

Appendix A

Notice of Preparation and Letters



Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
 For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Carmel Rio Road Subdivision

Lead Agency: Monterey County

Contact Person: Bob Schubert

Mailing Address: 168 West Alisal

Phone: (831) 755-5183

City: Salinas

Zip: 93901

County: Monterey

Project Location: County: Monterey

City/Nearest Community: Carmel

Cross Streets: Val Verde Drive & Rio Road

Zip Code:

Longitude/Latitude (degrees, minutes and seconds): ° ' " N / ° ' " W Total Acres: 7.9 acres

Assessor's Parcel No.: 015-021-020-000

Section:

Twp.:

Range:

Base:

Within 2 Miles: State Hwy #: Highway 1

Waterways:

Airports:

Railways:

Schools:

Document Type:CEQA: ☒ NOP☐ Draft EIRNEPA: ☐ NOIOther: ☐ Joint Document☐ Early Cons☐ Supplement/Subsequent EIR☐ EA☐ Final Document☐ Neg Dec

(Prior SCH No.)

☐ Draft EIS☐ Other:☐ Mit Neg Dec

Other:

☐ FONSI**Local Action Type:**☐ General Plan Update☐ Specific Plan☐ Rezone☐ Annexation☐ General Plan Amendment☐ Master Plan☐ Prezone☐ Redevelopment☐ General Plan Element☐ Planned Unit Development☐ Use Permit☐ Coastal Permit☐ Community Plan☐ Site Plan☒ Land Division (Subdivision, etc.)☐ Other:**Development Type:**☒ Residential: Units 31 units Acres 7.9 acres☐ Office:

Sq.ft.

Acres

Employees

☐ Transportation: Type☐ Commercial:

Sq.ft.

Acres

Employees

☐ Mining: Mineral☐ Industrial:

Sq.ft.

Acres

Employees

☐ Power: Type

MW

☐ Educational:☐ Waste Treatment: Type

MGD

☐ Recreational:☐ Hazardous Waste: Type☐ Water Facilities: Type

MGD

☐ Other:**Project Issues Discussed in Document:**☒ Aesthetic/Visual☐ Fiscal☒ Recreation/Parks☐ Vegetation☐ Agricultural Land☒ Flood Plain/Flooding☐ Schools/Universities☒ Water Quality☒ Air Quality☐ Forest Land/Fire Hazard☐ Septic Systems☒ Water Supply/Groundwater☒ Archeological/Historical☒ Geologic/Seismic☐ Sewer Capacity☐ Wetland/Riparian☒ Biological Resources☐ Minerals☐ Soil Erosion/Compaction/Grading☐ Growth Inducement☐ Coastal Zone☒ Noise☐ Solid Waste☒ Land Use☒ Drainage/Absorption☒ Population/Housing Balance☐ Toxic/Hazardous☐ Cumulative Effects☐ Economic/Jobs☒ Public Services/Facilities☒ Traffic/Circulation☐ Other:**Present Land Use/Zoning/General Plan Designation:****Project Description:** (please use a separate page if necessary)

The project proposed by Carmel Rio Rd, LLC consists of a standard subdivision of a 7.9-acre property to allow the development of 31 units including 24 single family lots and one parcel with seven deed-restricted inclusionary units. The project would require an Administrative Permit and Design Approval for development in the "S" (Site Control) and "D" (Design Control) zoning districts. A Zoning Ordinance Amendment would also be required to add a clarification to Section 21.14.050 that allows an exception to exceed a 4 unit/acre lot density for the purpose of affordable housing pursuant to Policy CV 1.10 in the Carmel Valley Master Plan.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with an "X".
If you have already sent your document to the agency please denote that with an "S".

☐ Air Resources Board	☐ Office of Historic Preservation
☐ Boating & Waterways, Department of	☐ Office of Public School Construction
☐ California Emergency Management Agency	☐ Parks & Recreation, Department of
☐ California Highway Patrol	☐ Pesticide Regulation, Department of
☒ Caltrans District #5	☐ Public Utilities Commission
☐ Caltrans Division of Aeronautics	☒ Regional WQCB #
☐ Caltrans Planning	☐ Resources Agency
☐ Central Valley Flood Protection Board	☐ Resources Recycling and Recovery, Department of
☐ Coachella Valley Mtns. Conservancy	☐ S.F. Bay Conservation & Development Comm.
☐ Coastal Commission	☐ San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
☐ Colorado River Board	☐ San Joaquin River Conservancy
☐ Conservation, Department of	☐ Santa Monica Mtns. Conservancy
☐ Corrections, Department of	☐ State Lands Commission
☐ Delta Protection Commission	☐ SWRCB: Clean Water Grants
☐ Education, Department of	☒ SWRCB: Water Quality
☐ Energy Commission	☒ SWRCB: Water Rights
☒ Fish & Game Region #	☐ Tahoe Regional Planning Agency
☐ Food & Agriculture, Department of	☐ Toxic Substances Control, Department of
☐ Forestry and Fire Protection, Department of	☐ Water Resources, Department of
☐ General Services, Department of	
☐ Health Services, Department of	Other: _____
☐ Housing & Community Development	Other: _____
☐ Native American Heritage Commission	

Local Public Review Period (to be filled in by lead agency)

Starting Date July 20, 2015

Ending Date August 19, 2015

Lead Agency (Complete if applicable):

Consulting Firm: Rincon Consultants

Address: 437 Figureroa

City/State/Zip: Monterey, CA 93940

Contact: Megan Jones

Phone: (831) 333-0310 ext. 250

Applicant: Brian Clark

Address: 430 Ortiz Avenue

City/State/Zip: Sand City, CA 93955

Phone: (831) 899-6666

Signature of Lead Agency Representative: Robert Schubert

Date: 7/1/15

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

MONTEREY COUNTY

RESOURCE MANAGEMENT AGENCY - PLANNING

Mike Novo, AICP, Director of Planning

168 West Alisal Street, 2nd Floor
Salinas, CA 93901
(831) 755-5025
Fax: (831) 757-9516
www.co.monterey.ca.us/rma



NOTICE OF PREPARATION

JUL 16 2015

To: Responsible Agencies/Interested Parties

From: Bob Schubert, Senior Planner
Monterey County Resource Management Agency – Planning Department

SUBJECT: Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Carmel Rio Road Subdivision (PLN140089)

STEPHEN L. VAGNINI
MONTEREY COUNTY CLERK
DEPUTY

The County of Monterey will be the Lead Agency and will prepare an Environmental Impact Report (EIR) for the Combined Development Permit application for development of the Carmel Rio Road Subdivision (Planning File Number: PLN140089). The project site is located at 15 and 26500 Val Verde Drive and is currently zoned Low Density Residential with a maximum gross density of one unit per acre, Design Control, Site Plan Review, and Residential Allocation Zoning (LDR/1-D-S-RAZ). The project proposed by Carmel Rio Rd, LLC consists of a standard subdivision of a 7.9-acre property to allow the development of 31 units including 24 single family lots and one parcel with seven deed-restricted inclusionary units. The project would require an Administrative Permit and Design Approval for development in the "S" (Site Control) and "D" (Design Control) zoning districts. A Zoning Ordinance Amendment would also be required to add a clarification to Section 21.14.050 that allows an exception to exceed a 4 unit/acre lot density for the purpose of affordable housing pursuant to Policy CV 1.10 in the Carmel Valley Master Plan. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency may need to use the EIR prepared by our agency when considering your permit or other approval for the project.

Pursuant to the public participation goals of CEQA, the County of Monterey will host an EIR scoping meeting to gather additional input on the content and focus of the environmental analysis to be conducted and presented in the EIR. The date, time, and location of the scoping meetings are listed below.

Thursday, July 30th
6:30 PM
St Phillips Lutheran Church
8065 Carmel Valley Road
Carmel, CA 93923

The project description, location, and the potential environmental effects are contained in the attached materials.

Due to time limits mandated by state law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice between July 20, 2015 and August 19, 2015.

Please submit your response to the address shown above. We will need the name for a contact person in your agency.

Sincerely,

Bob Schubert

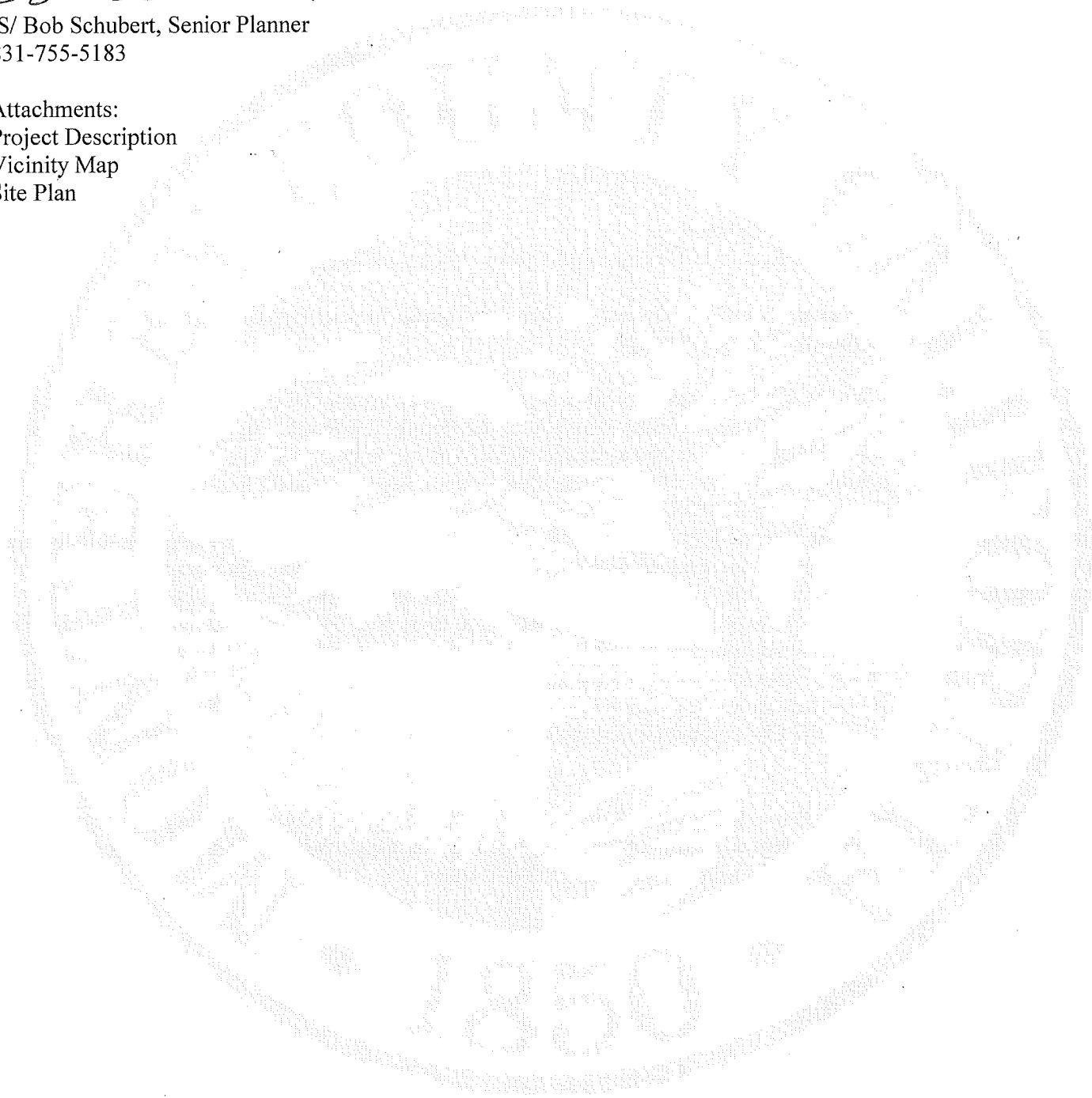
/S/ Bob Schubert, Senior Planner
831-755-5183

Attachments:

Project Description

Vicinity Map

Site Plan



PROJECT LOCATION

The project site is located at 15 and 26500 Val Verde Drive, within the Carmel Valley Master Plan Area, in Carmel Valley, Monterey County, CA. The project site is comprised of three parcels (Assessor's Parcel Numbers [APN] 015-021-020-000, 015-021-021-000 & 015-021-015-000).

The project site is bordered to the north and south by rural density single family residences, to the east (across Val Verde Drive) by open space (previously approved for development of the Carmel Community Life Center, for which entitlements have expired), and to the west by existing commercial use buildings and parking lots which are entered from Carmel Rancho Boulevard.

PROJECT DESCRIPTION

The project applicant is requesting a Combined Development Permit consisting of: (1) standard subdivision of three existing lots totaling 7.9-acres into 24 market rate lots and one inclusionary housing lot; and (2) Administrative Permit and Design Approval for development in the "S" (Site Review) and "D" (Design Review) Zoning District. A Zoning Ordinance Amendment would also be required to add a clarification to Section 21.14.050 that allows an exception to exceed a 4 unit/acre lot density for the purpose of affordable housing pursuant to Policy CV 1.10 in the Carmel Valley Master Plan.

The project would allow for the development of 24 market rate single family homes and seven inclusionary units (affordable housing). Single family lots would range from 0.24 to 0.38 acre, and it is anticipated that each single family home would be approximately 1,670 square feet in size. The inclusionary lot would be 0.91 acre and each of the seven units would be approximately 860 square feet. Access would be provided from Val Verde Drive. One internal looped road would be constructed on the site, with two entrances to Val Verde Drive.

Two of the three parcels (totaling 6.6 acres) are currently used for row crop agriculture (including strawberries, melons, artichokes, squash, pumpkins, fennel, fava beans, zucchini, radishes, and flowers). The third parcel (1.3 acres), which abuts Val Verde Drive in the southeast corner of the site, includes an existing single-family residence. This residence would be removed.

Water would be provided by existing on-site wells and the establishment of a Community Water Distribution System. Wastewater service would be provided via connection to the Carmel Area Wastewater District (CAWD). The project site is currently outside the CAWD boundaries, and as such will have to be annexed to CAWD before service can be provided.

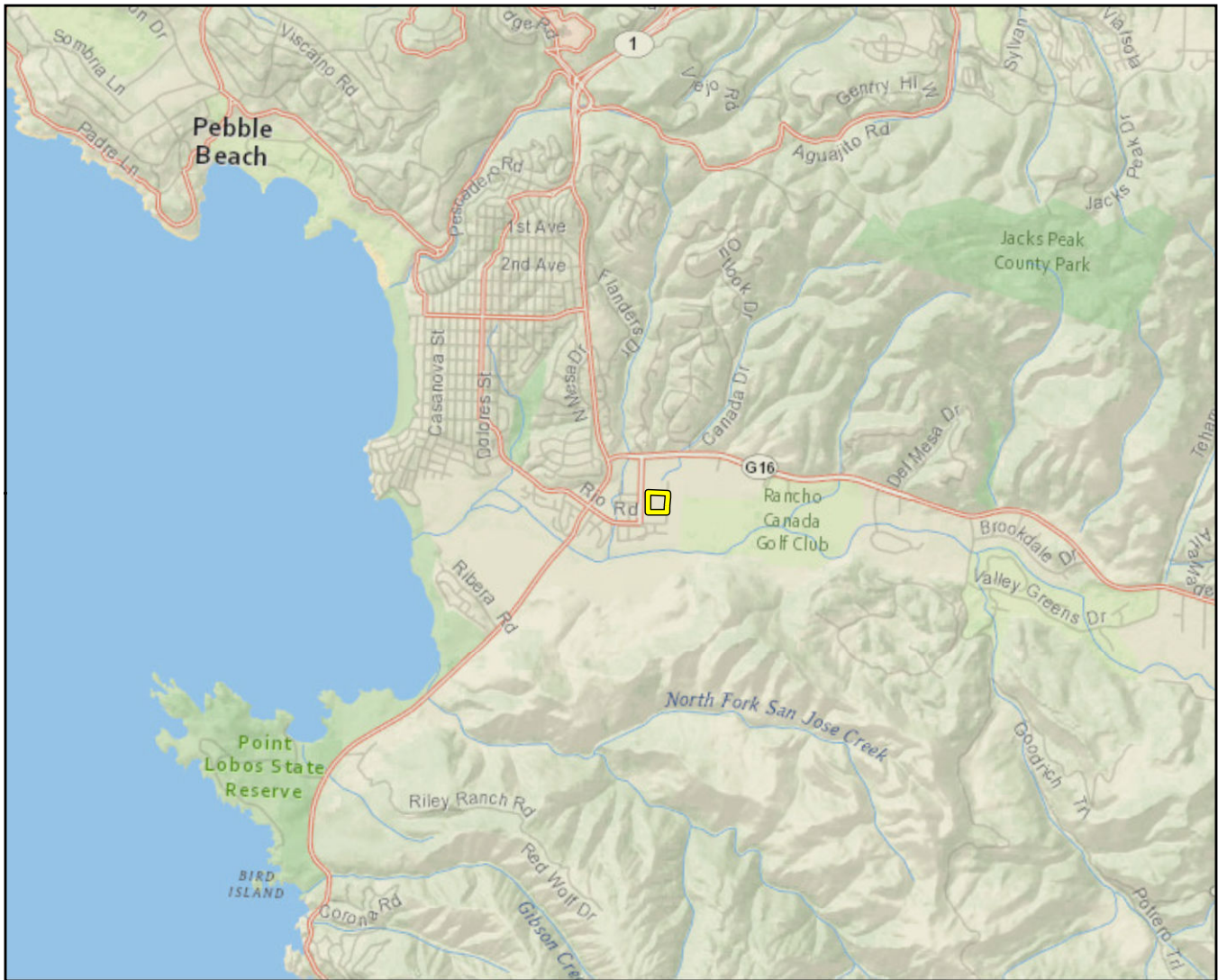
POTENTIAL ENVIRONMENTAL EFFECTS

Aesthetics, Air Quality, Biological Resources, Climate Change, Cultural Resources, Geology and Soils, Hydrology and Water Quality, Land Use and Planning, Noise, Population and Housing, Public Services, Recreation, Traffic and Circulation, and Utilities and Service Systems.

Cc: State Clearinghouse, Office of Planning and Research
1400 Tenth Street, Room 212
P.O. Box 3044
Sacramento, CA 95812-3044

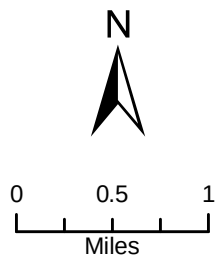
Figure 1: Project Location

Carmel Rio Road Subdivision EIR
Notice of Preparation



Imagery provided by ESRI and its licensors © 2015.

 Project Location



Regional Location

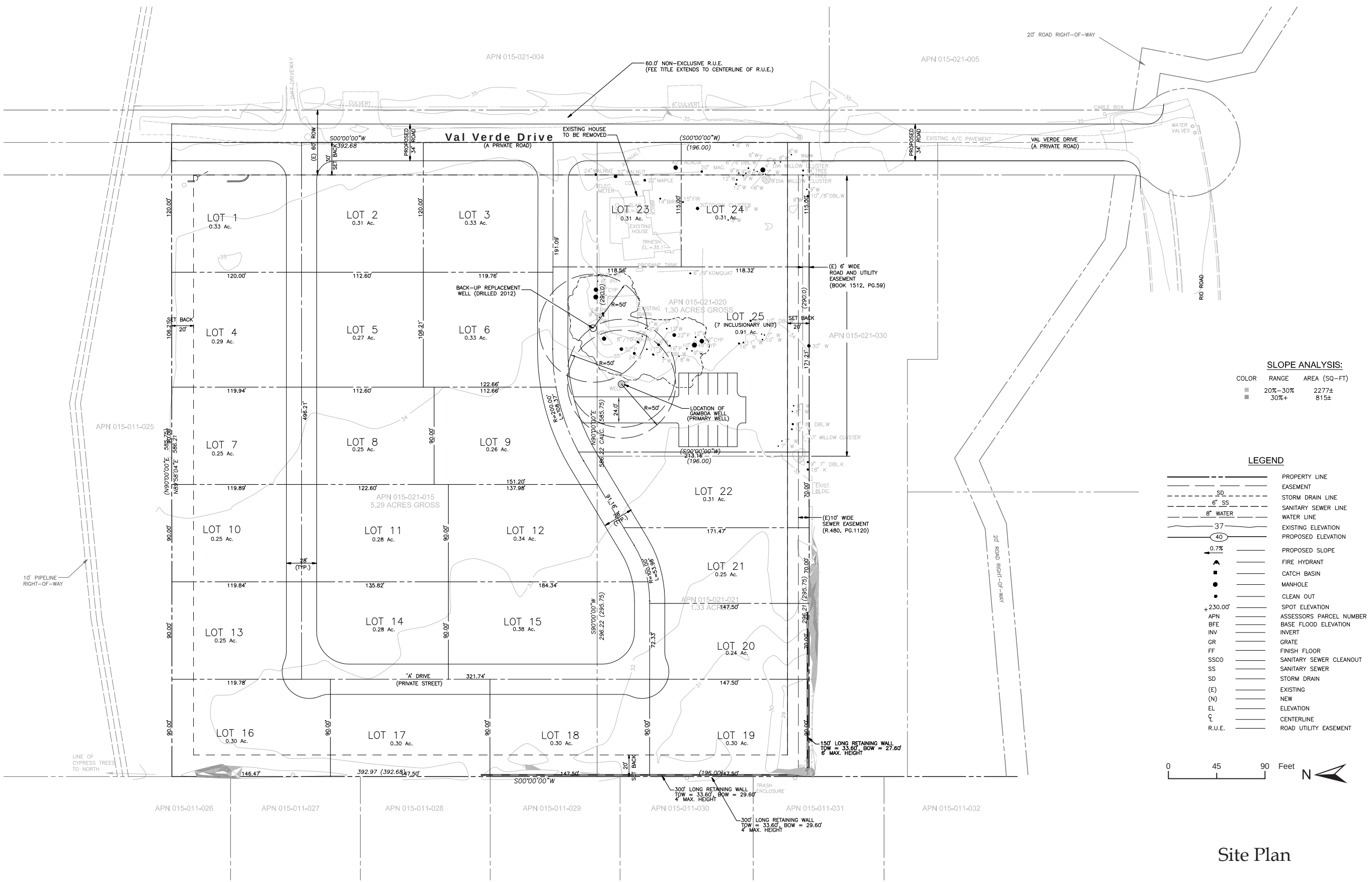
Figure 1



Figure 2: Site Plan

Carmel Rio Road Subdivision EIR

Notice of Preparation



Site Plan

Source: BESTOR ENGINEERS, 2014.

Figure 2

County of Monterey

July 23, 2015

Bob Schubert, Senior Planner
County of Monterey Resource Management Agency – Planning Department
168 West Alisal Street, 2nd Floor
Salinas, CA 93901

JUL 27 2015

Subject: Comments on Carmel Rio Road Subdivision Notice of Preparation (PLN140089)

Dear Mr. Schubert:

Thank you for providing the Monterey Bay Unified Air Pollution Control District (Air District) the opportunity to comment on the above-referenced document. The Air District has reviewed the document and has the following comments.

- Please refer to the Air District's CEQA Guidelines when evaluating potential air quality impacts of the project. The Air District's guidelines can be downloaded here: <http://mbuapcd.org/programs-resources/planning/ceqa/>.
- The Air District recommends using the CalEEMod model for estimating construction and operation emissions from the proposed project. This model can be downloaded from www.caleemod.com.
- Please review the Air District's Consistency Procedure spreadsheet available online at <http://mbuapcd.org/programs-resources/planning/ceqa/> to assist with the consistency determination with the air quality plan.
- The Air District recommends implementing design measures to minimize air quality and greenhouse gas impacts such as the following:
 - Do not install wood burning fireplaces or wood stoves. Fireplaces, stoves, or furnaces that operate with natural gas have much lower emissions.
 - Install an electric vehicle charging station(s) in a common area accessible to residents.

Please let me know if you have any questions. I can be reached at (831) 718-8013 or aclymo@mbuapcd.org.

Best Regards,



Amy Clymo
Supervising Air Quality Planner

DEPARTMENT OF TRANSPORTATION

50 HIGUERA STREET
SAN LUIS OBISPO, CA 93401-5415
PHONE (805) 549-3101
FAX (805) 549-3329
TTY 711
<http://www.dot.ca.gov/dist05/>



Serious drought
Help save water!

AUG 03 2015

July 28, 2015

MON-001-72.61
SCH# 2015071046

Bob Schubert
Monterey County Planning Department
168 West Alisal, 2nd Floor
Salinas, CA 93901

Dear Mr. Schubert:

COMMENTS TO CARMEL RIO ROAD SUBDIVISION NOTICE OF PREPARATION

The California Department of Transportation (Caltrans), District 5, Development Review, has reviewed the above referenced project and offers the following comments.

1. Caltrans supports local planning efforts that are consistent with State planning priorities intended to promote equity, strengthen the economy, protect the environment, and promote public health and safety. We accomplish this by working with local jurisdictions to achieve a shared vision of how the transportation system should and can accommodate interregional and local travel.
2. To ensure the traffic study in the Draft EIR includes the information needed to analyze the impacts (both cumulative and project-specific) of this effort, it is recommended that the analysis be prepared in accordance with the Department's *"Guide for the Preparation of Traffic Impact Studies."* An alternative methodology that produces technically comparable results can also be used.
3. Because we are responsible for the safety, operations, and maintenance of the State transportation system, our Level of Service (LOS) standards should be used to determine the significance of the project's impact. We endeavor to maintain a target LOS at the transition between LOS C and LOS D on all State transportation facilities.
4. Our future comments to this, and any subsequent EIR for the project, will stress the importance of using the Association of Monterey Bay Area Governments Model for traffic analysis, and to include all impacted transportation agencies early and often in the discussions.

5. The traffic study should include information on existing traffic volumes within the study area, including the State transportation system, and should be based on recent traffic volumes less than two years old. Counts older than two years cannot be used as a baseline. Feel free to contact us for assistance in acquiring the most recent data available.
6. The methodologies used to calculate the LOS should be consistent with the methods in the current version of the Highway Capacity Manual. All LOS calculations should also be included in the Draft EIR as an appendix made available for review.
7. At any time during the environmental review and approval process, Caltrans retains the statutory right to request a formal scoping meeting to resolve any issues of concern. Such formal scoping meeting requests are allowed per the provisions of the California Public Resources Code Section 21083.9 [a] [1].
8. Any work within the State right-of-way will require an encroachment permit issued from Caltrans. Detailed information such as complete drawings, biological and cultural resource findings, hydraulic calculations, environmental reports, traffic study, etc., may need to be submitted as part of the encroachment permit process.

If you have any questions, or need further clarification on items discussed above, please don't hesitate to call me at (805) 542-4751.

Sincerely,



JOHN J. OLEJNIK
Associate Transportation Planner
District 5 Development Review Coordinator
john.olejnik@dot.ca.gov



August 11, 2015

AUG 17 2015

Robert Schubert, Senior Planner
Monterey County RMA Planning Department
168 West Alisal Street, 2nd Floor
Salinas, CA 93901

**SUBJECT: MPWMD COMMENTS ON NOTICE OF PREPARATION OF DRAFT EIR
FOR CARMEL RIO ROAD SUBDIVISION; APN 015-021-015, -020 and -021; 15
and 26500 Val Verde Drive, Carmel; County ID# PLN140089 [SCH# not provided]
MPWMD Application #WDS-20090204RIO**

Dear Mr. Schubert:

This letter from the Monterey Peninsula Water Management District (MPWMD or District) is written in response to the Notice of Preparation of a Draft Environmental Impact Report (DEIR) circulated by Monterey County for the proposed Carmel Rio Road Subdivision. The project proposes 24 market rate single-family residential lots, and one inclusionary housing lot comprised of seven units that would be served by wells that currently provide water for agricultural irrigation on the subject parcels. The District serves as a Responsible Agency under CEQA for this project because a MPWMD Water Distribution System (WDS) Permit is needed to amend the current water system to serve the Subdivision (MPWMD Rule 20-A). MPWMD Water Permits are also required for each of the residential units as part of the County building permit process. MPWMD areas of authority include hydrology/water quality, water/utilities, and the MPWMD Mitigation Program for the Carmel River aquatic habitat, dependent species, and riparian corridor.

Hydrology/Water Quality and Related Aquatic Biology Issues: The District notes that current water extractions are applied to agricultural crops, with some of the water percolating back into the Carmel Valley Alluvial Aquifer (CVAA) as "return flow." In addition to the standard CEQA questions about construction and operation impacts, the Hydrology and Water Quality Chapter should assess the effects of the change from agricultural irrigation to consumptive water service to the Subdivision and sanitary sewers. Specific issues include:

- Estimate amount of return flow into the aquifer from pre-project agricultural irrigation;
- Estimate loss of return flow due to new project hardscape that replaces percolating soils;
- Assess effect of loss of return flow on the CVAA water levels and/or streamflow in the Carmel River adjacent to the subdivision, which can affect riparian vegetation and/or Carmel River aquatic life such as threatened steelhead fish and red-legged frog habitats;
- Assess water quality effects of agricultural practice versus residential uses; and
- Identify mitigation measures to reduce significant adverse effects, if applicable.

Water Rights and Adequate Water Supply: Carmel Rio submitted a formal application to MPWMD in February 2009 to create the Carmel Rio WDS. As part of a previous District review

(Travers), District Counsel determined in a January 31, 2006 letter that adequate riparian rights were documented for the proposed WDS at that time. This would remain true so long as the water is applied to the riparian parcels within the mapped alluvial aquifer. In a March 24, 2009 letter, the District confirmed that the technical information appeared to be complete and the District concurred with the conclusions of adequate supply for a 42-unit project and less than significant impact to other alluvial well owners, pursuant to District methodology. The water demand analysis also appeared to be reasonable at that time (2009). It is noted that standards and requirements for water using fixtures have changed since 2009. Thus, the applicant and EIR preparers should consult with the District Water Demand Division to ensure that current water use estimates are accurate, and learn about requirements related to water-using fixtures and outdoor irrigation for the project.

Water Use Baseline: The District and the applicant have exchanged correspondence related to the question of the CEQA baseline for water use and the baseline used for the MPWMD WDS Permit. MPWMD believes that there is the ability to use water from the subject wells for the proposed Subdivision, but the specific amount of water available and how it will be distributed will not be formally determined until completion of the WDS Permit process, including a public hearing before the MPWMD Board of Directors. A District June 12, 2015 letter to applicant Brian Clark stated:

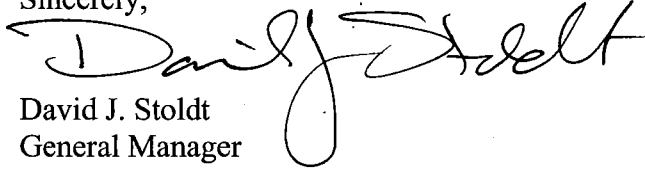
The County of Monterey is the CEQA Lead Agency for the project and is the entity that will determine the CEQA baseline for its review of the proposed project. However, for the District's WDS Permit, the District policy is to use the protocol set by the District Board in 2006 for wells in the Carmel Valley Alluvial Aquifer (CVAA). This entails using a 10-year average of water use as a baseline for setting a production limit. If you submit a revised application [to reflect the current project], the District is willing to use the 10-year average starting with the most recent 10 years of water production data. Otherwise, the District would use the 10-year average prior to the February 2009 original application (i.e., WY 1999 through 2008) as a baseline. Alternately, if you choose to request a production limit that is higher than the 10-year average historical use, the cumulative impacts to the Carmel River from increased water use must be evaluated in an Environmental Impact Report and any mitigation proposed must fully address those impacts. The CVAA protocol is on the District website at:
<http://www.mpwmd.net/pac/wds/WDSPermits/WDSMemo3.pdf>.

It is noted that concerns have been raised about significant increases in water use in recent years. District staff will evaluate whether this is due to water waste or unauthorized new uses as part of its assessment.

My staff and I are available to meet if further coordination is needed. I can be reached at dstoldt@mpwmd.net or 831/658-5650 if you have questions. The staff contact is Henrietta Stern, Project Manager, at henrietta@mpwmd.net or 831/658-5621; the District Engineer is Larry Hampson at larry@mpwmd.net or 831/658-5620; the Water Demand manager is Stephanie Locke at slocke@mpwmd.net or 831/658-5630.

Robert Schubert, County Planning
August 11, 2015
Page 3 of 3

Sincerely,

A handwritten signature in black ink, appearing to read "David J. Stoldt". The signature is fluid and cursive, with a large loop at the end.

David J. Stoldt
General Manager

Cc: Brian Clark, Carmel Rio
Henrietta Stern, MPWMD Project Manager
David Laredo, MPWMD Counsel

U:\mpwmd\CEQA\CarmelRio_CommentsonNOPforEIR_20150805.docx
Prepared by H. Stern on 8/10/2015 – with JO edits LH/KU approve



Appendix B

Visual Impact Study

Visual Impacts Study - Carmel Rio Road, LLC

Prepared by:

Paul Byrne, Architect LEED AP
26135 S Carmel Hills Dr.
Carmel, CA 93923

Deliverables:

- 1) Existing Site Visual Conditions & Review from Public Roadways
- 2) Pre & Post Construction Visual Impacts Study
- 3) Photo Simulations
- 4) Architectural Renderings - Conceptual



Monterey County RMA Planning #PLN140089

Visual Impacts Scope of Work: Future residential project visual impact when viewed from public areas, roadways, and existing conditions.

Site and Project Overview:

The Carmel Valley is a visually scenic area, a quality appreciated by the community and protected by County policy. The project is located on an eight acre "infill" site with access from Val Verde Drive (north/south street) approximately 5 blocks inland or east of from Highway 1 at the mouth of Carmel Valley. Access is from Rio Road to the south of subject site. Roadways to the north are Carmel Valley Road (CVR) and Carmel Rancho Boulevard (CRB) to the west. There is no direct access from CVR or CRB. CVR is not a designated scenic highway.

The proposed minor-subdivision is an in-fill project with existing development on three sides. The site has residential and commercial development on three sides and open space on the eastern perimeter. There are no homes to the east. Further up-valley is Rancho Canada Golf Course which is approximately 750 feet to the east but there is an earthen barrier and trees and subject site. The golf course and golfing activities cannot be seen from the subject site. To the northeast approximately 1/2 mile (not an immediate neighbor or adjacent property) is the Carmel Middle School.

The site is located on Val Verde Drive, serviced by a 60' wide private road easement, with cross street access from Rio Road to the south. Between the subject site and Carmel River 1,400 feet to the south there are approximately 164 homes. Val Verde Drive is a private roadway servicing 6 single family homes, 5 lots, and provides emergency access for Cottages of Carmel to the north.

The site's history is residential and agricultural use. Changes associated with the proposed minor residential sub-division would result in changes to the visual character of the site. Changes in visual contrast are assessed from various public and private locations, are identified, photographed and photo simulations developed for visual simulation referencing.

Evaluation of potential aesthetic mitigation through planting of additional trees for screening purposes or contrast-reducing finishes on fences and residential buildings is not a part of this exercise.

Structures proposed to be placed at the project site will consist of 24 single family homes and 7 inclusionary units. The applicant is not asking for lot area coverage or building variances with the exception of the inclusionary lot that proposes seven units versus current zoning which allows four. While architectural designs have not been completed renderings of the inclusionary units and courtyard style single family home styles envisioned have been produced.

Visual Impacts Summation:

The infill development has immediate visual impacts to three existing residential neighbors and the commercial tenants who reside in the CRB buildings.

Public roadways visual impacts:

- North Elevation and View Corridor

CVR is approximately 1,300 to 1,900 feet to the north. There is approximately a 300 foot wide view corridor of the proposed project site from CVR in the vicinity of the Carmel Middle School when viewing north to south from CVR.

This is considered the "prime" public viewing corridor regarding potential controversy. There would be approximately a 35 degree view corridor of the eastern facades of 5 of the 24 proposed the single family homes that front Val Verde Drive. There are two existing tree groves within this 35 degree view corridor.

- South Elevation and View Corridor

Rio Road to the south is the east/west public access road for the project. The proposed site is not seen from Rio Road shielded by two existing homes and the Carmel Waste Water District commercial building to the south of the proposed development. Given no visibility from the public Rio Road this viewing area should not be controversial.

- East Elevation and View Corridor

There are no homes to the east. There is a vacant 5 acre lot that was previously entitled for a Community Center to the immediate east of the subject site. These entitlements have lapsed. Further "up valley" or to the east approximately 750' is the Rancho Canada Golf Course. The golf course and golfing activities cannot be seen from the subject site.

To the northeast approximately 1,200' is a Carmel Middle School cypress tree line. The School has two rows of Cypress Trees on its western and southern properties lines that shield the subject property from the School and CVR. The school buildings cannot be seen from the subject site. Given no residential or commercial buildings to the east this view corridor should not be controversial.

- West Elevation and View Corridor

Carmel Rancho Boulevard (CRB) is a north/south public street to the west of the subject site. This street provides access to 11 commercial properties of which 6 vertical commercial buildings share a common property line with the subject site. There are three views corridors approximately 50' wide between vertical commercial buildings as seen from CRB or the Barnyards Shopping Center to the west of the subject site. The bulk of the residential homes will be screened by the vertical commercial structures along CRB. Visual impacts from public viewing areas along CRB or from the Barnyard are negligible.

Future residential project when viewed from Public areas and roadways - Existing Conditions:

- North Property Line Elevation - as viewed from Carmel Valley Road (CVR): To the north of the project site there is a 77 bed assisted care Cottages of Carmel facilities which is adjacent to CVR, several commercial buildings on the site referred to as "Britons", and two residential homes.

Pre and Post Construction - View changes from Public Roadways:

Findings: View of the infill project from CVR looking north to south given development on three sides is limited to a northeast to southwest view corridor on CVR of approximately 300' wide at the intersection of CVR and the Carmel Middle School area. The project is approximately 1,300 to 1,900 feet from CVR (north and south property corners from CVR). The "view corridor" of the development from CVR would be approximately a 35 degree (angled) view of the east elevation facades of the 5 homes facing Val Verde Drive.

- South Property Line Elevation - as viewed from Rio Road: Two Residential homes and Carmel Area Waste Water District commercial building to the south as viewed from Rio Road

Pre and Post Construction - View changes:

Findings: Pre and Post construction the same view from Rio Road i.e., project is not seen from any public roadway or area along Rio Road.

- East Property Line Elevation (up valley): No homes but Carmel Middle School is approximately 1/2 mile to the northeast

Pre and Post Construction - View changes:

Findings: No residential homes to the east. Closest "neighbors to the east" are Rancho Canada Golf Course and Carmel Middle School. The golf course and related activities (750' to east) cannot be seen from the subject site. The Middle School has a line of Cypress trees on its western and southern property lines that block viewing from the NE when looking to the SW if standing on CVR. The Middle School buildings are not visible when viewed from the subject site.

- West Property Line Elevation - as viewed from Carmel Rancho Boulevard or Barnyard Shopping Center

Pre and Post Construction - View changes:

They are 11 vertical commercial buildings and the Briton's Commercial district to the west and northwest of the subject site. There are 3 filtered view corridors between the commercial buildings approximately 50' wide when viewed from CRB or the Barnyard Shopping Center.

Deliverables - Visual Impact Studies:

- 1) Carmel Valley Road - north to south view - to project site.
- 2) Val Verde Drive - south to north view - reflecting new roadway and the homes situated along the eastern property line.
- 3) Barnyard Shopping Center - west to east view - from Clock Tower Lane looking across Carmel Rancho Blvd. Filtered view between the commercial buildings.
- 4) Site Plans - East to West orientation.

