0.16
Capacity (veh/h)	665	504	606	510
Control Delay (s)	173.2	15.4	35.3	11.2
Approach Delay (s)	173.2	29.0		11.2
Approach LOS	F	D		B

Intersection Summary				
Delay	101.4			
HCM Level of Service	F			
Intersection Capacity Utilization	97.9%	ICU Level of Service	F	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	750	144	107	754
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	833	160	119	838
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1989	913			993	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1989	913			993	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			83	
cM capacity (veh/h)	55	331			696	

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	993	119	838
Volume Left	0	119	0
Volume Right	160	0	0
cSH	1700	696	1700
Volume to Capacity	0.58	0.17	0.49
Queue Length 95th (ft)	0	15	0
Control Delay (s)	0.0	11.2	0.0
Lane LOS		B	
Approach Delay (s)	0.0	1.4	
Approach LOS			

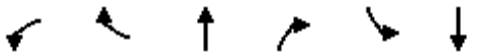
Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	1	11	11	0	0	15	294	0	2	838	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	1	12	12	0	0	16	309	0	2	882	8

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	14	12	325	893
Volume Left (vph)	1	12	16	2
Volume Right (vph)	12	0	0	8
Hadj (s)	-0.46	0.23	0.04	0.03
Departure Headway (s)	5.9	6.6	4.8	4.4
Degree Utilization, x	0.02	0.02	0.44	1.09
Capacity (veh/h)	580	516	738	812
Control Delay (s)	9.0	9.7	11.5	76.9
Approach Delay (s)	9.0	9.7	11.5	76.9
Approach LOS	A	A	B	F

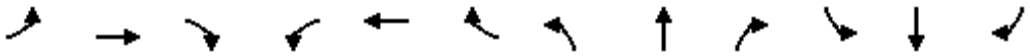
Intersection Summary			
Delay	58.4		
HCM Level of Service	F		
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	22	156	549	58	150	117
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	23	164	578	61	158	123

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	187	639	281
Volume Left (vph)	23	0	158
Volume Right (vph)	164	61	0
Hadj (s)	-0.47	-0.02	0.15
Departure Headway (s)	5.7	4.9	5.4
Degree Utilization, x	0.29	0.86	0.42
Capacity (veh/h)	595	732	633
Control Delay (s)	11.0	30.1	12.4
Approach Delay (s)	11.0	30.1	12.4
Approach LOS	B	D	B

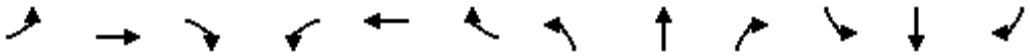
Intersection Summary			
Delay	22.4		
HCM Level of Service	C		
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	24	213	326	409	297	47	170	131	9	30	120	38
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	25	220	336	422	306	48	175	135	9	31	124	39

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	244	336	422	355	310	9	194
Volume Left (vph)	25	0	422	0	175	0	31
Volume Right (vph)	0	336	0	48	0	9	39
Hadj (s)	0.08	-0.67	0.53	-0.06	0.32	-0.67	-0.06
Departure Headway (s)	8.4	7.7	8.6	8.0	9.1	8.1	8.9
Degree Utilization, x	0.57	0.72	1.01	0.79	0.78	0.02	0.48
Capacity (veh/h)	425	464	409	443	393	434	384
Control Delay (s)	20.9	26.4	75.0	33.6	37.0	10.1	19.9
Approach Delay (s)	24.1		56.1		36.2		19.9
Approach LOS	C		F		E		C

Intersection Summary			
Delay	39.0		
HCM Level of Service	E		
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	618	5	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	15	657	5	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			663			690	690	660	690	693	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			663			690	690	660	690	693	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	100	100	100
cM capacity (veh/h)	1623			926			357	365	463	357	364	1085

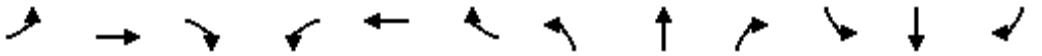
Direction, Lane #	EB 1
Volume Total	678
Volume Left	15
Volume Right	5
cSH	1623
Volume to Capacity	0.01
Queue Length 95th (ft)	1
Control Delay (s)	0.3
Lane LOS	A
Approach Delay (s)	0.3
Approach LOS	

Intersection Summary					
Average Delay	0.3				
Intersection Capacity Utilization	36.9%	ICU Level of Service		A	
Analysis Period (min)	15				

INTERSECTION LEVEL OF SERVICE CALCULATIONS

BUILDOUT VOLUMES

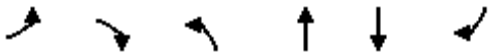
(COUNTER-CLOCKWISE CIRCULATION GEOMETRY + GARAGE)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	7	36	0	0	35	365	2	245	564	132	0	3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	1.00
Hourly flow rate (vph)	8	39	0	0	38	392	2	263	606	142	0	3

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	46	430	266	606	142	3
Volume Left (vph)	8	0	2	0	142	0
Volume Right (vph)	0	392	0	606	0	3
Hadj (s)	0.07	-0.51	0.04	-0.67	0.23	-0.57
Departure Headway (s)	7.3	5.7	6.3	5.6	6.9	3.2
Degree Utilization, x	0.09	0.68	0.47	0.94	0.27	0.00
Capacity (veh/h)	458	616	565	633	499	1121
Control Delay (s)	11.0	20.0	13.5	44.7	12.4	6.2
Approach Delay (s)	11.0	20.0	35.2		12.3	
Approach LOS	B	C	E		B	

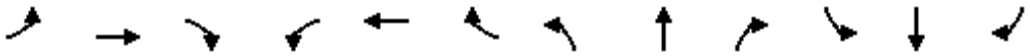
Intersection Summary				
Delay	27.8			
HCM Level of Service	D			
Intersection Capacity Utilization	55.6%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	618	0	0	263	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	651	0	0	277	0	0

Direction, Lane #	EB 1	NB 1
Volume Total (vph)	651	277
Volume Left (vph)	651	0
Volume Right (vph)	0	0
Hadj (s)	0.23	0.03
Departure Headway (s)	5.0	5.7
Degree Utilization, x	0.90	0.44
Capacity (veh/h)	714	616
Control Delay (s)	35.3	12.9
Approach Delay (s)	35.3	12.9
Approach LOS	E	B

Intersection Summary			
Delay	28.7		
HCM Level of Service	D		
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	101	753	0	0	0	252	0	513	15	41	22
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	105	784	0	0	0	262	0	534	16	43	23

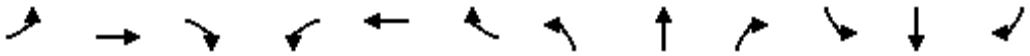
Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total (vph)	890	263	534	81
Volume Left (vph)	0	263	0	16
Volume Right (vph)	784	0	534	23
Hadj (s)	-0.50	0.53	-0.67	-0.10
Departure Headway (s)	5.4	7.1	5.9	6.9
Degree Utilization, x	1.33	0.52	0.87	0.16
Capacity (veh/h)	664	504	606	510
Control Delay (s)	174.0	16.2	35.3	11.2
Approach Delay (s)	174.0	29.0		11.2
Approach LOS	F	D		B

Intersection Summary				
Delay	101.2			
HCM Level of Service	F			
Intersection Capacity Utilization	97.9%	ICU Level of Service	F	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	765	144	92	769
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	850	160	102	854
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1989	930			1010	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1989	930			1010	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			85	
cM capacity (veh/h)	57	324			686	

Direction, Lane #	NB 1	SB 1	SB 2
Volume Total	1010	102	854
Volume Left	0	102	0
Volume Right	160	0	0
cSH	1700	686	1700
Volume to Capacity	0.59	0.15	0.50
Queue Length 95th (ft)	0	13	0
Control Delay (s)	0.0	11.2	0.0
Lane LOS		B	
Approach Delay (s)	0.0	1.2	
Approach LOS			

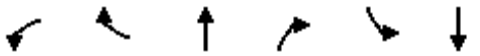
Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	1	11	26	0	32	15	294	15	49	823	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	1	12	27	0	34	16	309	16	52	866	8

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	14	61	341	926
Volume Left (vph)	1	27	16	52
Volume Right (vph)	12	34	16	8
Hadj (s)	-0.46	-0.21	0.02	0.04
Departure Headway (s)	6.1	6.2	5.0	4.6
Degree Utilization, x	0.02	0.10	0.47	1.18
Capacity (veh/h)	552	549	711	777
Control Delay (s)	9.2	9.9	12.4	113.5
Approach Delay (s)	9.2	9.9	12.4	113.5
Approach LOS	A	A	B	F

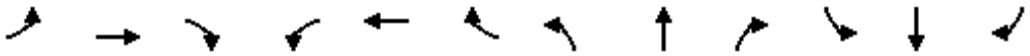
Intersection Summary			
Delay	82.0		
HCM Level of Service	F		
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	22	156	549	58	150	117
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	23	164	578	61	158	123

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	187	639	281
Volume Left (vph)	23	0	158
Volume Right (vph)	164	61	0
Hadj (s)	-0.47	-0.02	0.15
Departure Headway (s)	5.7	4.9	5.4
Degree Utilization, x	0.29	0.86	0.42
Capacity (veh/h)	595	732	633
Control Delay (s)	11.0	30.1	12.4
Approach Delay (s)	11.0	30.1	12.4
Approach LOS	B	D	B

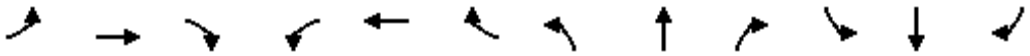
Intersection Summary			
Delay	22.4		
HCM Level of Service	C		
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	24	213	358	409	297	47	202	131	9	30	120	38
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	25	220	369	422	306	48	208	135	9	31	124	39

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total (vph)	244	369	422	355	343	9	194
Volume Left (vph)	25	0	422	0	208	0	31
Volume Right (vph)	0	369	0	48	0	9	39
Hadj (s)	0.08	-0.67	0.53	-0.06	0.34	-0.67	-0.06
Departure Headway (s)	8.5	7.7	8.9	8.3	9.1	8.1	9.1
Degree Utilization, x	0.58	0.79	1.04	0.81	0.87	0.02	0.49
Capacity (veh/h)	416	457	402	429	383	429	374
Control Delay (s)	21.1	33.1	84.7	37.3	47.4	10.1	20.4
Approach Delay (s)	28.3		63.1		46.4		20.4
Approach LOS	D		F		E		C

Intersection Summary				
Delay	44.7			
HCM Level of Service	E			
Intersection Capacity Utilization	77.5%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	618	5	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	15	657	5	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			663			690	690	660	690	693	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			663			690	690	660	690	693	0
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	100	100	100
cM capacity (veh/h)	1623			926			357	365	463	357	364	1085

Direction, Lane #	EB 1
Volume Total	678
Volume Left	15
Volume Right	5
cSH	1623
Volume to Capacity	0.01
Queue Length 95th (ft)	1
Control Delay (s)	0.3
Lane LOS	A
Approach Delay (s)	0.3
Approach LOS	

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	36.9%	ICU Level of Service	A	
Analysis Period (min)	15			

APPENDIX E

MITIGATED INTERSECTION LEVEL OF SERVICE CALCULATIONS

EXISTING CIRCULATION

MOVEMENT SUMMARY

Site: Monterey.Park Ext + Proj

Monterey Ave & Park Ave
Roundabout

EXISTING CIRCULATION

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South	RoadName										
3L	L	2	2.0	0.725	15.4	LOS B	10.1	257.7	0.76	0.78	28.9
8T	T	193	2.0	0.722	8.2	LOS A	10.1	257.7	0.76	0.66	30.4
8R	R	588	2.0	0.722	9.3	LOS A	10.1	257.7	0.76	0.65	30.6
Approach		784	2.0	0.722	9.1	LOS B	10.1	257.7	0.76	0.66	30.5
East	RoadName										
1L	L	311	2.0	0.409	13.6	LOS B	3.6	92.0	0.55	0.71	28.8
6T	T	38	2.0	0.409	6.7	LOS A	3.6	92.0	0.55	0.53	30.7
6R	R	62	2.0	0.408	7.2	LOS A	3.6	92.0	0.55	0.55	31.2
Approach		411	2.0	0.409	12.0	LOS B	3.6	92.0	0.55	0.67	29.3
North	RoadName										
7L	L	143	2.0	0.320	14.7	LOS B	2.5	62.5	0.62	0.81	28.8
4T	T	123	2.0	0.319	7.7	LOS A	2.5	62.5	0.62	0.63	30.7
4R	R	3	2.0	0.326	8.7	LOS A	2.5	62.5	0.62	0.64	31.0
Approach		270	2.0	0.319	11.4	LOS B	2.5	62.5	0.62	0.73	29.7
West	RoadName										
5L	L	8	2.0	0.084	15.8	LOS B	0.6	14.1	0.64	0.83	28.5
2T	T	39	2.0	0.084	8.9	LOS A	0.6	14.1	0.64	0.65	31.1
2R	R	12	2.0	0.084	10.2	LOS B	0.6	14.1	0.64	0.65	31.0
Approach		59	2.0	0.084	10.1	LOS B	0.6	14.1	0.64	0.68	30.7
All Vehicles		1523	2.0	0.725	10.3	LOS B	10.1	257.7	0.67	0.67	30.0

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Monterey.Park B.O. + Proj

EXISTING Circulation

Monterey Ave & Park Ave
Buildout + Project
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South	RoadName										
3L	L	2	2.0	0.725	16.0	LOS B	11.9	301.5	0.81	0.79	28.6
8T	T	213	2.0	0.758	8.8	LOS A	11.9	301.5	0.81	0.69	30.1
8R	R	610	2.0	0.758	10.0	LOS A	11.9	301.5	0.81	0.68	30.4
Approach		825	2.0	0.758	9.7	LOS B	11.9	301.5	0.81	0.68	30.3
East	RoadName										
1L	L	332	2.0	0.441	13.9	LOS B	4.0	102.0	0.60	0.73	28.7
6T	T	38	2.0	0.442	6.9	LOS A	4.0	102.0	0.60	0.55	30.4
6R	R	62	2.0	0.439	7.4	LOS A	4.0	102.0	0.60	0.57	31.0
Approach		432	2.0	0.441	12.3	LOS B	4.0	102.0	0.60	0.69	29.2
North	RoadName										
7L	L	143	2.0	0.353	14.9	LOS B	2.8	70.9	0.65	0.83	28.8
4T	T	143	2.0	0.353	8.0	LOS A	2.8	70.9	0.65	0.66	30.6
4R	R	3	2.0	0.362	9.0	LOS A	2.8	70.9	0.65	0.66	30.8
Approach		290	2.0	0.352	11.4	LOS B	2.8	70.9	0.65	0.74	29.6
West	RoadName										
5L	L	8	2.0	0.087	16.2	LOS B	0.6	15.0	0.66	0.84	28.3
2T	T	39	2.0	0.087	9.3	LOS A	0.6	15.0	0.66	0.67	31.0
2R	R	12	2.0	0.087	10.5	LOS B	0.6	15.0	0.66	0.66	30.7
Approach		59	2.0	0.087	10.4	LOS B	0.6	15.0	0.66	0.69	30.5
All Vehicles		1605	2.0	0.758	10.7	LOS B	11.9	301.5	0.72	0.69	29.9

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Bay.Capitola Existing + Proj

Capitola / Bay
Existing + Project
Summer
Roundabout

EXISTING circulation

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South	Capitola Ave										
3L	L	217	2.0	0.373	13.2	LOS B	3.1	78.2	0.65	0.79	29.4
8T	T	142	2.0	0.373	7.9	LOS A	3.1	78.2	0.65	0.64	30.4
8R	R	10	2.0	0.017	8.3	LOS A	0.1	1.7	0.50	0.54	31.2
Approach		370	2.0	0.373	11.0	LOS B	3.1	78.2	0.65	0.72	29.8
South East	Bay Ave										
11L	L	62	2.0	0.492	17.1	LOS B	4.5	115.1	0.74	0.91	28.1
16T	T	289	2.0	0.493	8.9	LOS A	4.5	115.1	0.74	0.76	30.7
16R	R	49	2.0	0.494	8.7	LOS A	4.5	115.1	0.74	0.70	30.8
Approach		400	2.0	0.493	10.1	LOS B	4.5	115.1	0.74	0.78	30.3
North	Capitola Ave										
7L	L	45	2.0	0.249	13.4	LOS B	1.5	38.6	0.59	0.86	29.5
4T	T	116	2.0	0.249	7.7	LOS A	1.5	38.6	0.59	0.63	31.2
4R	R	41	2.0	0.249	10.0	LOS B	1.5	38.6	0.59	0.73	31.0
Approach		202	2.0	0.249	9.4	LOS B	1.5	38.6	0.59	0.70	30.7
North West	Bay Ave										
15L	L	26	2.0	0.593	15.5	LOS B	6.1	155.9	0.67	0.82	28.9
12T	T	324	2.0	0.595	7.7	LOS A	6.1	155.9	0.67	0.64	31.2
12R	R	260	2.0	0.596	7.2	LOS A	6.1	155.9	0.67	0.60	31.2
Approach		610	2.0	0.595	7.8	LOS B	6.1	155.9	0.67	0.63	31.1
All Vehicles		1582	2.0	0.596	9.4	LOS A	6.1	155.9	0.67	0.70	30.5

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%			0%	-2%	
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	1.00			1.00		1.00
Frt	1.00			1.00		0.86
Flt Protected	0.95			0.98		1.00
Satd. Flow (prot)	1770			1827		1627
Flt Permitted	0.95			0.98		1.00
Satd. Flow (perm)	1770			1827		1627
Volume (vph)	552	0	92	141	0	423
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	581	0	97	148	0	445
RTOR Reduction (vph)	0	0	0	0	0	315
Lane Group Flow (vph)	581	0	0	245	0	130
Turn Type			Perm			custom
Protected Phases	4			2		
Permitted Phases			2			6
Actuated Green, G (s)	17.3			10.4		10.4
Effective Green, g (s)	17.3			10.4		10.4
Actuated g/C Ratio	0.48			0.29		0.29
Clearance Time (s)	4.0			4.0		4.0
Vehicle Extension (s)	3.0			3.0		3.0
Lane Grp Cap (vph)	858			532		474
v/s Ratio Prot	c0.33					
v/s Ratio Perm				0.13		0.08
v/c Ratio	0.68			0.46		0.27
Uniform Delay, d1	7.1			10.4		9.7
Progression Factor	1.00			1.00		1.00
Incremental Delay, d2	2.1			0.6		0.3
Delay (s)	9.2			11.0		10.1
Level of Service	A			B		B
Approach Delay (s)	9.2			11.0	10.1	
Approach LOS	A			B	B	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	35.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