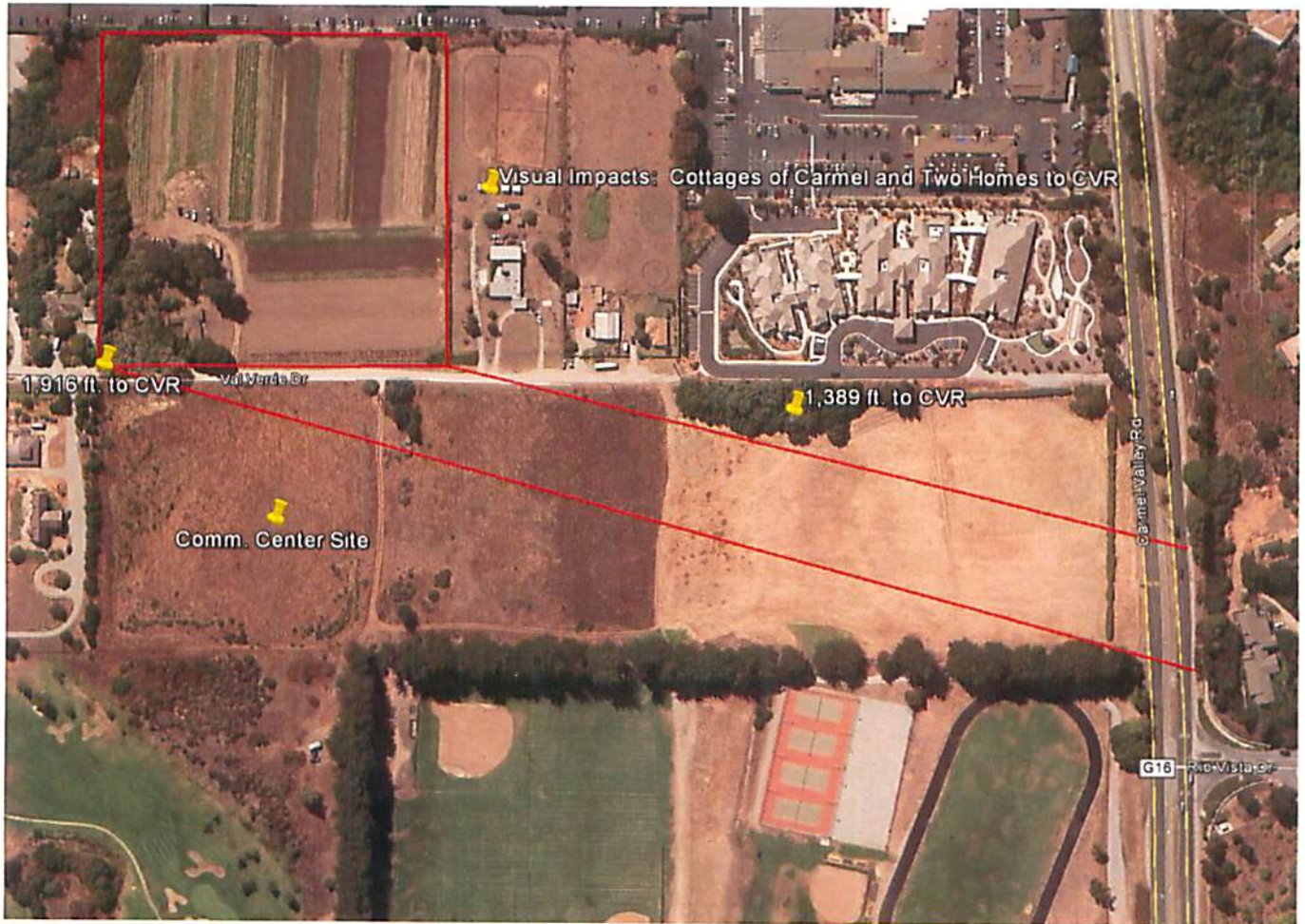
Elevation Studies:

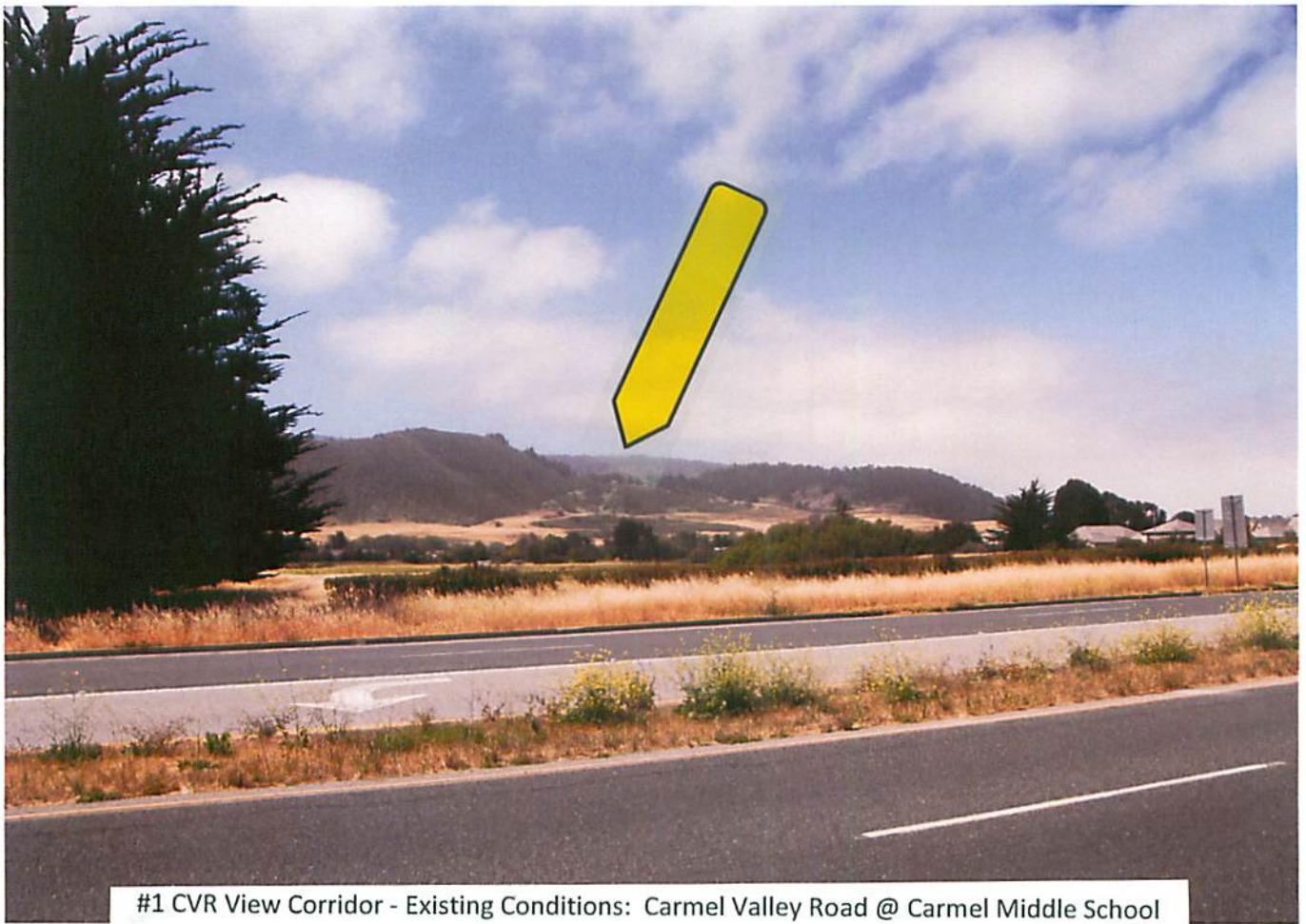
- 1) North, South, East & West

Architectural Renderings - Conceptual:

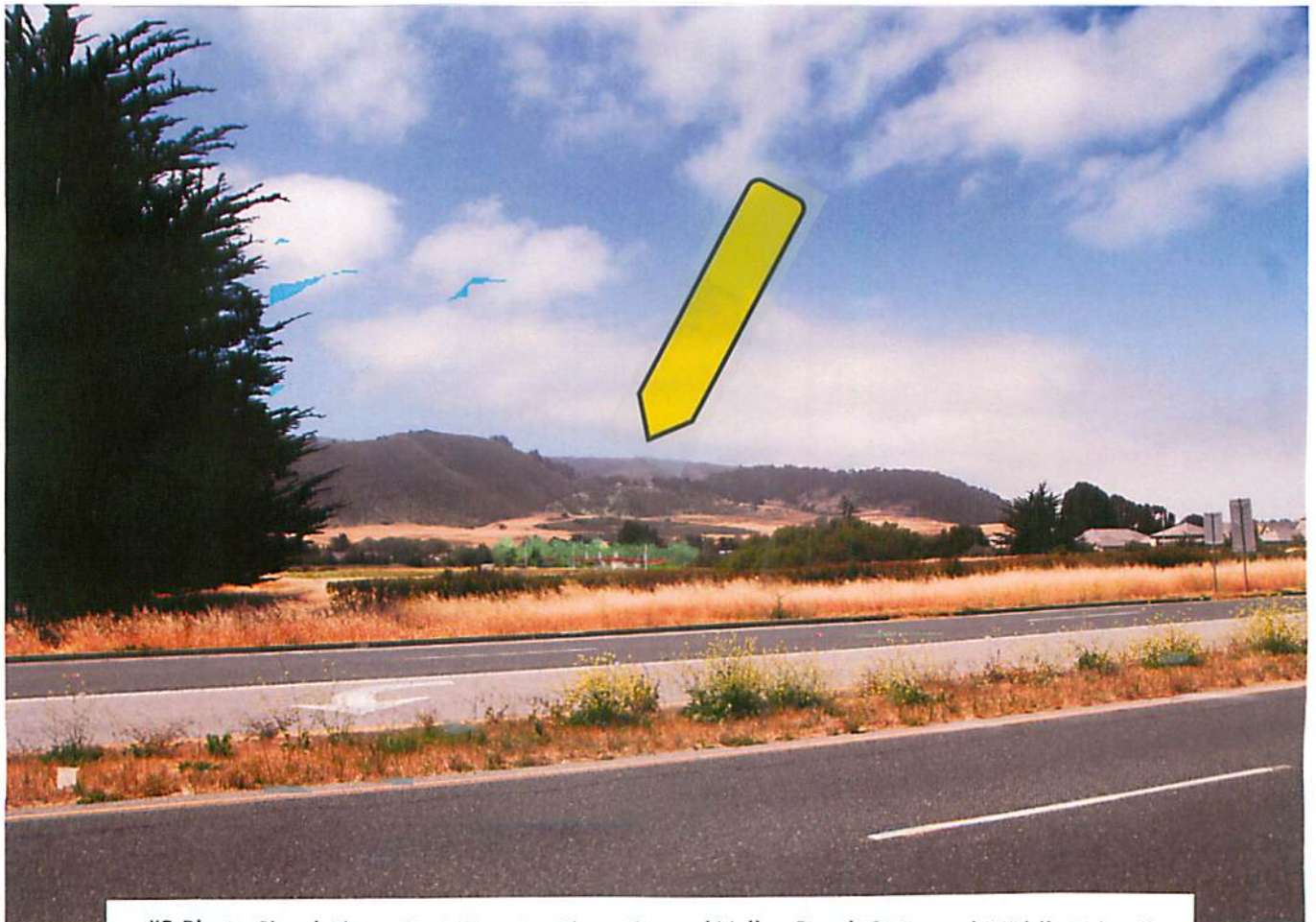
- 1) Affordable Units (7) and Courtyard Market Rate Style Homes (24)

Photo Simulation - North Elevation

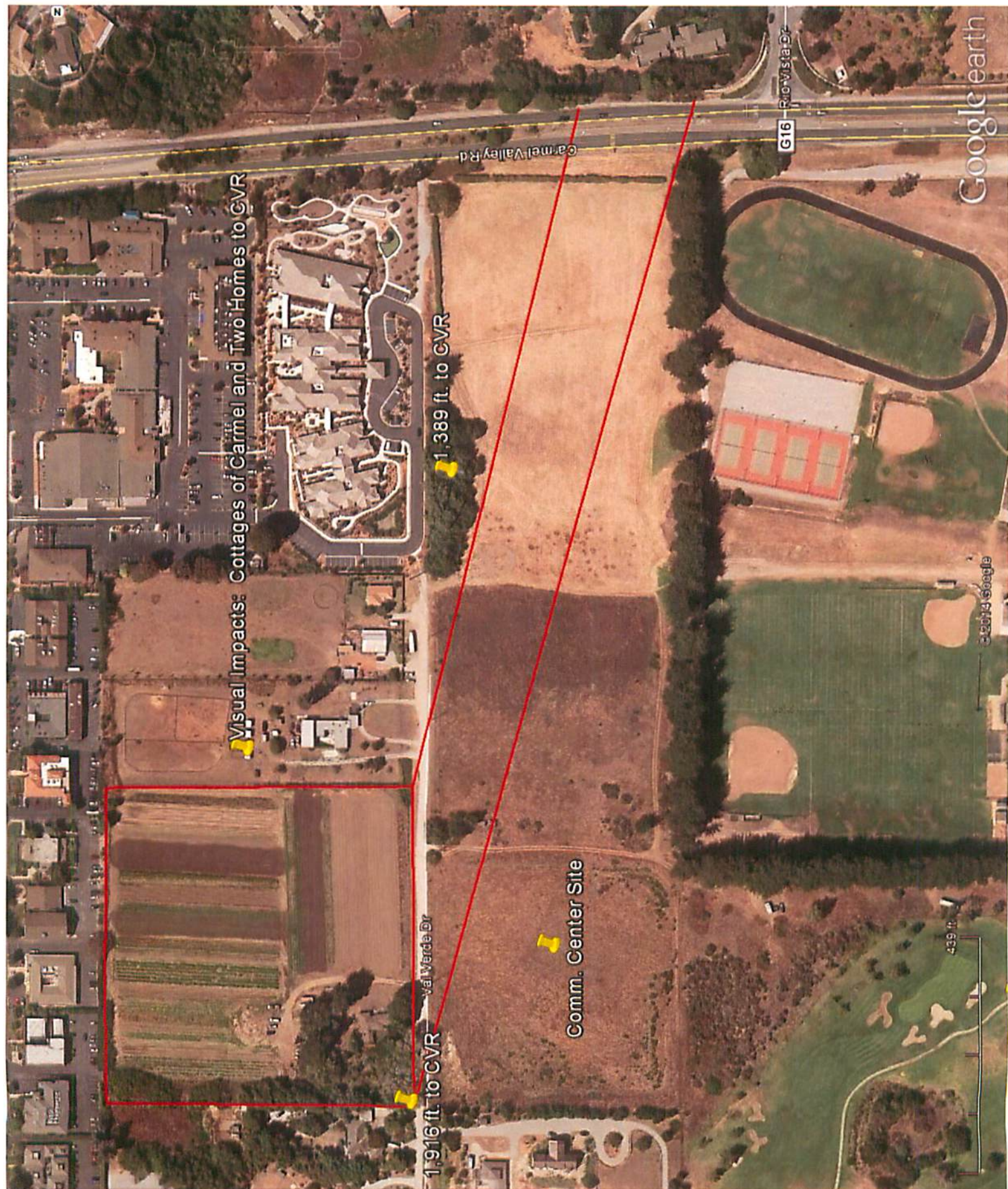




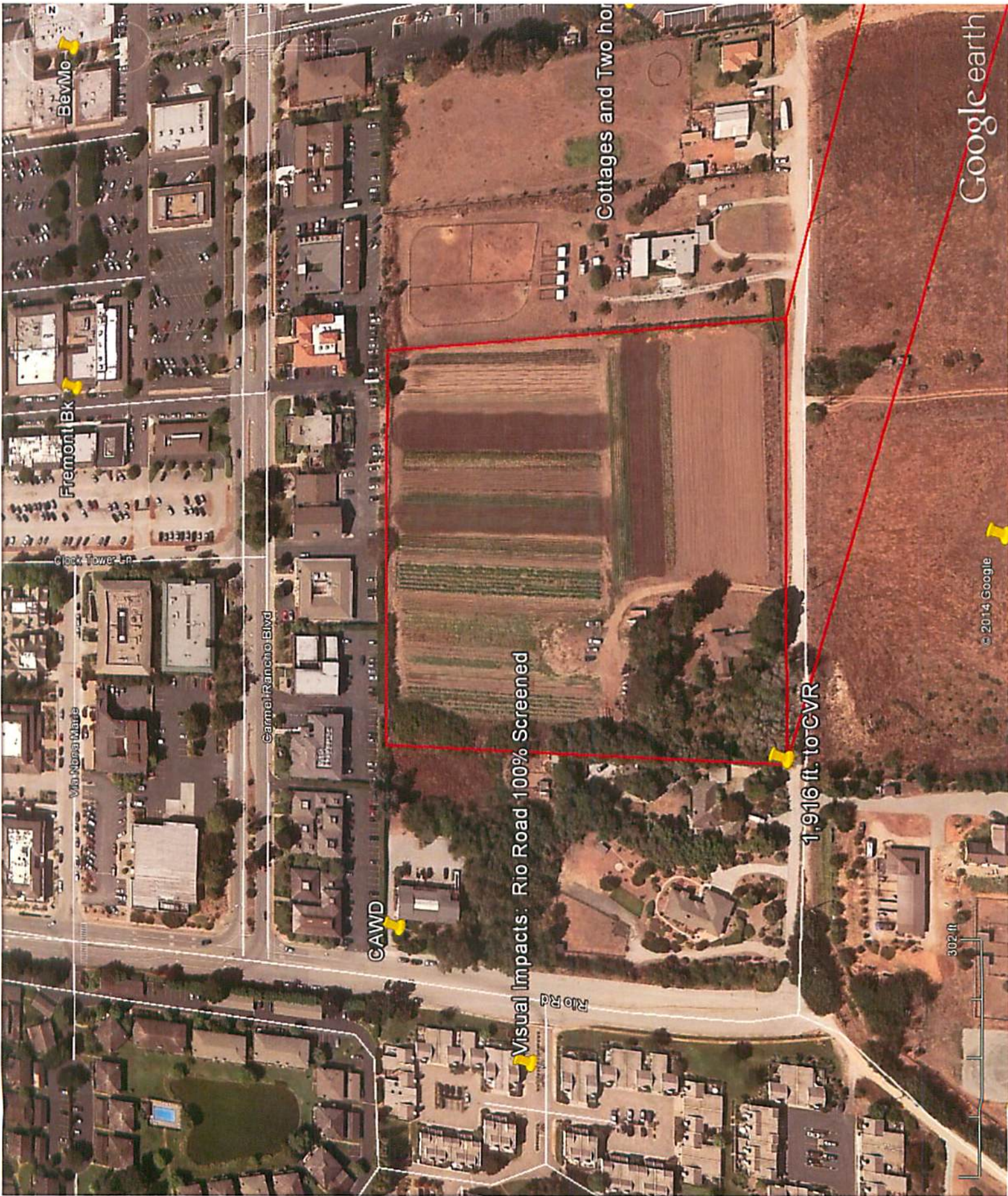
#1 CVR View Corridor - Existing Conditions: Carmel Valley Road @ Carmel Middle School
View: North to South - Primary Public Viewing Corridor



#2 Photo Simulation - Post Construction: Carmel Valley Road @ Carmel Middle School
View: North to South - Primary Public Viewing Corridor



Aerial View Corridor: Carmel Valley Road @ Carmel Middle School
View: North to South - Primary Public Viewing Corridor approximately 300' Wide



Aerial View Corridor - Enlarged Perspective: Carmel Valley Road @ Carmel Middle School
View: North to South - Primary Public Viewing Corridor approximately 300' Wide

Photo Simulation - South Elevation

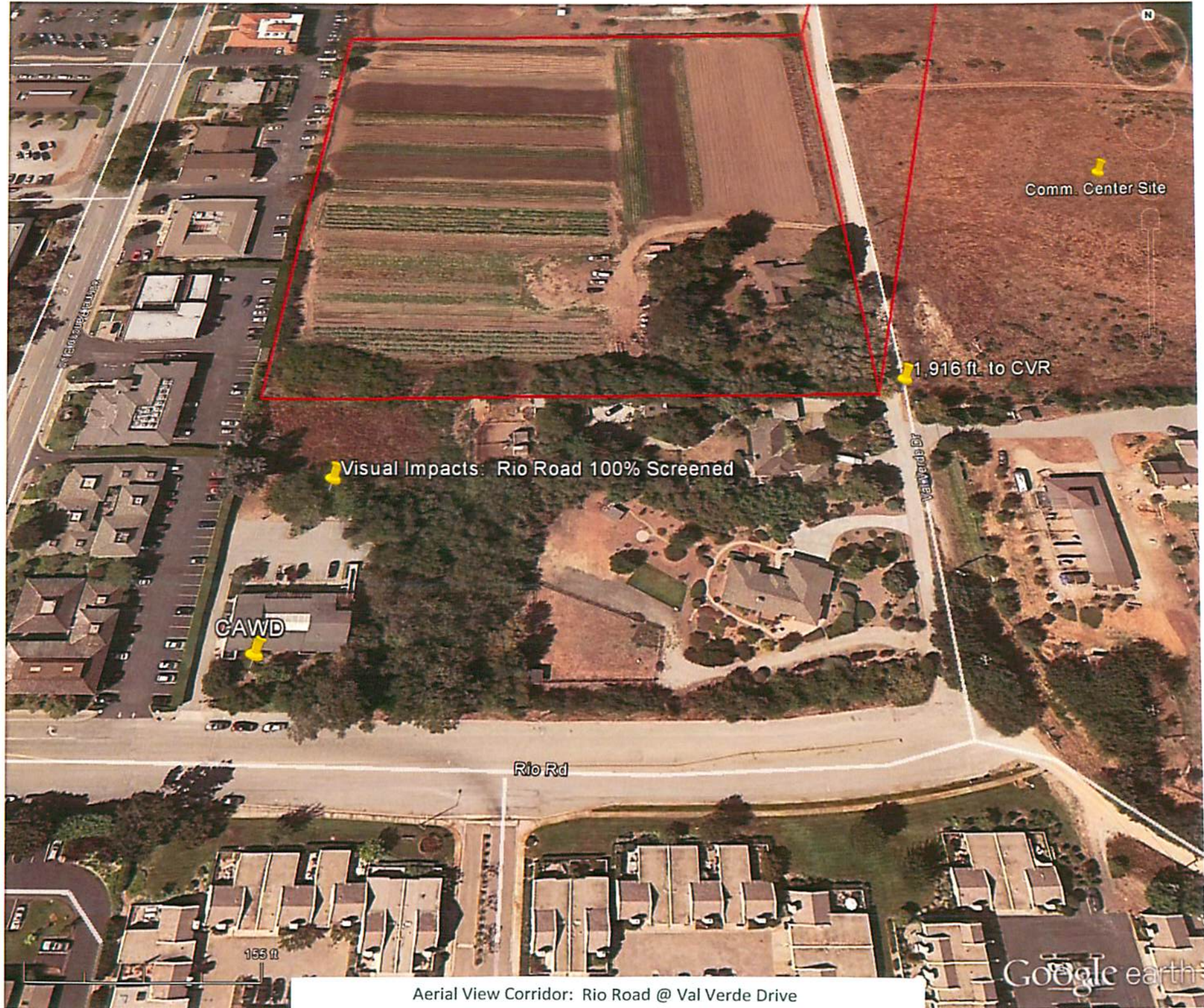




#1 Photo Simulation - Post Construction: New Private Road with Five Homes
View: South to North (CVR 1,900' North)



#2 Val Verde Drive - Private Road Existing Conditions
View: South to North



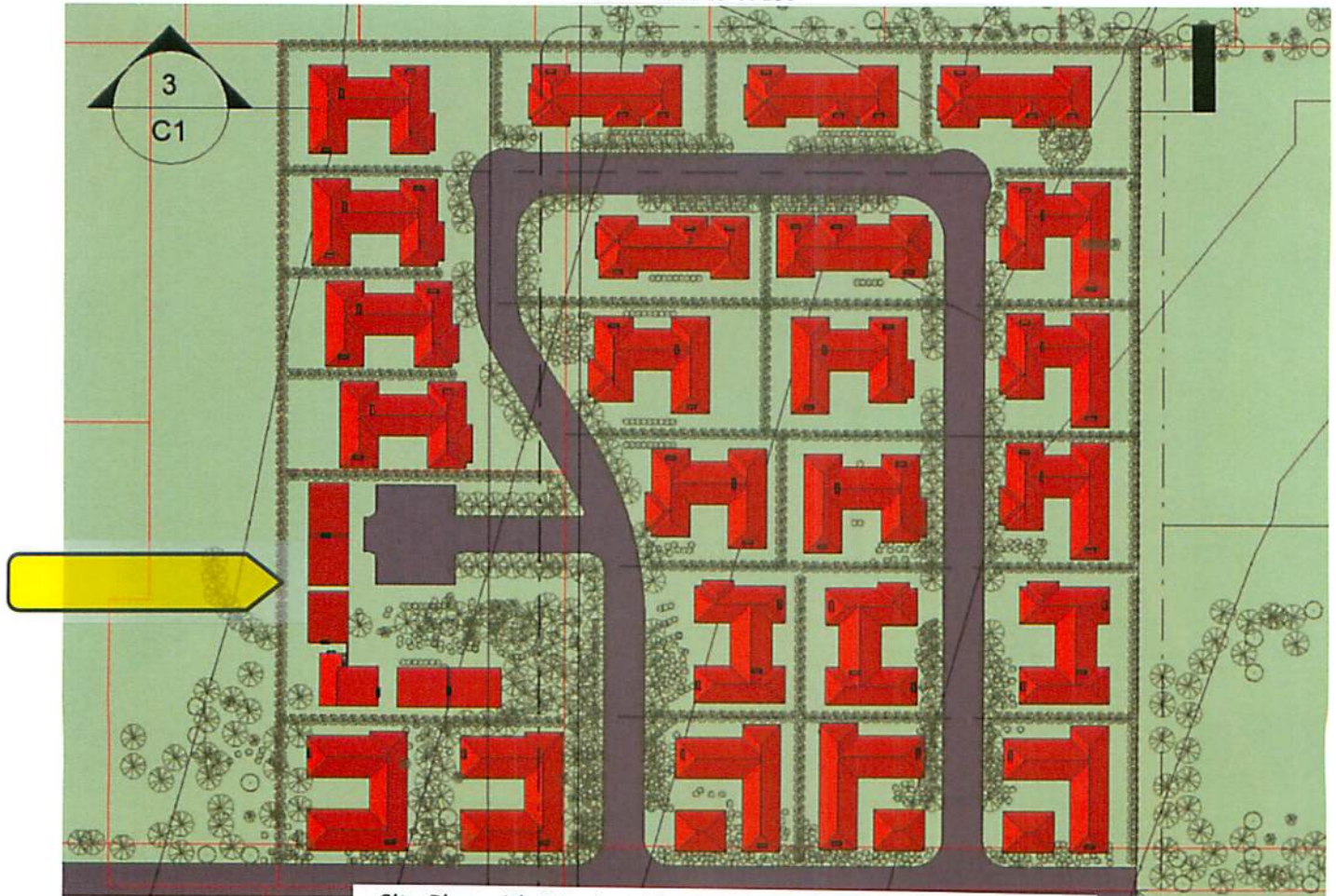
Aerial View Corridor: Rio Road @ Val Verde Drive
View: South to North

Photo Simulation - East Elevation & Site Plan
Inclusionary Housing

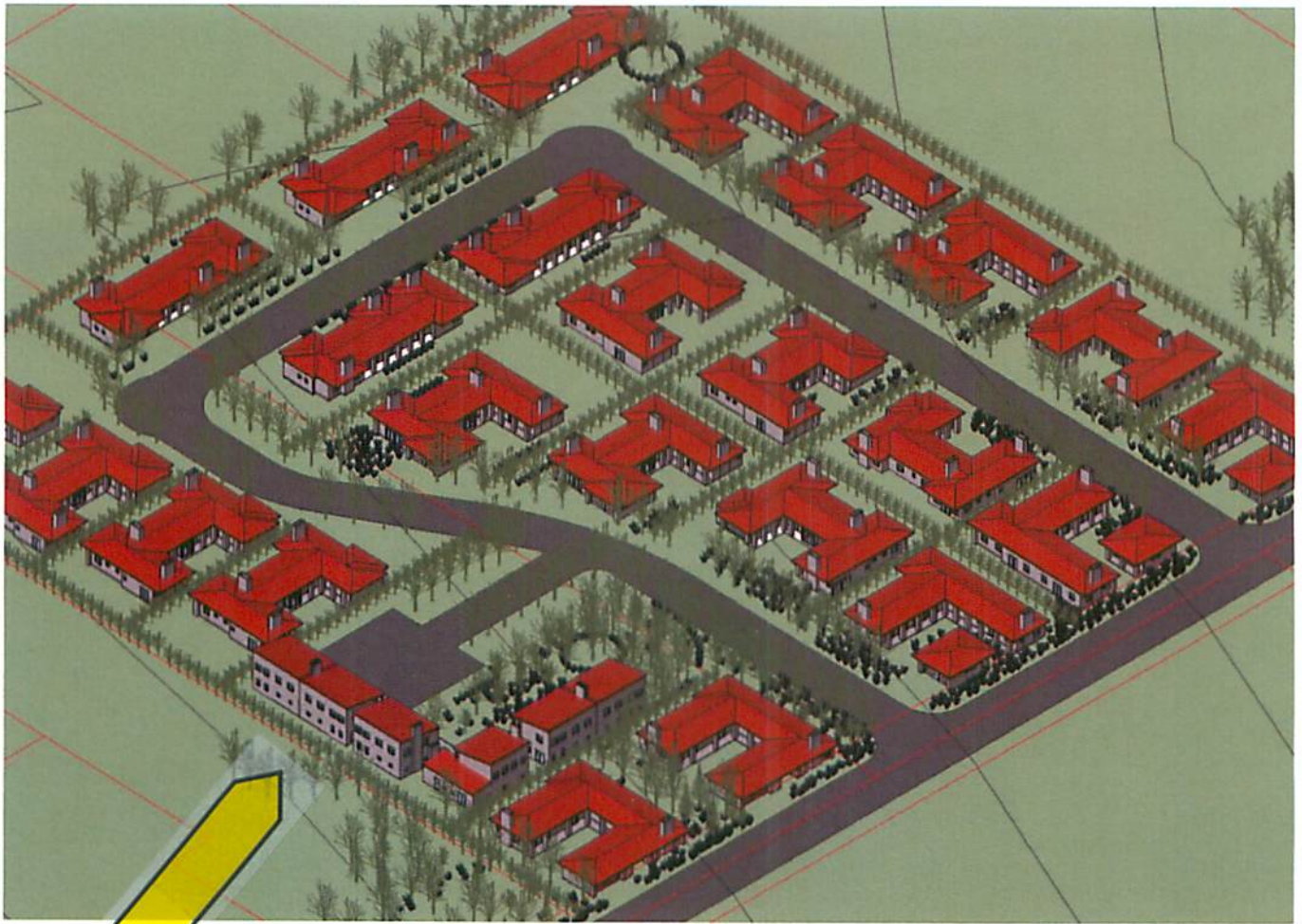




View: East to West



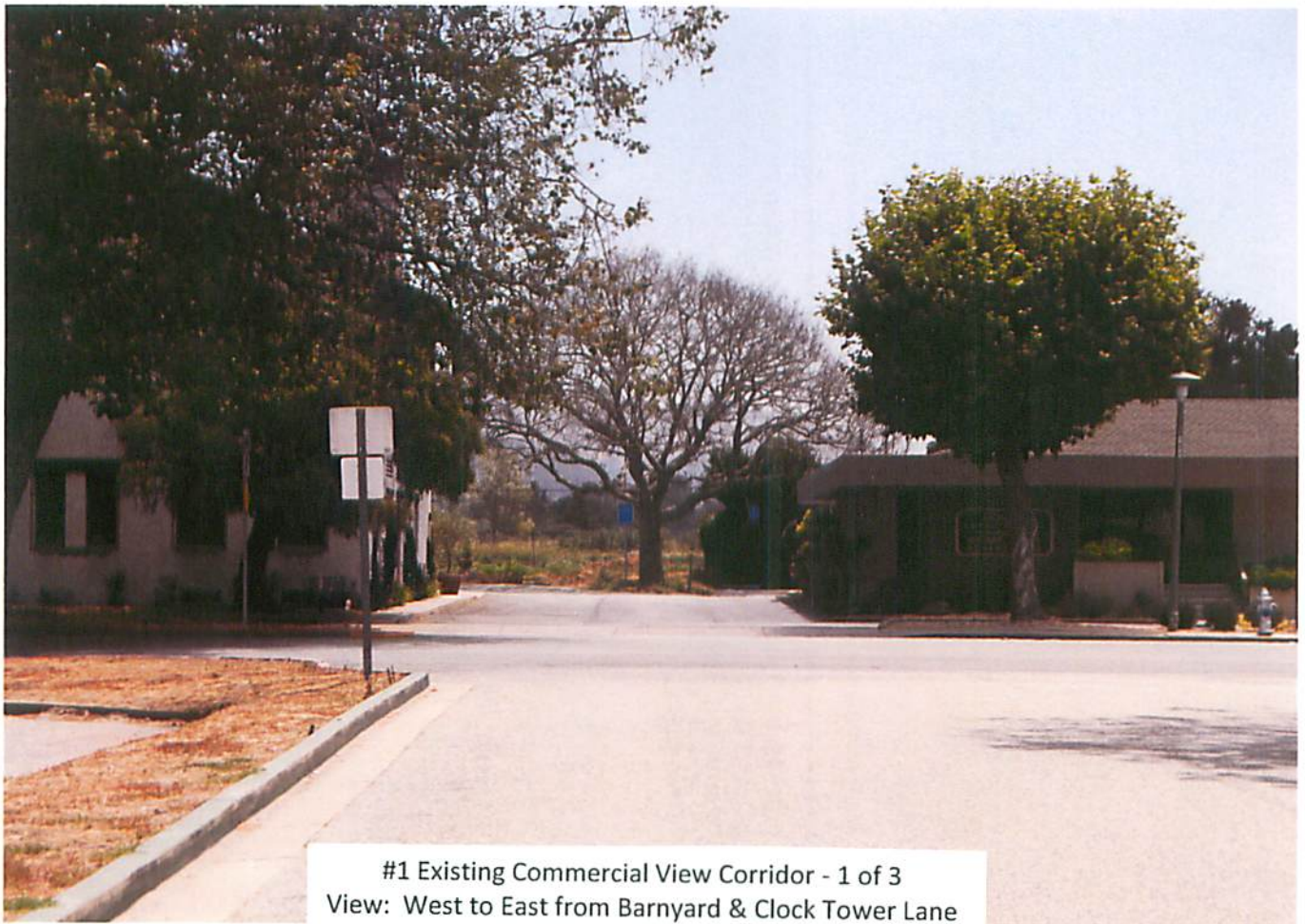
Site Plan with 7 Inclusionary Units on Southern Property Line
with 24 Single Family Homes



Site Plan with 7 Inclusionary Units & 24 Single Family Homes

Photo Simulation - West Elevation

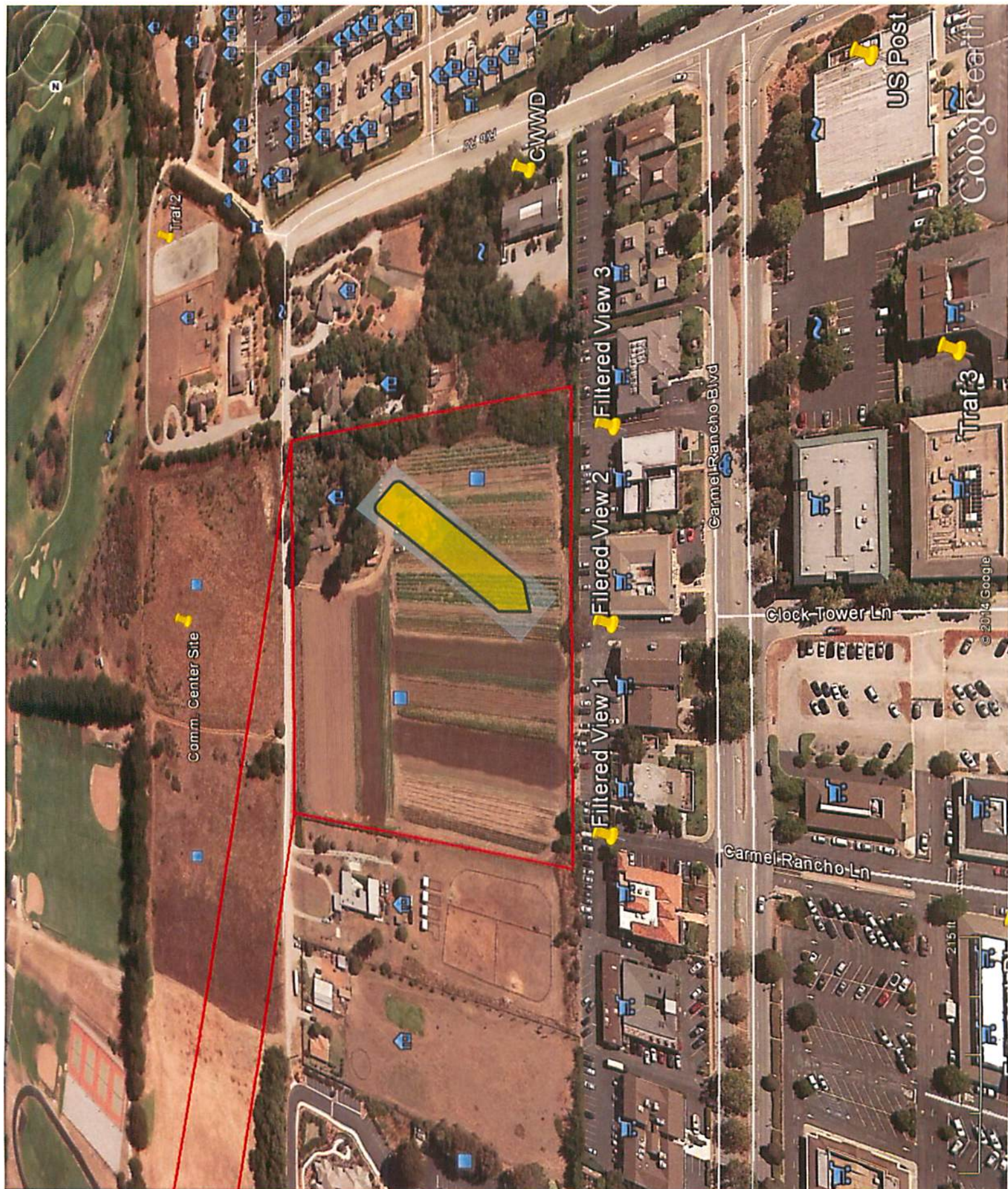




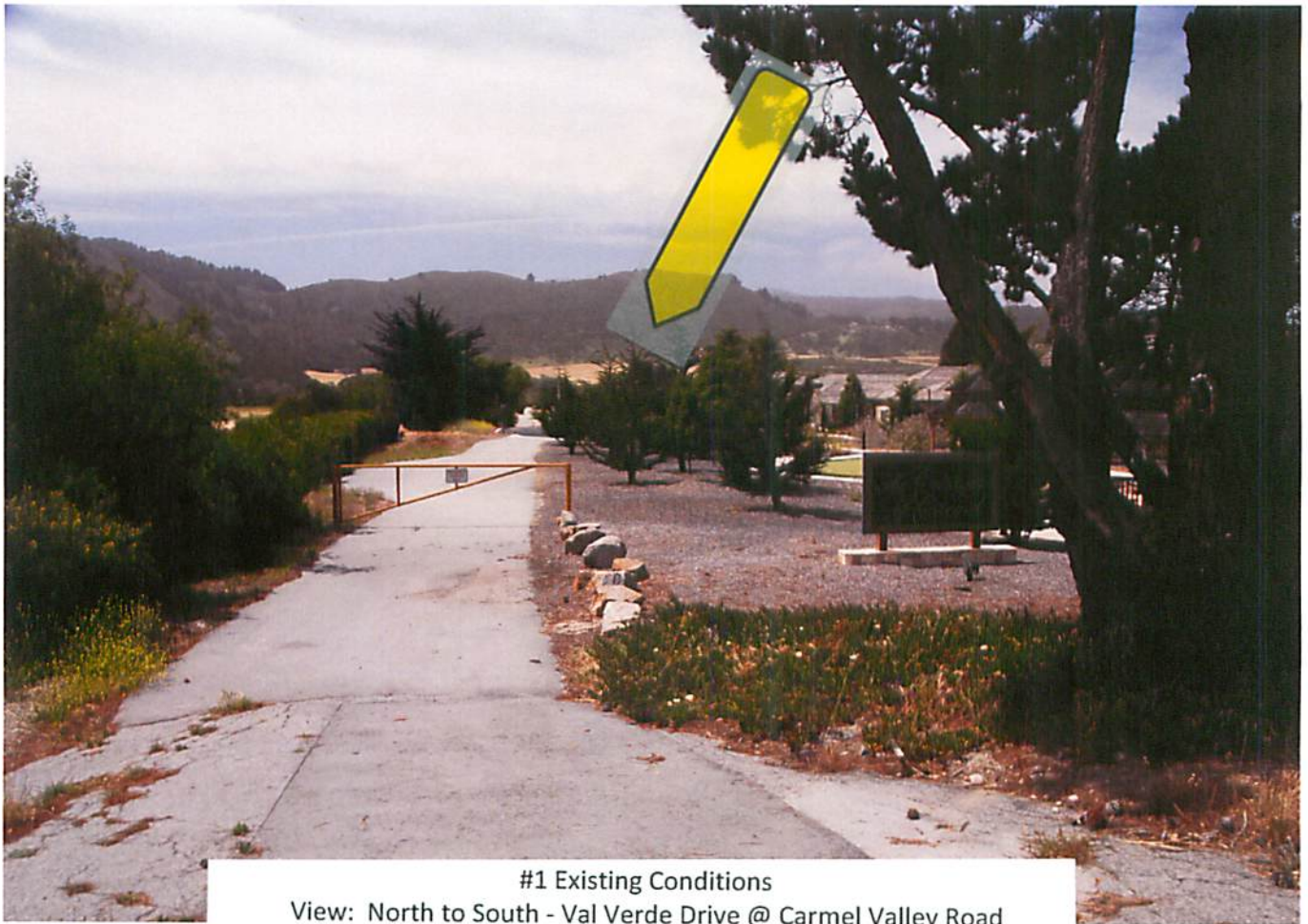
#1 Existing Commercial View Corridor - 1 of 3
View: West to East from Barnyard & Clock Tower Lane
Cross Street: Carmel Rancho Blvd.