MOVEMENT SUMMARY

Site: Bay.Capitola Existing BO + Proj

Capitola / Bay
Existing Circulation
Buildout + Project
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop Queued	Effective Stop Rate per veh	Average Speed mph
South	Capitola Ave										
3L	L	234	2.0	0.399	13.4	LOS B	3.4	85.6	0.68	0.80	29.3
8T	T	145	2.0	0.398	8.0	LOS A	3.4	85.6	0.68	0.65	30.2
8R	R	10	2.0	0.017	8.3	LOS A	0.1	1.7	0.51	0.54	31.2
Approach		388	2.0	0.399	11.3	LOS B	3.4	85.6	0.67	0.74	29.7
South East	Bay Ave										
11L	L	62	2.0	0.504	17.4	LOS B	4.8	120.8	0.76	0.92	28.0
16T	T	289	2.0	0.504	9.3	LOS A	4.8	120.8	0.76	0.79	30.6
16R	R	49	2.0	0.504	9.1	LOS A	4.8	120.8	0.76	0.73	30.7
Approach		400	2.0	0.504	10.5	LOS B	4.8	120.8	0.76	0.80	30.2
North	Capitola Ave										
7L	L	45	2.0	0.255	13.5	LOS B	1.6	40.0	0.60	0.86	29.5
4T	T	118	2.0	0.255	7.8	LOS A	1.6	40.0	0.60	0.64	31.1
4R	R	41	2.0	0.255	10.2	LOS B	1.6	40.0	0.60	0.73	30.9
Approach		204	2.0	0.255	9.5	LOS B	1.6	40.0	0.60	0.71	30.7
North West	Bay Ave										
15L	L	26	2.0	0.621	15.9	LOS B	7.0	178.4	0.69	0.83	28.8
12T	T	339	2.0	0.627	8.1	LOS A	7.0	178.4	0.69	0.66	31.0
12R	R	277	2.0	0.627	7.6	LOS A	7.0	178.4	0.69	0.62	31.1
Approach		642	2.0	0.627	8.2	LOS B	7.0	178.4	0.69	0.65	30.9
All Vehicles		1635	2.0	0.627	9.7	LOS A	7.0	178.4	0.69	0.72	30.4

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

COUNTER-CLOCKWISE CIRCULATION

MOVEMENT SUMMARY

Site: Bay.Capitola Existing + Proj

Capitola / Bay
Existing + Project
Summer
Roundabout

counterclockwise

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South	Capitola Ave										
3L	L	217	2.0	0.347	12.5	LOS B	3.0	75.2	0.59	0.74	29.5
8T	T	142	2.0	0.347	7.2	LOS A	3.0	75.2	0.59	0.58	30.7
8R	R	10	2.0	0.017	7.8	LOS A	0.1	1.6	0.44	0.51	31.4
Approach		370	2.0	0.347	10.3	LOS B	3.0	75.2	0.59	0.67	30.0
South East	Bay Ave										
11L	L	395	2.0	0.873	27.6	LOS C	18.6	473.0	1.00	1.18	23.4
16T	T	293	2.0	0.873	19.4	LOS B	18.6	473.0	1.00	1.18	24.9
16R	R	49	2.0	0.873	19.0	LOS B	18.6	473.0	1.00	1.11	24.9
Approach		737	2.0	0.873	23.8	LOS C	18.6	473.0	1.00	1.18	24.0
North	Capitola Ave										
7L	L	33	2.0	0.398	17.3	LOS B	3.3	82.6	0.87	1.00	27.6
4T	T	128	2.0	0.397	11.6	LOS B	3.3	82.6	0.87	0.94	29.4
4R	R	41	2.0	0.397	14.1	LOS B	3.3	82.6	0.87	0.88	28.8
Approach		202	2.0	0.397	13.1	LOS B	3.3	82.6	0.87	0.94	28.9
North West	Bay Ave										
15L	L	26	2.0	0.932	38.5	LOS D	20.7	526.6	1.00	1.45	20.2
12T	T	232	2.0	0.919	30.8	LOS C	20.7	526.6	1.00	1.45	21.1
12R	R	357	2.0	0.921	30.3	LOS C	20.7	526.6	1.00	1.36	21.1
Approach		614	2.0	0.920	30.8	LOS D	20.7	526.6	1.00	1.40	21.0
All Vehicles		1923	2.0	0.932	22.3	LOS C	20.7	526.6	0.91	1.13	24.3

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Monterey.Park CCW B.O. + Proj

Monterey Ave & Park Ave
Counter-Clockwise
Buildout + Project
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop Queued	Effective Stop Rate per veh	Average Speed mph
South	RoadName										
3L	L	2	2.0	0.272	13.7	LOS B	2.0	50.1	0.44	0.86	29.7
8T	T	266	2.0	0.278	6.6	LOS A	2.0	50.1	0.44	0.53	32.4
8R	R	613	2.0	0.494	7.0	LOS A	4.5	114.1	0.50	0.55	31.8
Approach		882	2.0	0.494	6.9	LOS B	4.5	114.1	0.48	0.55	31.9
East	RoadName										
6T	T	38	2.0	0.464	7.5	LOS A	4.0	102.4	0.63	0.62	31.0
6R	R	397	2.0	0.466	8.5	LOS A	4.0	102.4	0.63	0.67	31.0
Approach		435	2.0	0.466	8.4	LOS A	4.0	102.4	0.63	0.67	31.0
North	RoadName										
7L	L	143	2.0	0.117	12.2	LOS B	0.8	20.9	0.18	0.62	29.6
4R	R	3	2.0	0.116	5.6	LOS A	0.8	20.9	0.18	0.41	33.3
Approach		147	2.0	0.117	12.0	LOS B	0.8	20.9	0.18	0.62	29.6
West	RoadName										
5L	L	8	2.0	0.044	12.8	LOS B	0.3	6.8	0.32	0.78	29.9
2T	T	39	2.0	0.044	5.8	LOS A	0.3	6.8	0.32	0.43	32.9
Approach		47	2.0	0.044	7.0	LOS B	0.3	6.8	0.32	0.49	32.4
All Vehicles		1510	2.0	0.494	7.8	LOS A	4.5	114.1	0.49	0.59	31.4

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Bay.Capitola BO CCW + Proj

Capitola / Bay
Buidout CCW + Project
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South	Capitola Ave										
3L	L	220	2.0	0.329	12.3	LOS B	2.9	73.0	0.58	0.73	29.6
8T	T	142	2.0	0.330	6.6	LOS A	2.9	73.0	0.58	0.54	30.9
8R	R	10	2.0	0.016	7.3	LOS A	0.1	1.5	0.44	0.49	31.7
Approach		372	2.0	0.329	10.0	LOS B	2.9	73.0	0.58	0.65	30.1
South East	Bay Ave										
11L	L	445	2.0	0.962	38.4	LOS D	28.6	727.5	1.00	1.43	20.0
16T	T	323	2.0	0.964	30.2	LOS C	28.6	727.5	1.00	1.43	20.8
16R	R	51	2.0	0.964	29.8	LOS C	28.6	727.5	1.00	1.36	20.8
Approach		818	2.0	0.962	34.6	LOS D	28.6	727.5	1.00	1.43	20.4
North	Capitola Ave										
7L	L	33	2.0	0.572	28.5	LOS C	6.0	151.6	1.00	1.12	22.8
4T	T	130	2.0	0.570	22.8	LOS C	6.0	151.6	1.00	1.12	23.7
4R	R	41	2.0	0.574	25.1	LOS C	6.0	151.6	1.00	1.02	23.5
Approach		204	2.0	0.570	24.2	LOS C	6.0	151.6	1.00	1.10	23.5
North West	Bay Ave										
15L	L	26	2.0	1.043	65.6	LOS E	33.2	843.8	1.00	1.89	14.9
12T	T	232	2.0	1.034	57.4	LOS E	33.2	843.8	1.00	1.89	14.9
12R	R	389	2.0	1.035	57.4	LOS E	33.2	843.8	1.00	1.82	14.9
Approach		647	2.0	1.035	57.7	LOS E	33.2	843.8	1.00	1.85	14.9
All Vehicles		2041	2.0	1.043	36.4	LOS D	33.2	843.8	0.92	1.38	19.6

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout LOS Method: Same as Signalised Intersections.
Roundabout Capacity Model: SIDRA Standard.

Capitola Village Parking Structure Planning Project for the City of Capitola

December 16, 2010

WATRY DESIGN, INC.
Architects • Engineers • Parking Planners

FIELD PAOLI

Capitola Village Parking Structure Planning Project
for the
City of Capitola

December 16, 2010
Prepared by

Watry Design, Inc.
Architects, Structural Engineers, Parking Planners

with

FIELD PAOLI
Architects

420 Capitola Ave,
Capitola, CA 95010
Phone: 831.475-7300 • Fax: 831.464-8659

Table of Contents

December 16, 2010

Mr. Steve Jesberg
Public Works Director
420 Capitola Avenue
Capitola,CA 95010

RE: Capitola Village Parking Structure Planing Project

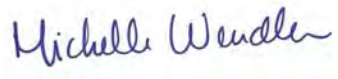
Dear Steve,

Watry Design is pleased to submit to you the Capitola Village Parking Structure Planning Study. This feasibility report includes results from data collection and site analysis in conjunction with the efforts of Field Paoli. Watry Design and Field Paoli have endeavored to assemble this information into a clear and concise format. We believe that it addresses the concerns and criteria identified in the original Request for Proposal, as well as those raised during the study process.

We thank you for this opportunity to work for you and hope to do so again in the near future.

Sincerely,

WATRY DESIGN, INC.



Michelle Wendler, Architect
Principal

Chapter 1 - Introduction

Background

This Parking Feasibility Study has been prepared by Watry Design, Inc. and Field Paoli, with direction from City of Capitola staff for short- and long-term planning purposes. It is the intent of this project to develop preliminary project details for the future development of a multi-level parking structure, which can then be incorporated with a future City Hall site redevelopment. The project will be developed in phases; the first phase is the parking structure with a possible City Hall/commercial development as a second phase.

Study Chronology

Task 1: Stakeholder meetings/background research – Watry met with City Staff and members of the City's Traffic and Parking Commission subcommittee for the Parking Structure to discuss background information, project vision and related issues. Prior to this meeting Watry reviewed documents provided by the City.

Task 2: Site meetings and Design coordination – Watry reviewed the site and developed design parameters and standards to be used in the preliminary design effort. The design parameters included, entrance and exit limitations, topography, number of parking spaces provided, and pedestrian access routes to the Central Village.

Task 3: Development of options for Parking Structure – Watry developed a set of preliminary options for the parking structure for review by the City and Commission. These options presented five alternative plan layout options. Preliminary cost estimates for each option were provided.

Task 4: Site Master Plan – Watry, in conjunction with Field Paoli, developed site plans for the entire site, incorporating parking structure and City Hall, developing spaces for future uses including civic functions and potential commercial space.

Task 5: Floor Plans for two selected parking structures. - Watry prepared plan sheets for two selected parking structure options. These plans included floor plans, basic structural elements, entrance and exit paths of travel for both vehicles and pedestrians and other elements necessary to visually depict the structure on site. Parking structures are placed on site background taken from aerial photography.

Task 6: 3-D renderings and visualization for site master plan - Based on direction from City staff Field Paoli prepared plan sheets for two final site master plans. An architectural rendering was prepared to represent architectural character of parking structure within the site context.

Task 7: Develop Parking Structure costs estimates – Rough cost estimates were developed for the two selected parking structure options. Include are cost estimates for planning, permitting, engineering, construction, and construction management costs, i.e. soft costs.

Task 8: Develop Site Master Plan costs – Watry and Field Paoli developed a budgetary cost estimate for the selected master plan. The estimate includes preliminary site development cost based on square footage of the buildings and site improvements.

Task 9: Project Report - The final project report describes the process of developing the selected options, specific details, costs estimates and reduced plan sheets.

Basis of Analysis

The study was established with the parameters that the structure should achieve a minimum of 325 new parking spaces to a maximum of 800 new parking spaces for a estimated cost of $10,000,000. Below is a brief summary of the parking demand requirements derived from previous studies authorized by the City of Capitola. As the Pacific Cove Lot is the only parcel left large enough to develop structured parking, it would be ideal to maximize the number of parking stalls provided while remaining within the budget the City can finance.

The following chart was excerpted from the Report on Parking Expansion Alternatives for the Traffic and Parking Commission dated April 14, 2010.

Demand	Low	High
Current Shortfall	176	390
Village Hotel	60	120
Replace Theater Spaces	39	39
Esplanade Pedestrian Walk	0	100
Valet Parking Program	0	50
Other New Development	50	100
Total Long Term Parking Needs	325	799

Chapter 2 - Parking Capacity Analysis

Parking Structure Design Analysis

Watry Design was commissioned by the City of Capitola to evaluate the feasibility of accommodating structured parking within the Pacific Cove Parking Lot. The analysis was provided in two steps, an initial analysis of 5 options followed by the development of 2 final options derived from the initial analysis.

Parking structures are made up of parking bays that include a drive aisle with parking stalls on either side. Efficient parking layouts have parking on both sides of a drive aisle. This parking can either be angled parking or 90 degree parking. 90 degree parking is more efficient than angled parking, but requires a wider width than angled parking. Two bay solutions fit the parking structure within the existing parking lot area. Initial analysis determined that the width of the site in the north south direction was a critical factor in the layout of the structure. Both 2 bay and 3 bay parking solutions were compared to the width of the site. 2 Bay structures only yield the minimum parking stalls and require 4 levels of parking to achieve that goal. Three bay parking solutions exceed the footprint of the existing parking lot and extend past the fence line to the north. Using 60 degree parking with 3 bays, you can meet the minimum parking demand in three parking levels. Since the height above grade is a factor relative to the impact on the surrounding community and the distance below grade is a factor relative to increasing cost, it was determined that the parking structure should not be higher than the adjacent railroad tracks and ideally would not be below grade far enough to require mechanical ventilation or sprinklers. These conditions guided the development of the final two options.

In addition to the analysis above, the following factors played into the decision for the final options.

Angled versus. 90 degree parking
Both 90 degree parking and angled parking were reviewed in the initial options. For the 2 bay solutions, 90 degree parking was used throughout. For the three bay solutions, angled parking was used, except on the ramp. 90 degree stalls were utilized where two-way circulation is required. 90 degree parking is more efficient than angled parking, which means that it will cost less per parking stall to build. However, due to the narrow site, it was determined that three bays of 90 degree parking was not feasible. In the final 2 options, 3 bay solutions of both 45 degree and 60 degree angles were evaluated. These options were evaluated to determine the impact on the northern area beyond the parking lot and took into consideration the removal of existing trees. Option 2 is 45 degree parking and provides a narrower building, but less parking stalls on each floor. Option 1 uses a 60 degree solution, is more efficient, but extends 9'-6" further to the north. (14'-6" past fence versus 5'-0" past fence).

Parking Stall Size
The initial options were reviewed with both 9'-0" wide and 8'-6" parking spaces. The standard stall sizes required by the City of Capitola zoning regulations are 9'-0" wide by 18'-0" long. The size of a parking space is usually relative to the type of user. High turnover spaces with less familiar users generally require wider parking spaces. Lower turnover spaces can have narrower parking spaces. Because the parking in this structure is longer term and lower turnover, we are recommending that 8'-6" wide by 18'-0" long stalls be used. In addition, the width of the stall has an affect on the efficiency which has a direct relationship to cost. Narrower stalls allow more stalls in the same square footage. It should also be noted that this is the most common stall size used in the Bay Area. This stall size is assumed for all the final options.

Ramp Type
Both express ramps and parked on ramps were investigated in the initial options. Express ramps are ramps that average up to 15% slope and connect the floors without parking. Parked on ramps are parking bays that are sloped to connect the floors. Ramp on ramps provide a higher level of service because cars can circulate from floor-to-floor without interacting with cars pulling in and out of parking spaces. Although they allow the parking to be on flat floors, it is less efficient and therefore contributes to a higher cost per parking stall. Express ramps are generally more advantageous in low turnover parking, are more efficient and therefore contribute to a lower cost per stall. However, parked on ramps require one third of the stalls to be parked on sloping floors and since the circulation between floors must also interact with cars pulling in and out of parking spaces, it provides a lower level of service. Due to the site configuration, it was possible to use an express ramp with the two bay solutions and it was investigated as a possible option. The 3 bay solutions were studied with parked on ramps. The conclusion was based on the type of user, a low turnover rate and the importance of maximizing new parking stalls within the site parameters and budget. The final options utilize a parked on ramp solution.

Number of Levels and Relationship to Existing Grade
Initial options were reviewed having three and four parking levels at a grade elevation of 33.5 and at 22. At elevation 33.5, the lowest level of parking did not require mechanical ventilation or sprinklers. At elevation 22, the lowest level requires both. After review of 3-D massing models to understand the proportions of the proposed options and their impact on the surrounding area, it was determined that the top deck of the parking structure should not be higher than the railroad tracks on the south side. The final options include a 3 and 4 level solution. Both options set the top deck at the tracks and therefore the lowest level of the 4 level option is completely below grade and would require mechanical ventilation and sprinklers.

The following programmatic items were included in all options.

Stairs and elevator cores were included at the southwest and southeast corners of the site providing connections to Monterey and Capitola Ave as well as to City Hall. The southwest core utilizes a new pedestrian linkage proposed to connect to Capitola Ave that will provide a more direct access to the Village. The vehicular access from Capitola Ave was widened to provide 2-way circulation at this entrance.

All options evaluated provide an area for valet parking on the top deck to provide additional new parking stalls into the Village area. The valet area would be utilized by hotels in the village and would be separated from the general use parking.

Parking Structure Descriptions for Final Options 1 and 2

The final options summary is provided below: Note both options retain 23 on grade stalls which are included in the stall count

	Option 1	Option 2
SQUARE FOOTAGE	168,300	213,400
STALL ANGLE	60 degrees	45 degrees
NUMBER OF LEVELS	3 levels	4 levels
ENCROACHMENT PAST FENCE	14’-6”	5'-0"
EFFICIENCY	317 sf/stall	331 sf/stall
NUMBER OF TOTAL STALLS	554 stalls	664 stalls
NUMBER OF NET NEW STALLS	320 stalls	430 stalls
TOTAL COST	$12,777,863	$18,813,270
COST PER STALL	$23,065	$28,333
COST PER NET NEW STALL	$39,931	$43,752
ADDED STALLS WITH VALET	26	24

Conclusions

After the evaluation of the final options it was determined that Option 1 was the preferred alternative for the following reasons.