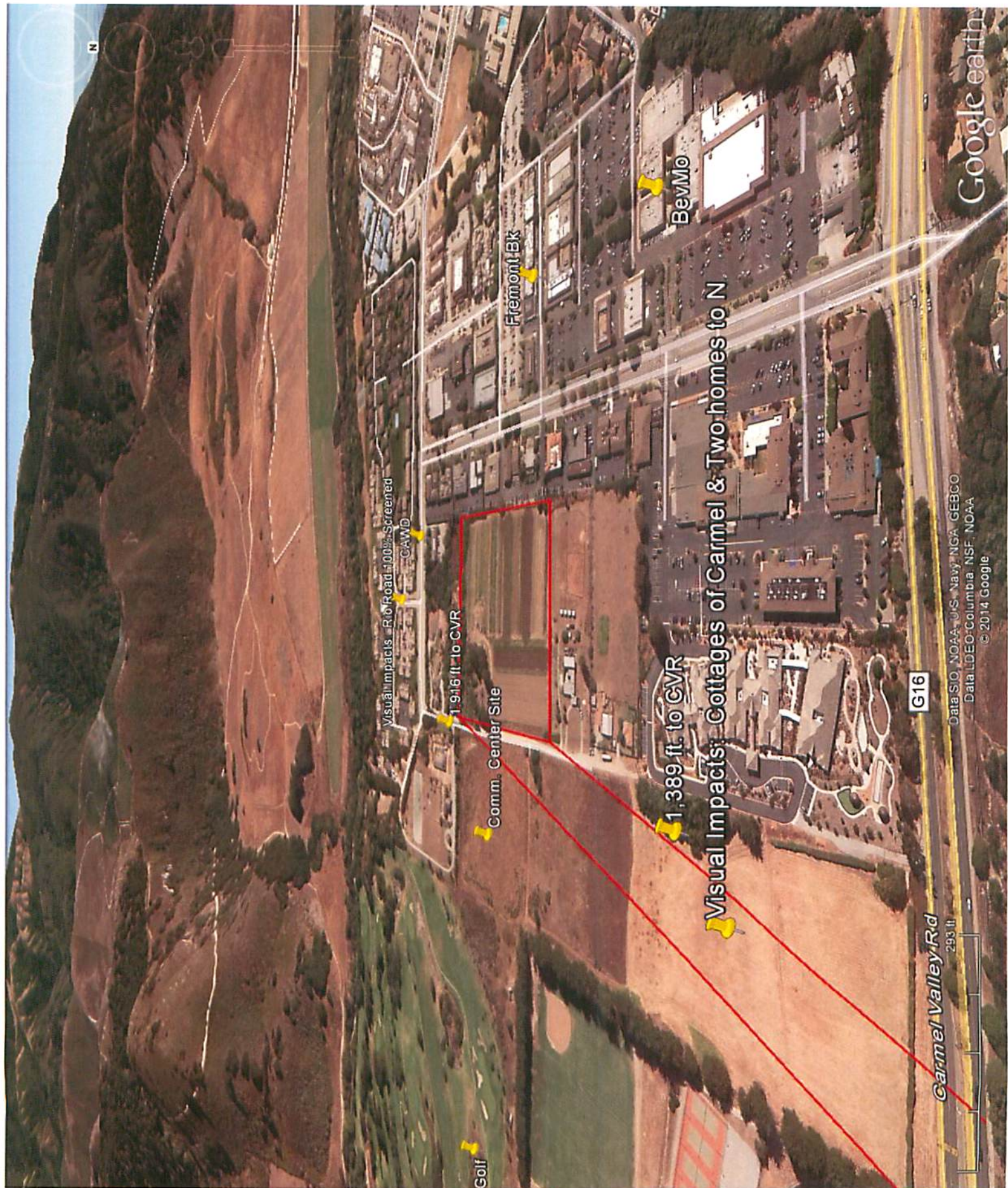


#2 Photo Simulation - Commercial View Corridor
View: West to East from Barnyard & Clock Tower Lane



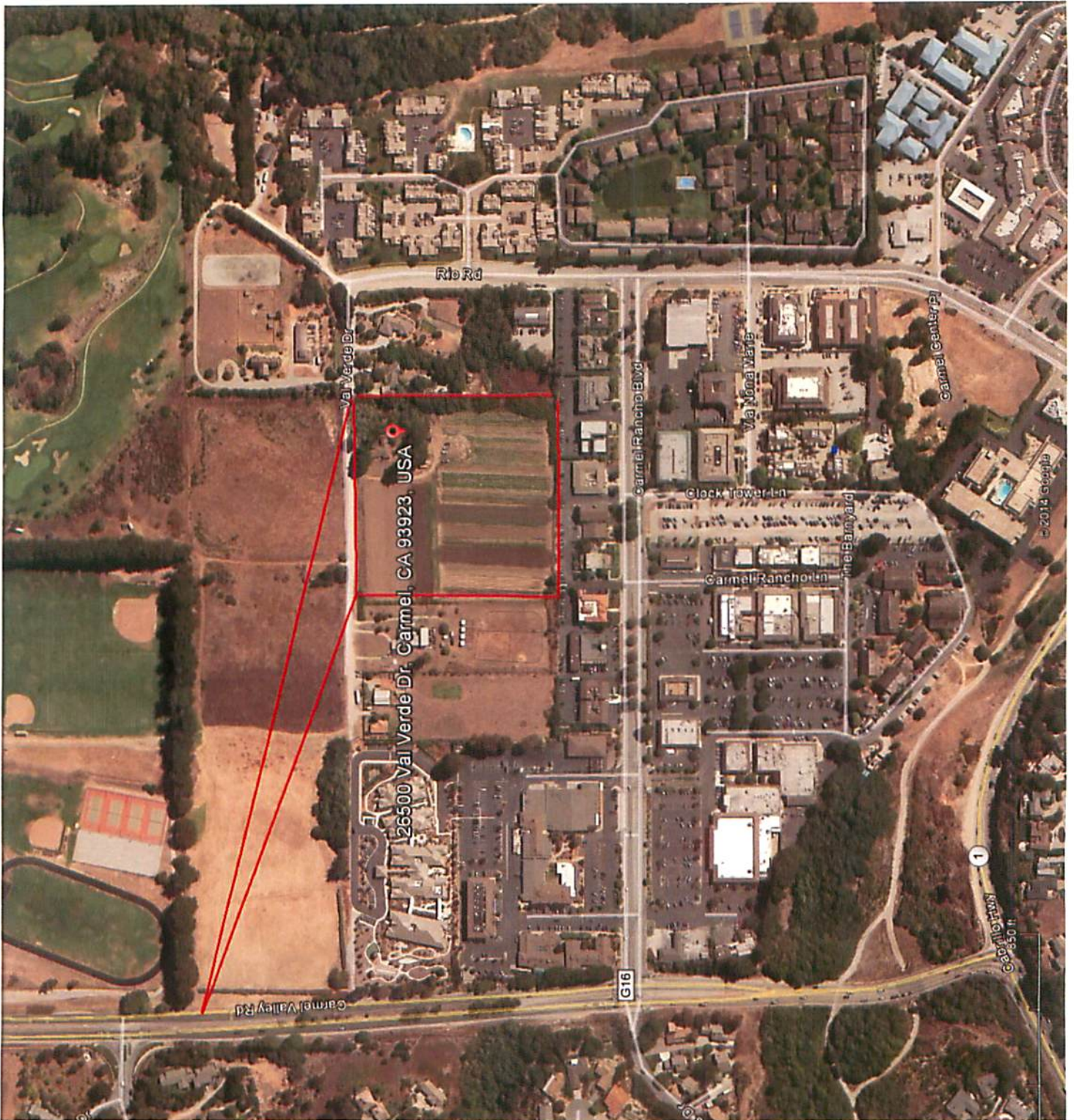
Aerial Site View - West Elevation looking East





Aerial Site View #1 - North Elevation looking South

Existing North Elevation & Visual Impact Study



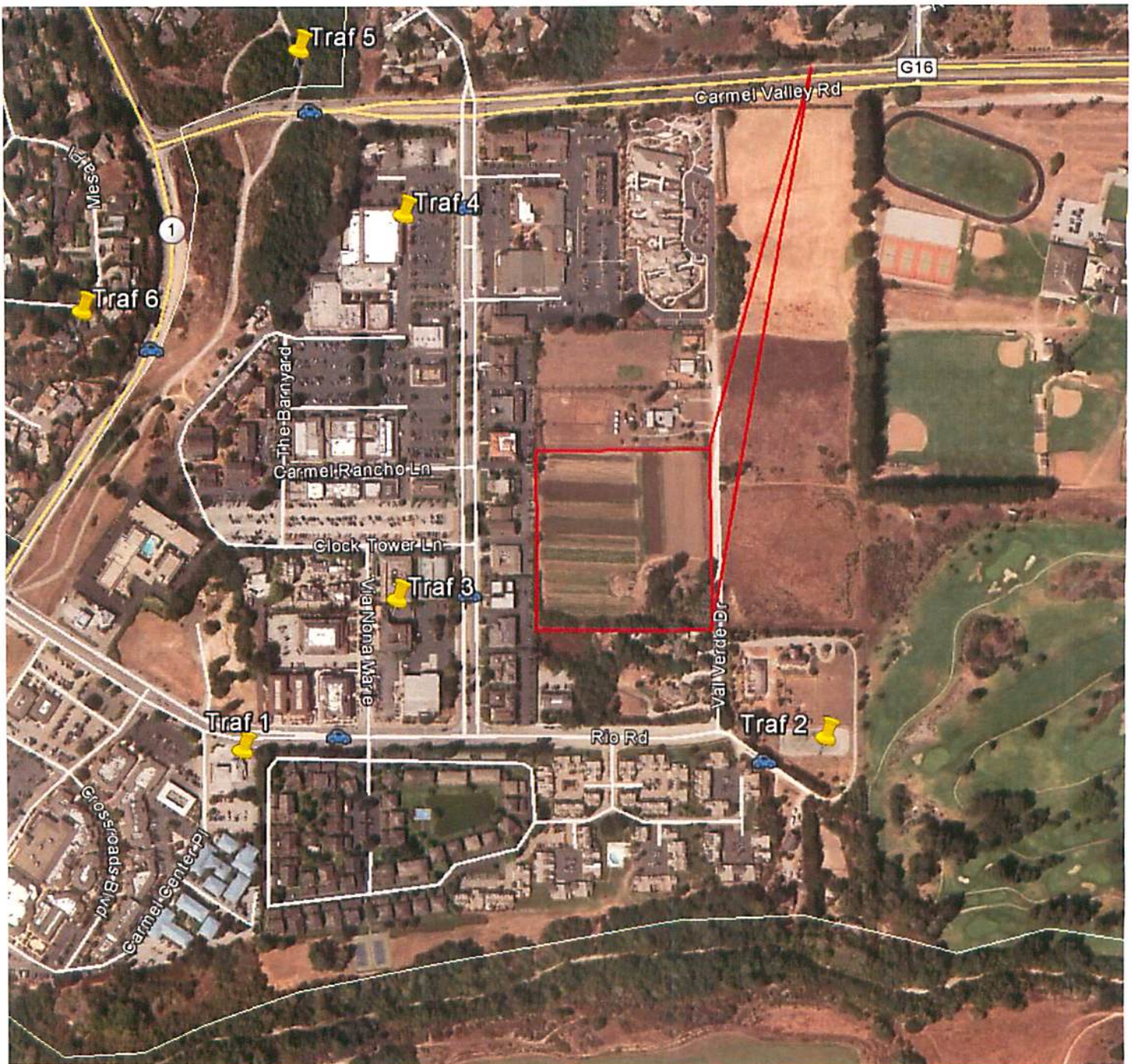


Aerial Site View #2 - North Elevation looking South



Aerial Site View #3 - North Elevation looking South

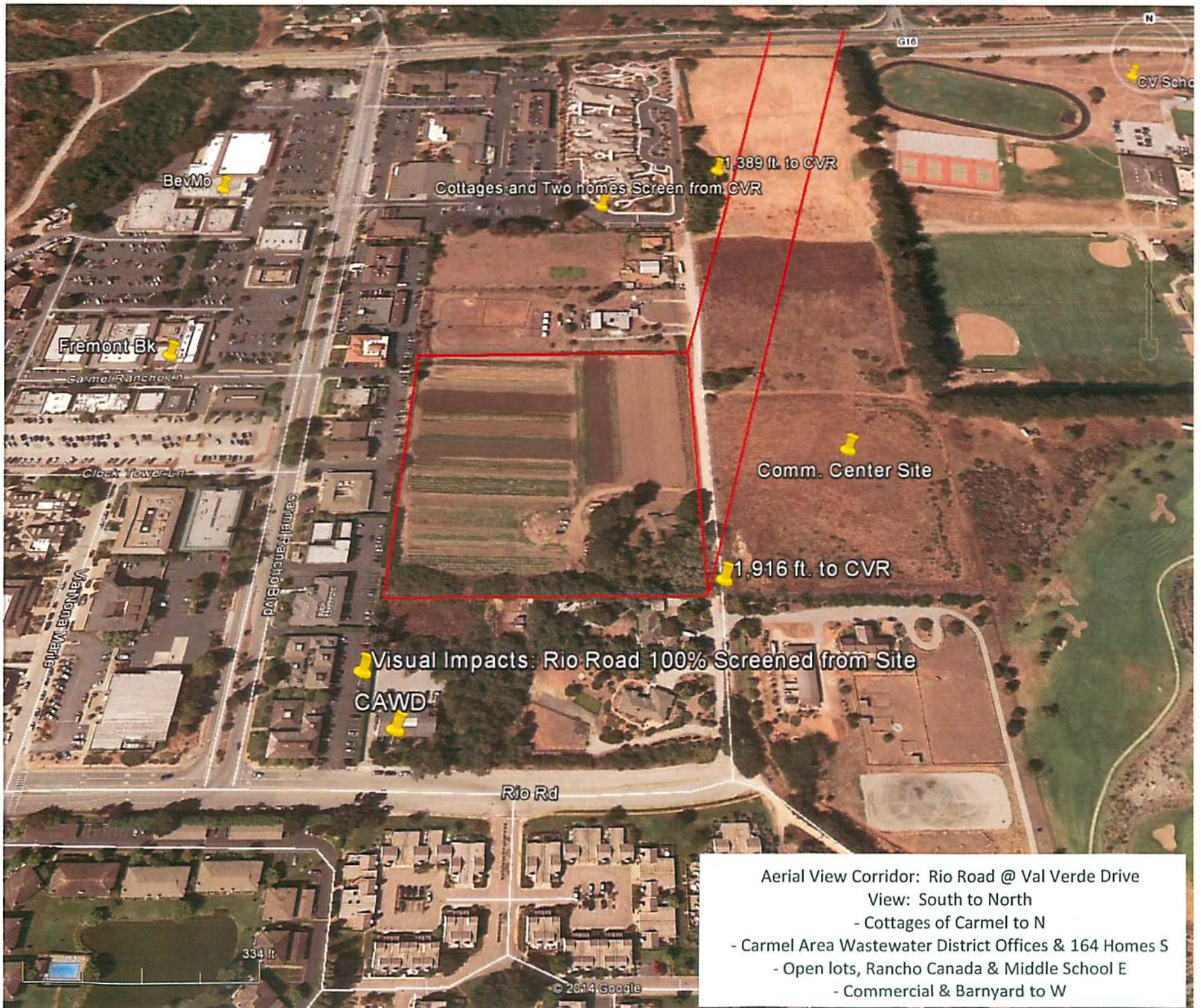
Existing South Elevation & Visual Impact Study





Existing East Elevation & Visual Impact Study





Aerial View Corridor: Rio Road @ Val Verde Drive

View: South to North

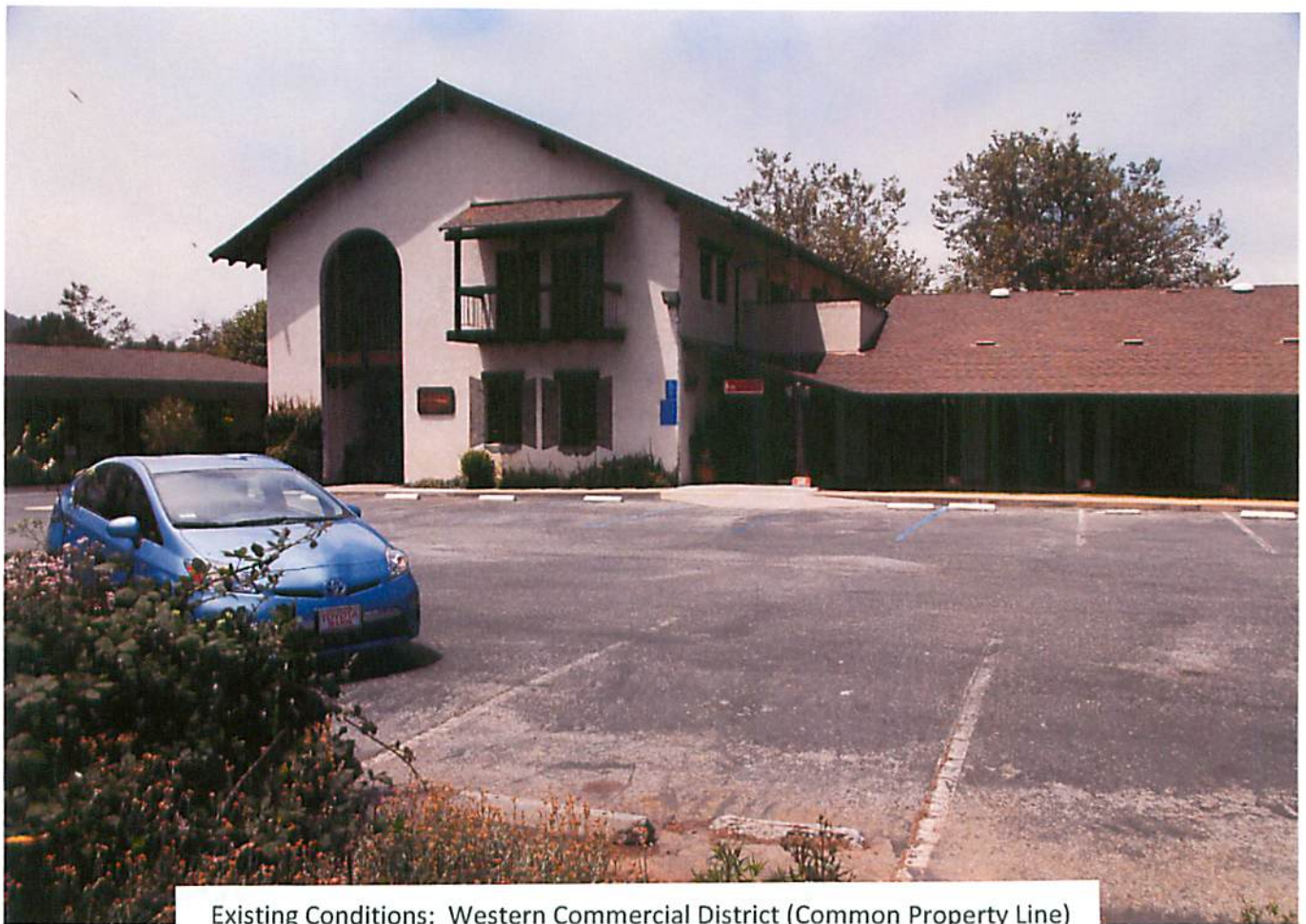
- Cottages of Carmel to N
- Carmel Area Wastewater District Offices & 164 Homes S
- Open lots, Rancho Canada & Middle School E
- Commercial & Barnyard to W



East Elevation - Aerial View Corridor

View: East to West

- Rancho Canada Golf Club & Carmel Middle School East of Site



Existing Conditions: Western Commercial District (Common Property Line)
View: East to West



Existing Conditions: Subject Site - Val Verde Drive looking West
View: East to West

Existing West Elevation & Visual Impact Study





West Elevation Existing Conditions - Aerial View Corridor
View: West to East
- US Post Office, Commercial District & Barnyard West of Site

Architectural Renderings
Inclusionary (7) and Market Rate Courtyard Style Homes (24)



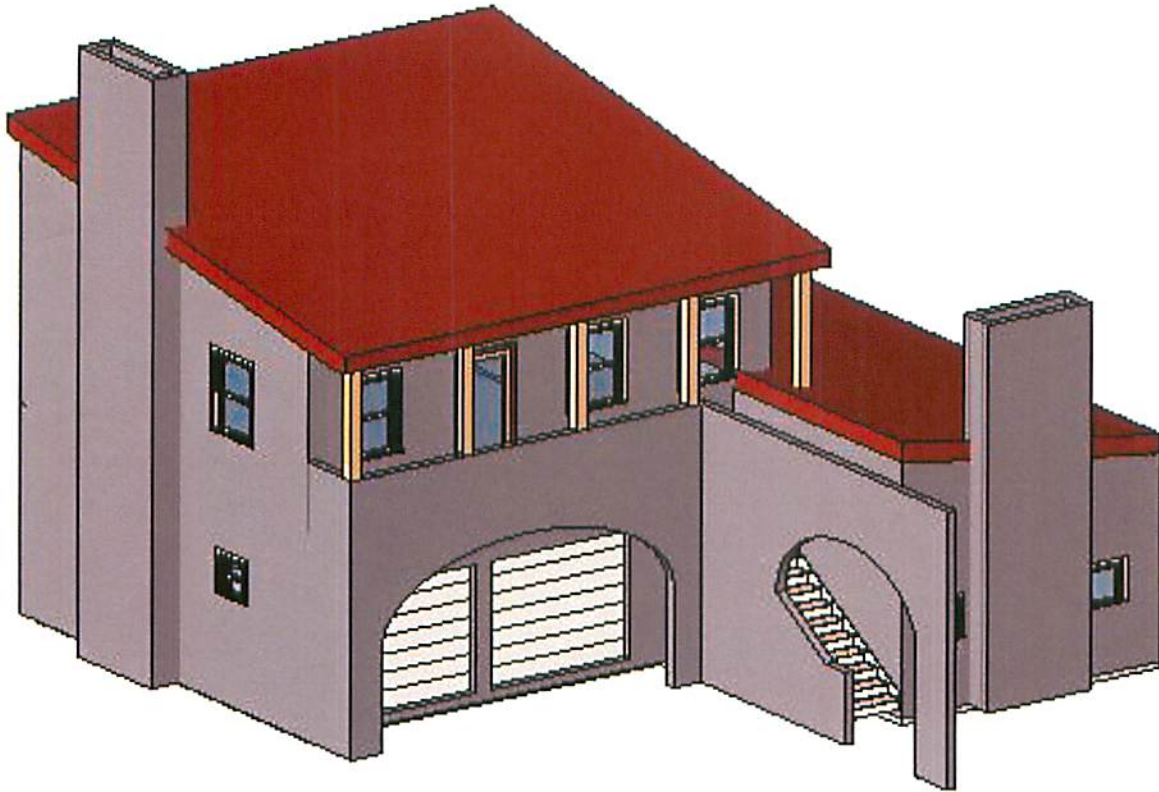
#1 Architectural Renderings - Inclusionary Units (7)
(colors not selected at this time)



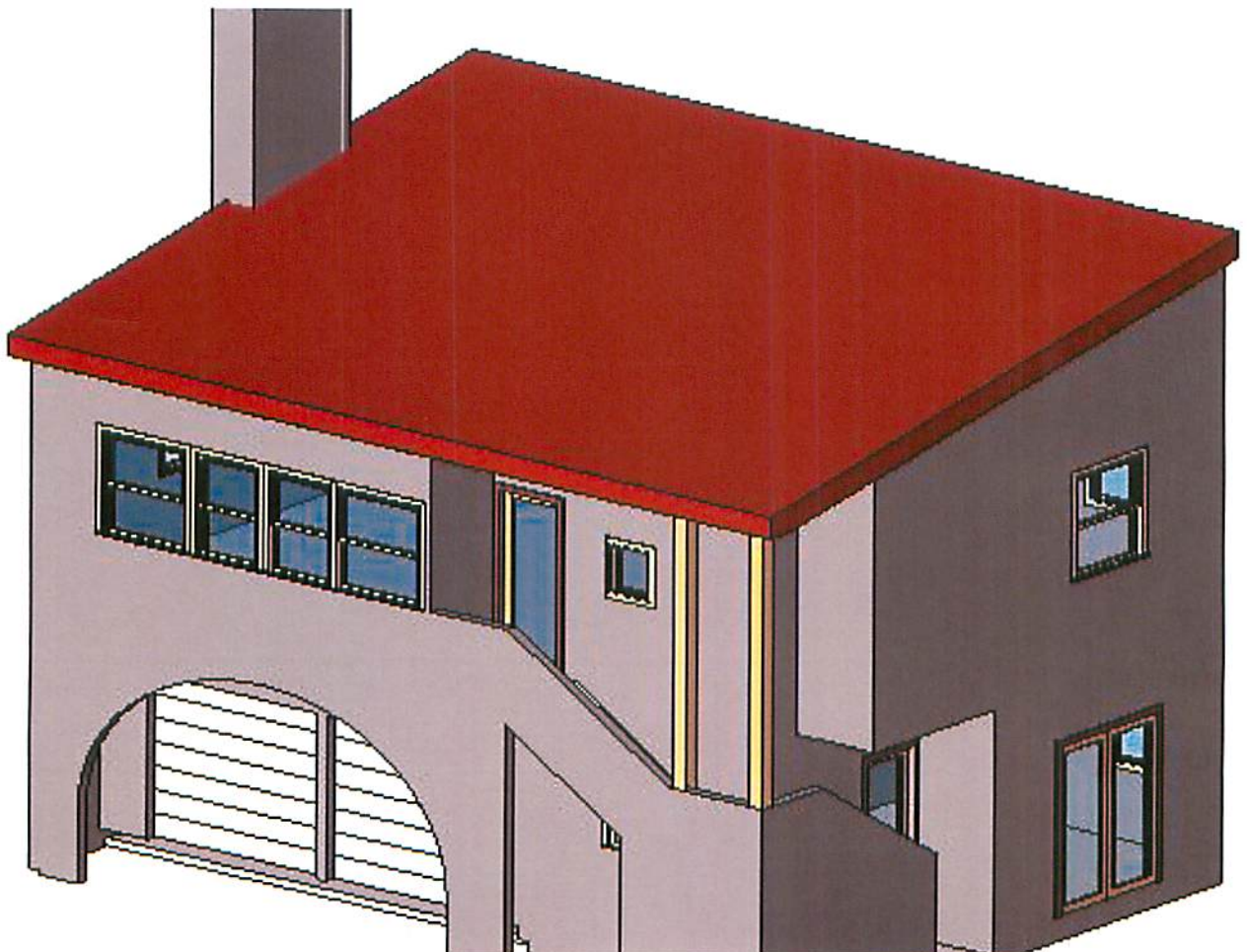
Conceptual



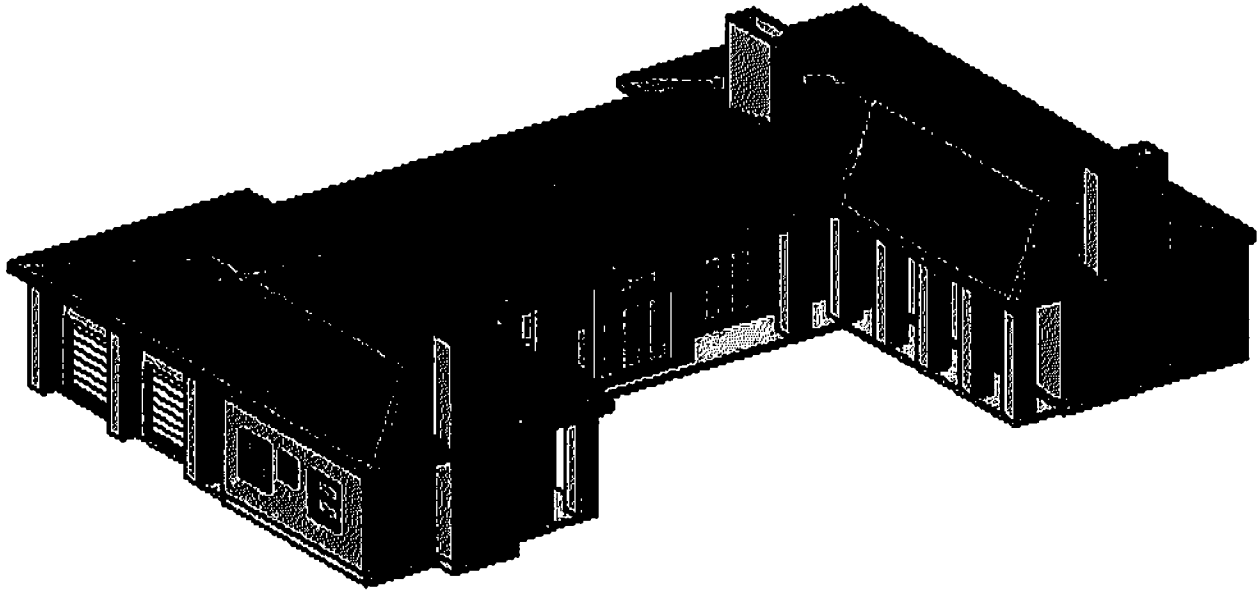
#2 Architectural Renderings - Inclusionary Units (7)
(colors not selected at this time)



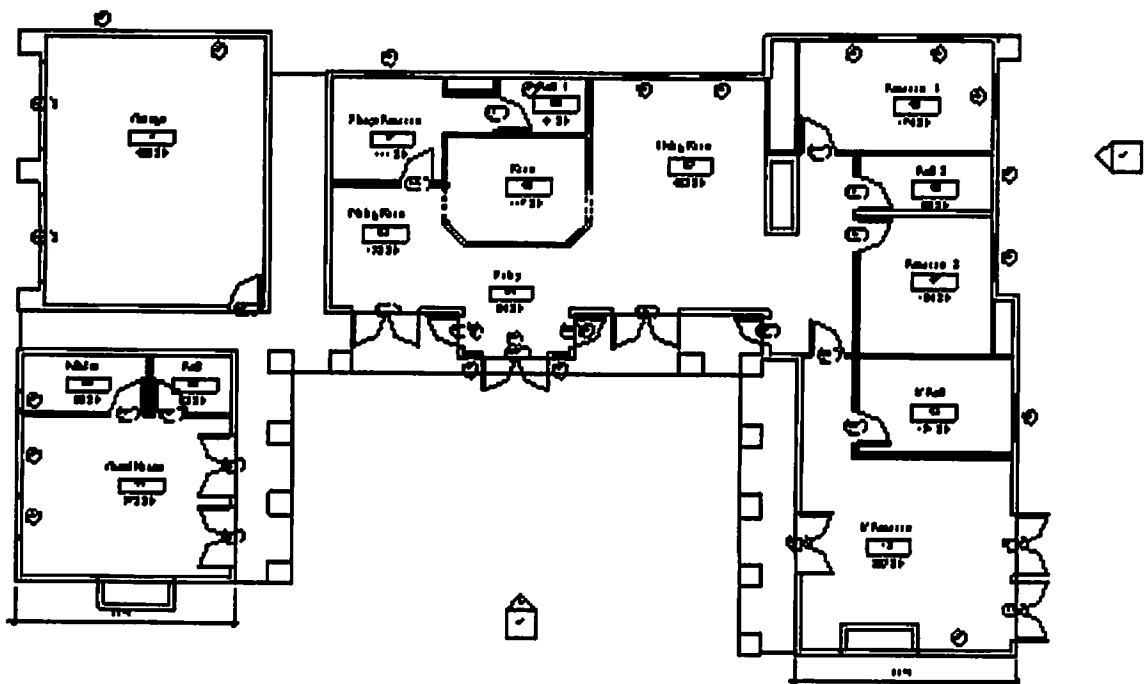
Conceptual



#3 Architectural Renderings - Courtyard Homes (24)
(colors not selected at this time)



Conceptual



Appendix C

Air Quality



Appendix C-1

Modeling Results



Carmel Rio Existing
North Central Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	1.00	Dwelling Unit	0.32	1,800.00	3

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.8	Precipitation Freq (Days)	53
Climate Zone	3			Operational Year	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2019

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.1100	0.7928	0.4964	6.9000e-004	1.8700e-003	0.0544	0.0563	6.7000e-004	0.0503	0.0509	0.0000	64.2949	64.2949	0.0184	0.0000	64.6805
Total	0.1100	0.7928	0.4964	6.9000e-004	1.8700e-003	0.0544	0.0563	6.7000e-004	0.0503	0.0509	0.0000	64.2949	64.2949	0.0184	0.0000	64.6805

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.1100	0.7928	0.4964	6.9000e-004	1.8700e-003	0.0544	0.0563	6.7000e-004	0.0503	0.0509	0.0000	64.2948	64.2948	0.0184	0.0000	64.6804
Total	0.1100	0.7928	0.4964	6.9000e-004	1.8700e-003	0.0544	0.0563	6.7000e-004	0.0503	0.0509	0.0000	64.2948	64.2948	0.0184	0.0000	64.6804

[illegible]

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0728	9.4000e-004	0.0848	3.0000e-005		0.0109	0.0109		0.0109	0.0109	1.0330	0.4453	1.4783	9.7000e-004	8.0000e-005	1.5238
Energy	1.7000e-004	1.4400e-003	6.1000e-004	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	3.9018	3.9018	1.3000e-004	5.0000e-005	3.9206
Mobile	6.7900e-003	0.0181	0.0787	1.6000e-004	0.0103	2.3000e-004	0.0105	2.7500e-003	2.2000e-004	2.9700e-003	0.0000	11.5787	11.5787	5.4000e-004	0.0000	11.5900
Waste						0.0000	0.0000		0.0000	0.0000	0.2680	0.0000	0.2680	0.0158	0.0000	0.6005
Water						0.0000	0.0000		0.0000	0.0000	0.0207	0.1444	0.1651	2.1300e-003	5.0000e-005	0.2257
Total	0.0798	0.0205	0.1641	2.0000e-004	0.0103	0.0113	0.0215	2.7500e-003	0.0112	0.0140	1.3216	16.0702	17.3918	0.0196	1.8000e-004	17.8605

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0728	9.4000e-004	0.0848	3.0000e-005		0.0109	0.0109		0.0109	0.0109	1.0330	0.4453	1.4783	9.7000e-004	8.0000e-005	1.5238
Energy	1.7000e-004	1.4400e-003	6.1000e-004	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	3.9018	3.9018	1.3000e-004	5.0000e-005	3.9206
Mobile	6.7900e-003	0.0181	0.0787	1.6000e-004	0.0103	2.3000e-004	0.0105	2.7500e-003	2.2000e-004	2.9700e-003	0.0000	11.5787	11.5787	5.4000e-004	0.0000	11.5900
Waste						0.0000	0.0000		0.0000	0.0000	0.2680	0.0000	0.2680	0.0158	0.0000	0.6005
Water						0.0000	0.0000		0.0000	0.0000	0.0207	0.1444	0.1651	2.1300e-003	5.0000e-005	0.2257
Total	0.0798	0.0205	0.1641	2.0000e-004	0.0103	0.0113	0.0215	2.7500e-003	0.0112	0.0140	1.3216	16.0702	17.3918	0.0196	1.8000e-004	17.8605

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/14/2016	5	10	
2	Site Preparation	Site Preparation	1/15/2016	1/15/2016	5	1	
3	Grading	Grading	1/16/2016	1/19/2016	5	2	
4	Building Construction	Building Construction	1/20/2016	6/7/2016	5	100	
5	Paving	Paving	6/8/2016	6/14/2016	5	5	
6	Architectural Coating	Architectural Coating	6/15/2016	6/21/2016	5	5	

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 3,645; Residential Outdoor: 1,215; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	4.00	226	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Site Preparation	Graders	1	8.00	174	0.41
Paving	Pavers	1	7.00	125	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	1.00	255	0.40
Grading	Rubber Tired Dozers	1	1.00	255	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.5600e-003	0.0562	0.0435	6.0000e-005		4.0200e-003	4.0200e-003		3.8400e-003	3.8400e-003	0.0000	5.4141	5.4141	1.0800e-003	0.0000	5.4369
Total	6.5600e-003	0.0562	0.0435	6.0000e-005		4.0200e-003	4.0200e-003		3.8400e-003	3.8400e-003	0.0000	5.4141	5.4141	1.0800e-003	0.0000	5.4369