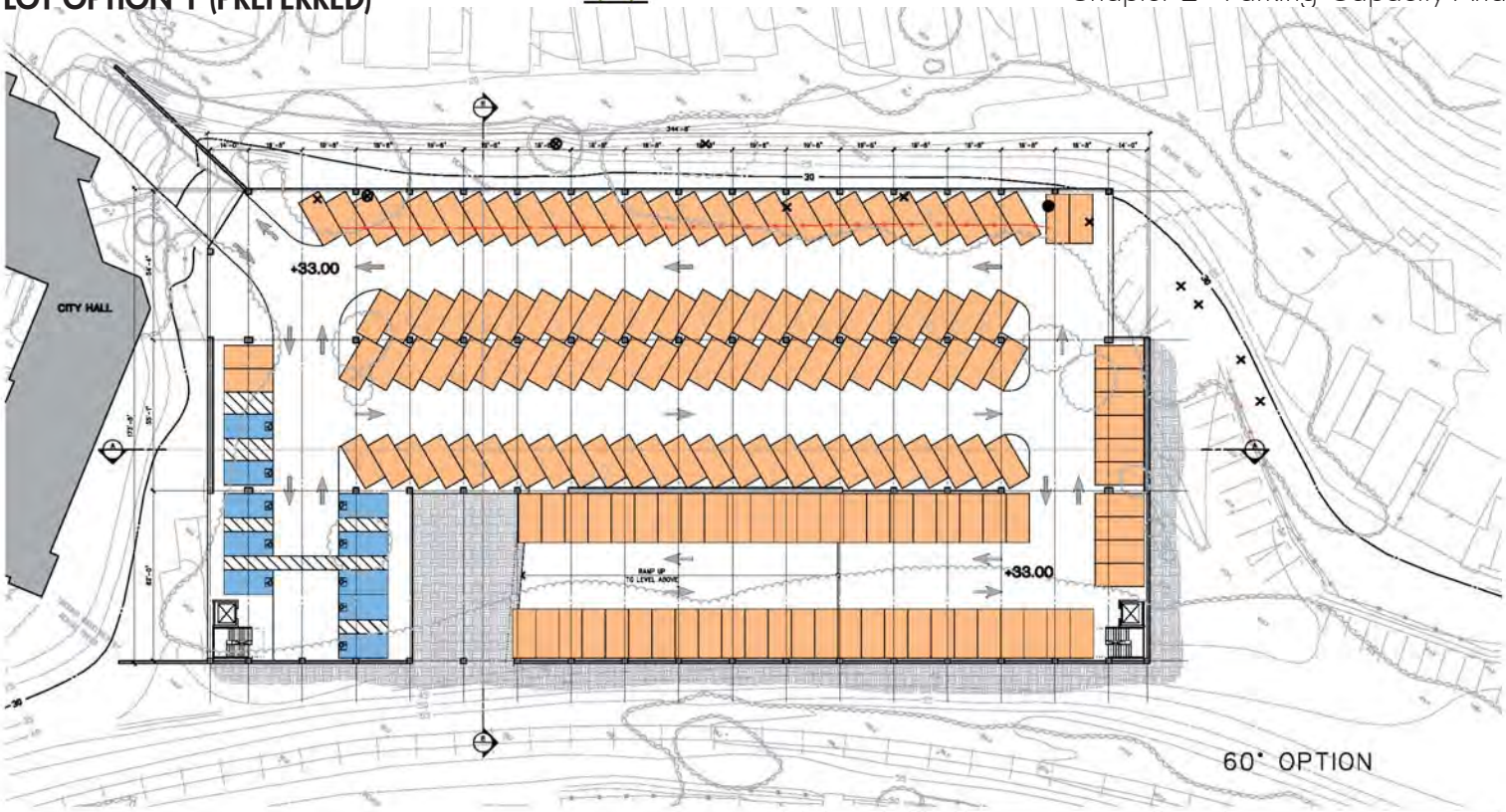
1. It is within the limits of the possible funding scenarios of the City.
2. It meets the minimum parking demand.
3. It fits within the site parameters; below the railroad tracks while not requiring a below grade level.

While Option 2 provides more parking spaces, it’s cost per new parking space is higher due to the higher sf/stall and the level below grade. While it is possible to add a level of parking to Option 1 and add approximately 190 parking spaces. The additional level would be below grade and would make the cost per new stall higher. This might be outside the funding limitations of the City.

The analysis provided the following insights.

1. It is not possible to meet the maximum parking demand within the funding limitations.
2. 4 levels of parking, if provided above grade to minimize costs, would be too tall.
3. Providing the 4th level of parking below grade may be cost prohibitive.
4. It is necessary to go beyond the limits of the existing surface parking lot to provide a more efficient solution.
5. The distance beyond the parking lot to the north can still be mitigated by landscaping.
6. It is possible to incorporate valet parking to increase the parking supply in the structure.
7. The pedestrian connection to Capitola Avenue is critical to the success of the project.
8. Widening the vehicular access to Capitola Avenue is critical to the success of the project.
9. The structure can be designed for both the current and future City Hall configurations.
10. Keeping the structure below the level of the railroad tracks is an important site consideration.
11. The architectural facade treatment and landscaping will be important to integrate the structure into the existing context and address community compatibility.

PACIFIC COVE PARKING LOT OPTION 1 (PREFERRED)



GROUND LEVEL PARKING PLAN

SCALE : 1/16" = 1'-0"

Not to Scale

TREE LEGEND

- INDICATES REDWOOD TREE
- INDICATES OAK TREE
- INDICATES PINE TREE

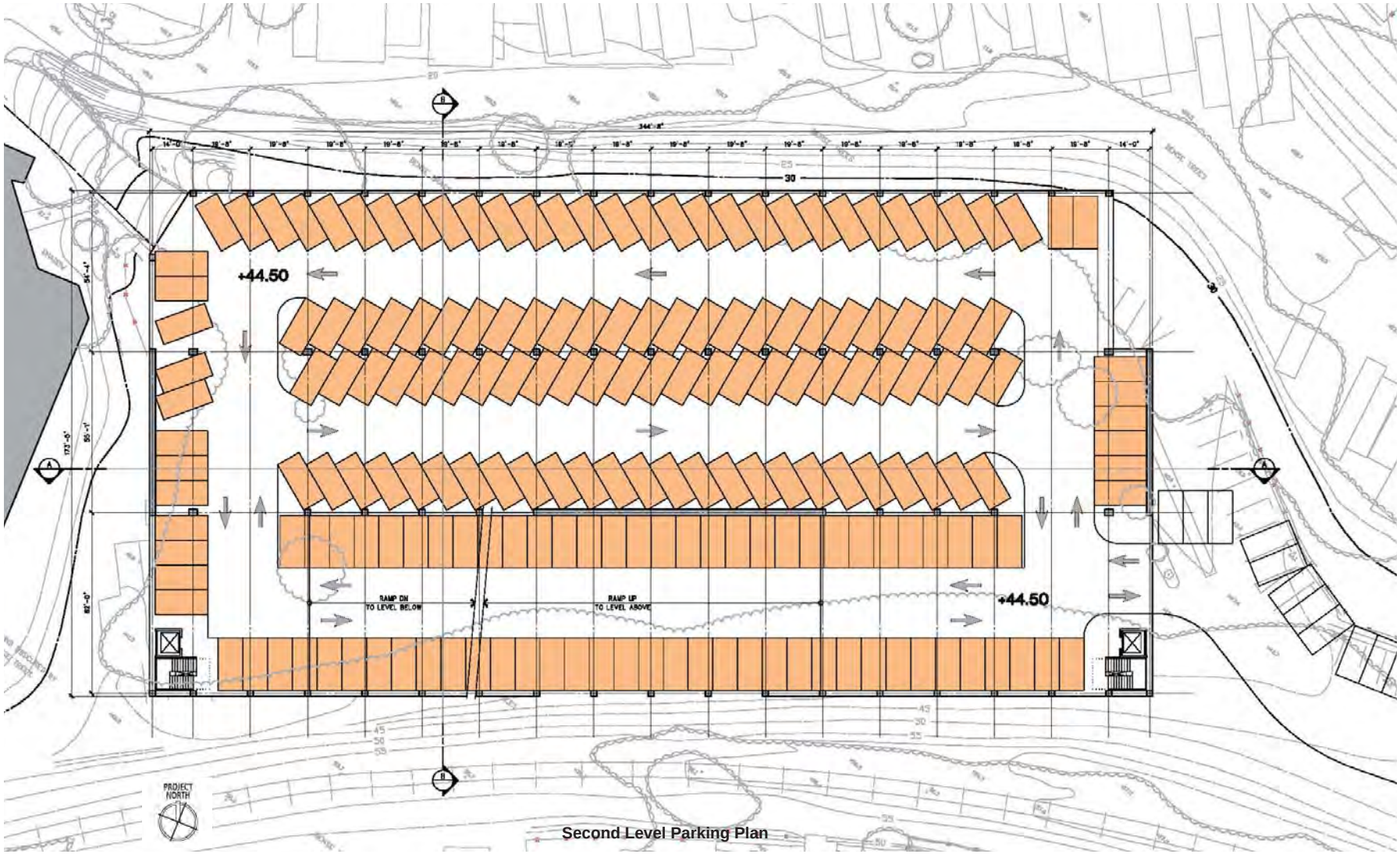
PROJECT NORTH

3 - LEVEL						
LEVEL	UNISTALL (8'-6" x 18'-0")	ACCESSIBLE (9'-0" x 18'-0")	VALET (8'-0" x 18'-0")	TOTAL	AREA (SQ.FT.)	SQ. FT. / STALL
Level 3	170	0	0	170	52,900	311
Level 2	189	0	0	189	58,900	312
Level G	162	10	0	172	56,500	328
TOTAL	521	10	0	531	168,300	317

Levels G & 2	351	10	0	361	115,400	320
Level 3 w/ Valet	95	0	101	196	52,900	270
TOTAL	446	10	101	557	168,300	302

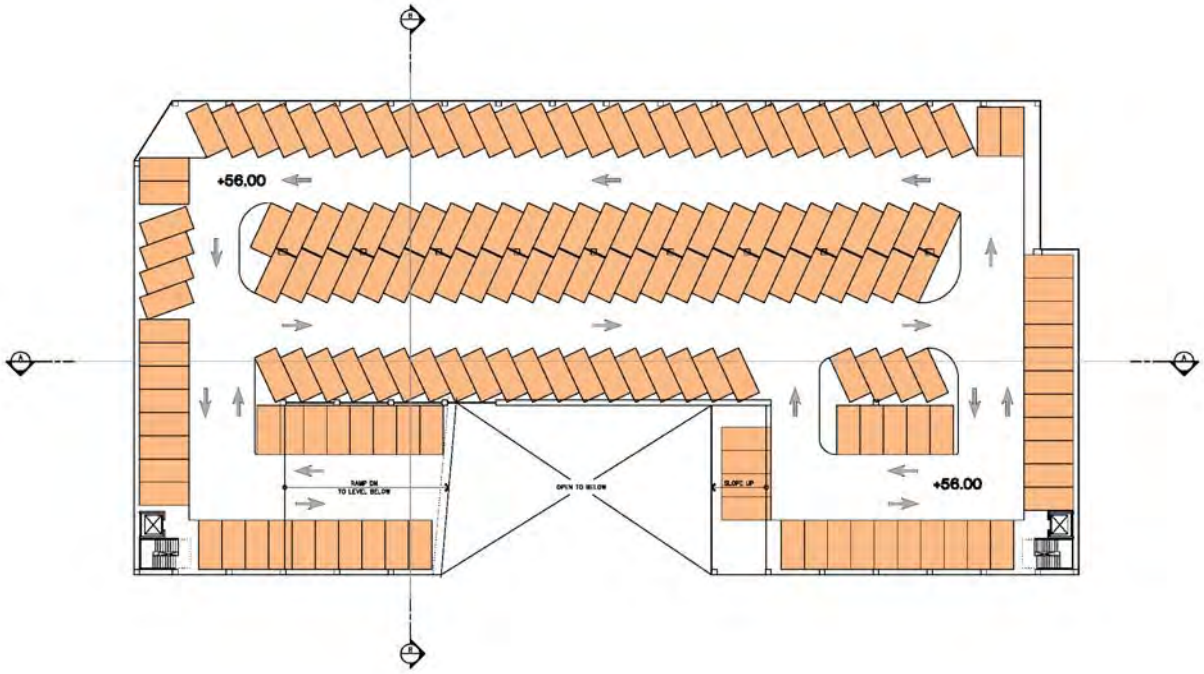
+23 ADDITIONAL STALLS ON-GRADE, GRAND TOTAL ON SITE: 554

NET NEW STALLS: 554 - 234 (E) = 320



Second Level Parking Plan

Not to Scale



PROJECT NORTH

THIRD LEVEL PARKING PLAN

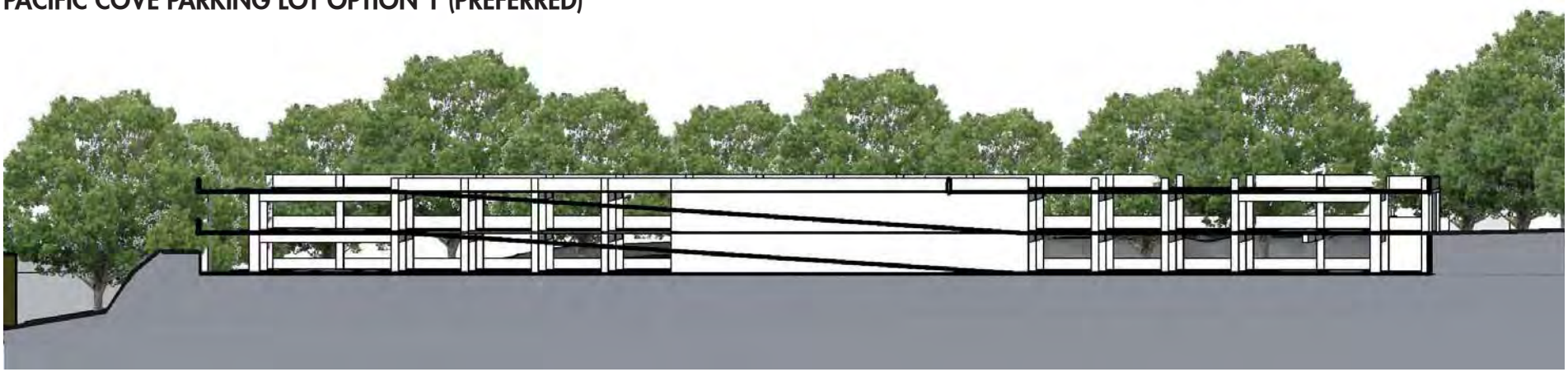
Not to Scale

PROJECT NORTH

THIRD LEVEL PARKING PLAN

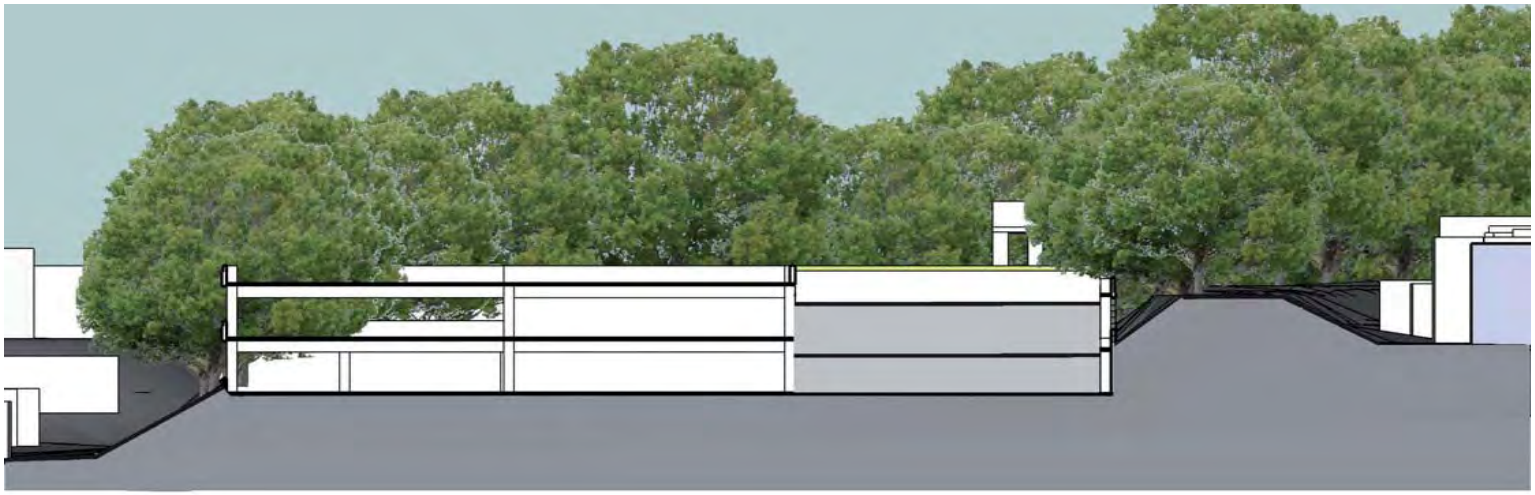
Not to Scale

PACIFIC COVE PARKING LOT OPTION 1 (PREFERRED)