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4000e-004	3.6000e-004	3.2200e-003	0.0000	4.0000e-004	0.0000	4.0000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3732	0.3732	3.0000e-005	0.0000	0.3737
Total	2.4000e-004	3.6000e-004	3.2200e-003	0.0000	4.0000e-004	0.0000	4.0000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3732	0.3732	3.0000e-005	0.0000	0.3737

3.2 Demolition - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.5600e-003	0.0562	0.0435	6.0000e-005		4.0200e-003	4.0200e-003		3.8400e-003	3.8400e-003	0.0000	5.4141	5.4141	1.0800e-003	0.0000	5.4369
Total	6.5600e-003	0.0562	0.0435	6.0000e-005		4.0200e-003	4.0200e-003		3.8400e-003	3.8400e-003	0.0000	5.4141	5.4141	1.0800e-003	0.0000	5.4369

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4000e-004	3.6000e-004	3.2200e-003	0.0000	4.0000e-004	0.0000	4.0000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3732	0.3732	3.0000e-005	0.0000	0.3737
Total	2.4000e-004	3.6000e-004	3.2200e-003	0.0000	4.0000e-004	0.0000	4.0000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3732	0.3732	3.0000e-005	0.0000	0.3737

3.3 Site Preparation - 2016**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.7000e-004	0.0000	2.7000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.8000e-004	6.8200e-003	3.6700e-003	0.0000		4.2000e-004	4.2000e-004		3.8000e-004	3.8000e-004	0.0000	0.4414	0.4414	1.3000e-004	0.0000	0.4442
Total	6.8000e-004	6.8200e-003	3.6700e-003	0.0000	2.7000e-004	4.2000e-004	6.9000e-004	3.0000e-005	3.8000e-004	4.1000e-004	0.0000	0.4414	0.4414	1.3000e-004	0.0000	0.4442

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	2.0000e-005	1.6000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0187	0.0187	0.0000	0.0000	0.0187
Total	1.0000e-005	2.0000e-005	1.6000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0187	0.0187	0.0000	0.0000	0.0187

3.3 Site Preparation - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.7000e-004	0.0000	2.7000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.8000e-004	6.8200e-003	3.6700e-003	0.0000		4.2000e-004	4.2000e-004		3.8000e-004	3.8000e-004	0.0000	0.4414	0.4414	1.3000e-004	0.0000	0.4442
Total	6.8000e-004	6.8200e-003	3.6700e-003	0.0000	2.7000e-004	4.2000e-004	6.9000e-004	3.0000e-005	3.8000e-004	4.1000e-004	0.0000	0.4414	0.4414	1.3000e-004	0.0000	0.4442

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	2.0000e-005	1.6000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0187	0.0187	0.0000	0.0000	0.0187
Total	1.0000e-005	2.0000e-005	1.6000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0187	0.0187	0.0000	0.0000	0.0187

3.4 Grading - 2016**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.5000e-004	0.0000	7.5000e-004	4.1000e-004	0.0000	4.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3100e-003	0.0112	8.7000e-003	1.0000e-005		8.0000e-004	8.0000e-004		7.7000e-004	7.7000e-004	0.0000	1.0828	1.0828	2.2000e-004	0.0000	1.0874
Total	1.3100e-003	0.0112	8.7000e-003	1.0000e-005	7.5000e-004	8.0000e-004	1.5500e-003	4.1000e-004	7.7000e-004	1.1800e-003	0.0000	1.0828	1.0828	2.2000e-004	0.0000	1.0874

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	7.0000e-005	6.4000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0746	0.0746	1.0000e-005	0.0000	0.0748
Total	5.0000e-005	7.0000e-005	6.4000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0746	0.0746	1.0000e-005	0.0000	0.0748

3.4 Grading - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.5000e-004	0.0000	7.5000e-004	4.1000e-004	0.0000	4.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3100e-003	0.0112	8.7000e-003	1.0000e-005		8.0000e-004	8.0000e-004		7.7000e-004	7.7000e-004	0.0000	1.0828	1.0828	2.2000e-004	0.0000	1.0874
Total	1.3100e-003	0.0112	8.7000e-003	1.0000e-005	7.5000e-004	8.0000e-004	1.5500e-003	4.1000e-004	7.7000e-004	1.1800e-003	0.0000	1.0828	1.0828	2.2000e-004	0.0000	1.0874

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	7.0000e-005	6.4000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0746	0.0746	1.0000e-005	0.0000	0.0748
Total	5.0000e-005	7.0000e-005	6.4000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0746	0.0746	1.0000e-005	0.0000	0.0748

3.5 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0691	0.6853	0.4106	5.7000e-004		0.0470	0.0470		0.0432	0.0432	0.0000	53.4584	53.4584	0.0161	0.0000	53.7970
Total	0.0691	0.6853	0.4106	5.7000e-004		0.0470	0.0470		0.0432	0.0432	0.0000	53.4584	53.4584	0.0161	0.0000	53.7970

Unmitigated Construction Off-Site

[illegible]

3.5 Building Construction - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0691	0.6853	0.4106	5.7000e-004		0.0470	0.0470		0.0432	0.0432	0.0000	53.4583	53.4583	0.0161	0.0000	53.7969
Total	0.0691	0.6853	0.4106	5.7000e-004		0.0470	0.0470		0.0432	0.0432	0.0000	53.4583	53.4583	0.0161	0.0000	53.7969

Mitigated Construction Off-Site

[illegible]

3.6 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.8000e-003	0.0266	0.0182	3.0000e-005		1.6500e-003	1.6500e-003		1.5300e-003	1.5300e-003	0.0000	2.4575	2.4575	6.7000e-004	0.0000	2.4717
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.8000e-003	0.0266	0.0182	3.0000e-005		1.6500e-003	1.6500e-003		1.5300e-003	1.5300e-003	0.0000	2.4575	2.4575	6.7000e-004	0.0000	2.4717

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	3.2000e-004	2.9000e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3359	0.3359	2.0000e-005	0.0000	0.3364
Total	2.1000e-004	3.2000e-004	2.9000e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3359	0.3359	2.0000e-005	0.0000	0.3364

3.6 Paving - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.8000e-003	0.0266	0.0182	3.0000e-005		1.6500e-003	1.6500e-003		1.5300e-003	1.5300e-003	0.0000	2.4575	2.4575	6.7000e-004	0.0000	2.4717
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.8000e-003	0.0266	0.0182	3.0000e-005		1.6500e-003	1.6500e-003		1.5300e-003	1.5300e-003	0.0000	2.4575	2.4575	6.7000e-004	0.0000	2.4717

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	3.2000e-004	2.9000e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3359	0.3359	2.0000e-005	0.0000	0.3364
Total	2.1000e-004	3.2000e-004	2.9000e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3359	0.3359	2.0000e-005	0.0000	0.3364

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0282					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.2000e-004	5.9300e-003	4.7100e-003	1.0000e-005		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	0.6383	0.6383	8.0000e-005	0.0000	0.6399
Total	0.0291	5.9300e-003	4.7100e-003	1.0000e-005		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	0.6383	0.6383	8.0000e-005	0.0000	0.6399

[illegible]

3.7 Architectural Coating - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0282					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.2000e-004	5.9300e-003	4.7100e-003	1.0000e-005		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	0.6383	0.6383	8.0000e-005	0.0000	0.6399
Total	0.0291	5.9300e-003	4.7100e-003	1.0000e-005		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	0.6383	0.6383	8.0000e-005	0.0000	0.6399

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	6.7900e-003	0.0181	0.0787	1.6000e-004	0.0103	2.3000e-004	0.0105	2.7500e-003	2.2000e-004	2.9700e-003	0.0000	11.5787	11.5787	5.4000e-004	0.0000	11.5900
Unmitigated	6.7900e-003	0.0181	0.0787	1.6000e-004	0.0103	2.3000e-004	0.0105	2.7500e-003	2.2000e-004	2.9700e-003	0.0000	11.5787	11.5787	5.4000e-004	0.0000	11.5900

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	9.57	10.08	8.77	27,451	27,451
Total	9.57	10.08	8.77	27,451	27,451

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	10.80	7.30	7.50	44.00	18.80	37.20	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.463435	0.038745	0.210439	0.164429	0.051257	0.007280	0.016684	0.030757	0.003062	0.002166	0.008230	0.000809	0.002706

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2.2295	2.2295	1.0000e-004	2.0000e-005	2.2380
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2.2295	2.2295	1.0000e-004	2.0000e-005	2.2380
NaturalGas Mitigated	1.7000e-004	1.4400e-003	6.1000e-004	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.6723	1.6723	3.0000e-005	3.0000e-005	1.6825
NaturalGas Unmitigated	1.7000e-004	1.4400e-003	6.1000e-004	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.6723	1.6723	3.0000e-005	3.0000e-005	1.6825

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	31338.5	1.7000e-004	1.4400e-003	6.1000e-004	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.6723	1.6723	3.0000e-005	3.0000e-005	1.6825
Total		1.7000e-004	1.4400e-003	6.1000e-004	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.6723	1.6723	3.0000e-005	3.0000e-005	1.6825

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	31338.5	1.7000e-004	1.4400e-003	6.1000e-004	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.6723	1.6723	3.0000e-005	3.0000e-005	1.6825
Total		1.7000e-004	1.4400e-003	6.1000e-004	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.6723	1.6723	3.0000e-005	3.0000e-005	1.6825

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	7663.71	2.2295	1.0000e-004	2.0000e-005	2.2380
Total		2.2295	1.0000e-004	2.0000e-005	2.2380

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	7663.71	2.2295	1.0000e-004	2.0000e-005	2.2380
Total		2.2295	1.0000e-004	2.0000e-005	2.2380

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0728	9.4000e-004	0.0848	3.0000e-005		0.0109	0.0109		0.0109	0.0109	1.0330	0.4453	1.4783	9.7000e-004	8.0000e-005	1.5238
Unmitigated	0.0728	9.4000e-004	0.0848	3.0000e-005		0.0109	0.0109		0.0109	0.0109	1.0330	0.4453	1.4783	9.7000e-004	8.0000e-005	1.5238

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.8200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	7.0300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0628	8.5000e-004	0.0773	3.0000e-005		0.0109	0.0109		0.0109	0.0109	1.0330	0.4332	1.4662	9.5000e-004	8.0000e-005	1.5114
Landscaping	2.3000e-004	9.0000e-005	7.4600e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0121	0.0121	1.0000e-005	0.0000	0.0124
Total	0.0728	9.4000e-004	0.0848	3.0000e-005		0.0109	0.0109		0.0109	0.0109	1.0330	0.4453	1.4783	9.6000e-004	8.0000e-005	1.5238

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.8200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	7.0300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0628	8.5000e-004	0.0773	3.0000e-005		0.0109	0.0109		0.0109	0.0109	1.0330	0.4332	1.4662	9.5000e-004	8.0000e-005	1.5114
Landscaping	2.3000e-004	9.0000e-005	7.4600e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0121	0.0121	1.0000e-005	0.0000	0.0124
Total	0.0728	9.4000e-004	0.0848	3.0000e-005		0.0109	0.0109		0.0109	0.0109	1.0330	0.4453	1.4783	9.6000e-004	8.0000e-005	1.5238

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.1651	2.1300e-003	5.0000e-005	0.2257
Unmitigated	0.1651	2.1300e-003	5.0000e-005	0.2257

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.065154 / 0.0410754	0.1651	2.1300e-003	5.0000e-005	0.2257
Total		0.1651	2.1300e-003	5.0000e-005	0.2257

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.065154 / 0.0410754	0.1651	2.1300e-003	5.0000e-005	0.2257
Total		0.1651	2.1300e-003	5.0000e-005	0.2257

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.2680	0.0158	0.0000	0.6005
Unmitigated	0.2680	0.0158	0.0000	0.6005

8.2 Waste by Land Use**Unmitigated**

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	1.32	0.2680	0.0158	0.0000	0.6005
Total		0.2680	0.0158	0.0000	0.6005

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	1.32	0.2680	0.0158	0.0000	0.6005
Total		0.2680	0.0158	0.0000	0.6005

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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10.0 Vegetation

Carmel Rio Existing
North Central Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	1.00	Dwelling Unit	0.32	1,800.00	3

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.8	Precipitation Freq (Days)	53
Climate Zone	3			Operational Year	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2019

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	11.6315	13.7058	9.3611	0.0131	0.8349	0.9398	1.6396	0.4356	0.8646	1.2037	0.0000	1,280.6109	1,280.6109	0.3555	0.0000	1,288.0763
Total	11.6315	13.7058	9.3611	0.0131	0.8349	0.9398	1.6396	0.4356	0.8646	1.2037	0.0000	1,280.6109	1,280.6109	0.3555	0.0000	1,288.0763

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	11.6315	13.7058	9.3611	0.0131	0.8349	0.9398	1.6396	0.4356	0.8646	1.2037	0.0000	1,280.6109	1,280.6109	0.3555	0.0000	1,288.0763
Total	11.6315	13.7058	9.3611	0.0131	0.8349	0.9398	1.6396	0.4356	0.8646	1.2037	0.0000	1,280.6109	1,280.6109	0.3555	0.0000	1,288.0763

[illegible]

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.5869	0.0217	1.9682	7.4000e-004		0.2653	0.2653		0.2653	0.2653	27.7717	11.7956	39.5673	0.0258	2.1800e-003	40.7858
Energy	9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625
Mobile	0.0391	0.0978	0.4325	9.6000e-004	0.0616	1.3600e-003	0.0630	0.0165	1.2500e-003	0.0177		77.3591	77.3591	3.4400e-003		77.4313
Total	1.6269	0.1274	2.4040	1.7500e-003	0.0616	0.2673	0.3289	0.0165	0.2672	0.2837	27.7717	99.2557	127.0275	0.0294	2.3700e-003	128.3796

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.5869	0.0217	1.9682	7.4000e-004		0.2653	0.2653		0.2653	0.2653	27.7717	11.7956	39.5673	0.0258	2.1800e-003	40.7858
Energy	9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625
Mobile	0.0391	0.0978	0.4325	9.6000e-004	0.0616	1.3600e-003	0.0630	0.0165	1.2500e-003	0.0177		77.3591	77.3591	3.4400e-003		77.4313
Total	1.6269	0.1274	2.4040	1.7500e-003	0.0616	0.2673	0.3289	0.0165	0.2672	0.2837	27.7717	99.2557	127.0275	0.0294	2.3700e-003	128.3796

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/14/2016	5	10	
2	Site Preparation	Site Preparation	1/15/2016	1/15/2016	5	1	
3	Grading	Grading	1/16/2016	1/19/2016	5	2	
4	Building Construction	Building Construction	1/20/2016	6/7/2016	5	100	
5	Paving	Paving	6/8/2016	6/14/2016	5	5	
6	Architectural Coating	Architectural Coating	6/15/2016	6/21/2016	5	5	

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 3,645; Residential Outdoor: 1,215; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	4.00	226	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Site Preparation	Graders	1	8.00	174	0.41
Paving	Pavers	1	7.00	125	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	1.00	255	0.40
Grading	Rubber Tired Dozers	1	1.00	255	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3122	11.2385	8.7048	0.0120		0.8039	0.8039		0.7674	0.7674		1,193.6106	1,193.6106	0.2386		1,198.6217
Total	1.3122	11.2385	8.7048	0.0120		0.8039	0.8039		0.7674	0.7674		1,193.6106	1,193.6106	0.2386		1,198.6217

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0475	0.0626	0.6563	1.0400e-003	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		87.0003	87.0003	5.8300e-003		87.1228
Total	0.0475	0.0626	0.6563	1.0400e-003	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		87.0003	87.0003	5.8300e-003		87.1228

3.2 Demolition - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3122	11.2385	8.7048	0.0120		0.8039	0.8039		0.7674	0.7674	0.0000	1,193.6106	1,193.6106	0.2386		1,198.6217
Total	1.3122	11.2385	8.7048	0.0120		0.8039	0.8039		0.7674	0.7674	0.0000	1,193.6106	1,193.6106	0.2386		1,198.6217

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0475	0.0626	0.6563	1.0400e-003	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		87.0003	87.0003	5.8300e-003		87.1228
Total	0.0475	0.0626	0.6563	1.0400e-003	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		87.0003	87.0003	5.8300e-003		87.1228

3.3 Site Preparation - 2016**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	1.3593	13.6350	7.3401	9.3500e-003		0.8338	0.8338		0.7671	0.7671		973.0842	973.0842	0.2935		979.2481
Total	1.3593	13.6350	7.3401	9.3500e-003	0.5303	0.8338	1.3640	0.0573	0.7671	0.8243		973.0842	973.0842	0.2935		979.2481

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0237	0.0313	0.3282	5.2000e-004	0.0411	4.1000e-004	0.0415	0.0109	3.8000e-004	0.0113		43.5001	43.5001	2.9200e-003		43.5614
Total	0.0237	0.0313	0.3282	5.2000e-004	0.0411	4.1000e-004	0.0415	0.0109	3.8000e-004	0.0113		43.5001	43.5001	2.9200e-003		43.5614

3.3 Site Preparation - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	1.3593	13.6350	7.3401	9.3500e-003		0.8338	0.8338		0.7671	0.7671	0.0000	973.0842	973.0842	0.2935		979.2481
Total	1.3593	13.6350	7.3401	9.3500e-003	0.5303	0.8338	1.3640	0.0573	0.7671	0.8243	0.0000	973.0842	973.0842	0.2935		979.2481

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0237	0.0313	0.3282	5.2000e-004	0.0411	4.1000e-004	0.0415	0.0109	3.8000e-004	0.0113		43.5001	43.5001	2.9200e-003		43.5614
Total	0.0237	0.0313	0.3282	5.2000e-004	0.0411	4.1000e-004	0.0415	0.0109	3.8000e-004	0.0113		43.5001	43.5001	2.9200e-003		43.5614

3.4 Grading - 2016**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7528	0.0000	0.7528	0.4138	0.0000	0.4138			0.0000			0.0000
Off-Road	1.3122	11.2385	8.7048	0.0120		0.8039	0.8039		0.7674	0.7674		1,193.6106	1,193.6106	0.2386		1,198.6217
Total	1.3122	11.2385	8.7048	0.0120	0.7528	0.8039	1.5566	0.4138	0.7674	1.1811		1,193.6106	1,193.6106	0.2386		1,198.6217

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0475	0.0626	0.6563	1.0400e-003	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		87.0003	87.0003	5.8300e-003		87.1228
Total	0.0475	0.0626	0.6563	1.0400e-003	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		87.0003	87.0003	5.8300e-003		87.1228

3.4 Grading - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7528	0.0000	0.7528	0.4138	0.0000	0.4138			0.0000			0.0000
Off-Road	1.3122	11.2385	8.7048	0.0120		0.8039	0.8039		0.7674	0.7674	0.0000	1,193.6106	1,193.6106	0.2386		1,198.6217
Total	1.3122	11.2385	8.7048	0.0120	0.7528	0.8039	1.5566	0.4138	0.7674	1.1811	0.0000	1,193.6106	1,193.6106	0.2386		1,198.6217

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0475	0.0626	0.6563	1.0400e-003	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		87.0003	87.0003	5.8300e-003		87.1228
Total	0.0475	0.0626	0.6563	1.0400e-003	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		87.0003	87.0003	5.8300e-003		87.1228

3.5 Building Construction - 2016**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3816	13.7058	8.2122	0.0113		0.9398	0.9398		0.8646	0.8646		1,178.5549	1,178.5549	0.3555		1,186.0202
Total	1.3816	13.7058	8.2122	0.0113		0.9398	0.9398		0.8646	0.8646		1,178.5549	1,178.5549	0.3555		1,186.0202

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

3.5 Building Construction - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3816	13.7058	8.2122	0.0113		0.9398	0.9398		0.8646	0.8646	0.0000	1,178.5549	1,178.5549	0.3555		1,186.0202
Total	1.3816	13.7058	8.2122	0.0113		0.9398	0.9398		0.8646	0.8646	0.0000	1,178.5549	1,178.5549	0.3555		1,186.0202

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

3.6 Paving - 2016**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1203	10.6282	7.2935	0.0111		0.6606	0.6606		0.6113	0.6113		1,083.583 2	1,083.583 2	0.2969		1,089.817 5
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	1.1203	10.6282	7.2935	0.0111		0.6606	0.6606		0.6113	0.6113		1,083.583 2	1,083.583 2	0.2969		1,089.817 5

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0854	0.1126	1.1814	1.8800e-003	0.1479	1.4800e-003	0.1494	0.0392	1.3500e-003	0.0406		156.6005	156.6005	0.0105		156.8211
Total	0.0854	0.1126	1.1814	1.8800e-003	0.1479	1.4800e-003	0.1494	0.0392	1.3500e-003	0.0406		156.6005	156.6005	0.0105		156.8211

3.6 Paving - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1203	10.6282	7.2935	0.0111		0.6606	0.6606		0.6113	0.6113	0.0000	1,083.583 2	1,083.583 2	0.2969		1,089.817 5
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	1.1203	10.6282	7.2935	0.0111		0.6606	0.6606		0.6113	0.6113	0.0000	1,083.583 2	1,083.583 2	0.2969		1,089.817 5

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0854	0.1126	1.1814	1.8800e-003	0.1479	1.4800e-003	0.1494	0.0392	1.3500e-003	0.0406		156.6005	156.6005	0.0105		156.8211
Total	0.0854	0.1126	1.1814	1.8800e-003	0.1479	1.4800e-003	0.1494	0.0392	1.3500e-003	0.0406		156.6005	156.6005	0.0105		156.8211

3.7 Architectural Coating - 2016**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	11.2631					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966		281.4481	281.4481	0.0332		282.1449
Total	11.6315	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966		281.4481	281.4481	0.0332		282.1449

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

3.7 Architectural Coating - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	11.2631					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966	0.0000	281.4481	281.4481	0.0332		282.1449
Total	11.6315	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966	0.0000	281.4481	281.4481	0.0332		282.1449

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0391	0.0978	0.4325	9.6000e-004	0.0616	1.3600e-003	0.0630	0.0165	1.2500e-003	0.0177		77.3591	77.3591	3.4400e-003		77.4313
Unmitigated	0.0391	0.0978	0.4325	9.6000e-004	0.0616	1.3600e-003	0.0630	0.0165	1.2500e-003	0.0177		77.3591	77.3591	3.4400e-003		77.4313

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	9.57	10.08	8.77	27,451	27,451
Total	9.57	10.08	8.77	27,451	27,451

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	10.80	7.30	7.50	44.00	18.80	37.20	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.463435	0.038745	0.210439	0.164429	0.051257	0.007280	0.016684	0.030757	0.003062	0.002166	0.008230	0.000809	0.002706

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625
NaturalGas Unmitigated	9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	85.859	9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625
Total		9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	0.085859	9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625
Total		9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.5869	0.0217	1.9682	7.4000e-004		0.2653	0.2653		0.2653	0.2653	27.7717	11.7956	39.5673	0.0258	2.1800e-003	40.7858
Unmitigated	1.5869	0.0217	1.9682	7.4000e-004		0.2653	0.2653		0.2653	0.2653	27.7717	11.7956	39.5673	0.0258	2.1800e-003	40.7858

6.2 Area by SubCategory**Unmitigated**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0154					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0385					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	1.5304	0.0208	1.8853	7.4000e-004		0.2649	0.2649		0.2649	0.2649	27.7717	11.6471	39.4188	0.0256	2.1800e-003	40.6342
Landscaping	2.5400e-003	9.6000e-004	0.0829	0.0000		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		0.1486	0.1486	1.5000e-004		0.1516
Total	1.5869	0.0217	1.9682	7.4000e-004		0.2653	0.2653		0.2653	0.2653	27.7717	11.7956	39.5673	0.0258	2.1800e-003	40.7858

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0154					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0385					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	1.5304	0.0208	1.8853	7.4000e-004		0.2649	0.2649		0.2649	0.2649	27.7717	11.6471	39.4188	0.0256	2.1800e-003	40.6342
Landscaping	2.5400e-003	9.6000e-004	0.0829	0.0000		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		0.1486	0.1486	1.5000e-004		0.1516
Total	1.5869	0.0217	1.9682	7.4000e-004		0.2653	0.2653		0.2653	0.2653	27.7717	11.7956	39.5673	0.0258	2.1800e-003	40.7858

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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10.0 Vegetation

Carmel Rio Existing

North Central Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	1.00	Dwelling Unit	0.32	1,800.00	3

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.8	Precipitation Freq (Days)	53
Climate Zone	3			Operational Year	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2019

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	11.6315	13.7058	9.3895	0.0130	0.8349	0.9398	1.6396	0.4356	0.8646	1.2037	0.0000	1,275.5319	1,275.5319	0.3555	0.0000	1,282.9973
Total	11.6315	13.7058	9.3895	0.0130	0.8349	0.9398	1.6396	0.4356	0.8646	1.2037	0.0000	1,275.5319	1,275.5319	0.3555	0.0000	1,282.9973

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	11.6315	13.7058	9.3895	0.0130	0.8349	0.9398	1.6396	0.4356	0.8646	1.2037	0.0000	1,275.5319	1,275.5319	0.3555	0.0000	1,282.9973
Total	11.6315	13.7058	9.3895	0.0130	0.8349	0.9398	1.6396	0.4356	0.8646	1.2037	0.0000	1,275.5319	1,275.5319	0.3555	0.0000	1,282.9973

[illegible]

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.5869	0.0217	1.9682	7.4000e-004		0.2653	0.2653		0.2653	0.2653	27.7717	11.7956	39.5673	0.0258	2.1800e-003	40.7858
Energy	9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625
Mobile	0.0424	0.1103	0.5089	9.2000e-004	0.0616	1.3700e-003	0.0630	0.0165	1.2600e-003	0.0177		73.9949	73.9949	3.4400e-003		74.0672
Total	1.6302	0.1400	2.4805	1.7100e-003	0.0616	0.2673	0.3290	0.0165	0.2672	0.2837	27.7717	95.8915	123.6633	0.0294	2.3700e-003	125.0155

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.5869	0.0217	1.9682	7.4000e-004		0.2653	0.2653		0.2653	0.2653	27.7717	11.7956	39.5673	0.0258	2.1800e-003	40.7858
Energy	9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625
Mobile	0.0424	0.1103	0.5089	9.2000e-004	0.0616	1.3700e-003	0.0630	0.0165	1.2600e-003	0.0177		73.9949	73.9949	3.4400e-003		74.0672
Total	1.6302	0.1400	2.4805	1.7100e-003	0.0616	0.2673	0.3290	0.0165	0.2672	0.2837	27.7717	95.8915	123.6633	0.0294	2.3700e-003	125.0155

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/14/2016	5	10	
2	Site Preparation	Site Preparation	1/15/2016	1/15/2016	5	1	
3	Grading	Grading	1/16/2016	1/19/2016	5	2	
4	Building Construction	Building Construction	1/20/2016	6/7/2016	5	100	
5	Paving	Paving	6/8/2016	6/14/2016	5	5	
6	Architectural Coating	Architectural Coating	6/15/2016	6/21/2016	5	5	

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 3,645; Residential Outdoor: 1,215; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	4.00	226	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Site Preparation	Graders	1	8.00	174	0.41
Paving	Pavers	1	7.00	125	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	1.00	255	0.40
Grading	Rubber Tired Dozers	1	1.00	255	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3122	11.2385	8.7048	0.0120		0.8039	0.8039		0.7674	0.7674		1,193.6106	1,193.6106	0.2386		1,198.6217
Total	1.3122	11.2385	8.7048	0.0120		0.8039	0.8039		0.7674	0.7674		1,193.6106	1,193.6106	0.2386		1,198.6217

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0506	0.0785	0.6848	9.8000e-004	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		81.9213	81.9213	5.8300e-003		82.0438
Total	0.0506	0.0785	0.6848	9.8000e-004	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		81.9213	81.9213	5.8300e-003		82.0438

3.2 Demolition - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3122	11.2385	8.7048	0.0120		0.8039	0.8039		0.7674	0.7674	0.0000	1,193.6106	1,193.6106	0.2386		1,198.6217
Total	1.3122	11.2385	8.7048	0.0120		0.8039	0.8039		0.7674	0.7674	0.0000	1,193.6106	1,193.6106	0.2386		1,198.6217

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0506	0.0785	0.6848	9.8000e-004	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		81.9213	81.9213	5.8300e-003		82.0438
Total	0.0506	0.0785	0.6848	9.8000e-004	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		81.9213	81.9213	5.8300e-003		82.0438

3.3 Site Preparation - 2016**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	1.3593	13.6350	7.3401	9.3500e-003		0.8338	0.8338		0.7671	0.7671		973.0842	973.0842	0.2935		979.2481
Total	1.3593	13.6350	7.3401	9.3500e-003	0.5303	0.8338	1.3640	0.0573	0.7671	0.8243		973.0842	973.0842	0.2935		979.2481

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0253	0.0392	0.3424	4.9000e-004	0.0411	4.1000e-004	0.0415	0.0109	3.8000e-004	0.0113		40.9607	40.9607	2.9200e-003		41.0219
Total	0.0253	0.0392	0.3424	4.9000e-004	0.0411	4.1000e-004	0.0415	0.0109	3.8000e-004	0.0113		40.9607	40.9607	2.9200e-003		41.0219

3.3 Site Preparation - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	1.3593	13.6350	7.3401	9.3500e-003		0.8338	0.8338		0.7671	0.7671	0.0000	973.0842	973.0842	0.2935		979.2481
Total	1.3593	13.6350	7.3401	9.3500e-003	0.5303	0.8338	1.3640	0.0573	0.7671	0.8243	0.0000	973.0842	973.0842	0.2935		979.2481

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0253	0.0392	0.3424	4.9000e-004	0.0411	4.1000e-004	0.0415	0.0109	3.8000e-004	0.0113		40.9607	40.9607	2.9200e-003		41.0219
Total	0.0253	0.0392	0.3424	4.9000e-004	0.0411	4.1000e-004	0.0415	0.0109	3.8000e-004	0.0113		40.9607	40.9607	2.9200e-003		41.0219

3.4 Grading - 2016**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7528	0.0000	0.7528	0.4138	0.0000	0.4138			0.0000			0.0000
Off-Road	1.3122	11.2385	8.7048	0.0120		0.8039	0.8039		0.7674	0.7674		1,193.6106	1,193.6106	0.2386		1,198.6217
Total	1.3122	11.2385	8.7048	0.0120	0.7528	0.8039	1.5566	0.4138	0.7674	1.1811		1,193.6106	1,193.6106	0.2386		1,198.6217

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0506	0.0785	0.6848	9.8000e-004	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		81.9213	81.9213	5.8300e-003		82.0438
Total	0.0506	0.0785	0.6848	9.8000e-004	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		81.9213	81.9213	5.8300e-003		82.0438

3.4 Grading - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7528	0.0000	0.7528	0.4138	0.0000	0.4138			0.0000			0.0000
Off-Road	1.3122	11.2385	8.7048	0.0120		0.8039	0.8039		0.7674	0.7674	0.0000	1,193.6106	1,193.6106	0.2386		1,198.6217
Total	1.3122	11.2385	8.7048	0.0120	0.7528	0.8039	1.5566	0.4138	0.7674	1.1811	0.0000	1,193.6106	1,193.6106	0.2386		1,198.6217

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0506	0.0785	0.6848	9.8000e-004	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		81.9213	81.9213	5.8300e-003		82.0438
Total	0.0506	0.0785	0.6848	9.8000e-004	0.0822	8.2000e-004	0.0830	0.0218	7.5000e-004	0.0225		81.9213	81.9213	5.8300e-003		82.0438

3.5 Building Construction - 2016**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3816	13.7058	8.2122	0.0113		0.9398	0.9398		0.8646	0.8646		1,178.5549	1,178.5549	0.3555		1,186.0202
Total	1.3816	13.7058	8.2122	0.0113		0.9398	0.9398		0.8646	0.8646		1,178.5549	1,178.5549	0.3555		1,186.0202

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

3.5 Building Construction - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3816	13.7058	8.2122	0.0113		0.9398	0.9398		0.8646	0.8646	0.0000	1,178.5549	1,178.5549	0.3555		1,186.0202
Total	1.3816	13.7058	8.2122	0.0113		0.9398	0.9398		0.8646	0.8646	0.0000	1,178.5549	1,178.5549	0.3555		1,186.0202

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

3.6 Paving - 2016**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1203	10.6282	7.2935	0.0111		0.6606	0.6606		0.6113	0.6113		1,083.583 2	1,083.583 2	0.2969		1,089.817 5
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	1.1203	10.6282	7.2935	0.0111		0.6606	0.6606		0.6113	0.6113		1,083.583 2	1,083.583 2	0.2969		1,089.817 5

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0911	0.1412	1.2326	1.7700e-003	0.1479	1.4800e-003	0.1494	0.0392	1.3500e-003	0.0406		147.4584	147.4584	0.0105		147.6789
Total	0.0911	0.1412	1.2326	1.7700e-003	0.1479	1.4800e-003	0.1494	0.0392	1.3500e-003	0.0406		147.4584	147.4584	0.0105		147.6789

3.6 Paving - 2016**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1203	10.6282	7.2935	0.0111		0.6606	0.6606		0.6113	0.6113	0.0000	1,083.583 2	1,083.583 2	0.2969		1,089.817 5
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	1.1203	10.6282	7.2935	0.0111		0.6606	0.6606		0.6113	0.6113	0.0000	1,083.583 2	1,083.583 2	0.2969		1,089.817 5

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0911	0.1412	1.2326	1.7700e-003	0.1479	1.4800e-003	0.1494	0.0392	1.3500e-003	0.0406		147.4584	147.4584	0.0105		147.6789
Total	0.0911	0.1412	1.2326	1.7700e-003	0.1479	1.4800e-003	0.1494	0.0392	1.3500e-003	0.0406		147.4584	147.4584	0.0105		147.6789

3.7 Architectural Coating - 2016**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	11.2631					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966		281.4481	281.4481	0.0332		282.1449
Total	11.6315	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966		281.4481	281.4481	0.0332		282.1449

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

3.7 Architectural Coating - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	11.2631					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966	0.0000	281.4481	281.4481	0.0332		282.1449
Total	11.6315	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966	0.0000	281.4481	281.4481	0.0332		282.1449

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0424	0.1103	0.5089	9.2000e-004	0.0616	1.3700e-003	0.0630	0.0165	1.2600e-003	0.0177		73.9949	73.9949	3.4400e-003		74.0672
Unmitigated	0.0424	0.1103	0.5089	9.2000e-004	0.0616	1.3700e-003	0.0630	0.0165	1.2600e-003	0.0177		73.9949	73.9949	3.4400e-003		74.0672

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	9.57	10.08	8.77	27,451	27,451
Total	9.57	10.08	8.77	27,451	27,451

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	10.80	7.30	7.50	44.00	18.80	37.20	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.463435	0.038745	0.210439	0.164429	0.051257	0.007280	0.016684	0.030757	0.003062	0.002166	0.008230	0.000809	0.002706

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625
NaturalGas Unmitigated	9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	85.859	9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625
Total		9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	0.085859	9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625
Total		9.3000e-004	7.9100e-003	3.3700e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1011	10.1011	1.9000e-004	1.9000e-004	10.1625

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.5869	0.0217	1.9682	7.4000e-004		0.2653	0.2653		0.2653	0.2653	27.7717	11.7956	39.5673	0.0258	2.1800e-003	40.7858
Unmitigated	1.5869	0.0217	1.9682	7.4000e-004		0.2653	0.2653		0.2653	0.2653	27.7717	11.7956	39.5673	0.0258	2.1800e-003	40.7858

6.2 Area by SubCategory**Unmitigated**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0154					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0385					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	1.5304	0.0208	1.8853	7.4000e-004		0.2649	0.2649		0.2649	0.2649	27.7717	11.6471	39.4188	0.0256	2.1800e-003	40.6342
Landscaping	2.5400e-003	9.6000e-004	0.0829	0.0000		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		0.1486	0.1486	1.5000e-004		0.1516
Total	1.5869	0.0217	1.9682	7.4000e-004		0.2653	0.2653		0.2653	0.2653	27.7717	11.7956	39.5673	0.0258	2.1800e-003	40.7858

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0154					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0385					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	1.5304	0.0208	1.8853	7.4000e-004		0.2649	0.2649		0.2649	0.2649	27.7717	11.6471	39.4188	0.0256	2.1800e-003	40.6342
Landscaping	2.5400e-003	9.6000e-004	0.0829	0.0000		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004		0.1486	0.1486	1.5000e-004		0.1516
Total	1.5869	0.0217	1.9682	7.4000e-004		0.2653	0.2653		0.2653	0.2653	27.7717	11.7956	39.5673	0.0258	2.1800e-003	40.7858

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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10.0 Vegetation

Carmel Rio Road
North Central Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	7.00	Dwelling Unit	0.91	6,020.00	21
Single Family Housing	24.00	Dwelling Unit	6.99	4,080.00	73

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.8	Precipitation Freq (Days)	53
Climate Zone	4			Operational Year	2018
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - From project description

Construction Phase - Reflects 18-month construction schedule

Grading - From project plans

Vehicle Trips - From project traffic study

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	0
tblConstructionPhase	NumDays	20.00	28.00
tblConstructionPhase	NumDays	230.00	285.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	PhaseEndDate	8/1/2018	6/30/2018
tblConstructionPhase	PhaseEndDate	3/24/2017	4/7/2017
tblConstructionPhase	PhaseStartDate	6/23/2018	5/23/2018
tblConstructionPhase	PhaseStartDate	2/11/2017	2/25/2017
tblGrading	AcresOfGrading	15.00	7.90
tblGrading	MaterialExported	0.00	199.00
tblGrading	MaterialImported	0.00	11,359.00
tblLandUse	LandUseSquareFeet	12,600.00	6,020.00
tblLandUse	LandUseSquareFeet	43,200.00	4,080.00
tblLandUse	LotAcreage	2.27	0.91
tblLandUse	LotAcreage	7.79	6.99
tblLandUse	Population	20.00	21.00
tblLandUse	Population	69.00	73.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblTripsAndVMT	WorkerTripNumber	11.00	14.00
tblTripsAndVMT	WorkerTripNumber	2.00	3.00
tblVehicleTrips	ST_TR	10.08	9.52
tblVehicleTrips	WD_TR	9.57	9.52

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.4864	3.9414	2.9913	4.3700e-003	0.2141	0.2379	0.4520	0.1076	0.2224	0.3300	0.0000	390.7118	390.7118	0.0855	0.0000	392.5081
2018	0.3292	1.4072	1.1455	1.7700e-003	8.3300e-003	0.0874	0.0957	2.2300e-003	0.0820	0.0843	0.0000	155.9628	155.9628	0.0378	0.0000	156.7567
Total	0.8156	5.3486	4.1367	6.1400e-003	0.2224	0.3253	0.5478	0.1098	0.3044	0.4142	0.0000	546.6746	546.6746	0.1233	0.0000	549.2648