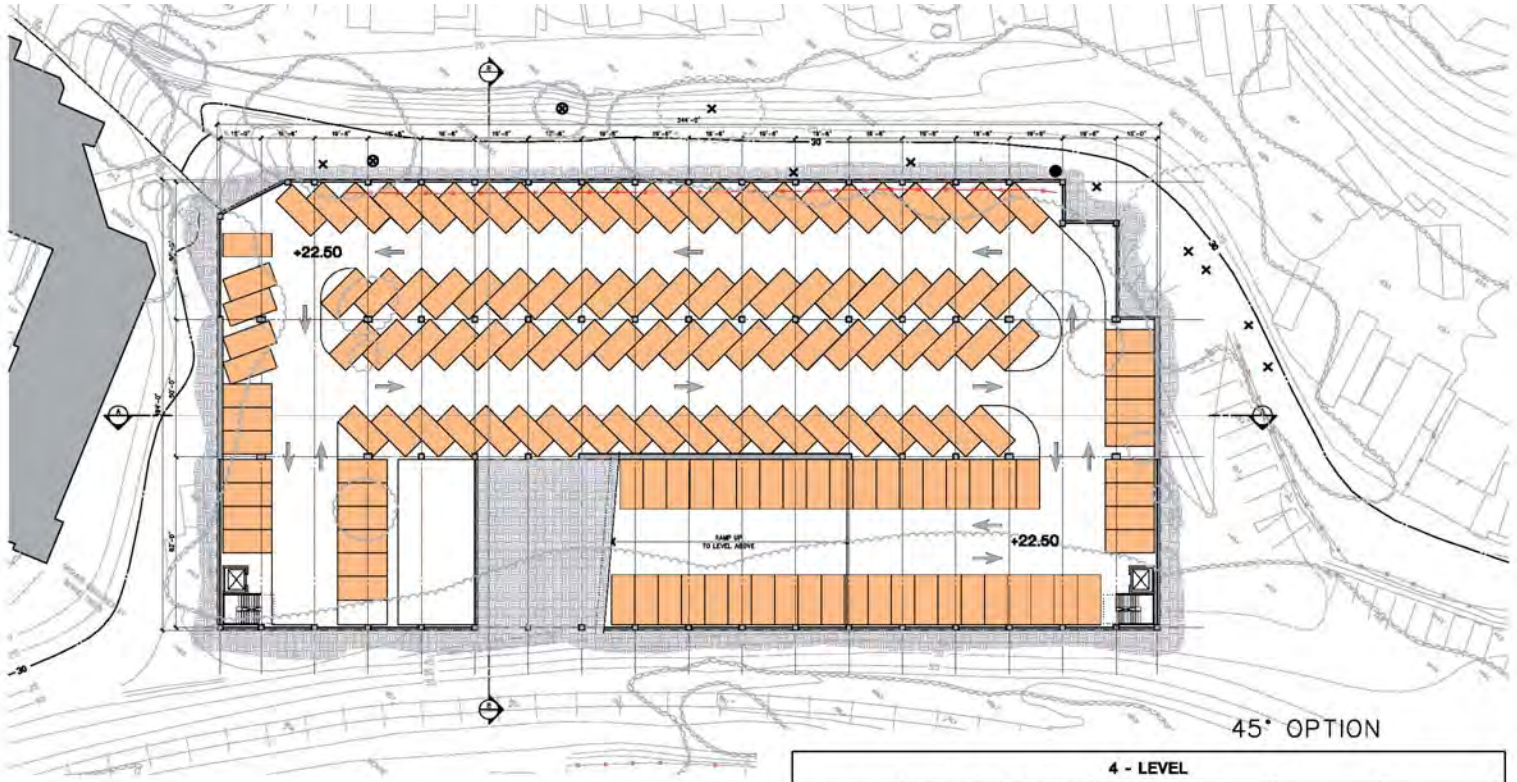
(City Hall) (Exit to Monterey Ave)

LONGITUDINAL SECTION - Option 1



(Pacific Cove Mobile Home Park) (Train Tracks)

TRANSVERSE SECTION - Option 1



BASEMENT LEVEL PARKING PLAN

SCALE : 1/16" = 1'-0"

Not to Scale

TREE LEGEND

⊗ INDICATES REDWOOD TREE

✕ INDICATES OAK TREE

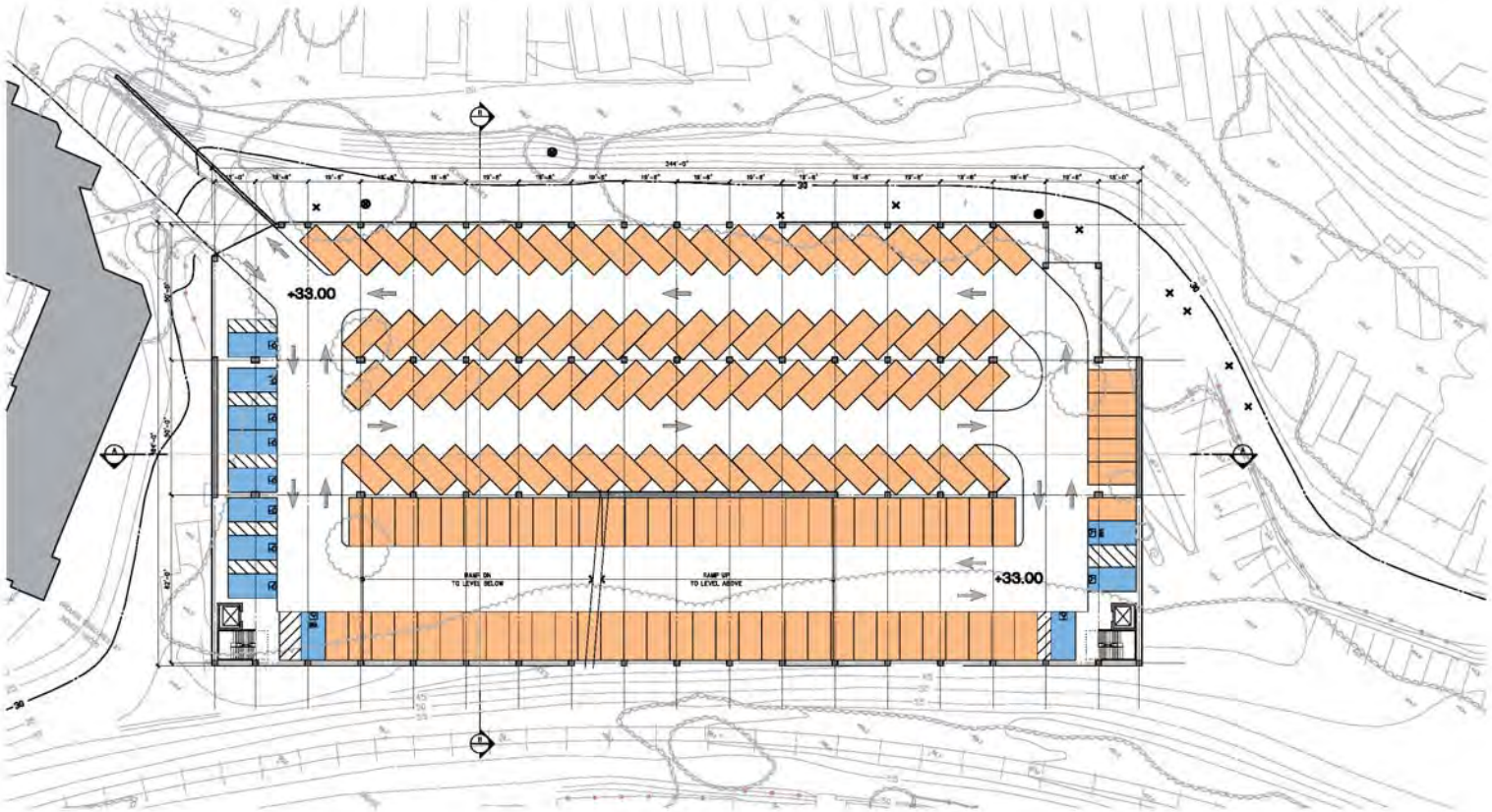
● INDICATES PINE TREE

PROJECT NORTH

4 - LEVEL						
LEVEL	UNISTALL (8'-6" x 18'-0")	ACCESSIBLE (9'-0" x 18'-0")	VALET (8'-0" x 16'-0")	TOTAL	AREA (SQ.FT.)	SQ. FT. / STALL
Level 3	163	0	0	163	49,100	301
Level 2	166	1	0	167	55,200	331
Level G	148	12	0	160	55,200	345
Basement	151	0	0	151	52,800	350
TOTAL	628	13	0	641	212,300	331
Levels G, 2 & 3	465	13	0	478	163,200	341
Level 3 w/ Valet	88	0	99	187	50,200	268
TOTAL	553	13	99	665	213,400	321

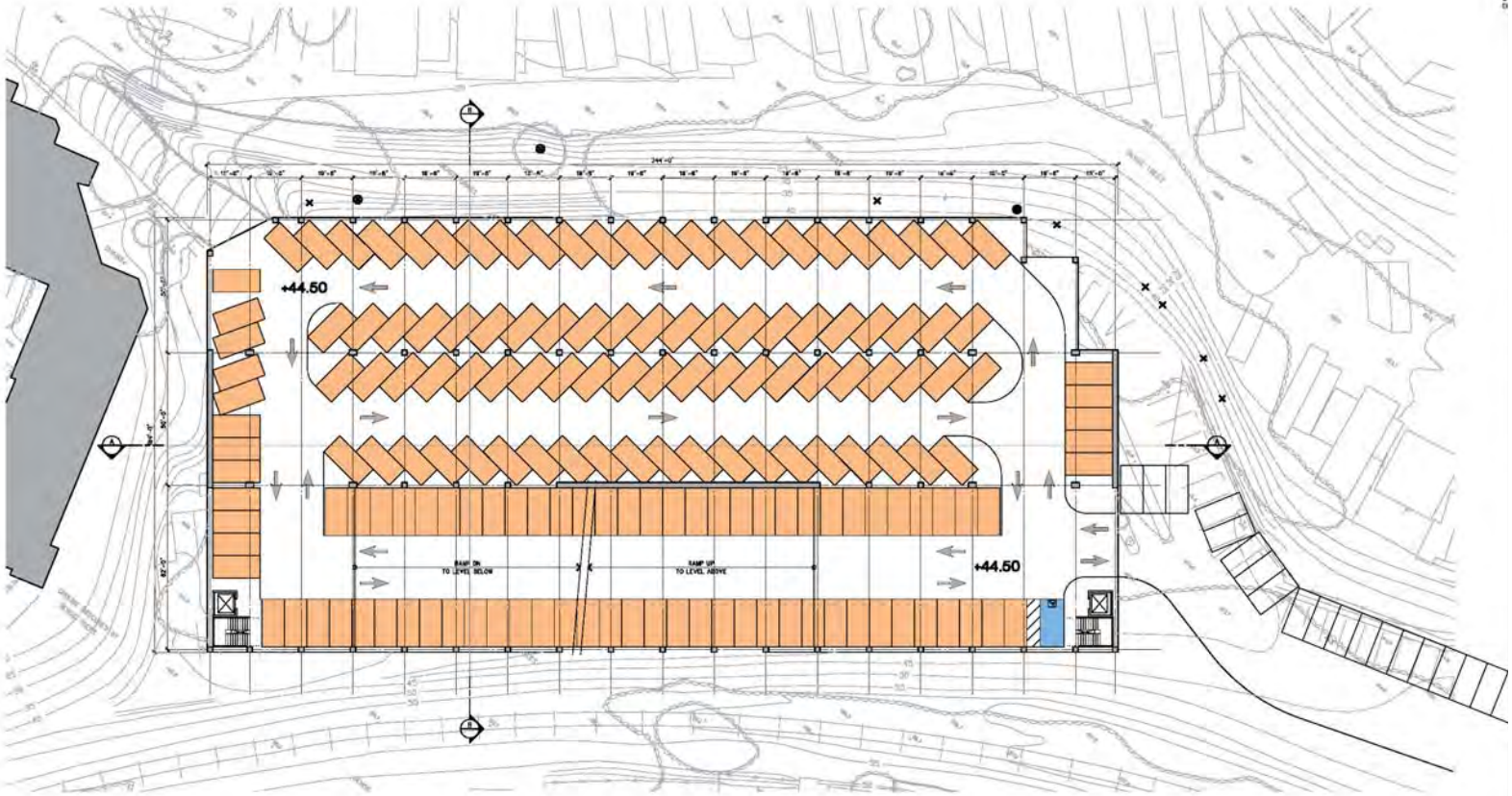
+23 ADDITIONAL STALLS ON-GRADE, GRAND TOTAL ON SITE: 664

NET NEW STALLS: 664 - 234 (E) = 430



GROUND LEVEL PARKING PLAN

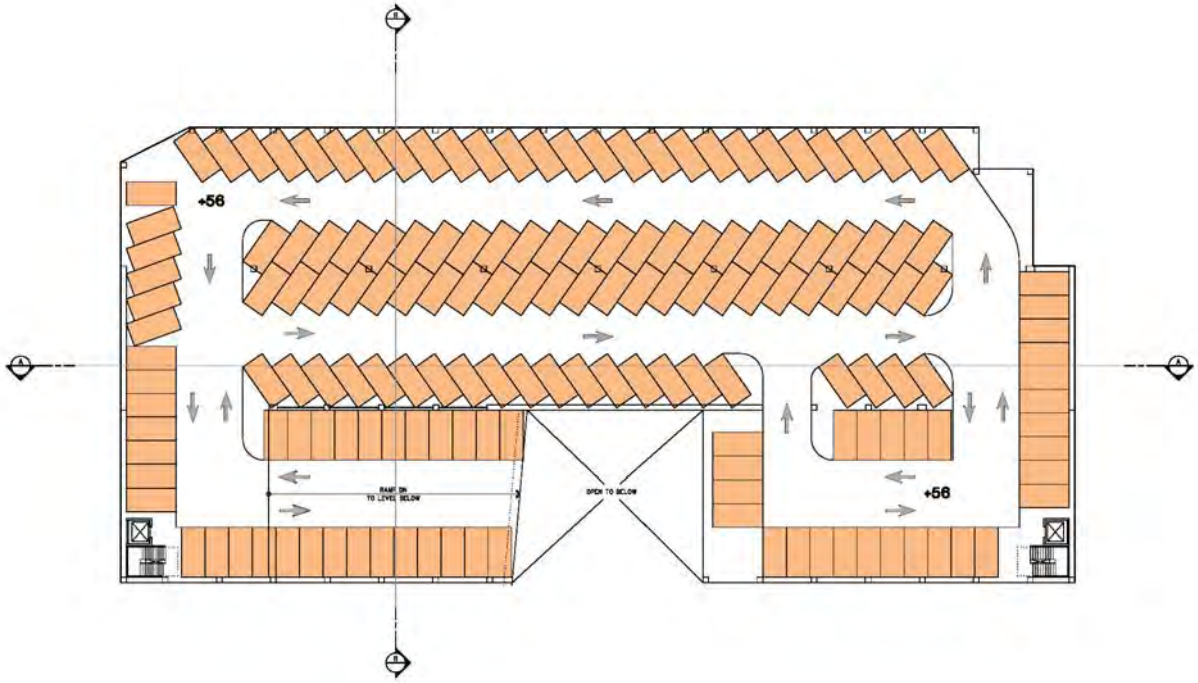
Not to Scale



PROJECT NORTH

SECOND LEVEL PARKING PLAN

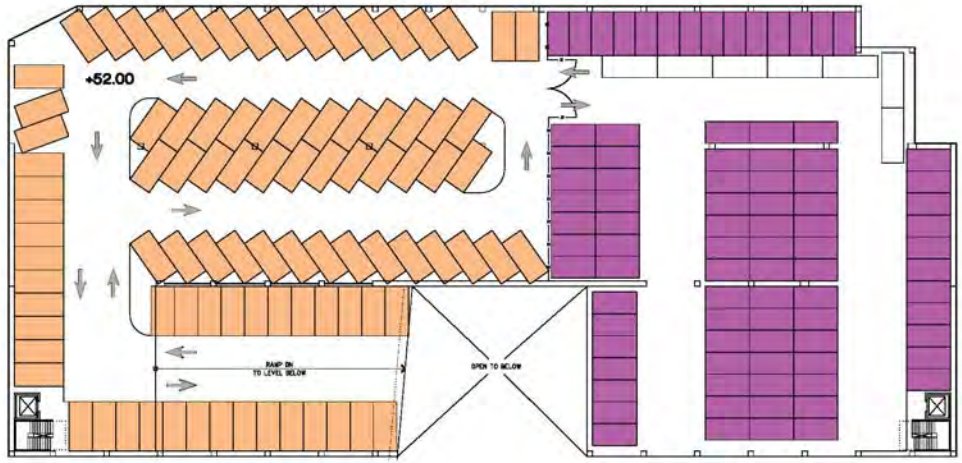
Not to Scale



PROJECT NORTH

THIRD LEVEL PARKING PLAN

Not to Scale



PROJECT NORTH

THIRD LEVEL PARKING PLAN

SCALE : 1/16" = 1'-0"

Not to Scale

(City Hall) (Exit to Monterey Ave)

LONGITUDINAL SECTION - Option 2

(Pacific Cove Mobile Home Park) (Train Tracks)

TRANSVERSE SECTION - Option 2

Chapter 3 - Master Plans and Visualization

Site Master Plans

The Site Master Plans illustrate how the parking structure can fit into the larger context of Capitola. The site is well suited as a location for parking to serve the downtown and beach areas and integrates well with the existing City offices. This development can be an opportunity to create a "gateway" element that announces the arrival at downtown Capitola. In addition to providing needed parking, it can improve the experience of visiting the downtown for both residents and out-of-town guests.

Adjacent Residential Areas

The parking structure is well buffered from adjacent residential properties. The raised railroad bed to the south forms a physical barrier separating the garage structure and the residential buildings to the south; the parking structure will be lower than the railroad bed. Its width allows for dense planting that will remain in place. The floor elevation of the structure is significantly higher than the mobile home community to the north and the hillside between them allows for planting of vegetation to screen views of the garage.

City Office Site

The parking structure's relationship to the City Office site was evaluated for access and for potential reuse. The viability of future commercial development was taken into consideration. Connections to the existing structure were planned to ensure convenient access and to provide ADA compliant routes for the disabled. Future modernization or reconstruction of the City Offices was considered, allowing for better vehicular circulation to the garage and orientation to make the City Offices a civic "gateway" element.

Vehicular Access

Existing street entrances will be maintained and enhanced for safety and ability to carry the necessary traffic. The west entrance road will be regraded to a flatter slope and its intersection with the driveway serving the mobile home community will be improved. Visibility and identification of the parking structure entries will be designed to improve wayfinding.

Pedestrian Access

Pedestrian routes connecting the parking with the downtown areas will be separated from the vehicular roadways to increase safety. The design will create a welcoming experience that creates a much stronger visual connection to downtown. A "boardwalk" path will lead from the elevator core to Capitola Avenue, passing under the railroad trellis to connect with the existing downtown sidewalk. This path will be constructed to provide ADA compliant access to the disabled and will created a well-landscaped amenity to the community.

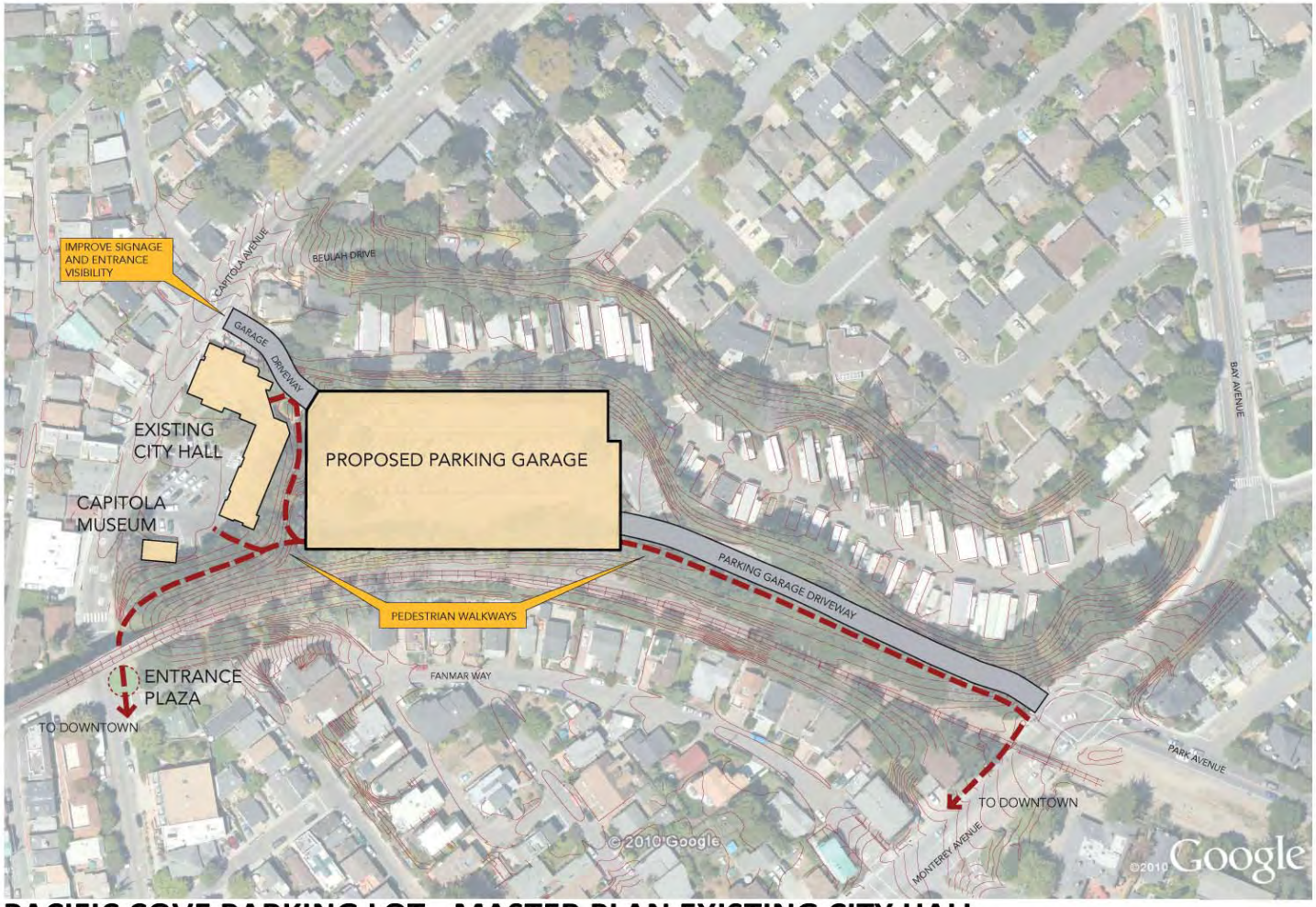
Visualization

The artist's sketch (page 23) illustrates the design characteristics of the new parking structure as it relates to the surrounding community. Viewed from above, the structure is well-buffered by foliage on all sides. As many existing trees as possible will be preserved. At street level, the parking structure is visible only at the three entrance points where design features will identify it and relate it to the architectural character of Capitola.

The existing City Offices are shown in the foreground. A pedestrian connection to the upper level will be maintained.

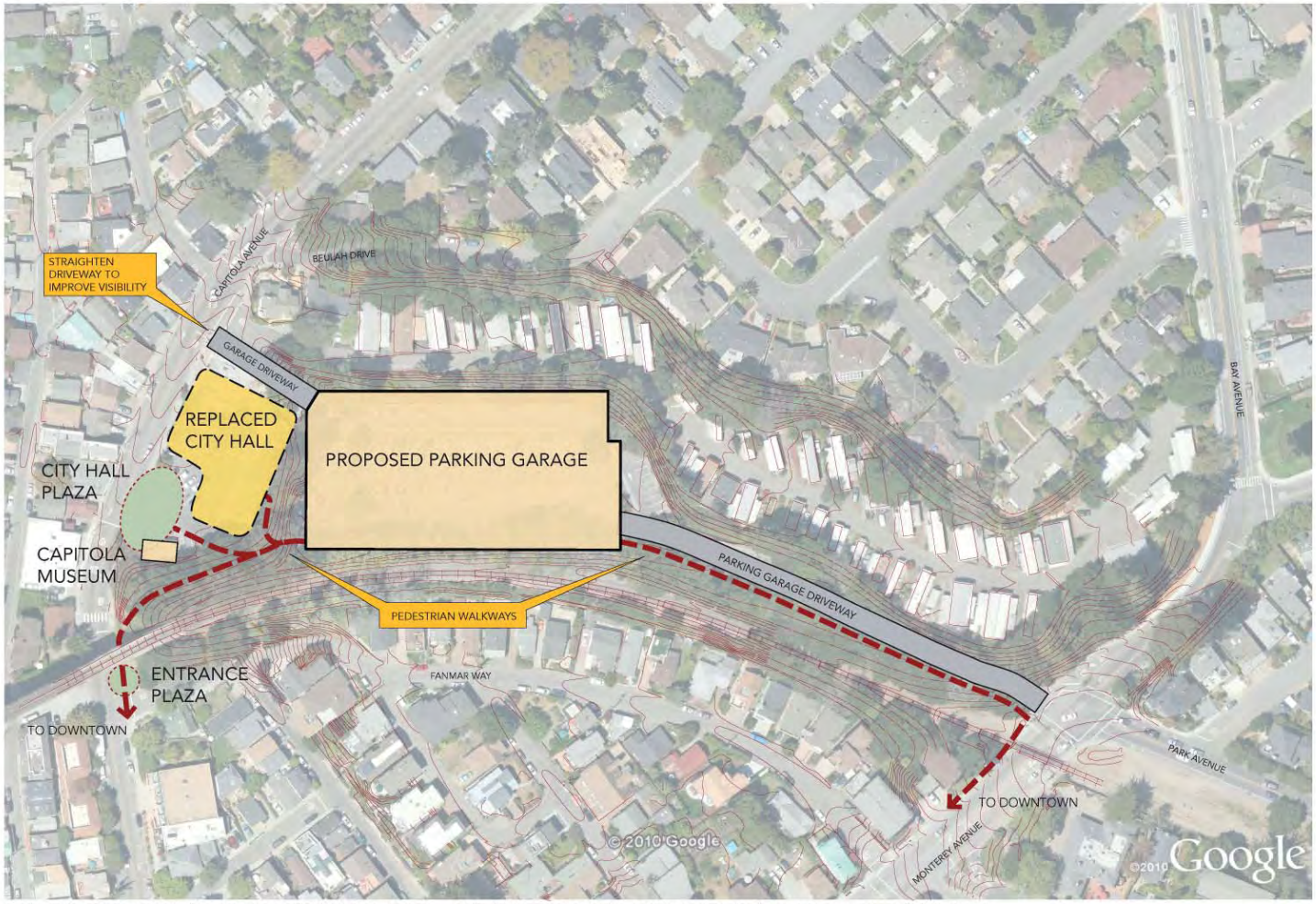
The driveway to the north of the City Offices will be widened to provide safer access and increase the view to the garage entrance, which will make it easy to identify.

The proposed boardwalk connection will traverse a landscaped hillside above the Museum and will pass beneath the trellis to improve the experience of walking from one's car to downtown.



PACIFIC COVE PARKING LOT - MASTER PLAN EXISTING CITY HALL

FIELD PAOLI



PACIFIC COVE PARKING LOT - MASTER PLAN REPLACED CITY HALL

FIELD PAOLI

WATRY DESIGN, INC.
Architects • Engineers • Parking Planners

FIELD PAOLI

Chapter 4 - Cost Analysis

Estimating Methodology

Please note that Watry Design developed it's database of unit costs from it's extensive experience working on similar parking structures. Recognizing that Watry Design has no control over the cost of materials, equipment, labor, or an individual contractor's method of determining prices, we cannot offer guarantees that the actual construction costs will not vary from this statement of opinion. These estimates are in 2010 dollars and include a 10% design contingency and 8% escalation costs. This would allow for approximately three years to start of construction. If construction on a structure is started later, costs would rise at approximately 4-6% per year. Depending on the timing of the construction bid, these unit costs may fluctuate. Construction costs assume a shallow foundation.

Soft costs may vary depending on the methodology of delivering the project. Soft costs generally would include full architectural and engineering services, soils report, site survey, ALTA report, title reports, permits and inspections, testing, traffic studies, construction management, and project management. We have included a 20% factor to cover soft costs(*). No land or financing costs have been included.

The costs assume mechanical ventilation and sprinklers only for levels completely below grade. The costs assume an architectural finish level above a standard parking structure in order to integrate the structure into the community.

As part of cost analysis, two program items that affect the cost were evaluated separately. We indicated the added cost for these program items on each option.

The first is the premium for upgrading the top deck of the parking structure to accommodate increased loading so that the possibility of using the top deck for something other than parking may be achieved. The typical parking structure is designed for 40 lbs/sf. Premium loading would increase this to 100 lbs/sf and allow for alternative uses, such as public gatherings.

The second is the premium for increasing the seismic importance factor. Currently, City police vehicles are parked on the surface lot next to City Hall. In some future scenarios, this parking may go away and it would be assumed that these vehicles may park in the parking structure. If these vehicles are first responding vehicles it may be considered important that the structure be designed above the base building code. The base building code only requires buildings to be designed to allow people to get out of the building prior to a possible collapse during a seismic event. While there is no such thing as an earthquake proof building, increasing the structural capacity of the seismic system provides a higher level of building protection. This is the same level of protection that Emergency Response Centers would be designed to. While the code does not mandate increasing the importance factor for first responding vehicles, we have provided this premium cost so that the City can make an informed decision on how to proceed.

We are also providing general order of magnitude costs for implementing the master plan scenario for a new City Hall.

Capitola Village Parking Structure Cost Estimates

Option 1

Construction Costs	$10,648,219
Soft Costs*	$2,129,644
Project Costs	**$12,777,863**

Optional Program Items:

Premium Loading	
Construction	**$823,843**
Soft Costs*	**$988,611**
Emergency Response Seismic Rating	
Construction	**$833,443**
Soft Costs*	**$1,000,131**

Option 2

Construction Costs	$15,677,725
Soft Costs*	$3,135,545
Project Costs	**$18,813,270**

Optional Program Items:

Premium Loading	
Construction	**$1,213,883**
Soft Costs*	**$1,456,660**
Emergency Response Seismic Rating	
Construction	**$1,229,457**
Soft Costs*	**$1,475,349**

Rebuild City Hall at Existing Site

Demo Existing City Hall	$106,000
New City Hall at same site	$4,712,500
Site Development around City Hall	$75,000
Temporary City Hall for 2 years	$420,000
Escalation	$410,680
Soft Costs*	$1,108,836
Project Cost	**$6,653,016**

For more detailed break down of these estimates please see the appendix.

APPENDIX

Appendix i

Detailed Opinions of Probable Construction Cost Options 1 and 2

City of Capitola Parking Structure
Opinion of Cost
Watry Design, Inc. job 09018

Parking Structure Option 1

Total Area	168,300 sf		Total Stall Count	554	
Elevated Area	109,400 sf		Structured Stalls	531	
On Grade Area	58,900 sf		Site Stalls	23	
Site Area	29,100 sf		Existing Stalls	234	

		Unit Cost	Quantity	Cost	SubTotal	add for 100 psf LL roof	add for I=1.5
Site					$ 606,610		
	Prep, grading, dewatering	$ 150,000	1	$ 150,000			
	Site Utilities	$ 100,000	1	$ 100,000			
	Retaining wall at NW	$ 75,000	1	$ 75,000			
	Site asphalt and parking	$ 5.00	20,370 sf	$ 101,850			
	Pedestrian Walkway	$ 150.00	500 lf	$ 75,000			
	Landscaping	$ 12.00	8,730 sf	$ 104,760			
Foundation					$ 1,178,100	$ 117,810	$ 294,525
	Shallow Foundation	$ 7.00	168,300 sf	$ 1,178,100			
Substructure					$ 634,900		
	Mass Excavation	$ 15.00	100 cy	$ 1,500			
	Shoring	$ 15.00	7,000 sf	$ 105,000			
	Slab on Grade	$ 6.00	58,900 sf	$ 353,400			
	Retaining Walls	$ 25.00	7,000 sf	$ 175,000			
Superstructure					$ 2,436,000		
	5" PT Concrete Decks	$ 12.00	109,400 sf	$ 1,312,800		$ 328,200	$ 262,560
	14x36 PT Beams	$ 4.00	109,400 sf	$ 437,600		$ 109,400	
	Curbs	$ 1.00	109,400 sf	$ 109,400			
	Shear Walls	$ 35.00	3,960 sf	$ 138,600			$ 69,300
	Columns	$ 4.00	109,400 sf	$ 437,600		$ 43,760	
Exterior Envelope					$ 1,086,800		
	Precast Rails	$ 200.00	2,068 lf	$ 413,600			
	Exterior Paint, finish	$ 1.50	168,300 sf	$ 252,450			
	Misc. Architecture	$ 2.50	168,300 sf	$ 420,750			
Interior Const					$ 420,750		
	Rails, doors, paint	$ 2.50	168,300 sf	$ 420,750			
Conveying					$ 380,000		
	Stairs	$ 20,000	4	$ 80,000		$ 20,000	
	Elevator	$ 150,000	2	$ 300,000			
Mechanical					$ -		
	Mechanical Ventilation	$ 2.00	0 sf	$ -			
Plumbing					$ 199,850		
	Plumbing	$ 0.75	168,300 sf	$ 126,225			
	Fire Protection	$ 1.25	58,900 sf	$ 73,625			
Electrical					$ 673,200		
	Electrical and Lighting	$ 4.00	168,300 sf	$ 673,200			
Equipment					$ 50,000		
	Pay by Space	$ 50,000	1	$ 50,000			
Misc. Costs					$ 336,600		
	Misc. Project Costs	$ 2.00	168,300 sf	$ 336,600			
	Total			$ 8,002,810	$ 8,002,810	$ 619,170	$ 626,385
	Design Contingency	10%	$ 800,281	$ 8,803,091	check		
	Escalation	8%	$ 704,247	$ 9,507,338	ok		
	Overhead, Profit, Insurance and GCs	12%	$ 1,140,881	$ 10,648,219			
						$ 823,843	$ 833,443

Construction Cost Total		**$ 10,648,219**	
	$	20,053	per struct stall
	$	63	per total sf
	$	19,221	per total stall
	$	33,276	per net new
Design Fees	10%	$ 1,064,822	
Construction Management	1%	$ 106,482	
Inspection	2%	$ 212,964	
Project Management	2%	$ 212,964	
Permits, Fees, Insurance	3%	$ 319,447	
Miscellaneous	2%	$ 212,964	
Financing and Land Costs	Not Included		$ 988,611 $ 1,000,131
Project Cost Total		**$ 12,777,863**	
	$	24,064	per struct stall
	$	76	per total sf
	$	23,065	per total stall
	$	39,931	per net new

Option 1

	Construction	Project
Cost add to allow 100psf LL at roof	$ 823,843	$ 988,611
Cost add to allow I=1.5 seismic	$ 833,443	$ 1,000,131

City of Capitola Parking Structure
Opinion of Cost
Watry Design, Inc. job 09018

Parking Structure Option 2

Total Area	212,300 sf		Total Stall Count	664	
Elevated Area	157,100 sf		Structured Stalls	641	
On Grade Area	55,200 sf		Site Stalls	23	
Site Area	32,800 sf		Existing Stalls	234	

		Unit Cost	Quantity	Cost	SubTotal	add for 100 psf LL at roof	add for I=1.5
Site					$ 943,520		
	Prep, grading, dewatering	$ 500,000	1	$ 500,000			
	Site Utilities	$ 100,000	1	$ 100,000			
	Retaining wall at NW	$ 75,000	1	$ 75,000			
	Site asphalt and parking	$ 5.00	22,960 sf	$ 114,800			
	Pedestrian Walkway	$ 150.00	500 lf	$ 75,000			
	Landscaping	$ 8.00	9,840 sf	$ 78,720			
Foundation					$ 1,910,700	$ 191,070	$ 477,675
	Shallow Foundation	$ 9.00	212,300 sf	$ 1,910,700			
Substructure					$ 1,795,907		
	Mass Excavation	$ 15.00	26,578 cy	$ 398,667			
	Shoring	$ 20.00	20,000 sf	$ 400,000			
	Slab on Grade	$ 6.00	55,200 sf	$ 331,200			
	Waterproofing	$ 5.00	13,208 sf	$ 66,040			
	Retaining Walls	$ 30.00	20,000 sf	$ 600,000			
Superstructure					$ 3,437,700		
	5" PT Concrete Decks	$ 12.00	157,100 sf	$ 1,885,200		$ 471,300	$ 377,040
	14x36 PT Beams	$ 4.00	157,100 sf	$ 628,400		$ 157,100	
	Curbs	$ 1.00	157,100 sf	$ 157,100			
	Shear Walls	$ 35.00	3,960 sf	$ 138,600			$ 69,300
	Columns	$ 4.00	157,100 sf	$ 628,400		$ 62,840	
Exterior Envelope					$ 952,800		
	Precast Rails	$ 200.00	2,032 lf	$ 406,400			
	Exterior Paint, finish	$ 1.50	157,100 sf	$ 235,650			
	Misc. Architecture	$ 2.50	124,300 sf	$ 310,750			
Interior Const					$ 530,750		
	Rails, doors, paint	$ 2.50	212,300 sf	$ 530,750			
Conveying					$ 470,000		
	Stairs	$ 20,000	6	$ 120,000		$ 30,000	
	Elevator	$ 175,000	2	$ 350,000			
Mechanical					$ 110,400		
	Mechanical Ventilation	$ 2.00	55,200 sf	$ 110,400			
Plumbing					$ 297,225		
	Plumbing	$ 0.75	212,300 sf	$ 159,225			
	Fire Protection	$ 1.25	110,400 sf	$ 138,000			
Electrical					$ 849,200		
	Electrical and Lighting	$ 4.00	212,300 sf	$ 849,200			
Equipment					$ 60,000		
	Pay by Space	$ 60,000	1	$ 60,000			
Misc. Costs					$ 424,600		
	Misc. Project Costs	$ 2.00	212,300 sf	$ 424,600			
	Total			$ 11,782,802	$ 11,782,802	$ 912,310	$ 924,015
	Design Contingency	10%	$ 1,178,280	$ 12,961,082	check		
	Escalation	8%	$ 1,036,887	$ 13,997,968	OK		
	Overhead, Profit, Insurance and GCs	12%	$ 1,679,756	$ 15,677,725		$ 1,213,883	$ 1,229,457