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.4859	3.9369	2.9881	4.3600e-003	0.4811	0.2376	0.7187	0.1731	0.2221	0.3952	0.0000	390.3267	390.3267	0.0854	0.0000	392.1209
2018	0.3290	1.4056	1.1442	1.7700e-003	8.3300e-003	0.0873	0.0956	2.2300e-003	0.0819	0.0842	0.0000	155.7884	155.7884	0.0378	0.0000	156.5814
Total	0.8149	5.3425	4.1323	6.1300e-003	0.4894	0.3250	0.8143	0.1753	0.3040	0.4794	0.0000	546.1152	546.1152	0.1232	0.0000	548.7023

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.0821	0.1140	0.1068	0.1629	-120.0252	0.1168	-48.6682	-59.6812	0.1183	-15.7312	0.0000	0.1023	0.1023	0.1135	0.0000	0.1024

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.9527	0.0555	5.0242	1.8800e-003		0.6746	0.6746		0.6746	0.6746	64.0434	27.2349	91.2782	0.0595	5.0400e-003	94.0888
Energy	5.9000e-003	0.0504	0.0215	3.2000e-004		4.0700e-003	4.0700e-003		4.0700e-003	4.0700e-003	0.0000	122.1534	122.1534	4.0000e-003	1.6700e-003	122.7542
Mobile	0.6081	0.6010	2.5955	4.8500e-003	0.3145	7.4700e-003	0.3220	0.0843	6.8800e-003	0.0912	0.0000	364.6582	364.6582	0.0177	0.0000	365.0290
Waste						0.0000	0.0000		0.0000	0.0000	8.3957	0.0000	8.3957	0.4962	0.0000	18.8153
Water						0.0000	0.0000		0.0000	0.0000	0.6408	4.4759	5.1167	0.0660	1.6000e-003	6.9977
Total	4.5666	0.7069	7.6411	7.0500e-003	0.3145	0.6861	1.0006	0.0843	0.6855	0.7698	73.0799	518.5224	591.6022	0.6433	8.3100e-003	607.6850

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.9527	0.0555	5.0242	1.8800e-003		0.6746	0.6746		0.6746	0.6746	64.0434	27.2349	91.2782	0.0595	5.0400e-003	94.0888
Energy	5.9000e-003	0.0504	0.0215	3.2000e-004		4.0700e-003	4.0700e-003		4.0700e-003	4.0700e-003	0.0000	122.1534	122.1534	4.0000e-003	1.6700e-003	122.7542
Mobile	0.6081	0.6010	2.5955	4.8500e-003	0.3145	7.4700e-003	0.3220	0.0843	6.8800e-003	0.0912	0.0000	364.6582	364.6582	0.0177	0.0000	365.0290
Waste						0.0000	0.0000		0.0000	0.0000	8.3957	0.0000	8.3957	0.4962	0.0000	18.8153
Water						0.0000	0.0000		0.0000	0.0000	0.6408	4.4759	5.1167	0.0660	1.5900e-003	6.9967
Total	4.5666	0.7069	7.6411	7.0500e-003	0.3145	0.6861	1.0006	0.0843	0.6855	0.7698	73.0799	518.5224	591.6022	0.6433	8.3000e-003	607.6840

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.1089e-003	0.1203	1.6785e-004

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2017	1/27/2017	5	20	
2	Site Preparation	Site Preparation	1/28/2017	2/10/2017	5	10	
3	Grading	Grading	2/25/2017	4/7/2017	5	30	
4	Building Construction	Building Construction	4/8/2017	5/11/2018	5	285	
5	Paving	Paving	5/12/2018	6/22/2018	5	30	
6	Architectural Coating	Architectural Coating	5/23/2018	6/30/2018	5	28	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	162	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	1	8.00	162	0.38
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	125	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	174	0.41
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Paving Equipment	2	8.00	130	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	1,445.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	14.00	3.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	3.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2017

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0405	0.4270	0.3389	4.0000e-004		0.0213	0.0213		0.0198	0.0198	0.0000	36.6182	36.6182	0.0101	0.0000	36.8292
Total	0.0405	0.4270	0.3389	4.0000e-004		0.0213	0.0213		0.0198	0.0198	0.0000	36.6182	36.6182	0.0101	0.0000	36.8292

3.2 Demolition - 2017**Unmitigated Construction Off-Site****Acres of Grading: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-003	9.6000e-004	8.5400e-003	1.0000e-005	1.1900e-003	1.0000e-005	1.2000e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0770	1.0770	7.0000e-005	0.0000	1.0785
Total	2.3000e-003	9.6000e-004	8.5400e-003	1.0000e-005	1.1900e-003	1.0000e-005	1.2000e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0770	1.0770	7.0000e-005	0.0000	1.0785

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0404	0.4265	0.3385	4.0000e-004		0.0212	0.0212		0.0198	0.0198	0.0000	36.5747	36.5747	0.0100	0.0000	36.7854
Total	0.0404	0.4265	0.3385	4.0000e-004		0.0212	0.0212		0.0198	0.0198	0.0000	36.5747	36.5747	0.0100	0.0000	36.7854

3.2 Demolition - 2017**Mitigated Construction Off-Site****Acres of Grading: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-003	9.6000e-004	8.5400e-003	1.0000e-005	1.1900e-003	1.0000e-005	1.2000e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0770	1.0770	7.0000e-005	0.0000	1.0785
Total	2.3000e-003	9.6000e-004	8.5400e-003	1.0000e-005	1.1900e-003	1.0000e-005	1.2000e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0770	1.0770	7.0000e-005	0.0000	1.0785

3.3 Site Preparation - 2017**Unmitigated Construction On-Site****Acres of Grading: 7.9**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0242	0.2588	0.1970	2.0000e-004		0.0138	0.0138		0.0127	0.0127	0.0000	18.1577	18.1577	5.5600e-003	0.0000	18.2745
Total	0.0242	0.2588	0.1970	2.0000e-004	0.0903	0.0138	0.1041	0.0497	0.0127	0.0623	0.0000	18.1577	18.1577	5.5600e-003	0.0000	18.2745

3.3 Site Preparation - 2017**Unmitigated Construction Off-Site****Acres of Grading: 7.9**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3800e-003	5.7000e-004	5.1300e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.2000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	0.6462	0.6462	4.0000e-005	0.0000	0.6471
Total	1.3800e-003	5.7000e-004	5.1300e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.2000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	0.6462	0.6462	4.0000e-005	0.0000	0.6471

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0242	0.2585	0.1968	2.0000e-004		0.0138	0.0138		0.0127	0.0127	0.0000	18.1361	18.1361	5.5600e-003	0.0000	18.2528
Total	0.0242	0.2585	0.1968	2.0000e-004	0.0903	0.0138	0.1041	0.0497	0.0127	0.0623	0.0000	18.1361	18.1361	5.5600e-003	0.0000	18.2528

3.3 Site Preparation - 2017**Mitigated Construction Off-Site****Acres of Grading: 7.9**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3800e-003	5.7000e-004	5.1300e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.2000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	0.6462	0.6462	4.0000e-005	0.0000	0.6471
Total	1.3800e-003	5.7000e-004	5.1300e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.2000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	0.6462	0.6462	4.0000e-005	0.0000	0.6471

3.4 Grading - 2017**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0954	0.0000	0.0954	0.0502	0.0000	0.0502	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0518	0.5397	0.3807	4.5000e-004		0.0306	0.0306		0.0281	0.0281	0.0000	41.4175	41.4175	0.0127	0.0000	41.6840
Total	0.0518	0.5397	0.3807	4.5000e-004	0.0954	0.0306	0.1260	0.0502	0.0281	0.0784	0.0000	41.4175	41.4175	0.0127	0.0000	41.6840

3.4 Grading - 2017**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0410	0.1705	0.2036	5.4000e-004	0.0122	2.5600e-003	0.0148	3.3600e-003	2.3500e-003	5.7200e-003	0.0000	48.1729	48.1729	3.3000e-004	0.0000	48.1800
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4500e-003	1.4300e-003	0.0128	2.0000e-005	1.7900e-003	2.0000e-005	1.8100e-003	4.8000e-004	2.0000e-005	4.9000e-004	0.0000	1.6155	1.6155	1.1000e-004	0.0000	1.6177
Total	0.0444	0.1719	0.2164	5.6000e-004	0.0140	2.5800e-003	0.0166	3.8400e-003	2.3700e-003	6.2100e-003	0.0000	49.7884	49.7884	4.4000e-004	0.0000	49.7977

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0954	0.0000	0.0954	0.0502	0.0000	0.0502	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0518	0.5391	0.3803	4.5000e-004		0.0306	0.0306		0.0281	0.0281	0.0000	41.3683	41.3683	0.0127	0.0000	41.6344
Total	0.0518	0.5391	0.3803	4.5000e-004	0.0954	0.0306	0.1260	0.0502	0.0281	0.0783	0.0000	41.3683	41.3683	0.0127	0.0000	41.6344

3.4 Grading - 2017**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0410	0.1705	0.2036	5.4000e-004	0.2792	2.5600e-003	0.2818	0.0689	2.3500e-003	0.0712	0.0000	48.1729	48.1729	3.3000e-004	0.0000	48.1800
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4500e-003	1.4300e-003	0.0128	2.0000e-005	1.7900e-003	2.0000e-005	1.8100e-003	4.8000e-004	2.0000e-005	4.9000e-004	0.0000	1.6155	1.6155	1.1000e-004	0.0000	1.6177
Total	0.0444	0.1719	0.2164	5.6000e-004	0.2810	2.5800e-003	0.2836	0.0694	2.3700e-003	0.0717	0.0000	49.7884	49.7884	4.4000e-004	0.0000	49.7977

3.5 Building Construction - 2017**Unmitigated Construction On-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2947	2.5085	1.7223	2.5500e-003		0.1692	0.1692		0.1589	0.1589	0.0000	227.5052	227.5052	0.0560	0.0000	228.6810
Total	0.2947	2.5085	1.7223	2.5500e-003		0.1692	0.1692		0.1589	0.1589	0.0000	227.5052	227.5052	0.0560	0.0000	228.6810

3.5 Building Construction - 2017**Unmitigated Construction Off-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.6500e-003	0.0255	0.0466	7.0000e-005	1.8300e-003	4.0000e-004	2.2300e-003	5.2000e-004	3.7000e-004	8.9000e-004	0.0000	5.9526	5.9526	5.0000e-005	0.0000	5.9536
Worker	0.0204	8.4800e-003	0.0757	1.3000e-004	0.0106	1.0000e-004	0.0107	2.8100e-003	9.0000e-005	2.9100e-003	0.0000	9.5492	9.5492	6.4000e-004	0.0000	9.5626
Total	0.0271	0.0339	0.1223	2.0000e-004	0.0124	5.0000e-004	0.0129	3.3300e-003	4.6000e-004	3.8000e-003	0.0000	15.5017	15.5017	6.9000e-004	0.0000	15.5161

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2944	2.5056	1.7202	2.5400e-003		0.1690	0.1690		0.1587	0.1587	0.0000	227.2345	227.2345	0.0559	0.0000	228.4090
Total	0.2944	2.5056	1.7202	2.5400e-003		0.1690	0.1690		0.1587	0.1587	0.0000	227.2345	227.2345	0.0559	0.0000	228.4090

3.5 Building Construction - 2017**Mitigated Construction Off-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.6500e-003	0.0255	0.0466	7.0000e-005	1.8300e-003	4.0000e-004	2.2300e-003	5.2000e-004	3.7000e-004	8.9000e-004	0.0000	5.9526	5.9526	5.0000e-005	0.0000	5.9536
Worker	0.0204	8.4800e-003	0.0757	1.3000e-004	0.0106	1.0000e-004	0.0107	2.8100e-003	9.0000e-005	2.9100e-003	0.0000	9.5492	9.5492	6.4000e-004	0.0000	9.5626
Total	0.0271	0.0339	0.1223	2.0000e-004	0.0124	5.0000e-004	0.0129	3.3300e-003	4.6000e-004	3.8000e-003	0.0000	15.5017	15.5017	6.9000e-004	0.0000	15.5161

3.5 Building Construction - 2018**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1268	1.1049	0.8328	1.2700e-003		0.0710	0.0710		0.0667	0.0667	0.0000	112.4656	112.4656	0.0275	0.0000	113.0436
Total	0.1268	1.1049	0.8328	1.2700e-003		0.0710	0.0710		0.0667	0.0667	0.0000	112.4656	112.4656	0.0275	0.0000	113.0436

3.5 Building Construction - 2018**Unmitigated Construction Off-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.1000e-003	0.0115	0.0223	3.0000e-005	9.1000e-004	1.8000e-004	1.0900e-003	2.6000e-004	1.6000e-004	4.2000e-004	0.0000	2.9258	2.9258	2.0000e-005	0.0000	2.9263
Worker	9.2500e-003	3.7900e-003	0.0335	7.0000e-005	5.2900e-003	5.0000e-005	5.3400e-003	1.4100e-003	5.0000e-005	1.4500e-003	0.0000	4.5977	4.5977	2.9000e-004	0.0000	4.6039
Total	0.0124	0.0153	0.0558	1.0000e-004	6.2000e-003	2.3000e-004	6.4300e-003	1.6700e-003	2.1000e-004	1.8700e-003	0.0000	7.5235	7.5235	3.1000e-004	0.0000	7.5301

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1266	1.1036	0.8318	1.2700e-003		0.0709	0.0709		0.0667	0.0667	0.0000	112.3318	112.3318	0.0275	0.0000	112.9091
Total	0.1266	1.1036	0.8318	1.2700e-003		0.0709	0.0709		0.0667	0.0667	0.0000	112.3318	112.3318	0.0275	0.0000	112.9091

3.5 Building Construction - 2018**Mitigated Construction Off-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.1000e-003	0.0115	0.0223	3.0000e-005	9.1000e-004	1.8000e-004	1.0900e-003	2.6000e-004	1.6000e-004	4.2000e-004	0.0000	2.9258	2.9258	2.0000e-005	0.0000	2.9263
Worker	9.2500e-003	3.7900e-003	0.0335	7.0000e-005	5.2900e-003	5.0000e-005	5.3400e-003	1.4100e-003	5.0000e-005	1.4500e-003	0.0000	4.5977	4.5977	2.9000e-004	0.0000	4.6039
Total	0.0124	0.0153	0.0558	1.0000e-004	6.2000e-003	2.3000e-004	6.4300e-003	1.6700e-003	2.1000e-004	1.8700e-003	0.0000	7.5235	7.5235	3.1000e-004	0.0000	7.5301

3.6 Paving - 2018**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0242	0.2574	0.2174	3.3000e-004		0.0141	0.0141		0.0130	0.0130	0.0000	30.5531	30.5531	9.5100e-003	0.0000	30.7529
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0242	0.2574	0.2174	3.3000e-004		0.0141	0.0141		0.0130	0.0130	0.0000	30.5531	30.5531	9.5100e-003	0.0000	30.7529

3.6 Paving - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1300e-003	1.2800e-003	0.0113	2.0000e-005	1.7900e-003	2.0000e-005	1.8100e-003	4.8000e-004	2.0000e-005	4.9000e-004	0.0000	1.5556	1.5556	1.0000e-004	0.0000	1.5577
Total	3.1300e-003	1.2800e-003	0.0113	2.0000e-005	1.7900e-003	2.0000e-005	1.8100e-003	4.8000e-004	2.0000e-005	4.9000e-004	0.0000	1.5556	1.5556	1.0000e-004	0.0000	1.5577

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0241	0.2571	0.2172	3.3000e-004		0.0141	0.0141		0.0129	0.0129	0.0000	30.5168	30.5168	9.5000e-003	0.0000	30.7163
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0241	0.2571	0.2172	3.3000e-004		0.0141	0.0141		0.0129	0.0129	0.0000	30.5168	30.5168	9.5000e-003	0.0000	30.7163

3.6 Paving - 2018**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1300e-003	1.2800e-003	0.0113	2.0000e-005	1.7900e-003	2.0000e-005	1.8100e-003	4.8000e-004	2.0000e-005	4.9000e-004	0.0000	1.5556	1.5556	1.0000e-004	0.0000	1.5577
Total	3.1300e-003	1.2800e-003	0.0113	2.0000e-005	1.7900e-003	2.0000e-005	1.8100e-003	4.8000e-004	2.0000e-005	4.9000e-004	0.0000	1.5556	1.5556	1.0000e-004	0.0000	1.5577

3.7 Architectural Coating - 2018**Unmitigated Construction On-Site****Residential Indoor: 20,453; Residential Outdoor: 6,818; Non-Residential Indoor: 0; Non-Residential Outdoor: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1800e-003	0.0281	0.0260	4.0000e-005		2.1100e-003	2.1100e-003		2.1100e-003	2.1100e-003	0.0000	3.5746	3.5746	3.4000e-004	0.0000	3.5817
Total	0.1622	0.0281	0.0260	4.0000e-005		2.1100e-003	2.1100e-003		2.1100e-003	2.1100e-003	0.0000	3.5746	3.5746	3.4000e-004	0.0000	3.5817

3.7 Architectural Coating - 2018

Unmitigated Construction Off-Site

Residential Indoor: 20,453; Residential Outdoor: 6,818; Non-Residential Indoor: 0; Non-Residential Outdoor: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.8000e-004	2.4000e-004	2.1200e-003	0.0000	3.3000e-004	0.0000	3.4000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2904	0.2904	2.0000e-005	0.0000	0.2908
Total	5.8000e-004	2.4000e-004	2.1200e-003	0.0000	3.3000e-004	0.0000	3.4000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2904	0.2904	2.0000e-005	0.0000	0.2908

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1800e-003	0.0281	0.0259	4.0000e-005		2.1100e-003	2.1100e-003		2.1100e-003	2.1100e-003	0.0000	3.5703	3.5703	3.4000e-004	0.0000	3.5774
Total	0.1622	0.0281	0.0259	4.0000e-005		2.1100e-003	2.1100e-003		2.1100e-003	2.1100e-003	0.0000	3.5703	3.5703	3.4000e-004	0.0000	3.5774

3.7 Architectural Coating - 2018

Mitigated Construction Off-Site

Residential Indoor: 20,453; Residential Outdoor: 6,818; Non-Residential Indoor: 0; Non-Residential Outdoor: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.8000e-004	2.4000e-004	2.1200e-003	0.0000	3.3000e-004	0.0000	3.4000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2904	0.2904	2.0000e-005	0.0000	0.2908
Total	5.8000e-004	2.4000e-004	2.1200e-003	0.0000	3.3000e-004	0.0000	3.4000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2904	0.2904	2.0000e-005	0.0000	0.2908

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.6081	0.6010	2.5955	4.8500e-003	0.3145	7.4700e-003	0.3220	0.0843	6.8800e-003	0.0912	0.0000	364.6582	364.6582	0.0177	0.0000	365.0290
Unmitigated	0.6081	0.6010	2.5955	4.8500e-003	0.3145	7.4700e-003	0.3220	0.0843	6.8800e-003	0.0912	0.0000	364.6582	364.6582	0.0177	0.0000	365.0290

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	66.64	66.64	61.39	189,822	189,822
Single Family Housing	228.48	228.48	210.48	650,818	650,818
Total	295.12	295.12	271.87	840,639	840,639

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	10.80	7.30	7.50	44.00	18.80	37.20	86	11	3
Single Family Housing	10.80	7.30	7.50	44.00	18.80	37.20	86	11	3

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.463934	0.038758	0.210530	0.164352	0.051306	0.007282	0.016583	0.030323	0.003051	0.002171	0.008186	0.000820	0.002705

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	63.7856	63.7856	2.8800e-003	6.0000e-004	64.0311
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	63.7856	63.7856	2.8800e-003	6.0000e-004	64.0311
NaturalGas Mitigated	5.9000e-003	0.0504	0.0215	3.2000e-004		4.0700e-003	4.0700e-003		4.0700e-003	4.0700e-003	0.0000	58.3678	58.3678	1.1200e-003	1.0700e-003	58.7230
NaturalGas Unmitigated	5.9000e-003	0.0504	0.0215	3.2000e-004		4.0700e-003	4.0700e-003		4.0700e-003	4.0700e-003	0.0000	58.3678	58.3678	1.1200e-003	1.0700e-003	58.7230

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	246981	1.3300e-003	0.0114	4.8400e-003	7.0000e-005		9.2000e-004	9.2000e-004		9.2000e-004	9.2000e-004	0.0000	13.1798	13.1798	2.5000e-004	2.4000e-004	13.2600
Single Family Housing	846791	4.5700e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003	0.0000	45.1880	45.1880	8.7000e-004	8.3000e-004	45.4630
Total		5.9000e-003	0.0504	0.0214	3.2000e-004		4.0700e-003	4.0700e-003		4.0700e-003	4.0700e-003	0.0000	58.3678	58.3678	1.1200e-003	1.0700e-003	58.7230

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	246981	1.3300e-003	0.0114	4.8400e-003	7.0000e-005		9.2000e-004	9.2000e-004		9.2000e-004	9.2000e-004	0.0000	13.1798	13.1798	2.5000e-004	2.4000e-004	13.2600
Single Family Housing	846791	4.5700e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003	0.0000	45.1880	45.1880	8.7000e-004	8.3000e-004	45.4630
Total		5.9000e-003	0.0504	0.0214	3.2000e-004		4.0700e-003	4.0700e-003		4.0700e-003	4.0700e-003	0.0000	58.3678	58.3678	1.1200e-003	1.0700e-003	58.7230

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	169751	49.3824	2.2300e-003	4.6000e-004	49.5725
Single Family Housing	49510.6	14.4032	6.5000e-004	1.3000e-004	14.4586
Total		63.7856	2.8800e-003	5.9000e-004	64.0311

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	169751	49.3824	2.2300e-003	4.6000e-004	49.5725
Single Family Housing	49510.6	14.4032	6.5000e-004	1.3000e-004	14.4586
Total		63.7856	2.8800e-003	5.9000e-004	64.0311

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.9527	0.0555	5.0242	1.8800e-003		0.6746	0.6746		0.6746	0.6746	64.0434	27.2349	91.2782	0.0595	5.0400e-003	94.0888
Unmitigated	3.9527	0.0555	5.0242	1.8800e-003		0.6746	0.6746		0.6746	0.6746	64.0434	27.2349	91.2782	0.0595	5.0400e-003	94.0888

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0158					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0395					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	3.8903	0.0528	4.7924	1.8700e-003		0.6733	0.6733		0.6733	0.6733	64.0434	26.8589	90.9022	0.0591	5.0400e-003	93.7050
Landscaping	7.1500e-003	2.6900e-003	0.2318	1.0000e-005		1.2700e-003	1.2700e-003		1.2700e-003	1.2700e-003	0.0000	0.3760	0.3760	3.7000e-004	0.0000	0.3838
Total	3.9527	0.0555	5.0242	1.8800e-003		0.6746	0.6746		0.6746	0.6746	64.0434	27.2349	91.2782	0.0595	5.0400e-003	94.0888

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0158					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0395					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	3.8903	0.0528	4.7924	1.8700e-003		0.6733	0.6733		0.6733	0.6733	64.0434	26.8589	90.9022	0.0591	5.0400e-003	93.7050
Landscaping	7.1500e-003	2.6900e-003	0.2318	1.0000e-005		1.2700e-003	1.2700e-003		1.2700e-003	1.2700e-003	0.0000	0.3760	0.3760	3.7000e-004	0.0000	0.3838
Total	3.9527	0.0555	5.0242	1.8800e-003		0.6746	0.6746		0.6746	0.6746	64.0434	27.2349	91.2782	0.0595	5.0400e-003	94.0888

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	5.1167	0.0660	1.5900e-003	6.9967
Unmitigated	5.1167	0.0660	1.6000e-003	6.9977

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	2.01977 / 1.27334	5.1167	0.0660	1.6000e-003	6.9977
Total		5.1167	0.0660	1.6000e-003	6.9977

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	2.01977 / 1.27334	5.1167	0.0660	1.5900e-003	6.9967
Total		5.1167	0.0660	1.5900e-003	6.9967

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	8.3957	0.4962	0.0000	18.8153
Unmitigated	8.3957	0.4962	0.0000	18.8153

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	41.36	8.3957	0.4962	0.0000	18.8153
Total		8.3957	0.4962	0.0000	18.8153

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	41.36	8.3957	0.4962	0.0000	18.8153
Total		8.3957	0.4962	0.0000	18.8153

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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10.0 Vegetation

Carmel Rio Road
North Central Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	7.00	Dwelling Unit	0.91	6,020.00	21
Single Family Housing	24.00	Dwelling Unit	6.99	4,080.00	73

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.8	Precipitation Freq (Days)	53
Climate Zone	4			Operational Year	2018
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MW hr)	641.35	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - From project description

Construction Phase - Reflects 18-month construction schedule

Grading - From project plans

Vehicle Trips - From project traffic study

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	0
tblConstructionPhase	NumDays	20.00	28.00
tblConstructionPhase	NumDays	230.00	285.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	PhaseEndDate	8/1/2018	6/30/2018
tblConstructionPhase	PhaseEndDate	3/24/2017	4/7/2017
tblConstructionPhase	PhaseStartDate	6/23/2018	5/23/2018
tblConstructionPhase	PhaseStartDate	2/11/2017	2/25/2017
tblGrading	AcresOfGrading	15.00	7.90
tblGrading	MaterialExported	0.00	199.00
tblGrading	MaterialImported	0.00	11,359.00
tblLandUse	LandUseSquareFeet	12,600.00	6,020.00
tblLandUse	LandUseSquareFeet	43,200.00	4,080.00
tblLandUse	LotAcreage	2.27	0.91
tblLandUse	LotAcreage	7.79	6.99
tblLandUse	Population	20.00	21.00
tblLandUse	Population	69.00	73.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblTripsAndVMT	WorkerTripNumber	11.00	14.00
tblTripsAndVMT	WorkerTripNumber	2.00	3.00
tblVehicleTrips	ST_TR	10.08	9.52
tblVehicleTrips	WD_TR	9.57	9.52

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.2652	51.8538	40.4459	0.0670	18.2141	2.7556	20.9697	9.9699	2.5352	12.5051	0.0000	6,712.8428	6,712.8428	1.2361	0.0000	6,738.8000
2018	13.4294	23.5643	18.5995	0.0290	0.1479	1.4991	1.6338	0.0392	1.4092	1.4453	0.0000	2,790.9161	2,790.9161	0.7344	0.0000	2,806.3387
Total	19.6946	75.4181	59.0454	0.0960	18.3620	4.2547	22.6035	10.0091	3.9443	13.9504	0.0000	9,503.7589	9,503.7589	1.9705	0.0000	9,545.1387

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.2621	51.8063	40.4097	0.0670	25.7911	2.7531	27.9995	9.9699	2.5328	12.5027	0.0000	6,710.0504	6,710.0504	1.2349	0.0000	6,735.9840
2018	13.4276	23.5430	18.5834	0.0289	0.1479	1.4977	1.6324	0.0392	1.4079	1.4440	0.0000	2,788.5216	2,788.5216	0.7337	0.0000	2,803.9302
Total	19.6897	75.3493	58.9931	0.0960	25.9390	4.2508	29.6320	10.0091	3.9407	13.9468	0.0000	9,498.5720	9,498.5720	1.9687	0.0000	9,539.9142

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.0250	0.0913	0.0885	0.0417	-41.2646	0.0914	-31.0944	0.0000	0.0915	0.0258	0.0000	0.0546	0.0546	0.0908	0.0000	0.0547

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	95.2666	1.3172	119.4631	0.0458		16.4360	16.4360		16.4356	16.4356	1,721.8473	726.7228	2,448.5701	1.5935	0.1354	2,524.0197
Energy	0.0323	0.2762	0.1175	1.7600e-003		0.0223	0.0223		0.0223	0.0223		352.5453	352.5453	6.7600e-003	6.4600e-003	354.6908
Mobile	3.1758	3.1010	13.6525	0.0282	1.8037	0.0415	1.8452	0.4820	0.0382	0.5203		2,329.8129	2,329.8129	0.1082		2,332.0859
Total	98.4747	4.6944	133.2332	0.0757	1.8037	16.4999	18.3036	0.4820	16.4961	16.9782	1,721.8473	3,409.0810	5,130.9283	1.7085	0.1419	5,210.7964

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	95.2666	1.3172	119.4631	0.0458		16.4360	16.4360		16.4356	16.4356	1,721.8473	726.7228	2,448.5701	1.5935	0.1354	2,524.0197
Energy	0.0323	0.2762	0.1175	1.7600e-003		0.0223	0.0223		0.0223	0.0223		352.5453	352.5453	6.7600e-003	6.4600e-003	354.6908
Mobile	3.1758	3.1010	13.6525	0.0282	1.8037	0.0415	1.8452	0.4820	0.0382	0.5203		2,329.8129	2,329.8129	0.1082		2,332.0859
Total	98.4747	4.6944	133.2332	0.0757	1.8037	16.4999	18.3036	0.4820	16.4961	16.9782	1,721.8473	3,409.0810	5,130.9283	1.7085	0.1419	5,210.7964

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2017	1/27/2017	5	20	
2	Site Preparation	Site Preparation	1/28/2017	2/10/2017	5	10	
3	Grading	Grading	2/25/2017	4/7/2017	5	30	
4	Building Construction	Building Construction	4/8/2017	5/11/2018	5	285	
5	Paving	Paving	5/12/2018	6/22/2018	5	30	
6	Architectural Coating	Architectural Coating	5/23/2018	6/30/2018	5	28	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	162	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	1	8.00	162	0.38
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	125	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	174	0.41
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Paving Equipment	2	8.00	130	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	1,445.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	14.00	3.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	3.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2017

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0482	42.6971	33.8934	0.0399		2.1252	2.1252		1.9797	1.9797		4,036.4674	4,036.4674	1.1073		4,059.7211
Total	4.0482	42.6971	33.8934	0.0399		2.1252	2.1252		1.9797	1.9797		4,036.4674	4,036.4674	1.1073		4,059.7211

3.2 Demolition - 2017**Unmitigated Construction Off-Site****Acres of Grading: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2148	0.0836	0.8740	1.5600e-003	0.1232	1.1600e-003	0.1244	0.0327	1.0700e-003	0.0338		125.5559	125.5559	7.9400e-003		125.7226
Total	0.2148	0.0836	0.8740	1.5600e-003	0.1232	1.1600e-003	0.1244	0.0327	1.0700e-003	0.0338		125.5559	125.5559	7.9400e-003		125.7226

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0445	42.6579	33.8623	0.0399		2.1233	2.1233		1.9779	1.9779	0.0000	4,032.7641	4,032.7641	1.1063		4,055.9965
Total	4.0445	42.6579	33.8623	0.0399		2.1233	2.1233		1.9779	1.9779	0.0000	4,032.7641	4,032.7641	1.1063		4,055.9965

3.2 Demolition - 2017**Mitigated Construction Off-Site****Acres of Grading: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2148	0.0836	0.8740	1.5600e-003	0.1232	1.1600e-003	0.1244	0.0327	1.0700e-003	0.0338		125.5559	125.5559	7.9400e-003		125.7226
Total	0.2148	0.0836	0.8740	1.5600e-003	0.1232	1.1600e-003	0.1244	0.0327	1.0700e-003	0.0338		125.5559	125.5559	7.9400e-003		125.7226

3.3 Site Preparation - 2017**Unmitigated Construction On-Site****Acres of Grading: 7.9**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.8382	51.7535	39.3970	0.0391		2.7542	2.7542		2.5339	2.5339		4,003.0859	4,003.0859	1.2265		4,028.8432
Total	4.8382	51.7535	39.3970	0.0391	18.0663	2.7542	20.8205	9.9307	2.5339	12.4646		4,003.0859	4,003.0859	1.2265		4,028.8432

3.3 Site Preparation - 2017**Unmitigated Construction Off-Site****Acres of Grading: 7.9**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2578	0.1003	1.0488	1.8800e-003	0.1479	1.4000e-003	0.1493	0.0392	1.2800e-003	0.0405		150.6671	150.6671	9.5200e-003		150.8671
Total	0.2578	0.1003	1.0488	1.8800e-003	0.1479	1.4000e-003	0.1493	0.0392	1.2800e-003	0.0405		150.6671	150.6671	9.5200e-003		150.8671

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.8338	51.7060	39.3609	0.0391		2.7517	2.7517		2.5316	2.5316	0.0000	3,999.4133	3,999.4133	1.2254		4,025.1470
Total	4.8338	51.7060	39.3609	0.0391	18.0663	2.7517	20.8180	9.9307	2.5316	12.4622	0.0000	3,999.4133	3,999.4133	1.2254		4,025.1470

3.3 Site Preparation - 2017**Mitigated Construction Off-Site****Acres of Grading: 7.9**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2578	0.1003	1.0488	1.8800e-003	0.1479	1.4000e-003	0.1493	0.0392	1.2800e-003	0.0405		150.6671	150.6671	9.5200e-003		150.8671
Total	0.2578	0.1003	1.0488	1.8800e-003	0.1479	1.4000e-003	0.1493	0.0392	1.2800e-003	0.0405		150.6671	150.6671	9.5200e-003		150.8671

3.4 Grading - 2017**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.3610	0.0000	6.3610	3.3494	0.0000	3.3494			0.0000			0.0000
Off-Road	3.4555	35.9825	25.3812	0.0297		2.0388	2.0388		1.8757	1.8757		3,043.6667	3,043.6667	0.9326		3,063.2507
Total	3.4555	35.9825	25.3812	0.0297	6.3610	2.0388	8.3998	3.3494	1.8757	5.2251		3,043.6667	3,043.6667	0.9326		3,063.2507

3.4 Grading - 2017**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.5949	10.9303	10.2739	0.0357	0.8392	0.1703	1.0096	0.2298	0.1567	0.3865		3,543.620 2	3,543.620 2	0.0245		3,544.133 8
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2148	0.0836	0.8740	1.5600e-003	0.1232	1.1600e-003	0.1244	0.0327	1.0700e-003	0.0338		125.5559	125.5559	7.9400e-003		125.7226
Total	2.8097	11.0139	11.1480	0.0373	0.9625	0.1715	1.1339	0.2625	0.1578	0.4203		3,669.176 1	3,669.176 1	0.0324		3,669.856 3

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.3610	0.0000	6.3610	3.3494	0.0000	3.3494			0.0000			0.0000
Off-Road	3.4524	35.9494	25.3579	0.0297		2.0369	2.0369		1.8740	1.8740	0.0000	3,040.874 3	3,040.874 3	0.9317		3,060.440 4
Total	3.4524	35.9494	25.3579	0.0297	6.3610	2.0369	8.3979	3.3494	1.8740	5.2234	0.0000	3,040.874 3	3,040.874 3	0.9317		3,060.440 4

3.4 Grading - 2017**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.5949	10.9303	10.2739	0.0357	19.3069	0.1703	19.4773	4.7628	0.1567	4.9195		3,543.620 2	3,543.620 2	0.0245		3,544.133 8
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2148	0.0836	0.8740	1.5600e-003	0.1232	1.1600e-003	0.1244	0.0327	1.0700e-003	0.0338		125.5559	125.5559	7.9400e-003		125.7226
Total	2.8097	11.0139	11.1480	0.0373	19.4302	0.1715	19.6016	4.7955	0.1578	4.9532		3,669.176 1	3,669.176 1	0.0324		3,669.856 3

3.5 Building Construction - 2017**Unmitigated Construction On-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.805 3	2,639.805 3	0.6497		2,653.449 0
Total	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.805 3	2,639.805 3	0.6497		2,653.449 0

3.5 Building Construction - 2017**Unmitigated Construction Off-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0646	0.2587	0.3572	7.0000e-004	0.0197	4.2000e-003	0.0239	5.6100e-003	3.8600e-003	9.4700e-003		69.2953	69.2953	5.4000e-004		69.3067
Worker	0.2005	0.0780	0.8158	1.4600e-003	0.1150	1.0900e-003	0.1161	0.0305	1.0000e-003	0.0315		117.1855	117.1855	7.4100e-003		117.3411
Total	0.2651	0.3367	1.1730	2.1600e-003	0.1348	5.2900e-003	0.1400	0.0361	4.8600e-003	0.0410		186.4809	186.4809	7.9500e-003		186.6478

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.0995	26.3814	18.1125	0.0268		1.7796	1.7796		1.6714	1.6714	0.0000	2,637.3834	2,637.3834	0.6491		2,651.0146
Total	3.0995	26.3814	18.1125	0.0268		1.7796	1.7796		1.6714	1.6714	0.0000	2,637.3834	2,637.3834	0.6491		2,651.0146

3.5 Building Construction - 2017**Mitigated Construction Off-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0646	0.2587	0.3572	7.0000e-004	0.0197	4.2000e-003	0.0239	5.6100e-003	3.8600e-003	9.4700e-003		69.2953	69.2953	5.4000e-004		69.3067
Worker	0.2005	0.0780	0.8158	1.4600e-003	0.1150	1.0900e-003	0.1161	0.0305	1.0000e-003	0.0315		117.1855	117.1855	7.4100e-003		117.3411
Total	0.2651	0.3367	1.1730	2.1600e-003	0.1348	5.2900e-003	0.1400	0.0361	4.8600e-003	0.0410		186.4809	186.4809	7.9500e-003		186.6478

3.5 Building Construction - 2018**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048		2,609.9390	2,609.9390	0.6387		2,623.3517
Total	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048		2,609.9390	2,609.9390	0.6387		2,623.3517

3.5 Building Construction - 2018**Unmitigated Construction Off-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0602	0.2337	0.3404	7.0000e-004	0.0197	3.7500e-003	0.0235	5.6100e-003	3.4500e-003	9.0500e-003		68.1207	68.1207	5.2000e-004		68.1316
Worker	0.1816	0.0698	0.7264	1.4600e-003	0.1150	1.0300e-003	0.1160	0.0305	9.5000e-004	0.0315		112.8564	112.8564	6.7500e-003		112.9983
Total	0.2418	0.3035	1.0668	2.1600e-003	0.1348	4.7800e-003	0.1395	0.0361	4.4000e-003	0.0405		180.9772	180.9772	7.2700e-003		181.1299

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6662	23.2395	17.5166	0.0268		1.4929	1.4929		1.4035	1.4035	0.0000	2,607.5445	2,607.5445	0.6381		2,620.9449
Total	2.6662	23.2395	17.5166	0.0268		1.4929	1.4929		1.4035	1.4035	0.0000	2,607.5445	2,607.5445	0.6381		2,620.9449

3.5 Building Construction - 2018**Mitigated Construction Off-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0602	0.2337	0.3404	7.0000e-004	0.0197	3.7500e-003	0.0235	5.6100e-003	3.4500e-003	9.0500e-003		68.1207	68.1207	5.2000e-004		68.1316
Worker	0.1816	0.0698	0.7264	1.4600e-003	0.1150	1.0300e-003	0.1160	0.0305	9.5000e-004	0.0315		112.8564	112.8564	6.7500e-003		112.9983
Total	0.2418	0.3035	1.0668	2.1600e-003	0.1348	4.7800e-003	0.1395	0.0361	4.4000e-003	0.0405		180.9772	180.9772	7.2700e-003		181.1299

3.6 Paving - 2018**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635		2,245.2695	2,245.2695	0.6990		2,259.9481
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635		2,245.2695	2,245.2695	0.6990		2,259.9481

3.6 Paving - 2018**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1946	0.0747	0.7783	1.5600e-003	0.1232	1.1100e-003	0.1243	0.0327	1.0200e-003	0.0337		120.9176	120.9176	7.2400e-003		121.0696
Total	0.1946	0.0747	0.7783	1.5600e-003	0.1232	1.1100e-003	0.1243	0.0327	1.0200e-003	0.0337		120.9176	120.9176	7.2400e-003		121.0696