Construction Cost Total			**$ 15,677,725**	
			$ 24,458	per struct stall
			$ 74	per total sf
			$ 23,611	per total stall
			$ 36,460	per net new
Design Fees	10%	$ 1,567,772		
Construction Management	1%	$ 156,777		
Inspection	2%	$ 313,554		
Project Management	2%	$ 313,554		
Permits, Fees, Insurance	3%	$ 470,332		
Miscellaneous	2%	$ 313,554		
Financing and Land Costs		Not Included	$ 1,456,660	$ 1,475,349
Project Cost Total			**$ 18,813,270**	
			$ 29,350	per struct stall
			$ 89	per total sf
			$ 28,333	per total stall
			$ 43,752	per net new

Option 2

	Construction	Project
Cost add to allow 100psf LL at roof	$ 1,213,883	$ 1,456,660
Cost add to allow I=1.5 seismic	$ 1,229,457	$ 1,475,349

Appendix ii

Initial Options A-E

Parking Structure for City of Capitola
Capitola, CA

STALL/ COST SUMMARY 9'-0" x 18'-0" STALLS

	TOTAL STALLS	TOTAL SQ. FT.	SQ. FT./STALL	NET NEW STALLS	TOTAL STALLS W/ VALET	NET NEW STALLS W/ VALET	Construction COST	COST/STALL no valet	COST/NET NEW STALL no valet	COST/SQ. FT
OPTION A	477	171,200	359	268	501	292	$10,500,000	$22,013	$39,179	$61
OPTION B	469	171,200	365	260	501	292	$12,800,000	$27,292	$49,231	$75
OPTION C	501	166,600	333	292	518	309	$10,000,000	$19,960	$34,247	$60
OPTION D	501	166,600	333	292	517	308	$12,300,000	$24,551	$42,123	$74

STALL/ COST SUMMARY 8'-6" x 18'-0" STALLS

	TOTAL STALLS	TOTAL SQ. FT.	SQ. FT./STALL	NET NEW STALLS	TOTAL STALLS W/ VALET	NET NEW STALLS W/ VALET	Construction COST	COST/STALL no valet	COST/NET NEW STALL no valet	COST/SQ. FT
OPTION A	508	171,200	337	299	551	342	$10,500,000	$20,669	$35,117	$61
OPTION B	508	171,200	337	299	551	342	$12,800,000	$25,197	$42,809	$75
OPTION C	550	166,600	303	341	565	356	$10,000,000	$18,182	$29,326	$60
OPTION D	550	166,600	303	341	565	356	$12,300,000	$22,364	$36,070	$74
OPTION E	530	173,100	327	321	547	338	$10,200,000	$19,245	$31,776	$59

232	Existing stalls in the lot
23	Remaining on grade stalls

NOTE: COSTS DO NOT INCLUDE PREMIUM FOR ESSENTIAL SERVICES PARKING

GROUND LEVEL PARKING PLAN
SCALE : 1/16" = 1'-0"

SUMMATION CHART					
LEVEL	UNISTALL (9'-0" x 18'-0")	ACCESSIBLE (9'-0" x 18'-0")	TOTAL	AREA (SQ.FT.)	SQ. FT. / STALL
Level 4	125	0	125	41,600	333
Level 3	119	0	119	44,400	373
Level 2	115	1	116	44,400	383
Level G	109	8	117	41,600	356
TOTAL	468	9	477	172,000	361
INCL VALET	501	9	510	171,200	336

WATRY DESIGN, INC.

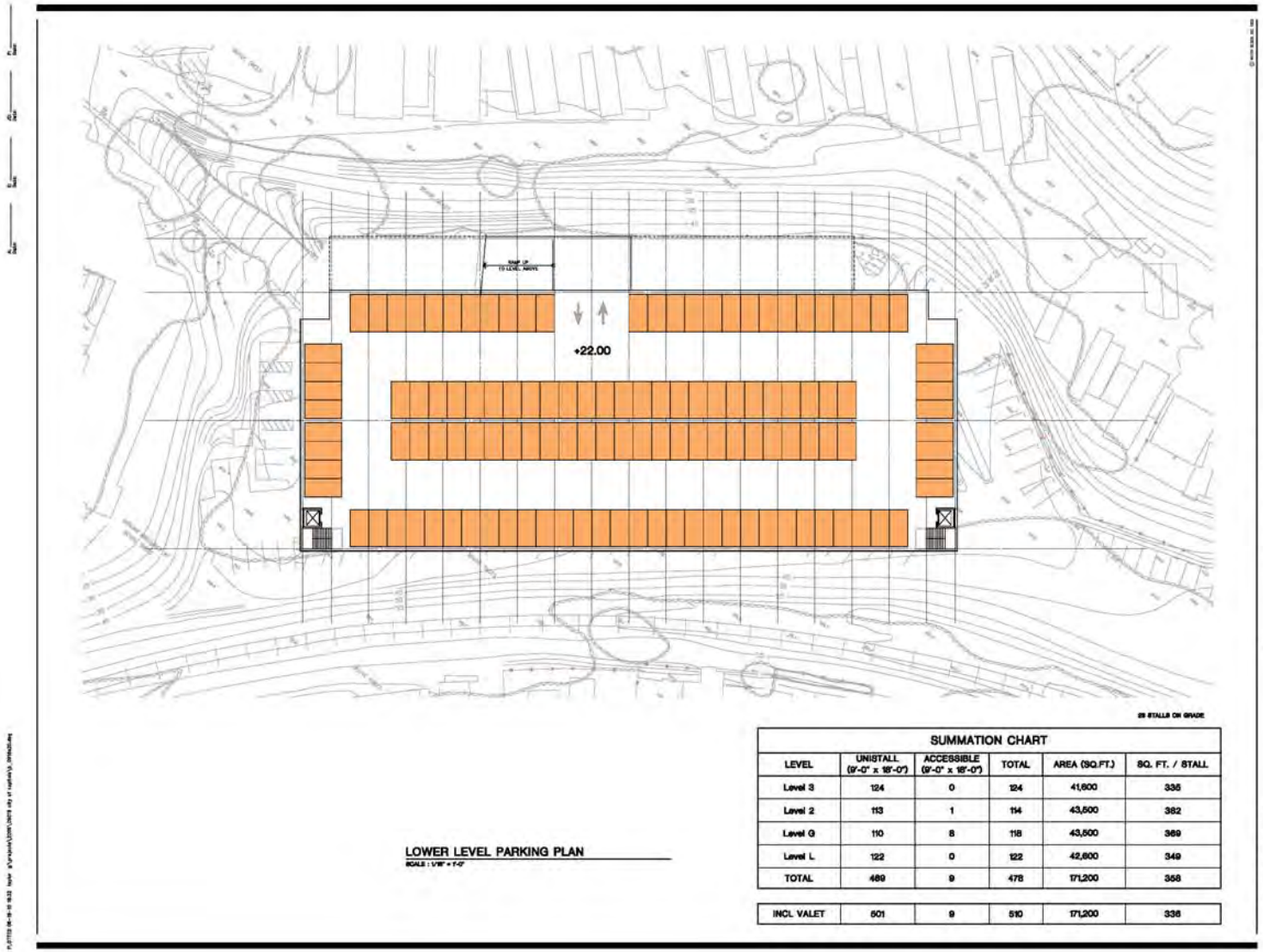
GROUND LEVEL PARKING PLAN

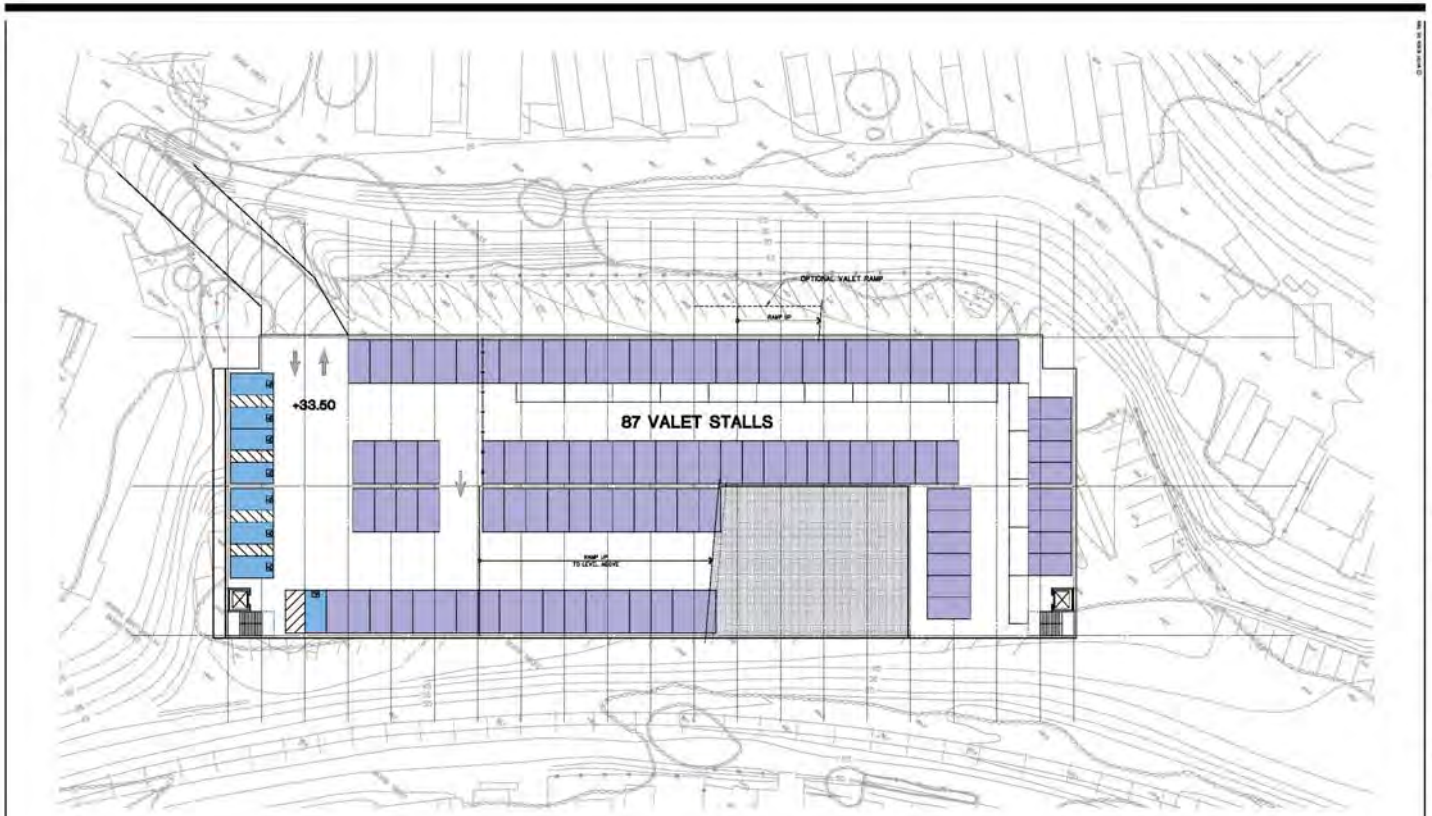
CITY OF CAPITOLA
PARKING STRUCTURE
CAPITOLA, CALIFORNIA

CONCEPT DESIGN

OPT A

A2.1


+22.00
LOWER LEVEL PARKING PLAN
SCALE : 1/16" = 1'-0"
SUMMATION CHART
LEVEL | UNISTALL (9'-0" x 18'-0") | ACCESSIBLE (9'-0" x 18'-0") | TOTAL | AREA (SQ.FT.) | SQ. FT. / STALL
Level 3 | 124 | 0 | 124 | 41,600 | 336
Level 2 | 113 | 1 | 114 | 43,500 | 382
Level G | 110 | 8 | 118 | 43,500 | 369
Level L | 122 | 0 | 122 | 42,600 | 349
TOTAL | 469 | 9 | 478 | 171,200 | 358
INCL VALET | 501 | 9 | 510 | 171,200 | 336
WATRY DESIGN, INC.
LOWER LEVEL PARKING PLAN
CITY OF CAPITOLA
PARKING STRUCTURE
CAPITOLA, CALIFORNIA
CONCEPT
DESIGN
OPT B
A2.0



GROUND LEVEL PARKING PLAN

SUMMATION CHART

LEVEL	UNISTALL (9'-0" x 18'-0")	ACCESSIBLE (9'-0" x 18'-0")	TOTAL	AREA (SQ.FT.)	SQ. FT. / STALL
Level 3	122	0	122	39,200	321
Level 2	140	1	141	44,200	313
Level G	135	2	137	44,200	323
Level L	104	8	112	39,000	348
TOTAL	501	11	512	166,600	325
INCL VALET	516	11	527	166,600	316

WATRY DESIGN, INC.

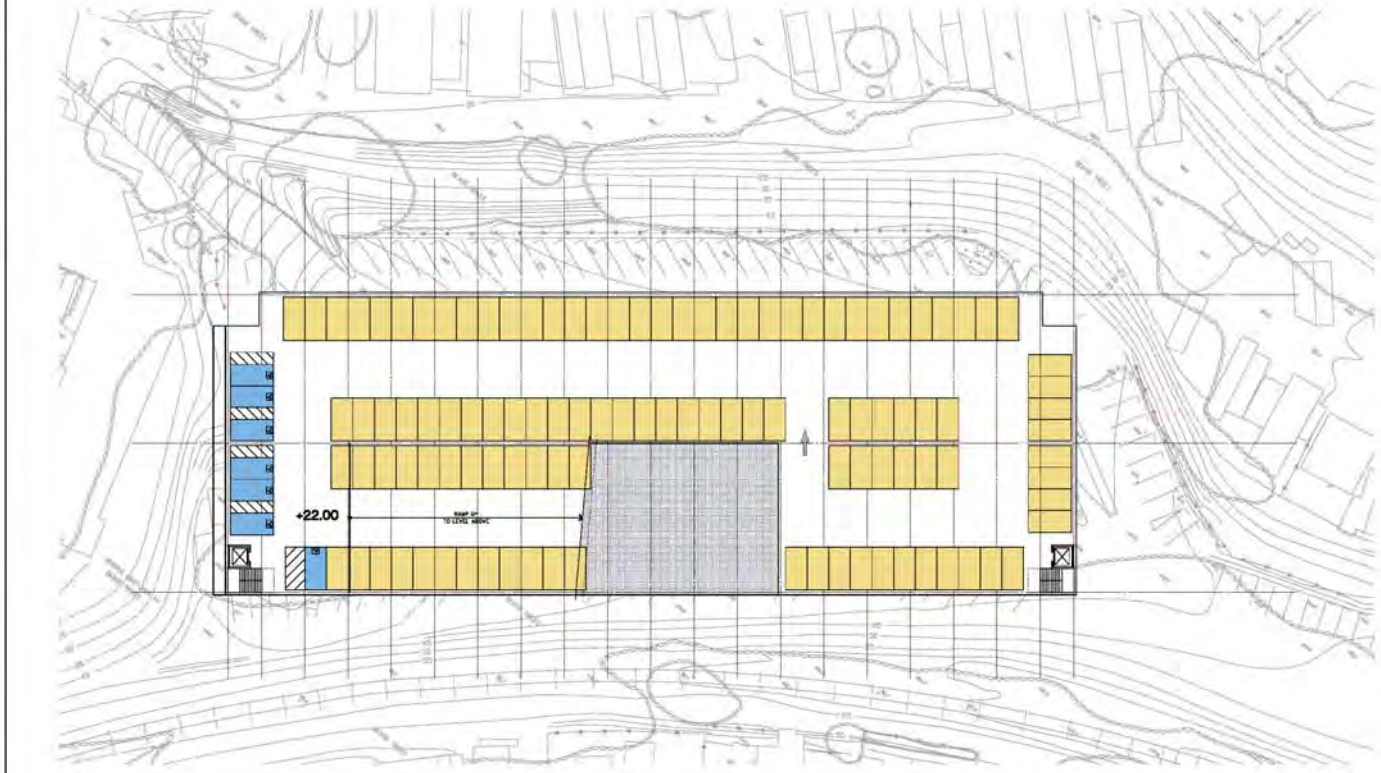
GROUND LEVEL PARKING PLAN

CITY OF CAPITOLA
PARKING STRUCTURE
CAPITOLA, CALIFORNIA

CONCEPT DESIGN

OPT C

SHEET
A2.1



LOWER LEVEL PARKING PLAN
SCALE : 1/16" = 1'-0"

SUMMATION CHART					
LEVEL	UNISTALL (9'-0" x 18'-0")	ACCESSIBLE (9'-0" x 18'-0")	TOTAL	AREA (SQ.FT.)	SQ. FT. / STALL
Level 3	121	0	121	39,200	324
Level 2	135	2	137	44,200	323
Level G	135	2	137	44,200	323
Level L	110	7	117	39,000	333
TOTAL	501	11	512	166,600	325
INCL VALET	517	11	528	166,600	316

WATRY DESIGN, INC.

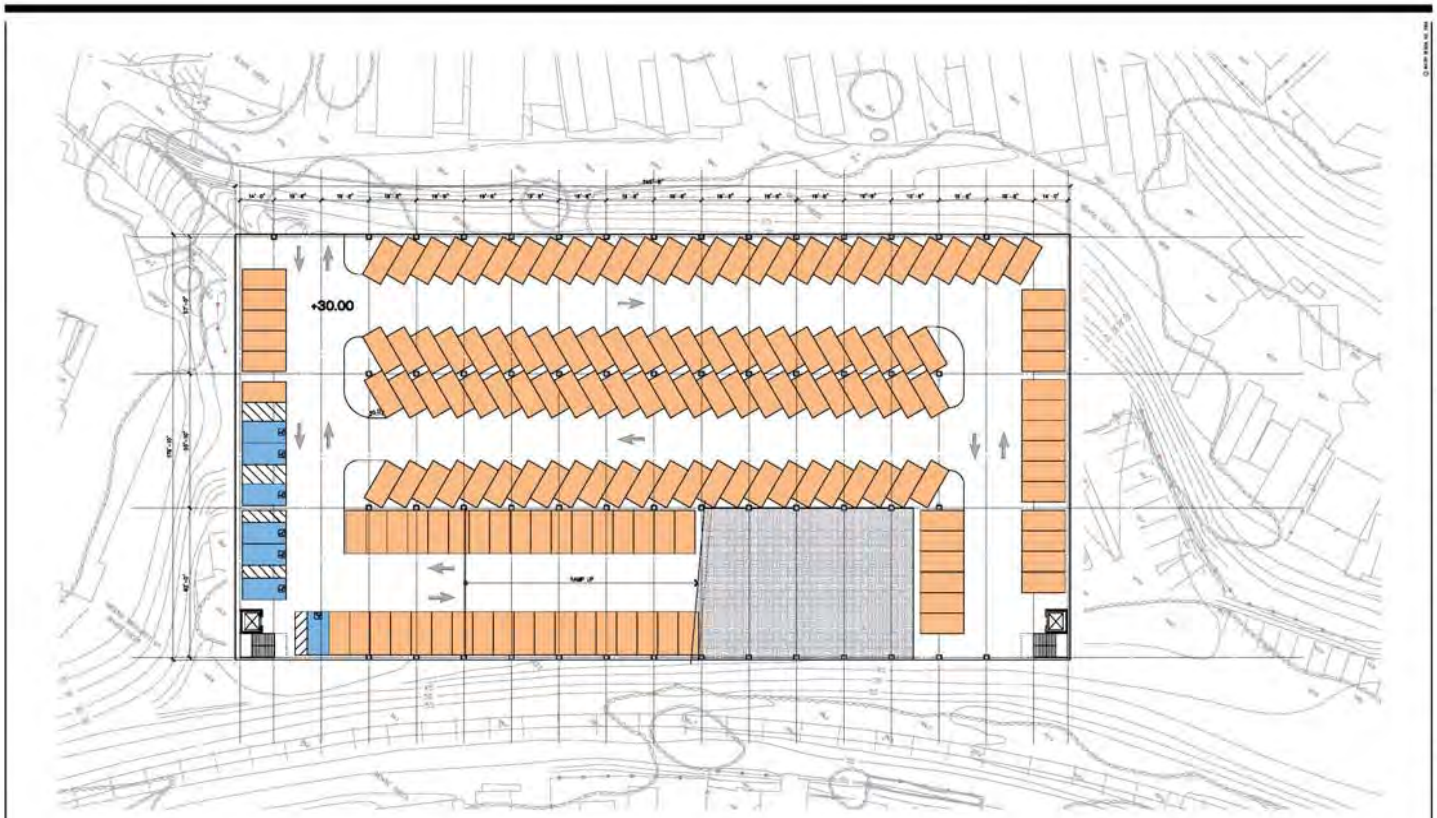
LOWER LEVEL PARKING PLAN

CITY OF CAPITOLA
PARKING STRUCTURE
CAPITOLA, CALIFORNIA

CONCEPT DESIGN

OPT D

A2.0



GROUND LEVEL PARKING PLAN

SCALE : 1/16" = 1'-0"

33 STALLS ON GRADE

SUMMATION CHART

LEVEL	UNISTALL (8'-6" x 18'-0")	ACCESSIBLE (9'-0" x 18'-0")	TOTAL	AREA (SQ.FT.)	SQ. FT. / STALL
Level 3	170	0	170	56,400	332
Level 2	190	2	192	61,200	319
Level G	161	7	168	55,500	330
TOTAL	521	9	530	173,100	327
INCL VALET	538	9	547	173,100	317

WATRY DESIGN, INC.

GROUND LEVEL PARKING PLAN

CITY OF CAPITOLA PARKING STRUCTURE

CAPITOLA, CALIFORNIA

CONCEPT DESIGN

OPT E

JOB NO : 0908

DATE : 06-23-10

DESIGN : CHOE

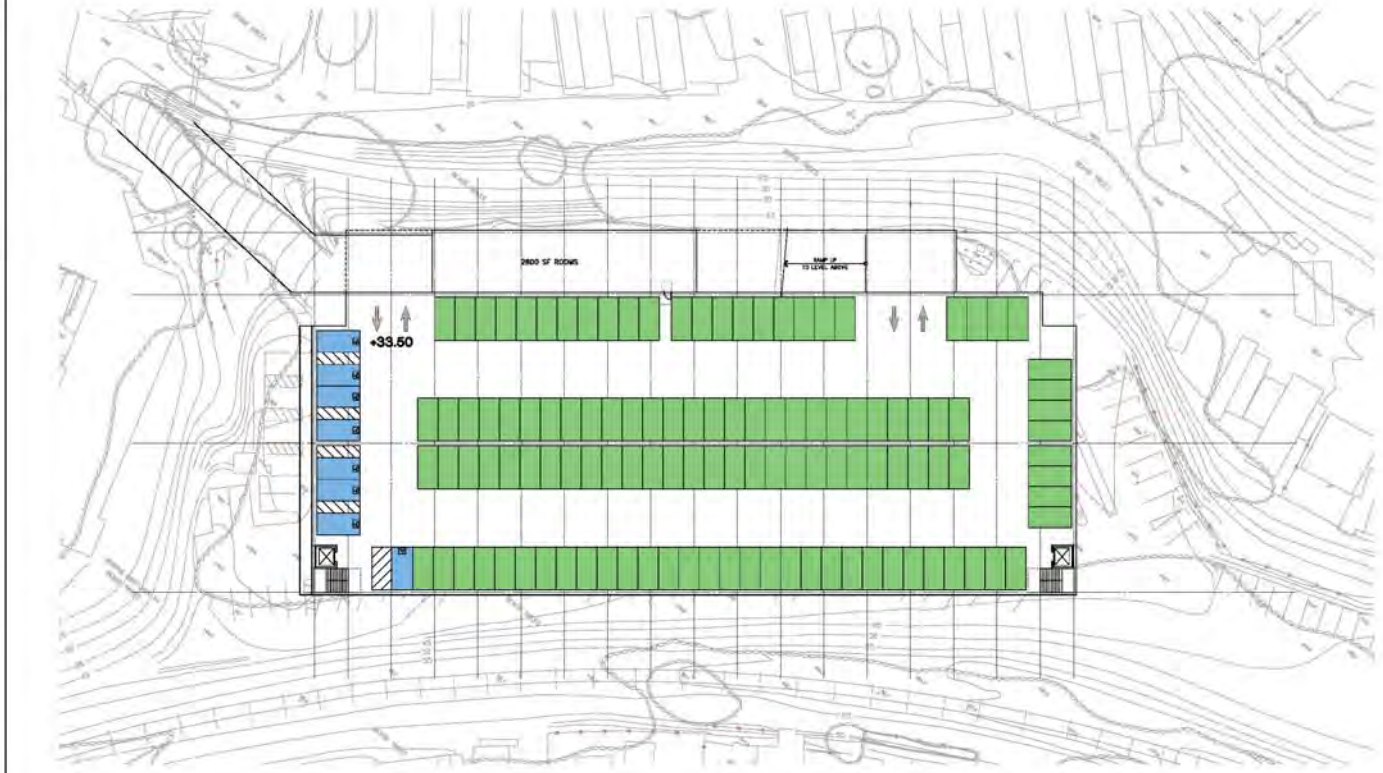
DRAWN : CHOE

CHECKED BY : WENDLER

FILE NAME : E_GRSA2

SHEET

A2.1



GROUND LEVEL PARKING PLAN

SUMMATION CHART					
LEVEL	UNISTALL (8'-6" x 18'-0")	ACCESSIBLE (9'-0" x 18'-0")	TOTAL	AREA (SQ.FT.)	SQ. FT. / STALL
Level 4	135	0	135	41,600	308
Level 3	126	1	127	44,400	350
Level 2	120	2	122	44,400	364
Level G	116	8	124	41,600	335
TOTAL	497	11	508	172,000	339
INCL VALET	540	11	551	171,200	311

WATRY DESIGN, INC.

GROUND LEVEL PARKING PLAN

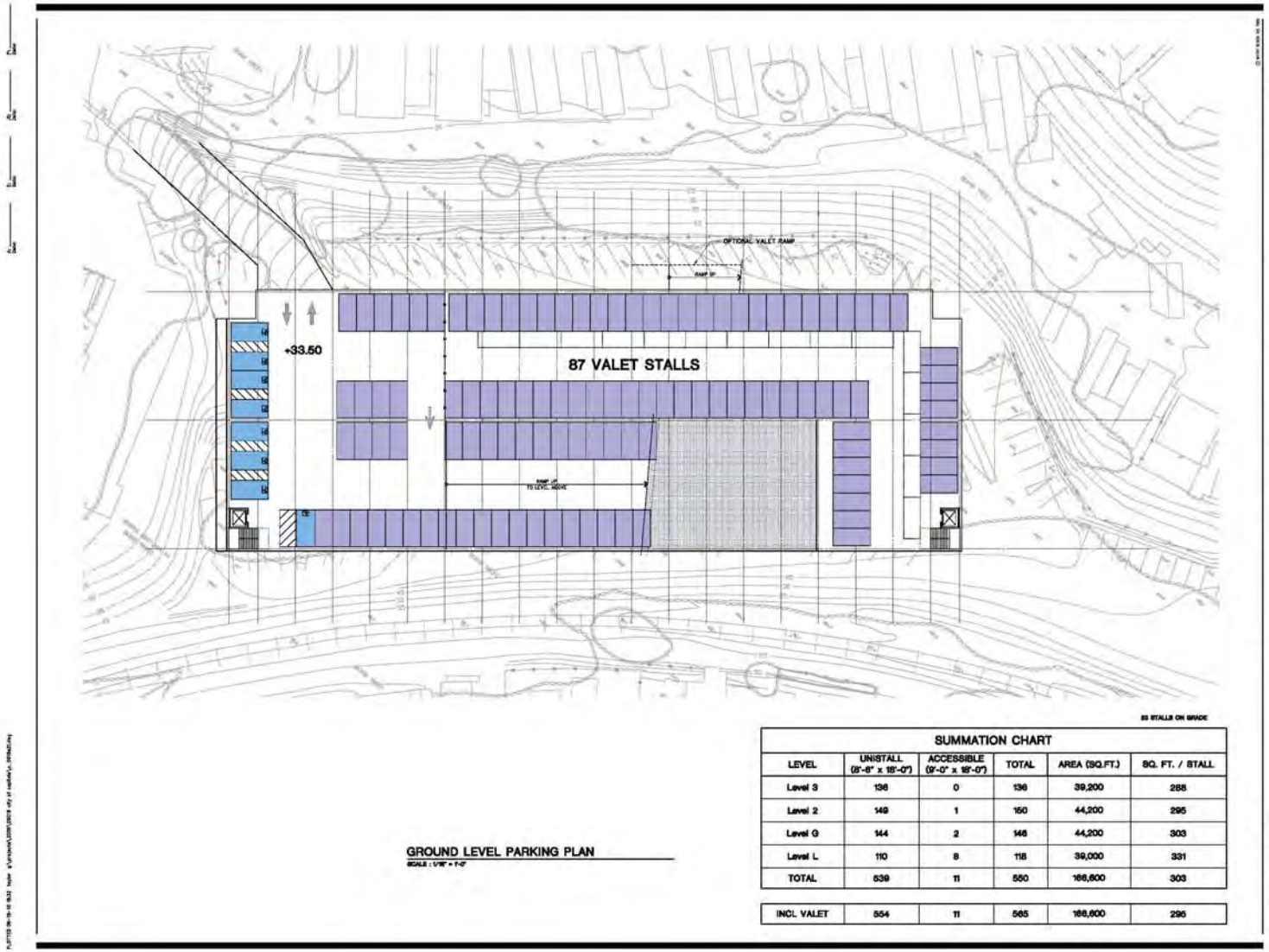
CITY OF CAPITOLA PARKING STRUCTURE

CAPITOLA, CALIFORNIA

CONCEPT DESIGN

OPT A2

A2.1


OPTIONAL VALET RAMP
RAMP UP
+33.50
87 VALET STALLS
RAMP UP TO LEVEL ABOVE
89 STALLS ON GRADE
GROUND LEVEL PARKING PLAN
SCALE : 1/16" = 1'-0"
SUMMATION CHART
LEVEL | UNISTALL (8'-6" x 18'-0") | ACCESSIBLE (9'-0" x 18'-0") | TOTAL | AREA (SQ.FT.) | SQ. FT. / STALL
Level 3 | 136 | 0 | 136 | 39,200 | 288
Level 2 | 149 | 1 | 150 | 44,200 | 295
Level G | 144 | 2 | 146 | 44,200 | 303
Level L | 110 | 8 | 118 | 39,000 | 331
TOTAL | 539 | 11 | 550 | 166,600 | 303
INCL VALET | 554 | 11 | 565 | 166,600 | 295
WATRY DESIGN, INC.
GROUND LEVEL PARKING PLAN
CITY OF CAPITOLA PARKING STRUCTURE
CAPITOLA, CALIFORNIA
CONCEPT DESIGN
OPT C2
A2.1

City of Capitola

Traffic and Parking Commission

Report on Parking Expansion Alternatives

Approved by the Traffic and Parking Commission on April 14, 2010

Executive Summary

Over the past eight months the Traffic and Parking Commission for the City of Capitola has determined that the expansion of public parking inventory serving Capitola Village should be one of the City's highest priorities. The Commission has reviewed all the recent reports and studies completed by the City, and using the data contained in these reports made a determination on a range of spaces needed and a location for them.

Using the 2008 Parking Needs Analysis by RBF Consulting, which quantified the existing needs as a range between 176 – 390 parking spaces, the Commission identified and quantified future needs that could be foreseen now. These future needs included spaces for a Village Hotel and other new development, possibly creating an Esplanade pedestrian promenade, and providing parking for a valet parking program. The results of this work indicate that the City should aim to create 325 new parking spaces at a minimum, with a maximum need of 799.

The Commission believes any new parking should be developed in such a way as to reduce vehicles traveling through the Village. The new parking should intercept vehicles coming from Bay Avenue and Park Avenue, and be easy to find for the vehicles entering from Stockton Avenue. The parking should be within walking distance of the Village, but also provide some form of transport between the parking location and the Village. Given these parameters, the Commission further determined that the City owned Pacific Cove property, which currently consists of a public parking lot and the Pacific Cove Mobile Home Park, is the best location for parking expansion.

The Commission realizes that development of new parking spaces cannot be done in isolation. In addition to providing more parking for the Village, the Commission supports the development of programs that will improve parking systems and provide alternatives to the search for parking.

In addition, the Commission has reviewed the Village Parking Permit Program and has recommended minor changes to this program that will be sent to the Council separately. The Commission will also be undertaking a review of the Neighborhood Parking Permit Program.

It is important to note the Commission has focused on parking and not yet on circulation. The Commission realizes that traffic and circulation need to be analyzed as they exist in the Village now, and how they would be impacted by the expansion of spaces in Pacific Cove.

Background

The Traffic and Parking Commission was formed by the Capitola City Council by Resolution No. 3740 which was adopted on February 26, 2009. The Commission's charge is to develop short, medium, and long term plans for City Council consideration that address traffic and parking demands in the City by considering citywide traffic and parking improvements developed in various studies and reports provided to the City Council. Once these plans are in place, the Commission shall act as an advisor to the City Council on implementation of the plans and other duties requested by the Council.

The Commission is comprised of eleven community members representing differing interests in the City and the Village area. Currently the Commission is comprised of the following.

Ed Bottorff, Central Village Resident
Ron Burke, Planning Commission Representative
Carin Hanna, Village Business Owner
Linda Hanson, Appointee of Council Member Norton
Margaret Kinstler, Central Village Resident
Vicki Muse, Appointee of Council Member Begun
Anne Nicol, Appointee of Council Member Nicol
Molly Ording, Appointee of Council Member Storey
Jeanne Roddy, Pacific Cove Mobile Home Park Resident
Nels Westman, Appointee of Council Member Graves
Gary Wetsel, Village Business Owner

The Commission held its first meeting on June 10, 2009. The Commission normally meets on a monthly basis, but has been meeting twice a month in January, February, and March of 2010 in order to complete this report.

On September 9, 2010 the Commission adopted the following vision statement as a guide in their analysis of traffic and parking as it relates to Capitola Village.

A Traffic and Parking Commission vision is to address parking needs in the Central Village without increasing public parking in the Central Village; and any parking removed from the Central Village must be replaced in kind outside the Central Village.

On November 12, 2009 the Commission chair, Gary Wetsel, presented an oral report to the City Council that included the initial recommendations for parking expansion (see Attachment 1 for slide presentation). Following this report, the Commissioners continued to pursue more detailed information on these recommendations. The Commission therefore established the four sub-committees to track and gather more detailed information in key areas in support of the Commission's initial recommendations.

Established Sub-Committees

1. Parking Structure – to identify key elements, potential timetable and costs of a new multi-level parking structure at the Pacific Cove Parking Lot site.

2. Lower Pacific Cove Mobile Home Park Surface Parking – to identify key issues and estimate of cost of creating a surface level parking lot on the western portion of the mobile home park.

3. Hotel – to track and study key issues relating to traffic and parking relative to the proposed Village Hotel.

4. Transportation Links between Pacific Cove and the Central Village - to look for innovative ways to move people that would both be an attraction and encourage people to park at Pacific Cove rather than the Village.

Many of the details contained in the report were the results of the work of these sub-committees.

Introduction

Although there are times when parking is readily available in the Village, including the Pacific Cove Parking Lot, the existing parking supply does not meet the demands during peak periods. This shortage in parking is frustrating for residents, merchants and visitors alike. The beauty of Capitola Village makes it a primary destination for many. Neighboring communities such as Santa Cruz, Los Gatos, Monterey, Pacific Grove, and Carmel either provide free parking or readily accessible parking to their commercial areas. The City of Capitola must strive to do its best to improve the quality of the lives of residents, merchants, and visitors and make planning decisions based on peak demands.

To make Capitola Village sustainable it must be able to handle the influx of seasonal visitors who are currently the life's blood for merchants, while also encouraging locals to visit during the slower periods, providing a stable foundation. To meet both these demands it is necessary to provide parking in the Village that result in the following:

- Improving availability of parking for Village residents without off-street parking.
- Improving availability of parking for customers of Village merchants.
- Improving availability of parking for Village employees.
- Improving availability of parking for beach/Village visitors.
- Lessening impact of Village parking shortage on adjacent neighborhoods.

Recent trends show that more and more people are competing for fewer and fewer parking spaces. Development of parcels, expansion of permit areas, increased permit holders, widening of sidewalks, expansion of loading zones, etc. all conspire to slowly but surely make fewer and fewer spaces available to meet a growing demand. In addition to this shrinking parking supply, stringent Coastal Commission restrictions insure that no well-planned major revitalizing commercial development (such as a hotel) is possible in the Village without a major new source of parking in close proximity to the Village.