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6099	17.1470	14.4811	0.0223		0.9378	0.9378		0.8628	0.8628	0.0000	2,243.2096	2,243.2096	0.6983		2,257.8747
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	1.6099	17.1470	14.4811	0.0223		0.9378	0.9378		0.8628	0.8628	0.0000	2,243.2096	2,243.2096	0.6983		2,257.8747

3.6 Paving - 2018**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1946	0.0747	0.7783	1.5600e-003	0.1232	1.1100e-003	0.1243	0.0327	1.0200e-003	0.0337		120.9176	120.9176	7.2400e-003		121.0696
Total	0.1946	0.0747	0.7783	1.5600e-003	0.1232	1.1100e-003	0.1243	0.0327	1.0200e-003	0.0337		120.9176	120.9176	7.2400e-003		121.0696

3.7 Architectural Coating - 2018**Unmitigated Construction On-Site****Residential Indoor: 20,453; Residential Outdoor: 6,818; Non-Residential Indoor: 0; Non-Residential Outdoor: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	11.2858					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.0102
Total	11.5844	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.0102

3.7 Architectural Coating - 2018**Unmitigated Construction Off-Site****Residential Indoor: 20,453; Residential Outdoor: 6,818; Non-Residential Indoor: 0; Non-Residential Outdoor: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0389	0.0150	0.1557	3.1000e-004	0.0246	2.2000e-004	0.0249	6.5400e-003	2.0000e-004	6.7400e-003		24.1835	24.1835	1.4500e-003		24.2139
Total	0.0389	0.0150	0.1557	3.1000e-004	0.0246	2.2000e-004	0.0249	6.5400e-003	2.0000e-004	6.7400e-003		24.1835	24.1835	1.4500e-003		24.2139

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	11.2858					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2984	2.0039	1.8525	2.9700e-003		0.1504	0.1504		0.1504	0.1504	0.0000	281.1903	281.1903	0.0267		281.7514
Total	11.5842	2.0039	1.8525	2.9700e-003		0.1504	0.1504		0.1504	0.1504	0.0000	281.1903	281.1903	0.0267		281.7514

3.7 Architectural Coating - 2018

Mitigated Construction Off-Site

Residential Indoor: 20,453; Residential Outdoor: 6,818; Non-Residential Indoor: 0; Non-Residential Outdoor: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0389	0.0150	0.1557	3.1000e-004	0.0246	2.2000e-004	0.0249	6.5400e-003	2.0000e-004	6.7400e-003		24.1835	24.1835	1.4500e-003		24.2139
Total	0.0389	0.0150	0.1557	3.1000e-004	0.0246	2.2000e-004	0.0249	6.5400e-003	2.0000e-004	6.7400e-003		24.1835	24.1835	1.4500e-003		24.2139

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.1758	3.1010	13.6525	0.0282	1.8037	0.0415	1.8452	0.4820	0.0382	0.5203		2,329.8129	2,329.8129	0.1082		2,332.0859
Unmitigated	3.1758	3.1010	13.6525	0.0282	1.8037	0.0415	1.8452	0.4820	0.0382	0.5203		2,329.8129	2,329.8129	0.1082		2,332.0859

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	66.64	66.64	61.39	189,822	189,822
Single Family Housing	228.48	228.48	210.48	650,818	650,818
Total	295.12	295.12	271.87	840,639	840,639

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	10.80	7.30	7.50	44.00	18.80	37.20	86	11	3
Single Family Housing	10.80	7.30	7.50	44.00	18.80	37.20	86	11	3

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.463934	0.038758	0.210530	0.164352	0.051306	0.007282	0.016583	0.030323	0.003051	0.002171	0.008186	0.000820	0.002705

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0323	0.2762	0.1175	1.7600e-003		0.0223	0.0223		0.0223	0.0223		352.5453	352.5453	6.7600e-003	6.4600e-003	354.6908
NaturalGas Unmitigated	0.0323	0.2762	0.1175	1.7600e-003		0.0223	0.0223		0.0223	0.0223		352.5453	352.5453	6.7600e-003	6.4600e-003	354.6908

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	2319.98	0.0250	0.2138	0.0910	1.3600e-003		0.0173	0.0173		0.0173	0.0173		272.9383	272.9383	5.2300e-003	5.0000e-003	274.5994
Single Family Housing	676.66	7.3000e-003	0.0624	0.0265	4.0000e-004		5.0400e-003	5.0400e-003		5.0400e-003	5.0400e-003		79.6070	79.6070	1.5300e-003	1.4600e-003	80.0915
Total		0.0323	0.2762	0.1175	1.7600e-003		0.0223	0.0223		0.0223	0.0223		352.5453	352.5453	6.7600e-003	6.4600e-003	354.6908

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	0.67666	7.3000e-003	0.0624	0.0265	4.0000e-004		5.0400e-003	5.0400e-003		5.0400e-003	5.0400e-003		79.6070	79.6070	1.5300e-003	1.4600e-003	80.0915
Single Family Housing	2.31998	0.0250	0.2138	0.0910	1.3600e-003		0.0173	0.0173		0.0173	0.0173		272.9383	272.9383	5.2300e-003	5.0000e-003	274.5994
Total		0.0323	0.2762	0.1175	1.7600e-003		0.0223	0.0223		0.0223	0.0223		352.5453	352.5453	6.7600e-003	6.4600e-003	354.6908

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	95.2666	1.3172	119.4631	0.0458		16.4360	16.4360		16.4356	16.4356	1,721.847 3	726.7228	2,448.570 1	1.5935	0.1354	2,524.019 7
Unmitigated	95.2666	1.3172	119.4631	0.0458		16.4360	16.4360		16.4356	16.4356	1,721.847 3	726.7228	2,448.570 1	1.5935	0.1354	2,524.019 7

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0866					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2161					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	94.8845	1.2873	116.8875	0.0457		16.4220	16.4220		16.4215	16.4215	1,721.847 3	722.1177	2,443.965 0	1.5890	0.1354	2,519.318 8
Landscaping	0.0794	0.0299	2.5756	1.4000e-004		0.0141	0.0141		0.0141	0.0141		4.6051	4.6051	4.5600e-003		4.7010
Total	95.2666	1.3172	119.4631	0.0458		16.4360	16.4360		16.4356	16.4356	1,721.847 3	726.7228	2,448.570 1	1.5935	0.1354	2,524.019 7

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0866					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2161					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	94.8845	1.2873	116.8875	0.0457		16.4220	16.4220		16.4215	16.4215	1,721.8473	722.1177	2,443.9650	1.5890	0.1354	2,519.3188
Landscaping	0.0794	0.0299	2.5756	1.4000e-004		0.0141	0.0141		0.0141	0.0141		4.6051	4.6051	4.5600e-003		4.7010
Total	95.2666	1.3172	119.4631	0.0458		16.4360	16.4360		16.4356	16.4356	1,721.8473	726.7228	2,448.5701	1.5935	0.1354	2,524.0197

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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10.0 Vegetation

Carmel Rio Road
North Central Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	7.00	Dwelling Unit	0.91	6,020.00	21
Single Family Housing	24.00	Dwelling Unit	6.99	4,080.00	73

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.8	Precipitation Freq (Days)	53
Climate Zone	4			Operational Year	2018
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - From project description

Construction Phase - Reflects 18-month construction schedule

Grading - From project plans

Vehicle Trips - From project traffic study

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	0
tblConstructionPhase	NumDays	20.00	28.00
tblConstructionPhase	NumDays	230.00	285.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	PhaseEndDate	8/1/2018	6/30/2018
tblConstructionPhase	PhaseEndDate	3/24/2017	4/7/2017
tblConstructionPhase	PhaseStartDate	6/23/2018	5/23/2018
tblConstructionPhase	PhaseStartDate	2/11/2017	2/25/2017
tblGrading	AcresOfGrading	15.00	7.90
tblGrading	MaterialExported	0.00	199.00
tblGrading	MaterialImported	0.00	11,359.00
tblLandUse	LandUseSquareFeet	12,600.00	6,020.00
tblLandUse	LandUseSquareFeet	43,200.00	4,080.00
tblLandUse	LotAcreage	2.27	0.91
tblLandUse	LotAcreage	7.79	6.99
tblLandUse	Population	20.00	21.00
tblLandUse	Population	69.00	73.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblTripsAndVMT	WorkerTripNumber	11.00	14.00
tblTripsAndVMT	WorkerTripNumber	2.00	3.00
tblVehicleTrips	ST_TR	10.08	9.52
tblVehicleTrips	WD_TR	9.57	9.52

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.7213	51.8793	43.4141	0.0670	18.2141	2.7556	20.9697	9.9699	2.5352	12.5051	0.0000	6,697.124 1	6,697.124 1	1.2361	0.0000	6,723.081 3
2018	13.4887	23.5934	18.8830	0.0289	0.1479	1.4991	1.6339	0.0392	1.4092	1.4453	0.0000	2,783.770 6	2,783.770 6	0.7344	0.0000	2,799.193 2
Total	20.2100	75.4728	62.2971	0.0959	18.3620	4.2547	22.6036	10.0091	3.9444	13.9504	0.0000	9,480.894 7	9,480.894 7	1.9705	0.0000	9,522.274 6

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.7181	51.8319	43.3908	0.0669	25.7911	2.7531	28.0001	9.9699	2.5328	12.5027	0.0000	6,694.331 7	6,694.331 7	1.2349	0.0000	6,720.265 3
2018	13.4870	23.5721	18.8669	0.0289	0.1479	1.4977	1.6325	0.0392	1.4079	1.4441	0.0000	2,781.376 2	2,781.376 2	0.7337	0.0000	2,796.784 8
Total	20.2051	75.4039	62.2577	0.0958	25.9390	4.2508	29.6326	10.0091	3.9408	13.9468	0.0000	9,475.707 8	9,475.707 8	1.9687	0.0000	9,517.050 1

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.0244	0.0912	0.0632	0.0626	-41.2646	0.0914	-31.0969	0.0000	0.0915	0.0259	0.0000	0.0547	0.0547	0.0908	0.0000	0.0549

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	95.2666	1.3172	119.4631	0.0458		16.4360	16.4360		16.4356	16.4356	1,721.847 3	726.7228	2,448.570 1	1.5935	0.1354	2,524.019 7
Energy	0.0323	0.2762	0.1175	1.7600e-003		0.0223	0.0223		0.0223	0.0223		352.5453	352.5453	6.7600e-003	6.4600e-003	354.6908
Mobile	3.8670	3.5002	16.0312	0.0269	1.8037	0.0417	1.8454	0.4820	0.0384	0.5205		2,227.974 8	2,227.974 8	0.1083		2,230.249 6
Total	99.1659	5.0936	135.6118	0.0745	1.8037	16.5001	18.3038	0.4820	16.4963	16.9783	1,721.847 3	3,307.242 8	5,029.090 1	1.7086	0.1419	5,108.960 1

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	95.2666	1.3172	119.4631	0.0458		16.4360	16.4360		16.4356	16.4356	1,721.847 3	726.7228	2,448.570 1	1.5935	0.1354	2,524.019 7
Energy	0.0323	0.2762	0.1175	1.7600e-003		0.0223	0.0223		0.0223	0.0223		352.5453	352.5453	6.7600e-003	6.4600e-003	354.6908
Mobile	3.8670	3.5002	16.0312	0.0269	1.8037	0.0417	1.8454	0.4820	0.0384	0.5205		2,227.974 8	2,227.974 8	0.1083		2,230.249 6
Total	99.1659	5.0936	135.6118	0.0745	1.8037	16.5001	18.3038	0.4820	16.4963	16.9783	1,721.847 3	3,307.242 8	5,029.090 1	1.7086	0.1419	5,108.960 1

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2017	1/27/2017	5	20	
2	Site Preparation	Site Preparation	1/28/2017	2/10/2017	5	10	
3	Grading	Grading	2/25/2017	4/7/2017	5	30	
4	Building Construction	Building Construction	4/8/2017	5/11/2018	5	285	
5	Paving	Paving	5/12/2018	6/22/2018	5	30	
6	Architectural Coating	Architectural Coating	5/23/2018	6/30/2018	5	28	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	162	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	1	8.00	162	0.38
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	125	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	174	0.41
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Paving Equipment	2	8.00	130	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	1,445.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	14.00	3.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	3.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2017

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0482	42.6971	33.8934	0.0399		2.1252	2.1252		1.9797	1.9797		4,036.4674	4,036.4674	1.1073		4,059.7211
Total	4.0482	42.6971	33.8934	0.0399		2.1252	2.1252		1.9797	1.9797		4,036.4674	4,036.4674	1.1073		4,059.7211

3.2 Demolition - 2017**Unmitigated Construction Off-Site****Acres of Grading: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2690	0.1049	0.9037	1.4700e-003	0.1232	1.1600e-003	0.1244	0.0327	1.0700e-003	0.0338		118.2099	118.2099	7.9400e-003		118.3765
Total	0.2690	0.1049	0.9037	1.4700e-003	0.1232	1.1600e-003	0.1244	0.0327	1.0700e-003	0.0338		118.2099	118.2099	7.9400e-003		118.3765

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0445	42.6579	33.8623	0.0399		2.1233	2.1233		1.9779	1.9779	0.0000	4,032.7641	4,032.7641	1.1063		4,055.9965
Total	4.0445	42.6579	33.8623	0.0399		2.1233	2.1233		1.9779	1.9779	0.0000	4,032.7641	4,032.7641	1.1063		4,055.9965

3.2 Demolition - 2017**Mitigated Construction Off-Site****Acres of Grading: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2690	0.1049	0.9037	1.4700e-003	0.1232	1.1600e-003	0.1244	0.0327	1.0700e-003	0.0338		118.2099	118.2099	7.9400e-003		118.3765
Total	0.2690	0.1049	0.9037	1.4700e-003	0.1232	1.1600e-003	0.1244	0.0327	1.0700e-003	0.0338		118.2099	118.2099	7.9400e-003		118.3765

3.3 Site Preparation - 2017**Unmitigated Construction On-Site****Acres of Grading: 7.9**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.8382	51.7535	39.3970	0.0391		2.7542	2.7542		2.5339	2.5339		4,003.0859	4,003.0859	1.2265		4,028.8432
Total	4.8382	51.7535	39.3970	0.0391	18.0663	2.7542	20.8205	9.9307	2.5339	12.4646		4,003.0859	4,003.0859	1.2265		4,028.8432

3.3 Site Preparation - 2017**Unmitigated Construction Off-Site****Acres of Grading: 7.9**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3228	0.1259	1.0844	1.7700e-003	0.1479	1.4000e-003	0.1493	0.0392	1.2800e-003	0.0405		141.8519	141.8519	9.5200e-003		142.0518
Total	0.3228	0.1259	1.0844	1.7700e-003	0.1479	1.4000e-003	0.1493	0.0392	1.2800e-003	0.0405		141.8519	141.8519	9.5200e-003		142.0518

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.8338	51.7060	39.3609	0.0391		2.7517	2.7517		2.5316	2.5316	0.0000	3,999.4133	3,999.4133	1.2254		4,025.1470
Total	4.8338	51.7060	39.3609	0.0391	18.0663	2.7517	20.8180	9.9307	2.5316	12.4622	0.0000	3,999.4133	3,999.4133	1.2254		4,025.1470

3.3 Site Preparation - 2017**Mitigated Construction Off-Site****Acres of Grading: 7.9**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3228	0.1259	1.0844	1.7700e-003	0.1479	1.4000e-003	0.1493	0.0392	1.2800e-003	0.0405		141.8519	141.8519	9.5200e-003		142.0518
Total	0.3228	0.1259	1.0844	1.7700e-003	0.1479	1.4000e-003	0.1493	0.0392	1.2800e-003	0.0405		141.8519	141.8519	9.5200e-003		142.0518

3.4 Grading - 2017**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.3610	0.0000	6.3610	3.3494	0.0000	3.3494			0.0000			0.0000
Off-Road	3.4555	35.9825	25.3812	0.0297		2.0388	2.0388		1.8757	1.8757		3,043.6667	3,043.6667	0.9326		3,063.2507
Total	3.4555	35.9825	25.3812	0.0297	6.3610	2.0388	8.3998	3.3494	1.8757	5.2251		3,043.6667	3,043.6667	0.9326		3,063.2507

3.4 Grading - 2017**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.9967	11.5414	17.1291	0.0358	0.8392	0.1709	1.0101	0.2298	0.1572	0.3870		3,535.2475	3,535.2475	0.0248		3,535.7689
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2690	0.1049	0.9037	1.4700e-003	0.1232	1.1600e-003	0.1244	0.0327	1.0700e-003	0.0338		118.2099	118.2099	7.9400e-003		118.3765
Total	3.2657	11.6463	18.0328	0.0372	0.9625	0.1721	1.1345	0.2625	0.1583	0.4208		3,653.4574	3,653.4574	0.0328		3,654.1454

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.3610	0.0000	6.3610	3.3494	0.0000	3.3494			0.0000			0.0000
Off-Road	3.4524	35.9494	25.3579	0.0297		2.0369	2.0369		1.8740	1.8740	0.0000	3,040.8743	3,040.8743	0.9317		3,060.4404
Total	3.4524	35.9494	25.3579	0.0297	6.3610	2.0369	8.3979	3.3494	1.8740	5.2234	0.0000	3,040.8743	3,040.8743	0.9317		3,060.4404

3.4 Grading - 2017**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.9967	11.5414	17.1291	0.0358	19.3069	0.1709	19.4778	4.7628	0.1572	4.9200		3,535.2475	3,535.2475	0.0248		3,535.7689
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2690	0.1049	0.9037	1.4700e-003	0.1232	1.1600e-003	0.1244	0.0327	1.0700e-003	0.0338		118.2099	118.2099	7.9400e-003		118.3765
Total	3.2657	11.6463	18.0328	0.0372	19.4302	0.1721	19.6022	4.7955	0.1583	4.9538		3,653.4574	3,653.4574	0.0328		3,654.1454

3.5 Building Construction - 2017**Unmitigated Construction On-Site**

Acres of Paving: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.8053	2,639.8053	0.6497		2,653.4490
Total	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.8053	2,639.8053	0.6497		2,653.4490

3.5 Building Construction - 2017**Unmitigated Construction Off-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0783	0.2713	0.6324	7.0000e-004	0.0197	4.2600e-003	0.0240	5.6100e-003	3.9200e-003	9.5300e-003		68.7568	68.7568	5.6000e-004		68.7685
Worker	0.2511	0.0979	0.8434	1.3700e-003	0.1150	1.0900e-003	0.1161	0.0305	1.0000e-003	0.0315		110.3292	110.3292	7.4100e-003		110.4848
Total	0.3294	0.3692	1.4759	2.0700e-003	0.1348	5.3500e-003	0.1401	0.0361	4.9200e-003	0.0410		179.0860	179.0860	7.9700e-003		179.2533

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.0995	26.3814	18.1125	0.0268		1.7796	1.7796		1.6714	1.6714	0.0000	2,637.3834	2,637.3834	0.6491		2,651.0146
Total	3.0995	26.3814	18.1125	0.0268		1.7796	1.7796		1.6714	1.6714	0.0000	2,637.3834	2,637.3834	0.6491		2,651.0146

3.5 Building Construction - 2017**Mitigated Construction Off-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0783	0.2713	0.6324	7.0000e-004	0.0197	4.2600e-003	0.0240	5.6100e-003	3.9200e-003	9.5300e-003		68.7568	68.7568	5.6000e-004		68.7685
Worker	0.2511	0.0979	0.8434	1.3700e-003	0.1150	1.0900e-003	0.1161	0.0305	1.0000e-003	0.0315		110.3292	110.3292	7.4100e-003		110.4848
Total	0.3294	0.3692	1.4759	2.0700e-003	0.1348	5.3500e-003	0.1401	0.0361	4.9200e-003	0.0410		179.0860	179.0860	7.9700e-003		179.2533

3.5 Building Construction - 2018**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048		2,609.9390	2,609.9390	0.6387		2,623.3517
Total	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048		2,609.9390	2,609.9390	0.6387		2,623.3517

3.5 Building Construction - 2018**Unmitigated Construction Off-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0729	0.2450	0.6067	7.0000e-004	0.0197	3.8000e-003	0.0235	5.6100e-003	3.4900e-003	9.1000e-003		67.5898	67.5898	5.3000e-004		67.6010
Worker	0.2278	0.0876	0.7436	1.3700e-003	0.1150	1.0300e-003	0.1160	0.0305	9.5000e-004	0.0315		106.2419	106.2419	6.7500e-003		106.3838
Total	0.3007	0.3326	1.3504	2.0700e-003	0.1348	4.8300e-003	0.1396	0.0361	4.4400e-003	0.0406		173.8317	173.8317	7.2800e-003		173.9847

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6662	23.2395	17.5166	0.0268		1.4929	1.4929		1.4035	1.4035	0.0000	2,607.5445	2,607.5445	0.6381		2,620.9449
Total	2.6662	23.2395	17.5166	0.0268		1.4929	1.4929		1.4035	1.4035	0.0000	2,607.5445	2,607.5445	0.6381		2,620.9449

3.5 Building Construction - 2018**Mitigated Construction Off-Site****Acres of Paving: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0729	0.2450	0.6067	7.0000e-004	0.0197	3.8000e-003	0.0235	5.6100e-003	3.4900e-003	9.1000e-003		67.5898	67.5898	5.3000e-004		67.6010
Worker	0.2278	0.0876	0.7436	1.3700e-003	0.1150	1.0300e-003	0.1160	0.0305	9.5000e-004	0.0315		106.2419	106.2419	6.7500e-003		106.3838
Total	0.3007	0.3326	1.3504	2.0700e-003	0.1348	4.8300e-003	0.1396	0.0361	4.4400e-003	0.0406		173.8317	173.8317	7.2800e-003		173.9847

3.6 Paving - 2018**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635		2,245.2695	2,245.2695	0.6990		2,259.9481
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635		2,245.2695	2,245.2695	0.6990		2,259.9481

3.6 Paving - 2018**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2441	0.0938	0.7967	1.4700e-003	0.1232	1.1100e-003	0.1243	0.0327	1.0200e-003	0.0337		113.8306	113.8306	7.2400e-003		113.9826
Total	0.2441	0.0938	0.7967	1.4700e-003	0.1232	1.1100e-003	0.1243	0.0327	1.0200e-003	0.0337		113.8306	113.8306	7.2400e-003		113.9826

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6099	17.1470	14.4811	0.0223		0.9378	0.9378		0.8628	0.8628	0.0000	2,243.2096	2,243.2096	0.6983		2,257.8747
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	1.6099	17.1470	14.4811	0.0223		0.9378	0.9378		0.8628	0.8628	0.0000	2,243.2096	2,243.2096	0.6983		2,257.8747

3.6 Paving - 2018**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2441	0.0938	0.7967	1.4700e-003	0.1232	1.1100e-003	0.1243	0.0327	1.0200e-003	0.0337		113.8306	113.8306	7.2400e-003		113.9826
Total	0.2441	0.0938	0.7967	1.4700e-003	0.1232	1.1100e-003	0.1243	0.0327	1.0200e-003	0.0337		113.8306	113.8306	7.2400e-003		113.9826

3.7 Architectural Coating - 2018**Unmitigated Construction On-Site****Residential Indoor: 20,453; Residential Outdoor: 6,818; Non-Residential Indoor: 0; Non-Residential Outdoor: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	11.2858					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.0102
Total	11.5844	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.0102

3.7 Architectural Coating - 2018**Unmitigated Construction Off-Site****Residential Indoor: 20,453; Residential Outdoor: 6,818; Non-Residential Indoor: 0; Non-Residential Outdoor: 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0488	0.0188	0.1594	2.9000e-004	0.0246	2.2000e-004	0.0249	6.5400e-003	2.0000e-004	6.7400e-003		22.7661	22.7661	1.4500e-003		22.7965
Total	0.0488	0.0188	0.1594	2.9000e-004	0.0246	2.2000e-004	0.0249	6.5400e-003	2.0000e-004	6.7400e-003		22.7661	22.7661	1.4500e-003		22.7965

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	11.2858					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2984	2.0039	1.8525	2.9700e-003		0.1504	0.1504		0.1504	0.1504	0.0000	281.1903	281.1903	0.0267		281.7514
Total	11.5842	2.0039	1.8525	2.9700e-003		0.1504	0.1504		0.1504	0.1504	0.0000	281.1903	281.1903	0.0267		281.7514

3.7 Architectural Coating - 2018

Mitigated Construction Off-Site

Residential Indoor: 20,453; Residential Outdoor: 6,818; Non-Residential Indoor: 0; Non-Residential Outdoor: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0488	0.0188	0.1594	2.9000e-004	0.0246	2.2000e-004	0.0249	6.5400e-003	2.0000e-004	6.7400e-003		22.7661	22.7661	1.4500e-003		22.7965
Total	0.0488	0.0188	0.1594	2.9000e-004	0.0246	2.2000e-004	0.0249	6.5400e-003	2.0000e-004	6.7400e-003		22.7661	22.7661	1.4500e-003		22.7965

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.8670	3.5002	16.0312	0.0269	1.8037	0.0417	1.8454	0.4820	0.0384	0.5205		2,227.9748	2,227.9748	0.1083		2,230.2496
Unmitigated	3.8670	3.5002	16.0312	0.0269	1.8037	0.0417	1.8454	0.4820	0.0384	0.5205		2,227.9748	2,227.9748	0.1083		2,230.2496

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	66.64	66.64	61.39	189,822	189,822
Single Family Housing	228.48	228.48	210.48	650,818	650,818
Total	295.12	295.12	271.87	840,639	840,639

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	10.80	7.30	7.50	44.00	18.80	37.20	86	11	3
Single Family Housing	10.80	7.30	7.50	44.00	18.80	37.20	86	11	3

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.463934	0.038758	0.210530	0.164352	0.051306	0.007282	0.016583	0.030323	0.003051	0.002171	0.008186	0.000820	0.002705

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0323	0.2762	0.1175	1.7600e-003		0.0223	0.0223		0.0223	0.0223		352.5453	352.5453	6.7600e-003	6.4600e-003	354.6908
NaturalGas Unmitigated	0.0323	0.2762	0.1175	1.7600e-003		0.0223	0.0223		0.0223	0.0223		352.5453	352.5453	6.7600e-003	6.4600e-003	354.6908

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	2319.98	0.0250	0.2138	0.0910	1.3600e-003		0.0173	0.0173		0.0173	0.0173		272.9383	272.9383	5.2300e-003	5.0000e-003	274.5994
Single Family Housing	676.66	7.3000e-003	0.0624	0.0265	4.0000e-004		5.0400e-003	5.0400e-003		5.0400e-003	5.0400e-003		79.6070	79.6070	1.5300e-003	1.4600e-003	80.0915
Total		0.0323	0.2762	0.1175	1.7600e-003		0.0223	0.0223		0.0223	0.0223		352.5453	352.5453	6.7600e-003	6.4600e-003	354.6908

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	2.31998	0.0250	0.2138	0.0910	1.3600e-003		0.0173	0.0173		0.0173	0.0173		272.9383	272.9383	5.2300e-003	5.0000e-003	274.5994
Single Family Housing	0.67666	7.3000e-003	0.0624	0.0265	4.0000e-004		5.0400e-003	5.0400e-003		5.0400e-003	5.0400e-003		79.6070	79.6070	1.5300e-003	1.4600e-003	80.0915
Total		0.0323	0.2762	0.1175	1.7600e-003		0.0223	0.0223		0.0223	0.0223		352.5453	352.5453	6.7600e-003	6.4600e-003	354.6908

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	95.2666	1.3172	119.4631	0.0458		16.4360	16.4360		16.4356	16.4356	1,721.847 3	726.7228	2,448.570 1	1.5935	0.1354	2,524.019 7
Unmitigated	95.2666	1.3172	119.4631	0.0458		16.4360	16.4360		16.4356	16.4356	1,721.847 3	726.7228	2,448.570 1	1.5935	0.1354	2,524.019 7

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0866					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2161					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	94.8845	1.2873	116.8875	0.0457		16.4220	16.4220		16.4215	16.4215	1,721.847 3	722.1177	2,443.965 0	1.5890	0.1354	2,519.318 8
Landscaping	0.0794	0.0299	2.5756	1.4000e-004		0.0141	0.0141		0.0141	0.0141		4.6051	4.6051	4.5600e-003		4.7010
Total	95.2666	1.3172	119.4631	0.0458		16.4360	16.4360		16.4356	16.4356	1,721.847 3	726.7228	2,448.570 1	1.5935	0.1354	2,524.019 7

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0866					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2161					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	94.8845	1.2873	116.8875	0.0457		16.4220	16.4220		16.4215	16.4215	1,721.8473	722.1177	2,443.9650	1.5890	0.1354	2,519.3188
Landscaping	0.0794	0.0299	2.5756	1.4000e-004		0.0141	0.0141		0.0141	0.0141		4.6051	4.6051	4.5600e-003		4.7010
Total	95.2666	1.3172	119.4631	0.0458		16.4360	16.4360		16.4356	16.4356	1,721.8473	726.7228	2,448.5701	1.5935	0.1354	2,524.0197

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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10.0 Vegetation

Appendix C-2

MBARD Consistency Procedure



row MBUAPCD CONSISTENCY DETERMINATION PROCEDURE Ver. 4.0

Data entry Data entered by user.

Consistency Finding

NO YES

6	Jurisdiction:	County of Monterey Unincorp	Lead Agency selects from pull down
7	Project Name:	Carmel Rio Road	Lead Agency enters
8	Base Year for this determination:	2010	Project Buildout/ Occupancy Year 2020 Lead Agency enters
9		Proposed Project Occupied DU	Total buildout of Project. Sum of all years, row 26.

JURISDICTION DATA FROM AQMP & DOF (no data entry)

		Base Year	Period ending January 1st of:					
		2010	2015	2020	2025	2030	2035	Notes
14	DOF Population	109,607	From Calif. Dept of Finance. Est. for Jan 1 -- released in June of each year.					
15	AMBAG DU Forecast for Jurisdiction	42,506	44,442	45,406	46,668	47,139	48,688	DUs from AMBAG Travel Model, current version.
	AMBAG Pop Forecast for Jurisdiction	109,509	111,105	113,778	114,469	113,628	114,052	Latest AMBAG Pop. & Employment forecasts.
17	AMBAG Forecast Population/ DU	2.58	2.50	2.51	2.45	2.41	2.34	Row 16/ row 15
18	Estimated Built DUs	38,874	Entry for 2010 is the DOF 1/2010 Housing Unit Estimate. Lead agency may overwrite if they have better data.					

JURISDICTION DUs w/o PROJECT

	2010	2015	2020	2025	2030	2035	
21	Housing Stock (Built DUs, Total)	40,258	38,874	38,874	38,874	38,874	2010 Housing Stock is baseline across the project time, 38,874 existing DUs (2016).
22	Approved but not Built DUs	0	99	99	99	99	Lead Agency estimates value at period end.
23	Total Built & Approved DUs	40,258	38,973	38,973	38,973	38,973	Sum of Row 21 + 22

PROPOSED NEW PROJECT DUs

	2015	2020	2025	2030	2035	
26	Proposed New Project DUs		31	31	31	Data entry by Lead Agency.
27	TOTAL, New Project + Built & Approved DUs	38,973	39,004	39,004	39,004	Sum of Row 23 + 26

NEW PROJECT CONSISTENCY DETERMINATION

29	Over (Under) AQMP DUs	(5,469)	(6,402)	(7,664)	(8,135)	(9,684)	Row 27 - Row 15
30	Is the project consistent in this Period?	YES	YES	YES	YES	YES	If Row 30 is (negative) = YES, if positive = NO.

OPTIONS IF INCONSISTENT (Choose one):

Year:		2015	2020	2025	2030	2035	
38	A. Consult CEQA Statute and Guidelines for appropriate mitigation options						
	B. Lead Agency preparation of consistency determination via an alternative method						
40	C. Regional offset of significant cumulative air quality impact; For EIRs, declare Statement of Overriding Consideration						

Appendix D

Biological Reports



Appendix D-1

Biological Assessment



Biological Assessment for Val Verde Property

Val Verde Drive, Carmel

Prepared for

Carmel Rio Road, LLC
8530 El Camino Estrada
Carmel, CA 93923

Prepared by

RanaCreekHabitatRestoration



May 29, 2007

Rana Creek Habitat Restoration
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Owner/Applicant

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APNs: 015-021-015, -020 & -021

SUMMARY

Carmel Rio Road, LLC proposes to construct residential housing on property off of Val Verde Drive in Carmel, California. The property was assessed for potential habitat for sensitive plant and animal species. No protected plant species were observed. Monterey dusky-footed woodrat nests were observed at the project site, which also provides potential nesting and foraging habitat for white-tailed kites, potential winter roosting habitat for monarch butterflies and potential temporary dispersal habitat for California red-legged frogs. Mitigation measures will decrease adverse impacts to sensitive species and the project is expected to have minimal impacts to sensitive species.

INTRODUCTION**Property Location**

The project site is located in Carmel, California and lies east of Highway 1 and south of Carmel Valley Road (Map. 1). The property is bounded to the east by Val Verde Drive, to the south by residential property and to the west by office buildings and covers approximately 7.9 acres. The Carmel River lies approximately 250 yards to the south. There is currently one residential house and small barn on the property. Nearby land uses include residential housing and shopping developments, fallow agricultural land, a golf course (Rancho Canada Golf Course) and riparian habitat associated with the Carmel River.

Project Description

The proposed project consists of constructing 31 single family and 11 inclusionary units with associated infrastructure including paved roads and carports.

METHODS

Prior to conducting the field portion of the assessment, the California Department of Fish and Game's *California Natural Diversity Data Base* (CNDDDB) was queried to determine the special-status species that have been documented on and near the project site. Additional data regarding the potential occurrence of special-status species were gathered from the following sources: *The Status of Rare, Threatened, and Endangered Plants and Animals of California 2000-2004* (CDFG 2005), *Inventory of Rare and Endangered Plants* (CNPS 2005) and *An Illustrated Field Key to the Flowering Plants of Monterey*

County (Matthews 1997). Soil types were determined using the Natural Resource Conservation Service's *Web Soil Survey* (NRCS 2007).

On May 23, 2007, Sarah Millus of Rana Creek Environmental Planning conducted the field portion of the assessment. The assessment included:

- recording all plant and animal species detected on the site;
- classifying and mapping habitats present on-site;
- searching for animal signs (e.g., nests, tracks);
- examining burrows and any other special habitat features; and
- taking representative photographs of the site.

RESULTS

Habitat Types

Map 2 shows the habitat types found on the Val Verde property.

Fallow agriculture

The majority of the proposed project site is covered by fallow agricultural land (Fig. 1). Dominant species include field mustard (*Brassica rapa*) and dwarf nettle (*Urtica urens*).



Fig. 1. Fallow agricultural field on northern end of Val Verde property, May 23, 2007.

Mixed woodland

A strip of wooded habitat approximately 15 yards in width runs around the residence and along the southern border of the project site. Species in this area include Monterey cypress (*Cupressus macrocarpa*), Monterey pine (*Pinus radiata*), myoporum (*Myoporum laetum*) and holly-leaved cherry (*Prunus ilicifolia*). Monterey cypress and Monterey pine are not listed species and are therefore not protected by the California Department of Fish and Game, but they are on the California Native Plant Society (CNPS) 1B List, meaning that CNPS considers them “rare or endangered in California and elsewhere.” These trees most likely were planted and were not part of the natural historical range for these species. Several Monterey dusky-footed woodrat nests were observed in this habitat.



Fig. 2 Woodland habitat on Val Verde property, May 23, 2007.

Residential

The southeast corner of the property contains a single house and a small storage shed. The vegetation in this area is mostly ornamental landscaping plants, including iceplant (*Carpobrotus edulis*) and cape ivy (*Senecio mikanioides*).

Soils

There are two soil types on the project site, Pico fine sandy loam and Metz fine sandy loam. The majority of the site is covered by Pico fine sandy loam, and only approximately 0.2 acres in the southwest corner of the project site is covered by Metz fine sandy loam (NRCS 2007). Descriptions below are from NRCS 2007.

Pico fine sandy loam

Deep, well drained soils that formed in alluvium from mostly sedimentary rocks. Pico soils are on floodplains and alluvial fans and have slopes of 0 to 9 percent. Pico soils are used primarily for growing row crops, citrus, grain, and pasture, and there is increasing urban use. Vegetation is annual grasses and forbs in uncultivated areas.

Metz fine sandy loam

Very deep, somewhat excessively drained soils that formed in alluvial material from mixed, but dominantly sedimentary rocks. Metz soils are on floodplains and alluvial fans and have slopes of 0 to 15 percent at elevations of 25 to 2,500 feet. Somewhat excessively drained; negligible to low runoff; moderately rapid permeability. Much of this soil is irrigated and used for growing pasture, hay, truck crops, field crops and fruit. Some areas are grazed and in willows, annual grasses and forbs.

Special-Status Species

In the sections below we list the special-status species that have the potential to occur at the project site. For each species we list the level of legal protection provided and discuss the species' potential to occur on the site.

PLANTS

A list of special status plant species known to occur within the vicinity of the Val Verde property is provided in Table 1 below. Monterey pine and Monterey cypress, both on the CNPS 1B list, were observed during the site visit. A list of all plant species observed is provided in Appendix 1.

Table 1.

Common Name <i>Scientific Name</i>	Status	Potential habitat types	Potential to occur at site
Plants			
Eastwood's goldenbush <i>Ericameria fasciculata</i>	CNPS 1B	sandy openings in closed-cone coniferous forest, maritime chaparral, coastal scrub, coastal dunes. 30-275m.	No habitat at site.
Gowen cypress <i>Cupressus goveniana</i> ssp. <i>goveniana</i>	FT, CNPS 1B	usually in sandy soils in closed-cone coniferous forest and coastal terraces. 100-125m.	Potential habitat at site.
Hickman's onion <i>Allium hickmanii</i>	CNPS 1B	sandy loam, damp ground and vernal swales in closed-cone coniferous forest, chaparral, coastal scrub, valley and foothill grassland, coastal prairie. 20-200m	Potential habitat at site.
Hooker's manzanita <i>Arctostaphylos hookeri</i> ssp. <i>hookeri</i>	CNPS 1B	sandy soils, sandy shales and sandstone outcrops in chaparral, coastal scrub, closed-cone coniferous forest and cismontane woodland. 85-300m.	No habitat at site.
Jolon clarkia <i>Clarkia jolonensis</i>	CNPS 1B	cismontane woodland. <500m.	No habitat at site.

Common Name <i>Scientific Name</i>	Status	Potential habitat types	Potential to occur at site
Kellogg's horkelia <i>Horkelia cuneata</i> ssp. <i>sericea</i>	CNPS 1B	openings in dunes, coastal sand hills, closed-cone coniferous forest, coastal scrub, chaparral. 10-200m.	No habitat at site.
marsh microseris <i>Microseris paludosa</i>	CNPS 1B	closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland. 5-300m.	No habitat at site.
Monterey cypress <i>Cupressus macrocarpa</i>	CNPS 1B	granitic soils in closed-cone coniferous forest. 10-30m.	Present at site.
Monterey pine <i>Pinus radiata</i>	CNPS 1B	dry bluffs and slopes in closed-cone coniferous forest, cismontane woodland. 25-185m.	Present at site.
sandmat manzanita <i>Arctostaphylos pumila</i>	CNPS 1B	on sandy soil in closed-cone coniferous forest, chaparral, cismontane woodland, coastal dunes and coastal scrub. 3-205m.	No habitat at site.
Santa Lucia bush mallow <i>Malacothamnus palmeri</i> var. <i>palmeri</i>	CNPS 1B	talus hilltops and slopes, sometimes on serpentine soil in cismontane woodland, chaparral. 30-1100m.	No habitat at site.
Yadon's rein orchid <i>Piperia yadonii</i>	FE, CNPS 1B	on poorly drained and often dry sandstone and sandy soil in closed-cone coniferous forest, chaparral, coastal bluff scrub. 10-415m.	No habitat at site.
Natural Community	—		
Monterey Cypress Forest	—		
Monterey Pine Forest	—		
Monterey Pygmy Cypress Forest	—		
Northern Bishop Pine Forest	—		

Conservation Status Codes:

FE: Federally Endangered

FT: Federally Threatened

CE: Listed as Endangered in California.

CT: Listed as Threatened in California

CR: Listed as Rare in California

SC: CDFG listed Special Concern

CNPS 1A, 2, etc.: California Native Plant Society rare, threatened, endangered list classification:

- 1A. Presumed extinct in California
- 1B. Rare or Endangered in California and elsewhere
2. Rare or Endangered in California, more common elsewhere
3. Plants for which we need more information – Review list
4. Plants of limited distribution – Watch list

INVERTEBRATES

monarch butterfly (*Danaus plexippus*) (Lepidoptera)

No current list status; California Special Animal. Monarchs overwinter along the California coast from October through March. They require roosting areas in tall trees, usually eucalyptus, Monterey pines or Monterey cypress which provide protection from wind. They also require that sites be near sources of water and nectar. The tall cypress and pine trees present of the project site may provide winter roosting habitat for monarch butterflies.

Smith's blue butterfly (*Euphilotes enoptes smithi*)

Federally endangered. Found in association with coast buckwheat (*Eriogonum latifolium*) and seacliff buckwheat (*E. parvifolium*). Adult emergence and seasonal activity is synchronized with the blooming period of the buckwheat at a given site. Individual adult males and females live approximately one week, and both sexes spend the majority of their time on *Eriogonum* flowerheads. Females lay single eggs on the buckwheat flowers. There is no buckwheat present at the project site, and so it does not provide habitat for Smith's blue butterfly.

AMPHIBIANS

California red-legged frog (*Rana aurora draytonii*)

Federally Threatened species and a California Species of Special Concern. California red-legged frogs (CRLF) are found in freshwater aquatic habitats including streams, shallow ponds and drainages usually associated with riparian vegetation. Breeding occurs from November through April. Adult CRLF may disperse from breeding sites at any time of year and use a variety of upland habitat, moving through the landscape regardless of vegetation or topography. Upland habitat is used by dispersing frogs and to escape desiccation during the summer months and includes anything that provides shade and moisture, such as rocks, downed wood, moist leaf litter and small mammal burrows. There is one record for CRLF approximately 0.3 miles from the project site (CNDDB 2007). The project site may provide dispersal habitat for CRLF. Frogs are mostly likely to be found in the wooded areas on the project site. Little cover for frogs, such as small mammal burrows or leaf litter, was observed in the other habitats on site, and frogs are less likely to be present in these areas.

FISH

steelhead (*Oncorhynchus mykiss irideus*)

The central California coastal population of steelhead is Federally listed as Threatened. Steelhead are anadromous fish that come to streams in the spring to spawn in cool or cold waters with a gravel bottom, and clear and swift running water. Steelhead are known to occur in the Carmel River, 0.25 miles from the project site. Existing residential housing is present between the project site and the Carmel River. The project is not expected to impact steelhead.

BIRDS

white-tailed (=black-shouldered) kite (*Elanus leucurus*)

White-tailed kite is a California Fully Protected Species. White-tailed kites breed in lowland grasslands, wetlands, oak-woodland and savannah habitats, and riparian areas associated with open areas (Moore 2000). Habitats which support larger rodent prey populations are more suitable. Summer habitat preferences include riparian zones and dry pastures. Nests are built in trees, either in single isolated trees or those within large stands. Egg laying begins in February and peaks in March and April, and fledging is complete by October. Kites are non-migratory and winter habitat is similar to breeding

habitat, but without the need for nest trees. Riparian corridors represent a preferred landscape characteristic for kites in both the breeding and non-breeding season. White-tailed kites have been observed foraging in the open fields near the project site (P. Regan, Rana Creek, pers. obs.). The tall pine and cypress trees on the project site provide potential nesting habitat for kites and the fallow agriculture field provides potential foraging habitat.

MAMMALS

Monterey dusky-footed woodrat (*Neotoma fuscipes luciana*)



Fig. 3. Monterey dusky-footed woodrat nest observed in woodland habitat May 23, 2007.

The Monterey dusky-footed woodrat is a California Species of Special Concern. These woodrats are found close to water in areas of dense overgrowth such as willows and live oak and tend to avoid open grasslands or oak woodlands with small amounts of underbrush. Woodrats build multi-chamber houses on the ground, usually next to trees, out of dead wood, leaves and grass. Within suitable habitats, woodrats live in small colonies of three to fifteen or more nests. Availability of building materials may limit woodrat populations. Woodrats are primarily herbivorous, eating plant material including leaves, flowers and acorns. The reproductive period of this species usually

extends from December to September, but individuals can be reproductively active year-round. Most females are reproductively active in April and May. Several Monterey dusky-footed woodrat nests were observed in the wooded areas of the project site (Fig. 3). Measures that will avoid adverse impacts to woodrats are outlined in the impacts and mitigation measures section below.

DISCUSSION

The majority of the project site is covered by non-native plant species and provides little habitat for sensitive species. The woodland area on the project site provides the highest quality habitat for sensitive species. Monterey dusky-footed woodrats were the only sensitive species observed on the project site in these wooded areas, and the tall trees here provide potential nesting habitat for white-tailed kites and other bird species.

IMPACTS AND MITIGATION MEASURES

1. **Impact:** Monterey dusky-footed woodrats present on site may be harmed by construction activities.

Mitigation: Construction activities will ideally occur when woodrats are least likely to be reproducing, October through November. A pre-construction survey for woodrat nests will be conducted by a qualified biologist prior to the onset of construction activities. All woodrat nests located during the survey will be flagged and a 25 ft buffer area established around each nest or group of nests. If nests cannot be avoided and must be removed to allow construction activities, nest(s) will be dismantled by hand prior to grading or vegetation removal activities. Dismantling of nests will be monitored by a qualified biologist. If young are encountered during nest dismantling, the dismantling activity will be stopped and the material carefully replaced back on the nest. Construction activities within 25 feet of nests with young will be stopped. These nests will be rechecked in 2-3 weeks to determine development of the young. Once the young are determined to be capable of being independent, nest dismantling can continue.

2. **Impact:** The project site provides potential nesting and foraging habitat for white-tailed kites, a California Fully Protected Species. This species, as well as other bird species protected under the Migratory Bird Treaty Act and the California Fish and Game Code, potentially nesting at the project site, may be disturbed by construction activities.

Mitigation: A qualified biologist will conduct nest surveys on the site prior to construction or site preparation activities occurring during the nesting season of white-tailed kites (February through October). The survey shall be conducted no more than 14 days prior to commencement of construction activities. If active nests of white-tailed kite (or other species protected under the Migratory Bird Treaty Act and the California Fish and Game Code) are present in the construction zone, a temporary fence shall be erected 200 feet (or less if determined appropriate by the biologist) around the nest site. Upon recommendation of the biologist, clearing and construction within the fenced area shall be postponed or halted until juveniles have fledged and there is no evidence of a second nesting attempt. The biologist shall serve as a construction monitor during those periods when construction activities will occur near active nest areas to ensure that no inadvertent impacts to these nests will occur.

3. **Impact:** Overwintering monarch butterflies may be harmed or disturbed by construction activities.

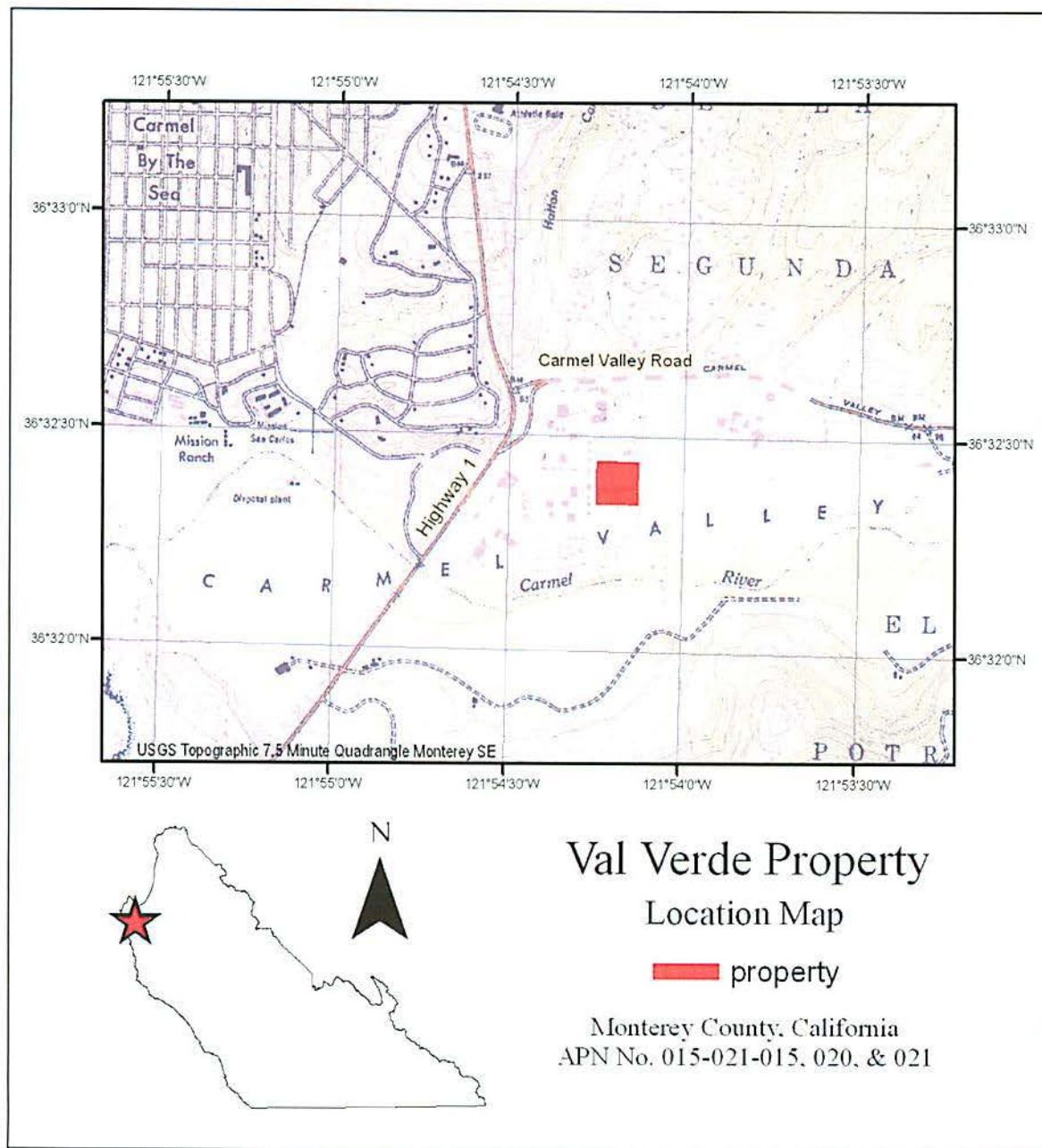
Mitigation: If construction activities occur during times when monarchs may be present (October through March), all tall trees should be inspected for the presence of monarchs by a qualified biologist prior to work being done around them. If monarchs are present, work associated with those specific trees being used by monarchs should be delayed until the monarchs are no longer present.

4. **Impact:** California red-legged frog that may be temporarily using the project site during dispersal activities may be harassed or harmed by construction activities.

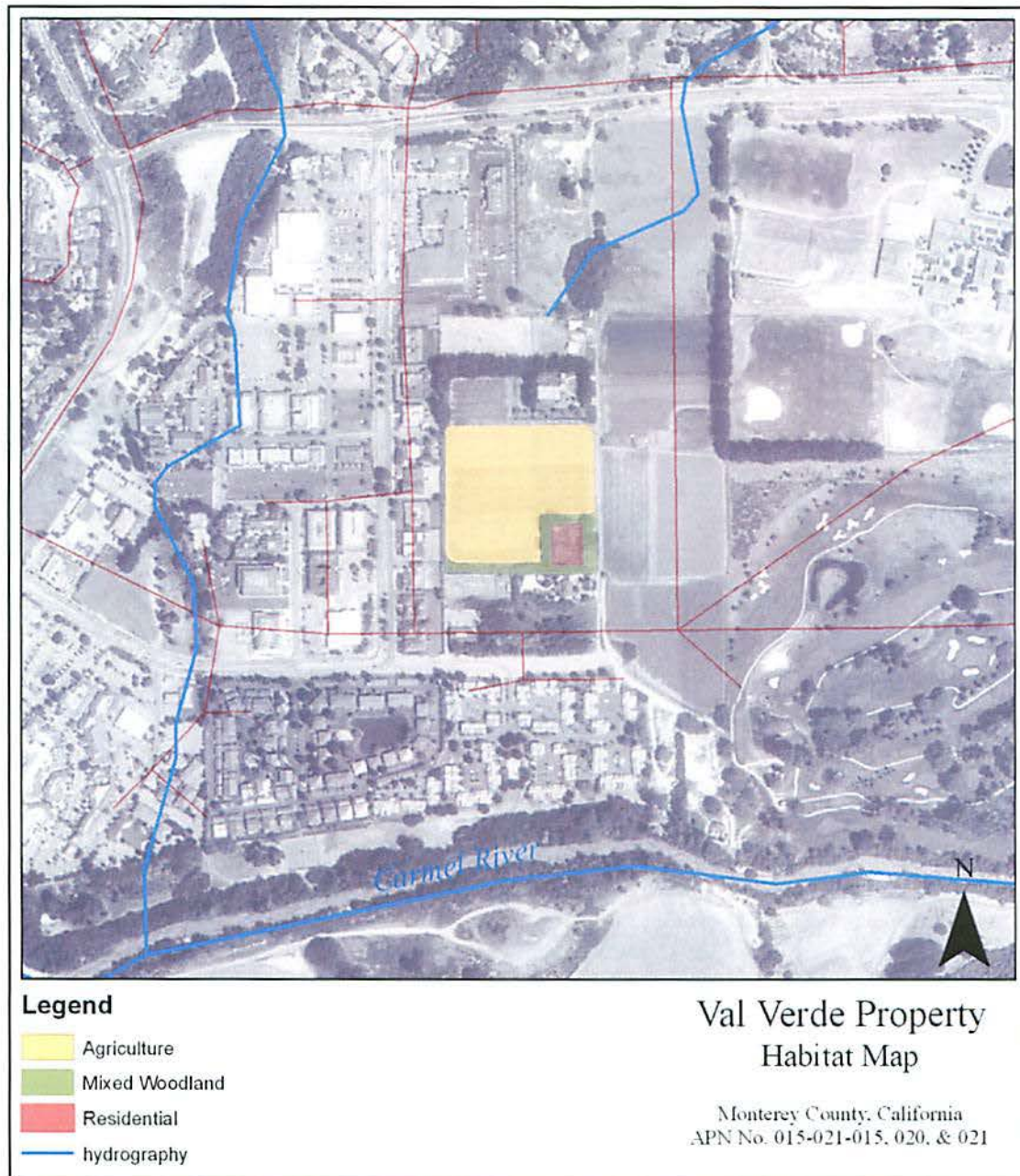
Mitigation: No vegetation removal or grading will take place while it is raining. Precautions will also be taken to prevent puddling on site that may attract frogs. If initial ground disturbance occurs between October 15 and May 31, a pre-construction/grading survey of the entire area proposed for grading/construction activities shall be conducted for red-legged frogs by a qualified biologist. The survey shall be conducted no earlier than 14 days prior to the commencement of construction-related activities. If red-legged frogs are observed, grading/construction activities shall be postponed and the U.S. Fish and Wildlife Service shall be consulted to identify measures to minimize the potential of take to occur.

REFERENCES

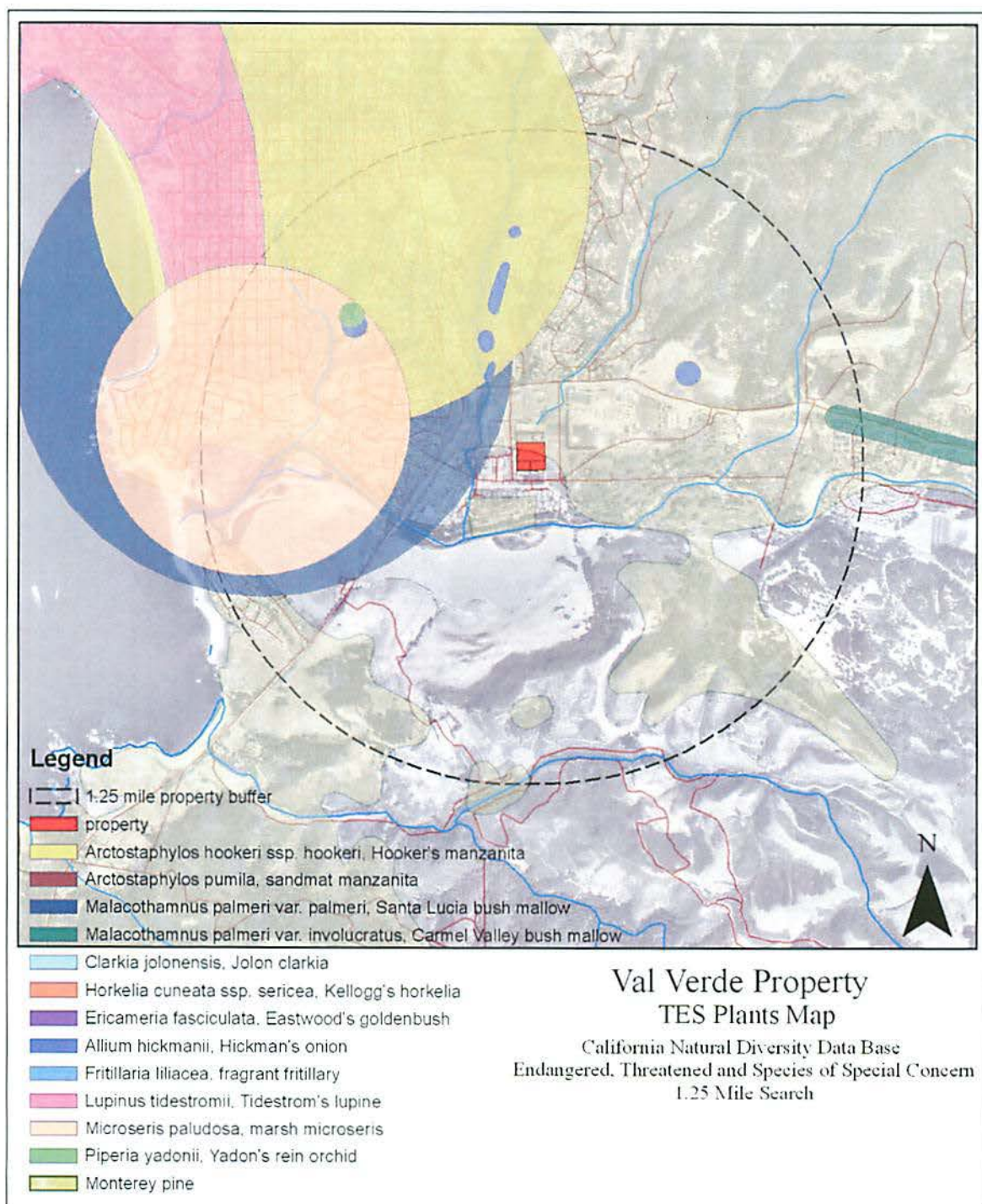
- [CDFG] California Department of Fish and Game. 2005. The Status of Rare, Threatened, and Endangered Plants and Animals of California 2000-2004. Habitat Conservation Planning Branch.
http://www.dfg.ca.gov/hcpb/species/t_e_spp/ann_te_rpt.shtml. Accessed Feb. 2007.
- [CNDDDB] California Natural Diversity Database. 2007. California Natural Diversity Database website. <http://www.dfg.ca.gov/whdab/html/cndddb.html>. Accessed May 2007.
- [CNPS] California Native Plant Society. 2005. Inventory of Rare and Endangered Plants (online edition, v6-05d). <<http://www.cnps.org/inventory>>. Accessed May 2007.
- [NRCS] Natural Resource Conservation Service. 2007. Web Soil Survey. <<http://websoilsurvey.nrcs.usda.gov/app/>>. Accessed on May 2007.
- CalFlora. 2007. The CalFlora Database: Information on California Plants for Education, Research and Conservation. <<http://www.calflora.org/>>. Accessed on Feb. 2007.
- Mathews, M. A. and The California Native Plant Society. 1997. *The Illustrated Field Key to the Flowering Plants of Monterey County*.
- Moore, J. 2000. White-tailed Kite (*Elanus leucurus*). Point Reyes Bird Observatory, Partners in Flight website.
<http://www.prbo.org/calpif/html/docs/species/grassland/wtkiacct.html>. Accessed December. 2006.
- Remsen, J. V. 1978. Bird Species of Special Concern in California: An Annotated List of Declining or Vulnerable Bird Species. Sacramento, CA: California Department of Fish and Game. 54 pp.



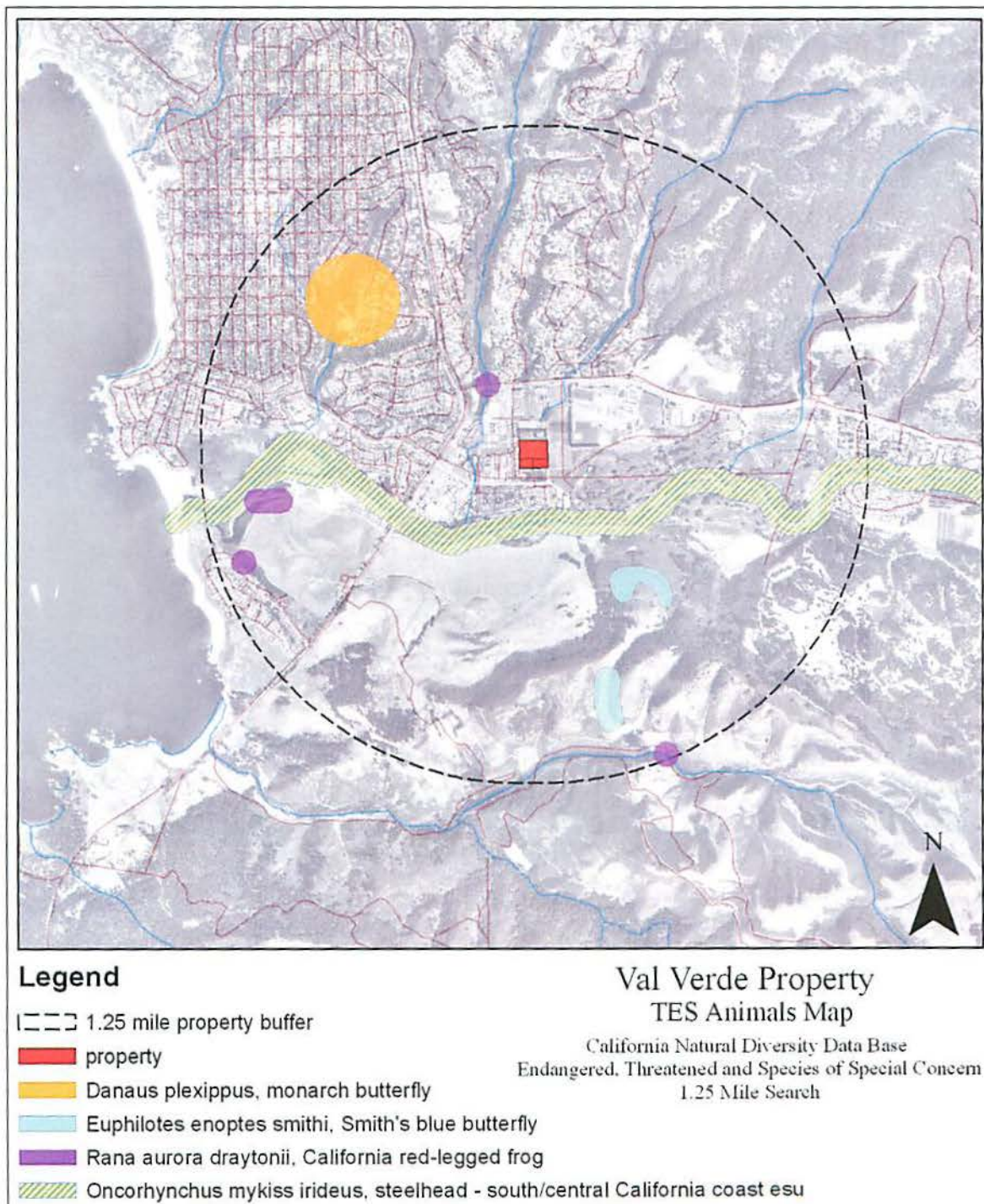
Map 1. Location of Val Verde Property in Carmel, Ca.



Map 2. Habitat types on Val Verde property.



Map 3. CNDDDB plant records within 1.25 miles of Val Verde project site.



Map 4. CNDDDB animal records within 1.25 miles of the Val Verde project site.

APPENDIX 1. Plant species observed at Val Verde site May 23, 2007.

Scientific Name	Common Name
<i>Acer negundo</i>	box elder
<i>Anagallis arvensis</i> *	scarlet pimpernel
<i>Avena fatua</i> *	slender wild oats
<i>Baccharis pilularis</i>	coyote brush
<i>Brassica rapa</i> *	field mustard
<i>Bromus hordeaceus</i> *	soft chess
<i>Carduus pycnocephalus</i> *	Italian thistle
<i>Carpobrotus edulis</i> *	hottentot fig (ice plant)
<i>Conium maculatum</i> *	poison hemlock
<i>Cupressus macrocarpa</i> **	Monterey cypress
<i>Echinocystis lobata</i>	wild cucumber
<i>Hordeum jubatum</i>	foxtail barley
<i>Lamium purpureum</i> *	red henbit
<i>Leymus triticoides</i>	creeping wild rye
<i>Lolium perenne</i> *	perennial ryegrass
<i>Malva parviflora</i> *	common mallow
<i>Melaleuca</i> sp.*	honey myrtle
<i>Myoporum laetum</i> *	myoporum
<i>Pinus radiata</i> **	Monterey pine
<i>Prunus ilicifolia</i>	holly-leaved cherry
<i>Rubus discolor</i> *	Himalayan blackberry
<i>Sonchus asper</i> *	prickly sow thistle
<i>Urtica urens</i> *	dwarf nettle

* Non-native species

** Native species planted on the site

APPENDIX 2. Animal species detected at Val Verde site May 23, 2007.

Taxa	Scientific Name	Common Name
Invertebrates	<i>Pieris rapae</i> (Lepidoptera)	cabbage white
	<i>Papilio</i> sp. (Lepidoptera)	swallowtail
Reptiles	<i>Sceloporus occidentalis bocourtii</i>	coast range fence lizard
Birds	<i>Agelaius phoeniceus</i>	red-winged blackbird
	<i>Aphelocoma californica</i>	Western scrub jay
	<i>Callipepla californica</i>	California quail
	<i>Carduelis psaltria</i>	lesser goldfinch
	<i>Carpodacus mexicanus</i>	house finch
	<i>Euphagus cyanocephalus</i>	Brewer's blackbird
	<i>Melospiza melodia</i>	song sparrow
	<i>Pipilo crissalis</i>	California towhee
	<i>Poecile rufescens</i>	chestnut-backed chickadee
	<i>Zenaida macroura</i>	mourning dove
Mammals	<i>Neotoma fuscipes luciana</i>	Monterey dusky-footed woodrat

Appendix D-2

Updated Biological Assessment



Updated Biological Assessment

For

**Val Verde Property
Val Verde Drive
Carmel, California**

APNs 015-021-015, -020,-021

Prepared For

Carmel Rio Road, LLC
430 Ortiz Ave. #B
San City, CA 93955

Prepared By

Rana Creek



March 23, 2012

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MAP 1 – SITE VICINITY MAP

MAP 2 – PROJECT SITE PLAN

MAP 2 – CNDDDB 2-MILE RADIUS MAP

TABLE 1 – SPECIAL STATUS WILDLIFE, PLANTS, OR SENSITIVE NATURAL COMMUNITIES KNOWN OR WITH THE POTENTIAL TO OCCUR IN THE PROJECT AREA

APPENDIX A – SITE PHOTOGRAPHS

APPENDIX B – CALIFORNIA NATURAL DIVERSITY DATABASE QUADRANGLE RESULTS

APPENDIX C – LIST OF PLANT AND ANIMAL SPECIES OBSERVED

1.0 INTRODUCTION

Carmel Rio Road, LLC proposes to develop three parcels with residential housing off of Val Verde Drive in Carmel, Monterey County, California. Rana Creek Habitat Restoration (Rana Creek) has prepared this Updated Biological Assessment (BA), which presents current information regarding the project description; existing site conditions and biotic resources; special status species with a potential to occur in the area; potential project impacts; and recommended avoidance, minimization, and/or mitigation measures. This report is an update to a previous BA, dated May 29, 2007, prepared by Rana Creek for this project.

Findings from the 2012 research and site survey verified the same biotic resources at the site that were identified in the 2007 BA, but did not reveal any new sensitive biological resources. As discussed in the 2007 BA and confirmed during this study:

- multiple Monterey dusky-footed woodrat nests (*Neotoma fuscipes luciana*) are present at the site on APN 015-021-020;
- trees at the site provide potential nesting and foraging habitat for white-tailed kite (*Elanus leucurus*) or other raptors and marginal potential winter roosting habitat for Monarch butterflies (*Danaus plexippus*);
- dense tree and shrub vegetation on APN 015-021-020 provides nesting habitat for a variety of migratory and resident birds;
- a portion of the site (APN 015-021-020) could be used as potential temporary dispersal habitat for California red-legged frogs (*Rana draytonii*) (CRLF); and
- the majority of the site is disturbed or is utilized for agriculture and no special status plants were observed.

Implementation of the recommended avoidance, minimization, and/or mitigation measures will reduce project impacts to a less than significant level.

1.1 Property Location and Legal Description

The project site is located in Carmel, Monterey County, California and lies approximately 0.35 miles east of Highway 1 and 0.25 miles south of Carmel Valley Road (**Map 1**). The subject property consists of three parcels totaling approximately 8.0 acres: APN 015-021-015 (5.0 acres), APN 015-021-0120 (1.5 acres) and APN 015-021-021 (1.5 acres). The site is bounded towards the east by Val Verde Drive and a fallow field, towards the south by residential property, towards the west by office buildings, and towards the north by a residential property.

The site is located within the Carmel U.S. Geological Survey (USGS) 7.5-minute quadrangle at an approximate elevation of 562 feet above mean sea level. The southernmost property line is located approximately 1,025 feet north of the Carmel River channel and 920 feet north of the edge of the riparian corridor. According to the Monterey County Planning Department, the property is zoned LDR-1-D-S “low density residential”.

1.2 Project Description

The proposed project consists of constructing 31 single-family and 11 inclusionary units with associated infrastructure, including paved roads and carports (**Map 2**). Access to the development will be provided by improving Val Verde Drive beginning at its intersection with Rio Road. As of the date of this report, a replacement well permit has been issued by Monterey County Department of Environmental Health for installation of one replacement water supply well and destruction of the original well (Travers well) on APN 015-021-015. It should be noted that, based on the calculation of an approximately 725-foot pumping zone of influence for the replacement Travers well (Bierman, 2012) and the designation of the well as a replacement for the existing Travers well on the same parcel, the Monterey County Planning Department determined that the replacement well installation and operation will not affect the riparian zone or in-stream flows in the Carmel River and therefore will not require a discretionary permit or BA for that aspect of the project (Monterey County Planning Department e-mail correspondence, dated February 24, 2012).

2.0 METHODS

2.1 Research

Prior to conducting the field portion of the assessment, the California Department of Fish and Game (CDFG) *California Natural Diversity Database* (CNDDB) was queried to determine if records exist for special status species within the Carmel Valley 7.5-minute quadrangle and the eight surrounding quadrangles. This broad search was used to create a target list of potential special status species. Documented special status species within approximately two miles of the project site were thoroughly reviewed and mapped in order to determine their likelihood of occurrence at the project site. In addition, aerial imagery was reviewed in order to identify other ponds, wetlands, or creeks within an approximately 1.0-mile radius of the site.

Additional data regarding the potential occurrence of special status species were gathered from the following sources: *The Status of Rare, Threatened, and Endangered Plants and Animals of California 2000-2004* (CDFG, 2005), *Inventory of Rare and Endangered Plants* (CNPS, 2010), and *An Illustrated Field Key to the Flowering Plants of Monterey County* (Matthews, 1997). Soils mapped on the property were reviewed using information provided by the Natural Resource Conservation Service (NRCS) Soil Survey. Critical habitat designations for S-CCC steelhead and CRLF were reviewed using available documentation from National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) and wetlands data was reviewed using the USFWS National Wetlands Inventory (NWI) database.

2.2 Field Inspections

The field site inspection was conducted by Rana Creek staff and thoroughly evaluated the entire site, with particular attention given to areas that could potentially provide habitat for special status or other protected plants and/or wildlife. The site inspection included the following activities:

- recording all plant and animal species detected within the project area and along access routes;
- identifying plant communities present on site;
- evaluating the project area for suitable habitat that could support special status species with a likelihood of occurrence in the area;
- taking representative photographs of the site; and
- evaluating the potential impacts of the proposed project on the biological resources at the site, including special status species and their habitats.

3.0 RESULTS

3.1 Database Review – Special Status Species

According to the 2012 CNDDDB, a record for fifteen special status plants on the California Native Plant Society (CNPS) 1B List occur within two miles of the site. However, none of these plants were observed on site and in most cases, the associated conditions/habitat are not present at the site. Twelve special status animals have been documented within two miles of the site. This includes Monterey dusky-footed woodrat and white-tailed kite, which were not included in the CNDDDB results but were observed on site in 2007. Monterey dusky-footed woodrat nests were observed again during the 2012 survey (see **Section 3.5**). These species are listed in **Table 1** along with their corresponding habitat requirements and likelihood of occurrence at the site. **Map 3** shows CNDDDB locations of special status species within a 2-mile radius of the site.

Table 1 – Summary of Special Status Wildlife, Plants, or Sensitive Natural Communities Known or with the Potential to Occur in the Project Area – 2-Mile CNDDB Search Radius.

Species Name	Common Name	Status (Federal/State)	Probability of Occurrence in the Project Area	Habitat Requirements
WILDLIFE				
<i>Actinemys marmorata</i> (<i>Emys marmorata</i>)	Western pond turtle	--/SC	Unlikely	Western pond turtles are found in ponds, marshes, rivers, streams, and irrigation ditches containing aquatic vegetation. They are usually seen sunning on logs, banks, or rocks near banks. Individuals move up to three or four miles within a creek system, especially during “walk-about” before a female lays eggs. They nest in burrows which can be up to several hundred feet away from river or pond banks and may be found in woodlands, grasslands, and open forest.
<i>Ambystoma californiense</i>	California tiger salamander	FT/ST	No suitable habitat	The adult California tiger salamander is a semi-permanent resident of annual grasslands and valley or foothill woodlands/savannah, and is occasionally found along streams. Adults spend most of the year underground in mammal burrows, logs or rocks. The first heavy rains of winter initiate the migration of adults to permanent and temporary ponds. Larvae require ponds, lakes or vernal pools, usually within grasslands.

Species Name	Common Name	Status (Federal/State)	Probability of Occurrence in the Project Area	Habitat Requirements
<i>Anniella pulchra</i>	legless lizard	--/SC	No suitable habitat	Legless lizards occur in loose sandy soil, typically at the base of shrubs where leaf litter is present, and soils are slightly moist. Legless lizards forage for spiders, insect larvae, and other small insects.
<i>Coelus globosus</i>	globose dune beetle	--/SC	No suitable habitat	Coastal sand dunes habitat, in foredunes and sand hummocks immediately above high tide; it burrows beneath the sand surface and is most common beneath dune vegetation.
<i>Cypseloides niger</i>	black swift	--/SC	No suitable habitat	Nest sites occur in hollows or on ledges associated with rocky cliffs with a nearby water source. Foraging for flying insects occurs in the air, sometimes over bodies of water.
<i>Danaus plexippus</i>	monarch butterfly	--/SC (wintering sites)	Possible	Prefers stands of Eucalyptus and Monterey pines with protection from the wind for mass wintering sites between approximately October and March.
<i>Elanus leucurus</i>	white-tailed (syn. black shouldered) kite	--/SC	Possible (observed foraging on site during 2007)	Breed in lowland grasslands, wetlands, oak woodland, savannah, and riparian habitats. Foraging habitat includes dry pastures and riparian zones. Nests are built in trees; either solitary or associated with a large stand of trees.
<i>Euphilotes enoptes smithi</i>	Smith's blue butterfly	FT/--	No suitable habitat	Associated with coastal scrub plant community. Requires buckwheat plants (<i>Eriogonum parvifolium</i> or <i>Eriogonum latifolium</i>) as a host plant for larvae and as a nectar source for adults).

Species Name	Common Name	Status (Federal/State)	Probability of Occurrence in the Project Area	Habitat Requirements
<i>Lasiurus cinereus</i>	hoary bat	--/SC	No suitable habitat	Prefers open habitats or habitat mosaics, with access to trees for cover & open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Requires nearby water source.
<i>Neotoma fuscipes luciana</i> *	Monterey dusky-footed woodrat	--/SC	Present (nest sites)	Prefer areas near a water source with available nest materials, including dead wood, leaves, and grass. Commonly associated with willow riparian and oak woodlands. The Monterey dusky-footed woodrat is a subspecies of the common woodrat, a common inhabitant of oak and riparian woodlands.
<i>Oncorhynchus mykiss</i>	South-central California Coast (S-CCC) ESU Steelhead	FT/SC	No suitable habitat ⁺	After hatching in gravels of cold-water streams, steelhead spend the first 1 to 2 years of their lives in freshwater before migrating to the ocean. Adult steelhead spend 2 to 3 years in the ocean and then return to their spawning grounds to breed. Habitat requirements for steelhead include an intact stream system that is free of barriers, a variety of flow/depth conditions, areas with gravel substrate and minimal bed-impairing sedimentation, woody debris, and overhanging vegetation. Lagoons near river mouths can also provide rearing habitat for juvenile steelhead.