In the early 1980's the City purchased Pacific Cove Mobile Home Park and installed the first parking meters in the City for the express purpose of providing additional parking for Capitola Village. While Phase One added 234 new parking spaces in the upper section, Phase Two (the lower section) has remained in residential use to this day. The Commission recommends the construction of new parking spaces in a portion of the existing Pacific Cove Mobile Home Park as potentially the fastest and least expensive source of additional parking. The Commission understands the potential for legal and other logistical challenges to this partial solution; however this cannot be a potential solution until the City begins the necessary process.

It is critical to realize though that developing parking in the lower portion of the Pacific Cove Mobile Home Park will not alone address all the current and future parking needs. Thus it is clear that any expansion parking capacity at Pacific Cove must be further accommodated on the upper

level where the existing Pacific Cove Parking Lot is located. This expansion can only be done with a multi-level parking structure. Although both of these parking expansion projects are located on the Pacific Cove property they must be treated as separate projects so that an unforeseen delay in one project does not delay the other.

The Commission has considered other sites for the development of new parking but considers the Pacific Cove property as the only suitable site because it is within a reasonable walking distance of the Village and all roads to the village lead to Pacific Cove (see map on next page). The Commission's search for parking has considered "in-fill" parking by trying to capture every nook and cranny to convert to a public parking space. This "Parkitola" approach simply does not generate sufficient spaces to address the identified long term needs and also has the negative effect of encouraging parkers to spread out into the neighborhoods in search of parking spaces.

Consultants have determined, using Local Coastal Plan criteria, that a deficit of 176 spaces already exists based on existing land uses[i]. This deficit is the absolute minimum need to meet the shortage and nothing short of a parking structure can provide this number, let alone any demand from new development such as a new hotel or closing a portion of the Esplanade to cars.

The construction of a parking structure in Pacific Cove and the development of a Village hotel or any other development are vitally linked because it is highly unlikely that any significant redevelopment project could or should provide the required parking on-site. Smart public/private partnerships could result in the timely construction of the parking structure while providing significantly improved utilization of the available on-site parking and a lower cost to the City resulting from sharing of construction costs.

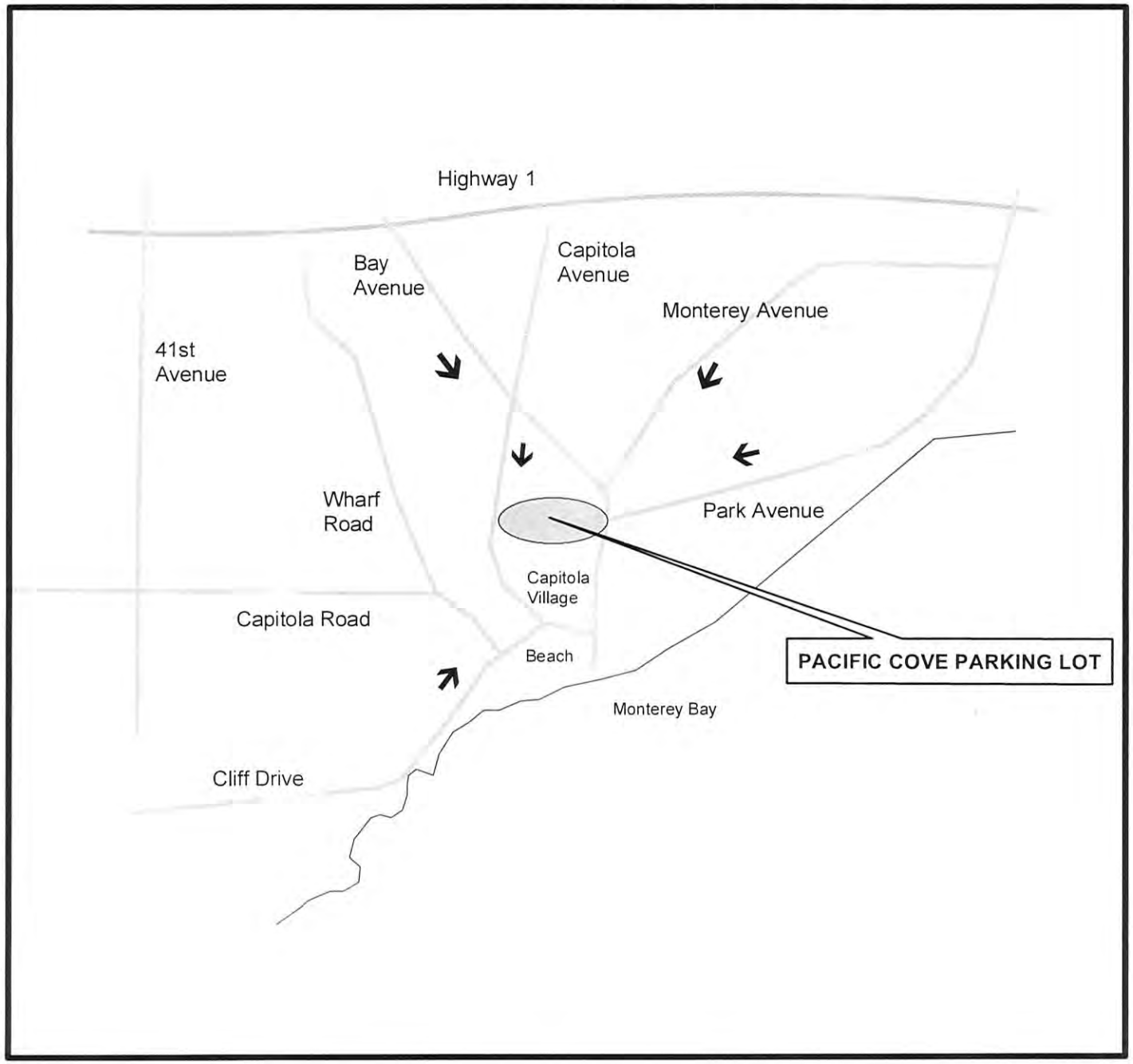
The Commission also believes that a public "people mover" between Pacific Cove and the Village is key to the success. While we are not yet prepared to make a formal recommendation, we believe such a service is readily available and could make Capitola Village "unique" and serve as a very practical addition to the utilization of the parking structure.

Further, while the Commission has not yet formally addressed traffic or congestion in the Village, we believe that parking expansion in the Pacific Cove property as proposed will not only reduce congestion in the Central Village but, because of the its central location, permit a more efficient traffic flow.

The time has come to identify and start work on implementing the right solution. The Commission has reviewed all available studies and information and believes the recommendations in this report focus on the most practical means of addressing this critical need today as well as for the future.

Roads Leading to Capitola Village

All roads point to Pacific Cove



Key Elements for developing new parking for the Village

- Intercepts as many roads as possible headed to the Village
- Easy access for vehicles coming from the Village
- Easy pedestrian access from parking to Village

Parking Needs Analysis

One of the first decision points for the Commission was a determination that if any new parking is built to serve the Village area, it should address not only the existing needs but also the identifiable future needs. The 2008 Parking Analysis[ii] studied the existing parking inventory and the demand for spaces based on the existing number of residential units, commercial space, and demand for parking resulting from visitors to Capitola Beach. This study established a minimum need for 176 parking spaces and also a theoretical maximum 390 based on current needs. The 390 spaces represent a design target of 15% over demand to provide openings in the parking system so that vehicles do not have to circle around looking for a parking space.

After reviewing this report the Commission agreed that these numbers were the best numbers available and used them in identifying the existing parking needs. Next the Commission set out to identify future needs that should be included in any new parking expansion. The Commission considered several issues before settling on the following list:

Village Hotel - A new village hotel will not be able to provide all the required parking on site. Based on the preliminary plans being presented by Barry Swenson Builder, a hotel on the theater site will require 100 – 120 spaces. In addition the Central Village will lose 39 public paid parking spaces currently available on the theater lot. While the amount of onsite parking that can be provided by the hotel is variable, it was the consensus of the Commission that offsite parking of some level would be required. The Commission decided that a minimum of 60 spaces should be planned in any new parking lot development for a new hotel with a maximum of 120 spaces. The final number will depend on discussions between a hotel developer and the city.

Esplanade Pedestrian Plaza – Over the years the concept of removing all or a portion of parking from the Esplanade to create a pedestrian plaza has been broadly discussed. While the Commission as a body has not taken a position on this matter, it did agree that additional parking would be mandatory for any new development for this concept. A range of 0 – 100 replacement spaces was identified for this need; the zero representing no project and 100 spaces representing full closure of the Esplanade from Stockton Avenue to Monterey Avenue. Partial closure of the Esplanade from San Jose to Monterey would require the replacement of 60 spaces.

Designated Valet Parking Spaces – In 2009 the City approved the development of a valet parking program for the village that entailed utilizing two spaces in the Village as a drop off zone, with the cars being shuttled to a remote parking lot outside the Central Village. The California Coastal Commission, whose approval was required for the project, added language that forbade the use of public parking for the remote lot, effectively eliminating using space in the existing Pacific Cove Parking Lot[iii]. The Commission has added a maximum of 50 spaces to be designated for a valet program.

New Development and Redevelopment – A primary need for new parking for the Village is to enable development and more specifically redevelopment. Current projects have been stymied by the inability to meet parking requirements. The Commission recommends adding 50 -100 spaces for this purpose. It is understood that any development project utilizing these spaces would need to pay for the spaces via an in-lieu parking fee.

The following chart summarizes the parking needs, both present and future, that the City of Capitola should plan for in developing new parking. This range is developed with the idea that updated information will be available to refine this number in the future, while also providing target numbers for use in preliminary planning of a parking structure.

Demand	**Low**	**High**
Current Shortfall	176	390
Village Hotel	60	120
Replace Theater Spaces	39	39
Esplanade Pedestrian Walk	0	100
Valet Parking Program	0	50
Other New Development	50	100
Total Long Term Parking Needs	**325**	**799**

It is important to remember that these numbers represent new parking spaces added to existing inventory. If a new parking structure is built at the Pacific Cove Parking Lot site, the spaces eliminated to accommodate the structure will need to be added to these numbers to determine the total number planned for the parking structure.

Short Term Program and Policy Changes to Assist Parking Solutions

Besides adding to the parking inventory the Commission has also reviewed and is recommending several programs that will help manage and enhance parking in the Central Village. Many of these programs aren't new but have never been implemented, or have only been implemented on a trial basis.

Public Valet Parking – As discussed above, a valet parking program would provide an opportunity to add parking outside the Central Village that services visitors to the Village. Although current efforts in attracting a vendor for this operation have not been successful, the Commission recommends that staff continue to work on ways to implement this program.

Pay Stations – The Commission realizes the revenue generated from parking meters in the Village is critical, and that the stand alone parking meters, that accept only coins, have real functional limits that have been reached. At the current meter rate of $1.50 per hour, twelve quarters are needed to pay for the 2 hours of parking currently permitted. Pay stations, where one station services up to 15 spaces and accepts payment via credit cards in

addition to coins, would greatly enhance the parking experience. Besides the payment benefits, utilizing pay stations could ultimately lead to advanced parking management systems where vacant spaces are identified and sign boards are utilized to direct drivers to open parking spaces, deterring people from circling around the Village hunting for a space. There are two basic types of pay stations, Pay and Display where a ticket is printed and displayed on the dashboard, and Pay by Space where each parking stall is numbered and paid for at the pay station. The Commission is recommending Pay by Space stations as these types of systems allow a user to pay or add time to their "meter" at any station in the system without returning to their vehicle. Another key component of installing pay stations would be the ability to easily enact variable rate structures where the rate could vary by season, day of the week, or even hour of the day, with all the information contained at each station.

Year Round or Seasonal Shuttle Program – The Commission supports staff's continuing exploration of a city-wide shuttle to encourage residents, employees and visitors to stay out of their cars and still be able to get around town.

Medium Term Program and Policy Changes to Assist Parking Solutions

In-lieu Parking Fees for Commercial Development – The current parking shortfall inside the Central Village does not allow new development and redevelopment. An in-lieu parking program would allow these projects to meet their parking requirements by paying for spaces in an approved parking structure that reflect the actual construction costs. By eliminating parking in the Village, vehicle trips and related congestion would also be reduced.

Zoning Changes for the CV – The 2008 Parking Analysis[iv] includes an analysis of Capitola's parking requirements in the zoning code. This analysis indicates that the existing codes are too strict and do not take into account shared use of existing on-street parking. The Commission supports a review of these requirements and adoption of new codes similar to the ITE standards referenced in the report however until additional parking is developed changes to the Zoning Code would have no impact.

Long Range Parking Space Inventory Development

If additional parking is to be developed the key question is where should it go? The Commission has discussed this issue and has agreed on the following parameters:

1. New parking areas should intercept cars before entering the Village from Park Avenue, Capitola Avenue, and Bay Avenue. Cars entering from Stockton Avenue should be directed to use Capitola Avenue to access the parking lot to discourage circling the Village looking for a space.

2. The new parking areas must have a combination of convenient pedestrian access to the Central Village, and alternate transportation such as a shuttle bus or tramway.

3. The new parking areas should not clutter the entrances to the Village by filling up existing open spaces and landscaped areas such as the UPRR corridors along Cliff Drive and at Monterey Avenue and Park Avenue.

4. The new parking areas must benefit to visitors, residents, business owners and employees.

Given these parameters the Commission recommends the additional parking be located at the Pacific Cove property owned by the City. The existing uses on the property include the Pacific Cove Parking Lot and the Pacific Cove Mobile Home Park. Further development of parking on this site can be accomplished two ways, a multi-level structure over the parking lot and surface parking in the lower mobile home park.

The following chart shows the estimated number of parking spaces that could be provided on the Pacific Cove property:

Pacific Cove Parking Expansion	**New Parking**	**Total Parking**
Existing Pacific Cove parking lot		234
Surface on a portion of the lower Pacific Cove Mobile	113	113
Pacific Cove Parking Structure over existing parking	325	325
Total Proposed	**438**	**672**

Two of the Commission's sub-committees have delved into details of these issues and their reports are contained in Attachments 2 and 3.

Fiscal Analysis

Parking Structure

Size – This analysis reflects a 500 space parking structure (175 existing spaces to be replaced and 325 new spaces).

Development Costs - Based on per space cost ranges contained in recent reports to the City from various consultants (high $21,000; low $17,000), we have used an average cost estimate of $19,000 per space which results in a cost of $9.5 Million.

Potential Funding for Construction:

Source	Amount
Hotel Contribution (See explanation below)	$ 2,900,000
CDBG Grants	$ 2,000,000
EDA Grants	$ 1,000,000
Bond Proceeds	$ 3,600,000
TOTAL	$ 9,500,000

On-going Annual Costs:

Item	Estimated Cost
Debt Service on $3.6 million bond*	$208,000
Operating and Maintenance	$200,000
Total	$408,000

*assumes $3.6 million at 4% over 30 years

Revenue Streams - Sources for revenue streams to pay the annual expense are as follows:

Source	Amount
Dedicated Parking Fund	$ 50,000
Adding parking meters to 43 existing 2-hour unmetered parking spaces in Village	$ 92,000
Enhanced revenue from expanded Pacific Cove parking (@ $1/hr rate)	$163,000
Dedication of 50% of TOT revenues from new Village hotel	$120,000
TOTAL	$424,000

Village Hotel Contribution - The methodology of calculating the Village Hotel's portion of the proposed parking structure was based on the net price per new parking space. While the gross cost per space for a parking structure is $19,000, the net cost must factor out the existing spaces that will be reconstructed. This methodology recognizes the City's contribution of existing spaces and land for the project.

Space determination	
Gross spaces to be built	500
Existing spaces lost due structure construction[v]	175
Net new spaces	325
Net cost per new space	$ 29,000*

*$9,500,000 divided by 325 net spaces

Hotel needs and costs	
Minimum spaces needed	60
Replace theater lot public spaces	39
Total spaces needed by hotel	99
Hotel contribution	$2,900,000*

*99 spaces @ $29,000

Surface Parking in a portion of the Pacific Cove Mobile Home Park

Size – Based on the 2005 Parking Garage and Housing Feasibility Study[vi], this site could provide 113 spaces

Development Costs – The sub-committee estimated the minimum costs at $1.35 million (see attachment 3)

On-going Annual Costs:

Item	**Estimated Cost**
I-Bank loan or other financing*	$ 78,000
Operating and maintenance	$ 20,000
Total	$ 98,000

*assumes $1.35 million at 4% for 30 years

Potential Funding for Relocation and Construction:

Source	**Amount**
Dedicated Parking Fund	$ 50,000
Enhanced revenue from additional 113 spaces (@ $1/hr rate)	$ 56,500
TOTAL	$ 106,500

Other Revenue Streams - Other potential sources of annual revenue that could be utilized for either parking enhancement project:

Source	**Amount**
Cell phone tower on structure	$ 25,000
Increase TOT rate from 10% to 12%	$150,000
Install pay stations in Village with dual rate structure*	$250,000
Village Business District	TBD
Sales Tax Increase Initiative	TBD

*A significant portion of this will be offset by the cost to purchase/lease and operate the pay station system. This revenue figure is VERY preliminary.

Specific Recommendations for Increasing Parking Supply for the Village

1. **Develop surface parking in the Lower Pacific Cove Mobile Home Park** – As part of a long term solution to the shortage of parking spaces in the Central Village, the Lower Portion of the Pacific Cove Mobile Home Park should be converted to surface parking to create the maximum number of parking spaces. These new parking spaces alone will not meet the minimum need of 325 spaces, but it will provide some relief while also providing parking when a parking structure is being built on the Pacific Cove Parking Lot site. If the parking structure is properly sized, this surface parking could potentially be turned to another use upon completion of the structure.
2. **Construct a multi-level parking structure on the Pacific Cove Parking Lot site** –Pursue the construction of a multi-level parking structure on the Pacific Cove Parking Lot site. The Commission's analysis has determined that a parking structure must be included in any solution to meet the minimum demand for additional parking.

Continued Traffic and Parking Commission Roles

The Traffic and Parking Commission feels that this report meets the direction of the City Council to provide guidance on parking in the Village and encourages the City Council to take immediate action to begin implementation of these long-term plans. The Commission realizes that implementing these recommendations entails an enormous amount of work and the Commission is willing and able to assist as necessary. The Commission will work with City staff on these and other matters, but it is ultimately up to the City Council and City staff to provide the direction, leadership and allocation of resources necessary to move forward with these projects.

The Commission will continue with its sub-committee investigations and will next begin a review of the neighborhood parking permit program and traffic circulation and congestion issues.

Endnotes

[i] Parking Garage and Housing Feasibility Study, RBF Consulting, June 2006

[ii] See above

[iii] California Coastal Commission, Local Coastal Program Amendment No. 1-07, September 16, 2009

[iv] See i above

[v] See i above

[vi] See i above