Species Name	Common Name	Status (Federal/State)	Probability of Occurrence in the Project Area	Habitat Requirements
<i>Rana draytonii</i>	California red-legged frog	FT/SC	Possible (dispersal)	In the coast ranges, requires ephemeral or permanent water such as ponds, reservoirs, or creeks with areas of slow moving water or pools during winter/spring. Water must last at minimum until the end of June for reproduction. During late summer or fall, adult frogs are known to utilize a variety of upland habitat types with either leaf litter or small mammal burrows. Adult frogs may travel as far as 3 miles overland in non-riparian habitats to an aquatic site.
PLANTS				
<i>Allium hickmanii</i>	Hickman's onion	--/CNPS 1B.2	Not present - no suitable habitat	Requires moist soil conditions and prefers sandy loam. Associated with closed-cone coniferous forest, chaparral, coastal scrub, valley and foothill grassland, and coastal prairie
<i>Arctostaphylos hookeri</i> ssp. <i>hookeri</i>	Hooker's manzanita	--/CNPS 1B.2	Not present - no suitable habitat	Associated with sandy or shaley soils and sandstone outcrops in chaparral, coastal scrub, closed-cone coniferous forest and cismontane woodland.
<i>Arctostaphylos pumila</i>	sandmat manzanita	--/--/CNPS 1B.2	Not present - no suitable habitat	Occurs in sandy soils within maritime chaparral or within openings in closed cone coniferous forest or oak woodland.
<i>Clarkia jolonensis</i>	Jolon clarkia	--/CNPS 1B.2	Not present - no suitable habitat	Edges and recently burned areas of oak woodland, coastal scrub, or chaparral

Species Name	Common Name	Status (Federal/State)	Probability of Occurrence in the Project Area	Habitat Requirements
<i>Delphinium hutchinsoniae</i>	Hutchinson's larkspur	--/CNPS 1B.2	Not present - no suitable habitat	Chaparral, coastal scrub, and grassland
<i>Ericameria fasciculata</i>	Eastwood's goldenbush	--/CNPS 1B.1	Not present - no suitable habitat	Chaparral, maritime chaparral, closed-cone pine forest, and northern coastal scrub.
<i>Fritillaria liliacea</i>	fragrant fritillary	--/CNPS 1B.2	Not present - no suitable habitat	Associated with clay-rich soils in coastal prairie or grasslands associated with native bunchgrasses. Commonly associated with serpentine soils.
<i>Horkelia cuneata</i> <i>ssp. sericea</i>	Kellogg's horkelia	--/--/CNPS 1B.1	Not present - no suitable habitat	Occurs in sandy or gravelly soil within closed cone coniferous forest, coastal scrub, maritime chaparral, or grassland.
<i>Lupinus tidestromii</i>	Tidestrom's lupine	FE/SE/CNPS1B.1	Not present - no suitable habitat	Occurs in coastal dune strand in areas of open sand with minimal competition from other vegetation
<i>Malacothamnus palmeri</i> var. <i>involucratus</i>	Carmel Valley bush mallow	--/CNPS 1B.2	Not present - no suitable habitat	Chaparral and foothill woodlands.
<i>Malacothrix saxatilis</i> var. <i>arachnoidea</i>	Carmel Valley malacothrix	--/CNPS 1B.2	Not present - no suitable habitat	Chaparral. Rock outcrops or steep rocky roadcuts
<i>Microseris paludosa</i>	marsh microseris	--/CNPS 1B.2	Not present - no suitable habitat	Associated with closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland.

Species Name	Common Name	Status (Federal/State)	Probability of Occurrence in the Project Area	Habitat Requirements
<i>Pinus radiata</i>	Monterey pine	--/CNPS 1B	Present (not associated with a native stand)	Closed-cone coniferous forest
<i>Piperia yadonii</i>	Yadon's rein orchid	FE/--/CNPS 1B.1	Not present - no suitable habitat	Sandy soil in closed cone coniferous forest, woodland, maritime chaparral, and costal scrub.
<i>Trifolium polyodon</i>	Pacific Grove clover	--/--/CNPS 1B.1	Not present - no suitable habitat	Vernally moist swales within coastal prairie or vernally moist dune swales. Sometimes occurs along edges of old roads, trails.

Notes:

*: Not listed in CNDDB radius search

FE: Federal Endangered

FT: Federal Threatened

ST: State Threatened

SC: California Department of Fish & Game Species of Special Concern

CNPS: California Native Plant Society rare, threatened, endangered list classification

1B: Plants Categorized as Rare, Threatened, or Endangered in California and Elsewhere

3.2 Critical Habitat Designations

The project site does not occur within USFWS critical habitat areas. The nearest critical habitat area is CRLF unit MNT-2, which is located south, east, and northeast of the site. The nearest portion of MNT-2 in relation to the site is located approximately 0.25 towards the south (USFWS, 2010). In addition, the Carmel River is classified as critical habitat for the Distinct Population Segment (DPS) of S-CCC steelhead (NMFS, 2007). However, the project and its associated water supply wells are not anticipated to affect in-stream flows or fish habitat based on the distance of the project from the river ($\geq 1,025$ feet) and the results of the supply well pumping radius analysis performed by Bierman Hydrogeologic (2012).

3.3 Aquatic Habitats Within 1.5 Km

No aquatic habitat occurs on site. The nearest aquatic habitat is associated with the Carmel River, which is located 1,025 feet south of the southern boundary of the site. The March 20th site visit occurred two days after a period of substantial rainfall and although soils were moist, no standing water was observed within the project area.

3.4 Soils and Topography

According to NRCS data, the majority of surface soils at the site consist of Pico fine sandy loam, which is well-drained soil derived from sedimentary alluvium. A small area in the southwest corner of the site (0.2 acres) is mapped as Metz fine sandy loam (NRCS, 2012).

Pico fine sandy loam

Deep, well drained soils that formed in alluvium from mostly sedimentary rocks. Pico soils are on floodplains and alluvial fans and have slopes of 0 to 9 percent. Vegetation is typically annual grasses and forbs in uncultivated areas.

Metz fine sandy loam

Very deep, somewhat excessively drained soils formed in alluvial material derived from sedimentary rock. Metz soils are on floodplains and alluvial fans, form slopes of 0 to 15 percent, and are characterized by low runoff and moderately rapid permeability. Characteristic vegetation includes annual grasses, forbs, and riparian woodland.

Based on the site plan prepared by Bestor Engineers (**Map 2**) and the site visit, the site is nearly flat, with a very slight slope towards the west-southwest.

3.5 Field Observations

3.5.1 Existing Site Conditions

Rana Creek staff conducted the field site assessment on March 20, 2012 between approximately 8:00 a.m. and 11:00 a.m. Conditions during the site visit consisted of calm winds, partly cloudy skies, and a temperature of approximately 50 degrees Fahrenheit.

The March 2012 site visit found that the site conditions on APN 015-021-020 remain as described in the 2007 BA. This parcel contains an existing residence, an adjacent shed, a variety of landscape plants, and a wooded area. The other two parcels were fallow agricultural fields dominated by weedy plant species during 2007. These parcels have since been converted to active row crops operated by Serendipity Farms (see **Appendix A**).

3.5.2 Habitat Types

The following habitat types were observed at the site on March 20, 2012.

Agriculture – Row Crops

The majority of the proposed project site consists of agricultural land that is currently in row crop production.

Mixed Woodland

A strip of mixed woodland habitat occurs around the residence on APN 015-021-020 and along the southern and eastern border of the project site adjacent to Val Verde Drive. This habitat is relatively impacted by non-native species and human disturbance and therefore does not fit a particular Holland (1986) or Keeler-Wolf (2007) association. Tree species in this area include Monterey cypress (*Cupressus macrocarpa*), Monterey pine (*Pinus radiata*), myoporum (*Myoporum laetum*), coast redwood (*Sequoia sempervirens*), box elder (*Acer negundo*), and holly-leaved cherry (*Prunus ilicifolia*). The Monterey pine and cypress trees, which as listed by the CNPS as 1B (rare or endangered in California and elsewhere) as well as the coast redwood appear to have been intentionally planted and are not part of a native stand. The understory in this habitat ranges from sparse with a groundcover of leaf litter, to dense areas of poison oak (*Toxicodendron diversilobum*), English ivy (*Hedera helix*), and poison hemlock (*Conium maculatum*). Monterey dusky-footed woodrat nests are located throughout this habitat at the site.

Residential

The southeast corner of the property contains a single house and a small storage shed. The vegetation in this area is mostly ornamental landscaping plants, non-native grasses and other common weeds.

3.5.3 Special Status Plants and Wildlife

Although much of the site consists of row crops, the wooded areas found within APN 015-021-020 contain potential and/or confirmed habitat for several special status species as well as nesting habitat for birds protected by the Migratory Bird Treaty Act of 1918 (MBTA) and California Department of Fish and Game Code 3513. Habitat on site for special status plants that could potentially occur in the area is very poor. No special status plants were observed during the site inspection. Potential or confirmed special status/protected animals are discussed below in more detail.

3.5.3.1 California red-legged frog

CRLF is a Federal threatened and California species of special concern. Although not observed on site, CRLF is known from multiple areas along the Carmel River. The

nearest CNDDDB occurrence is approximately 600 feet towards the southeast from the site. CRLF are found in freshwater aquatic habitats including streams, shallow ponds, and drainages with associated riparian vegetation. Breeding occurs from November through April. Adult CRLF may disperse from breeding sites at any time of year and use a variety of upland habitat, moving through the landscape regardless of vegetation or topography. Dispersing frogs avoid desiccation during the summer months by utilizing anything that provides shade and/or moisture such as rocks, downed wood, moist leaf litter, and small mammal burrows (USFWS, 2010).

The site may provide some dispersal habitat for CRLF, especially within the wooded areas of APN 015-021-020 where soils are seasonally moist and leaf litter and rotting logs occur. The highest likelihood of dispersing CRLF occurring on the site is during the fall corresponding with the first series of winter rains. However, the majority of the site provides little cover (small mammal burrows, leaf litter) for dispersing CRLF. In addition, several barriers exist between the site and the Carmel River riparian corridor, including paved roads and a residential development.

3.5.3.2 White-tailed (syn. black shouldered) kite

The white-tailed kite is a California Fully Protected Species. White-tailed kites breed in lowland grasslands, wetlands, oak woodland, oak savannah, and riparian areas adjacent to open fields or grasslands (Small, 1994). Habitats that support larger rodent prey are more suitable. Summer habitat preferences include riparian zones and dry pastures. Nests are built in trees, either in single isolated trees or those within larger stands. Egg laying begins in February and peaks in March or April while fledging is typically complete by October. Kites are non-migratory and winter habitat is similar to breeding habitat, but without the need for nest trees. Riparian corridors represent a preferred landscape characteristic for kites in both the breeding and non-breeding seasons. White-tailed kites were observed foraging in the open fields near the project site during 2007 (Rana Creek, 2007). However, no white-tailed kites were observed during the 2012 site visit. The tall pine and cypress trees on the project site provide potential nesting habitat for kites while the nearby fallow agricultural fields provide potential foraging habitat.

3.5.3.3 Nesting Birds and other Raptors

A variety of resident birds and a red-tailed hawk (*Buteo jamaicensis*) were observed foraging in and around the wooded portion of the site among shrubs and trees (see **Appendix C**). In addition, a pair of Anna's hummingbirds (*Calypte anna*) was observed and the female was seen gathering small twigs, presumably for nest materials. Although no nests were directly observed, resident and/or migratory birds as well as raptors could potentially utilize the trees on site for nesting. As such, tree removal or use of heavy equipment has the potential to affect nesting birds during the nesting season (approximately February – August).

3.5.3.4 Monterey dusky-footed woodrat

The Monterey dusky-footed woodrat, a subspecies of the common woodrat, is a California species of special concern. These woodrats are found near a water source in areas of dense overgrowth in oak woodlands, willow riparian zones, and scrub. Woodrats tend to avoid open areas such as grasslands or woodlands with sparse understory.

Woodrats build multi-chamber nests on the ground, usually next to trees, out of dead wood, leaves, and grass. Within suitable habitats, woodrats form small colonies of three or more nests. Woodrats are primarily herbivorous, eating plant material including leaves, flowers, and acorns. The reproductive period of this species usually extends from December to September, but individuals can be reproductively active year-round. Most females are reproductively active in April and May.

Several Monterey dusky-footed woodrat nests were observed in the wooded areas of the project site during the 2007 BA (Rana Creek, 2007). During the March 20, 2012 site visit, 12 woodrat nests were observed within the wooded portions of APN 015-021-020. Nests were variable in size and condition, although several showed signs of recent activity (i.e. active nest entrance). Most nests were built adjacent to the trunks of trees and at least one was located up off the ground in the fork of a tree. Because the site lies within the range of the Monterey dusky-footed woodrat, it is assumed that the nests on site belong to that species.

3.5.3.5 *Monarch butterfly*

The monarch butterfly is listed on the California Department of Fish & Game special animals list (CDFG, 2012). Monarch butterflies arrive along the California coast during the fall and can form large clusters in the branches of eucalyptus trees or Monterey pines. These mass wintering sites are typically located within stands of the favorable tree species that are protected from direct, strong winds. Although some of the trees found within APN 015-021-020 could potentially provide a mass wintering location, the habitat is relatively poor due to the isolated nature and limited number of preferred tree species. No monarch butterflies were observed during the 2012 site inspection.

4.0 DISCUSSION

The 2012 data search and field inspection confirmed that site conditions and environmental conditions remain similar to those that were observed during the 2007 BA, with the exception of the presence of active row crops on APN 015-021-015 and 015-021-021. Most of the project site provides little habitat for special status species. However, the wooded portion of the site within APN 015-021-020 provides the highest quality habitat for special status species especially white tailed kite, Monterey dusky-footed woodrat, and other nesting birds or raptors protected by the MBTA and Fish & Game Code. In addition, portions of the wooded habitat provide potential, but poor quality mass wintering sites for monarch butterfly.

Although the habitat on-site is generally not favorable for CRLF and breeding habitat is absent, the presence of the riparian corridor associated with the Carmel River and several CNDDDB observations of CRLF less than 1,000 feet away indicate that dispersing CRLF could potentially occur within the wooded areas of the site. Recommended avoidance and minimization measures required to reduce project impacts to a less than significant level are provided below in Section 5.

5.0 PROJECT IMPACTS, AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Because site and environmental conditions were similar to previous observations, the recommended avoidance, minimization, and/or mitigation measures are consistent with the 2007 BA. Provided that these measures are followed, any potential impacts of the project should be reduced to a less than significant level. Initial vegetation/tree removal within APN 015-021-020 should be timed so that it occurs during the fall months, as described in the avoidance, minimization, and mitigation measures listed below.

1. **Impact:** Monterey dusky-footed woodrats (i.e. nests) present on site may be harmed by construction activities.

Mitigation 1A: Initial vegetation removal should ideally occur when woodrats are least likely to be reproducing (October - November). A pre-construction survey for woodrat nests will be conducted by a qualified biologist prior to the onset of construction activities. All woodrat nests located during the survey will be flagged and a 25 foot buffer area established around each nest or group of nests. If nests cannot be avoided and must be removed to allow construction activities, the nest(s) will be dismantled by hand prior to grading or vegetation removal activities. Dismantling of nests will be monitored by a qualified biologist. If young are encountered during nest dismantling, the dismantling activity will cease and the material carefully replaced back on the nest. Construction activities within 25 feet of these active nests will cease. The active nests will be left undisturbed for a period of 2 to 3 weeks to allow development of young. Once the biologist determines that young are capable of being independent, nest dismantling will be allowed to continue.

2. **Impact:** The project site provides potential nesting and foraging habitat for white-tailed kites, a California Fully Protected Species. This species, as well as other bird species protected under the MBTA and California Fish & Game code, potentially nesting at the project site, may be disturbed by construction activities.

Avoidance & Minimization 2A: Initial vegetation and tree removal should be timed to occur between September 1 and January 31. If vegetation removal cannot occur during this timeframe, a qualified biologist shall conduct nest surveys on the site prior to vegetation removal. The survey shall be conducted no more than 14 days prior to the onset of construction. If active nests of white-tailed kite or other birds species protected by the MTBA or California Fish & Game code are present in the construction zone, a temporary fence shall be erected 200 feet (or less if determined appropriate by the biologist) around the nest site. Upon recommendation of the biologist, clearing and construction within the fenced area shall be postponed or halted until juveniles have fledged and there is no evidence of a second nesting attempt. The biologist shall serve as

construction monitor during those periods when construction activities will occur near active nest areas to ensure that no inadvertent impacts to the nests occur.

3. **Impact:** Overwintering monarch butterflies may be harmed or disturbed by construction activities.

Avoidance & Minimization 3A: If construction activities occur during times when monarch butterflies may be present (October – March), all tall trees shall be inspected for the presence of monarchs by a qualified biologist prior to work being done around the trees. If monarchs are present in the trees, work associated with or around the subject trees shall be delayed until the overwintering monarch butterflies are no longer present.

4. **Impact:** Dispersing CRLF has the potential to occur on the subject site and could be harassed or harmed by construction activities.

Avoidance & Minimization 4A: Vegetation removal should ideally occur during the fall, before the first winter rainfall event occurs. No vegetation removal or grading will take place during periods of rain. Precautions will also be exercised to prevent puddle formation, which could attract CRLF. If initial vegetation clearing and ground disturbance is anticipated to occur between October 15 and May 31, a pre-construction/grading survey for CRLF shall be conducted. The pre-construction survey shall address all areas that will be affected by vegetation removal or grading activities and must occur no earlier than 4 days prior to the onset of grading. If CRLF are observed during the pre-construction survey, all grading/construction activities shall be postponed and USFWS shall be consulted for further guidance.

6.0 REFERENCES

Bierman Hydrogeologic. 2012. Rio Road & Val Verde Subdivision, APNs 015-021-015, 020, & 021: Letter to Monterey County Planning and Building Inspection Department, dated February 23, 2012.

California Natural Diversity Database. 2012. California natural diversity database website. <http://www.dfg.ca.gov/whdab/html/cnddb.html>.

California Native Plant Society. 2012. Inventory of rare and endangered plants (online edition, v8-01a <<http://www.cnps.org/inventory>>. Accessed on March 7, 2012.

Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California: Non-Game Heritage Program, California Department of Fish & Game Sacramento, CA.

Keeler-Wolf, T. and Shoenherr, A. 2007. Terrestrial vegetation of california.

Mathews, M. A and The California Native Plant Society. 1997. An illustrated field key to the flowering plants of Monterey County.

Natural Resource Conservation Service. 2012. soil survey: Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions, Available at <http://soils.usda.gov/technical/classification/osd/index.html> Accessed March 7, 2012.

Rana Creek Habitat Restoration. 2007. Biological assessment for Val Verde property, Val Verde Drive, Carmel: dated May 29, 2007.

Small, A. 1994. California birds, their status and distribution: Ibis Publishing Company.

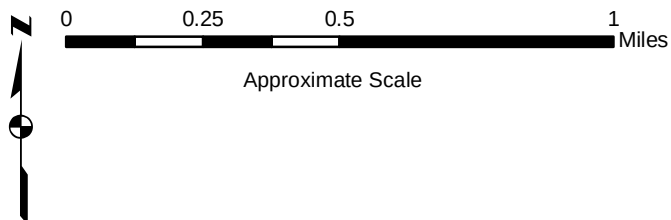
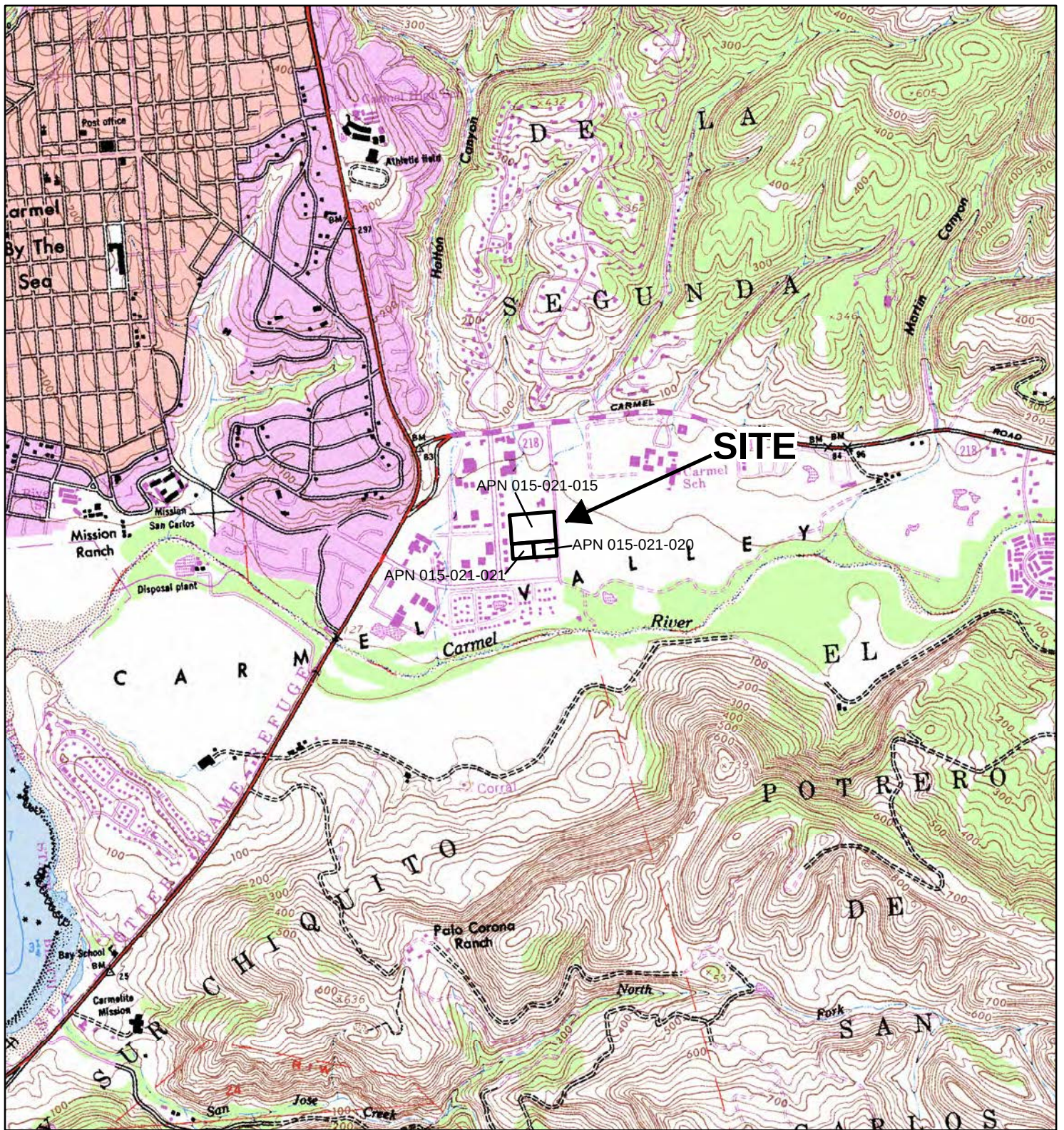
Stebbins, R.C. 2003. Western reptiles and amphibians, 3rd edition.

[USFWS] U.S. Fish & Wildlife Service. 2005. Revised guidance on site assessments and field surveys for the California red-legged frog: dated August 2005.

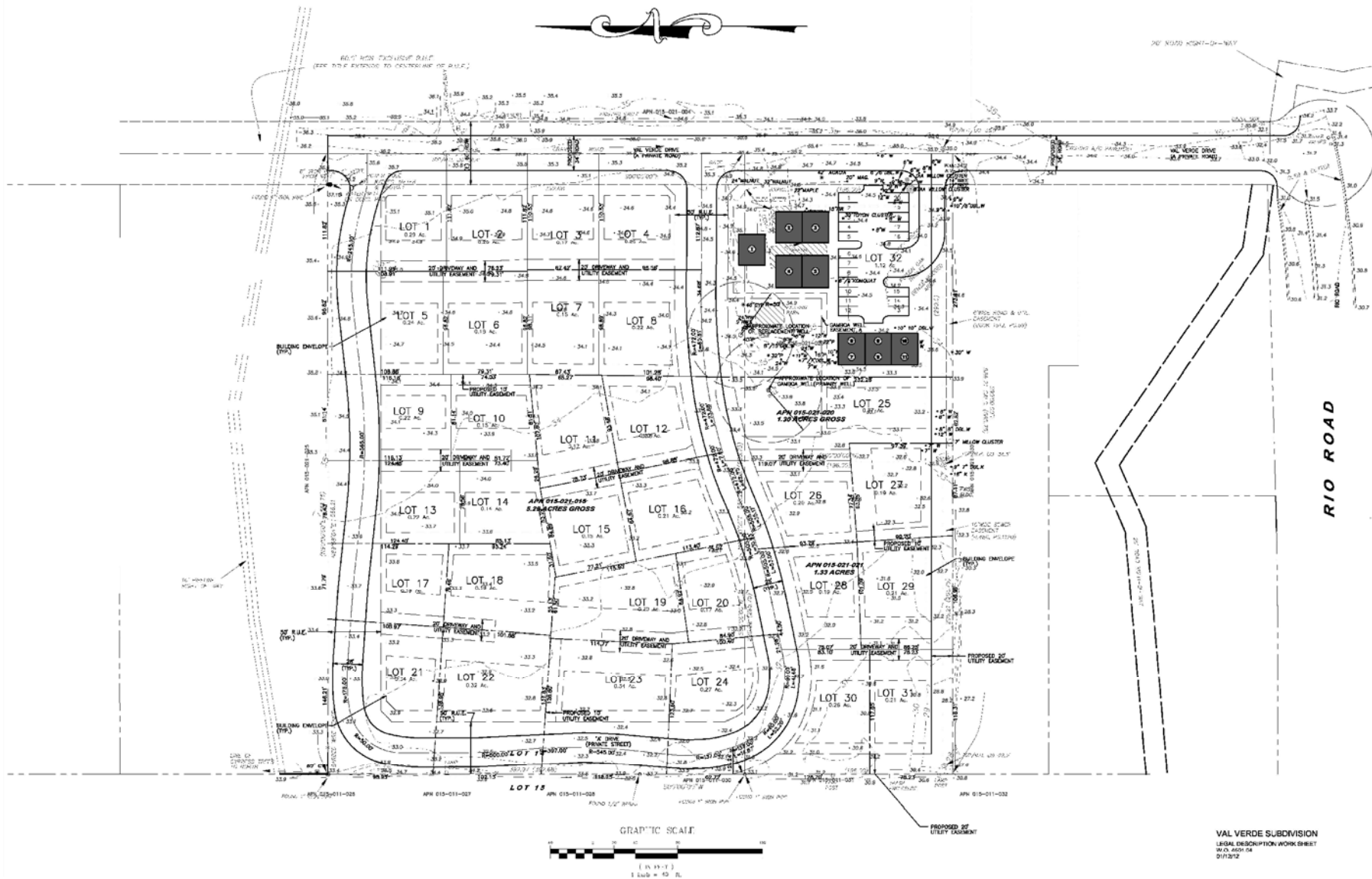
USFWS. 2010. Endangered and threatened wildlife and plants – Revised Designation of Critical Habitat for the California Red-Legged Frog: Federal Register Vol. 75, No. 51. March 17, 2010, Rules and Regulations.

USFWS. 2012. <http://crithab.fws.gov/flex/crithabMapper.jsp>. Accessed March 9, 2012

USFWS. 2012. National Wetlands Inventory:
<http://www.fws.gov/wetlands/Data/Mapper.html>. Accessed March 9, 2012.



Map 1 - Site Vicinity
Updated Biological Assessment
Val Verde Drive, Carmel, CA
Date: March, 2012



Map 2 - Project Site Plan
 Updated Biological Assessment
 Val Verde Drive, Carmel, CA
 Date: March, 2012

Appendix A - Site Photographs (March 20, 2012) – Val Verde Drive Biological Assessment, Carmel, CA



Photo 1: View from Val Verde Dr. of row crops on APN 015-021-015 and adjoining commercial area towards the west.



Photo 2: Empty fallow field across Val Verde Drive, east of the site. View towards the southeast.



Photo 3: View of row crops from northeast corner of site. Old Travers well is in the foreground.



Photo 4: Existing residence on APN 015-021-020.

Appendix A - Site Photographs (March 20, 2012) – Val Verde Drive Biological Assessment, Carmel, CA



Photo 5: View south from APN 015-021-015 towards residential lot and cluster of mature Monterey pine, cypress, redwood, and other trees.



Photo 7: Woodrat nest in poison hemlock patch on APN 015-021-020



Photo 6: View south from APN 015-021-021 towards property line and adjoining area containing dense vegetation.



Photo 8: Entrance to woodrat nest on APN 015-021-020

Appendix A - Site Photographs (March 20, 2012) – Val Verde Drive Biological Assessment, Carmel, CA



Photo 9: Woodrat nest in tree on APN 015-021-020



Photo 10: Woodrat nest on APN 015-021-020



Photo 11: Woodrat nest on APN 015-021-020



Photo 12: Wooded area on APN 015-021-020 containing seasonally moist soils and abundant leaf litter.

Appendix B
CNDDDB - Surrounding Quadrangle Search
March 2012
Val Verde Drive Updated Biological Assessment

Species Name	Common Name	FEDLIST	CALLIST	GRANK	SRANK	CNPS Rank
<i>Agelaius tricolor</i>	tricolored blackbird	None	None	G2G3	S2	
<i>Allium hickmanii</i>	Hickman's onion	None	None	G2	S2.2	1B.2
<i>Ambystoma californiense</i>	California tiger salamander	Threatened	Threatened	G2G3	S2S3	
<i>Anniella pulchra nigra</i>	black legless lizard	None	None	G3G4T2T3Q	S2	
<i>Anniella pulchra pulchra</i>	silvery legless lizard	None	None	G3G4T3T4Q	S3	
<i>Arctostaphylos edmundsii</i>	Little Sur manzanita	None	None	G2	S2.2	1B.2
<i>Arctostaphylos hookeri</i> ssp. <i>hookeri</i>	Hooker's manzanita	None	None	G3T2?	S2?	1B.2
<i>Arctostaphylos montereyensis</i>	Toro manzanita	None	None	G2	S2.1	1B.2
<i>Arctostaphylos pajaroensis</i>	Pajaro manzanita	None	None	G2	S2.1	1B.1
<i>Arctostaphylos pumila</i>	sandmat manzanita	None	None	G2	S2.2	1B.2
<i>Astragalus tener</i> var. <i>titi</i>	coastal dunes milk-vetch	Endangered	Endangered	G1T1	S1	1B.1
<i>Athene cucularia</i>	burrowing owl	None	None	G4	S2	
<i>Buteo regalis</i>	ferruginous hawk	None	None	G4	S3S4	
<i>Castilleja ambigua</i> ssp. <i>insalutata</i>	pink johnny-nip	None	None	G4T1	S1	1B.1
Central Dune Scrub	None	None	None	G2	S2.2	
Central Maritime Chaparral	Central Maritime Chaparral	None	None	G2	S2.2	
<i>Centromadia parryi</i> ssp. <i>congdonii</i>	Congdon's tarplant	None	None	G4T2	S2	1B.2
<i>Charadrius alexandrinus nivosus</i>	western snowy plover	Threatened	None	G4T3	S2	
<i>Chorizanthe pungens</i> var. <i>pungens</i>	Monterey spineflower	Threatened	None	G2T2	S2.2	1B.2
<i>Chorizanthe robusta</i> var. <i>robusta</i>	robust spineflower	Endangered	None	G2T1	S1	1B.1
<i>Clarkia jolonensis</i>	Jolon clarkia	None	None	G2	S2.2	1B.2
<i>Coelus globosus</i>	globose dune beetle	None	None	G1	S1	
<i>Collinsia multicolor</i>	San Francisco collinsia	None	None	G2	S2.2	1B.2
<i>Cordylanthus rigidus</i> ssp. <i>littoralis</i>	seaside bird's-beak	None	Endangered	G5T1	S1.1	1B.1
<i>Cypseloides niger</i>	black swift	None	None	G4	S2	
<i>Danaus plexippus</i>	monarch butterfly	None	None	G5	S3	
<i>Delphinium californicum</i> ssp. <i>interius</i>	Hospital Canyon larkspur	None	None	G3T2?	S2?	1B.2
<i>Delphinium hutchinsoniae</i>	Hutchinson's larkspur	None	None	G2	S2.1	1B.2
<i>Emys marmorata</i>	western pond turtle	None	None	G3G4	S3	
<i>Eremophila alpestris actia</i>	California horned lark	None	None	G5T3Q	S3	
<i>Ericameria fasciculata</i>	Eastwood's goldenbush	None	None	G2	S2.1	1B.1
<i>Eriogonum nortonii</i>	Pinnacles buckwheat	None	None	G2	S2.3	1B.3
<i>Erysimum ammodendrum</i>	sand-loving wallflower	None	None	G2	S2.2	1B.2
<i>Erysimum menziesii</i> ssp. <i>menziesii</i>	Menzies' wallflower	Endangered	Endangered	G3?T1	S1	1B.1
<i>Erysimum menziesii</i> ssp. <i>yadonii</i>	Yadon's wallflower	Endangered	Endangered	G3?T1	S1	1B.1
<i>Eucyclogobius newberryi</i>	tidewater goby	Endangered	None	G3	S2S3	
<i>Euphilotes enoptes smithi</i>	Smith's blue butterfly	Endangered	None	G5T1T2	S1S2	
<i>Falco mexicanus</i>	prairie falcon	None	None	G5	S3	
<i>Fritillaria liliacea</i>	fragrant fritillary	None	None	G2	S2	1B.2
<i>Gilia tenuiflora</i> ssp. <i>arenaria</i>	sand gilia	Endangered	Threatened	G3G4T2	S2	1B.2
<i>Hesperocyparis goveniana</i>	Goven cypress	Threatened	None	G1	S1.2	1B.2
<i>Hesperocyparis macrocarpa</i>	Monterey cypress	None	None	G1	S1.2	1B.2
<i>Horkelia cuneata</i> ssp. <i>sericea</i>	Kellogg's horkelia	None	None	G4T1	S1.1	1B.1
<i>Lasiurus cinereus</i>	hoary bat	None	None	G5	S4?	
<i>Lasthenia conjugens</i>	Contra Costa goldfields	Endangered	None	G1	S1	1B.1
<i>Layia carnosa</i>	beach layia	Endangered	Endangered	G2	S2	1B.1
<i>Lindieriella occidentalis</i>	California lindieriella	None	None	G3	S2S3	
<i>Lupinus tidestromii</i>	Tidestrom's lupine	Endangered	Endangered	G2	S2.1	1B.1
<i>Malacothamnus palmeri</i> var. <i>involutus</i>	Carmel Valley bush-mallow	None	None	G3T2Q	S2.2	1B.2
<i>Malacothamnus palmeri</i> var. <i>palmeri</i>	Santa Lucia bush-mallow	None	None	G3T2Q	S2.2	1B.2
<i>Malacothrix saxatilis</i> var. <i>arachnoidea</i>	Carmel Valley malacothrix	None	None	G5T2	S2.2	1B.2
<i>Microseris paludosa</i>	marsh microseris	None	None	G2	S2.2	1B.2
<i>Monolopia gracilis</i>	woodland woollythreads	None	None	G2G3	S2S3	1B.2
Monterey Cypress Forest	Monterey Cypress Forest	None	None	G1	S1.2	
Monterey Pine Forest	Monterey Pine Forest	None	None	G1	S1.1	
Monterey Pygmy Cypress Forest	Monterey Pygmy Cypress Forest	None	None	G1	S1.1	
Northern Bishop Pine Forest	Northern Bishop Pine Forest	None	None	G2	S2.2	
Northern Coastal Salt Marsh	Northern Coastal Salt Marsh	None	None	G3	S3.2	
<i>Oceanodroma homochroa</i>	ashy storm-petrel	None	None	G2	S2	
<i>Oncorhynchus mykiss irideus</i>	steelhead - south/central California coast DPS	Threatened	None	G5T2Q	S2	
<i>Pelecanus occidentalis californicus</i>	California brown pelican	Delisted	Delisted	G4T3	S1S2	
<i>Phrynosoma blainvillii</i>	coast horned lizard	None	None	G4G5	S3S4	
<i>Pinus radiata</i>	Monterey pine	None	None	G1	S1.1	1B.1
<i>Piperia yadonii</i>	Yadon's rein orchid	Endangered	None	G2	S2.1	1B.1
<i>Plagiobothrys uncinatus</i>	hooked popcorn-flower	None	None	G2	S2.2	1B.2
<i>Potentilla hickmanii</i>	Hickman's cinquefoil	Endangered	Endangered	G1	S1	1B.1
<i>Rana draytonii</i>	California red-legged frog	Threatened	None	G4T2T3	S2S3	
<i>Reithrodontomys megalotis distichlis</i>	Salinas harvest mouse	None	None	G5T1	S1	
<i>Rosa pinetorum</i>	pine rose	None	None	G2Q	S2.2	1B.2
<i>Sidalcea malachroides</i>	maple-leaved checkerbloom	None	None	G3G4	S3S4.2	4.2
<i>Stebbinsoseris decipiens</i>	Santa Cruz microseris	None	None	G2	S2.2	1B.2
<i>Taxidea taxus</i>	American badger	None	None	G5	S4	
<i>Tortula californica</i>	California screw moss	None	None	G2?	S2	1B.2
<i>Trifolium buckwestiorum</i>	Santa Cruz clover	None	None	G1	S1.1	1B.1
<i>Trifolium hydrophilum</i>	saline clover	None	None	G2	S2	1B.2
<i>Trifolium polyodon</i>	Pacific Grove clover	None	Rare	G1Q	S1.1	1B.1
<i>Trifolium trichocalyx</i>	Monterey clover	Endangered	Endangered	G1	S1	1B.1
Valley Needlegrass Grassland	Valley Needlegrass Grassland	None	None	G3	S3.1	

Notes: CNDDDB Quad Results includes USGS 7.5-minute Quadrangles - Marina, Monterey, Mt. Carmel, Seaside, Soberanes Point

Appendix C

Plant and Animal Species Observed on March 20, 2012

Val Verde Drive Updated Biological Assessment

Species Name	Common Name	Native
PLANTS		
<i>Acer negundo</i>	box elder	y
<i>Avena barbata</i>	slender wild oat	n
<i>Baccharis pilularis</i>	coyote brush	y
<i>Brassica rapa</i>	field mustard	n
<i>Bromus carinatus</i>	California brome	y
<i>Bromus diandrus</i>	ripgut grass	n
<i>Bromus hordaceus</i>	soft chess brome	n
<i>Carduus pycnocephalus</i>	Italian thistle	n
<i>Carpobrotus edulis</i>	iceplant	n
<i>Chamomilla suaveolens</i>	pineapple weed	n
<i>Conium maculatum</i>	poison hemlock	n
<i>Cupressus macrocarpa</i>	Monterey cypress	y
<i>Erodium botrys</i>	long-beaked filaree	n
<i>Hedera helix</i>	English ivy	n
<i>Hordeum jubatum</i>	foxtail barley	n
<i>Lolium multiflorum</i>	Italian ryegrass	n
<i>Malva parviflora</i>	common mallow	n
<i>Marah fabaceus</i>	wild cucumber	y
<i>Melaleuca sp.</i>	honey myrtle	n
<i>Melilotus albus</i>	white sweetclover	n
<i>Myoporum laetum</i>	lollypop tree	n
<i>Pinus radiata</i>	Monterey pine	y
<i>Polypogon monspeliensis</i>	rabbit's foot grass	n
<i>Prunus ilicifolia</i>	holly-leaved cherry	y
<i>Raphanus raphanistrum</i>	wild radish	n
<i>Rubus ursinus</i>	California blackberry	y
<i>Rumex sp.</i>	dock	n
<i>Sequoia sempervirens</i>	redwood	y
<i>Sonchus oleraceus</i>	common sowthistle	n
<i>Toxicodendron diversilobum</i>	poison oak	y
<i>Tropaeolum majus</i>	nasturtium	n
WILDLIFE		
Birds		
<i>Aphelocoma californica</i>	Western scrub jay	
<i>Bombycilla cedrorum</i>	cedar waxwing	
<i>Buteo jamaicensis</i>	red-tail hawk	
<i>Calypte anna</i>	Anna's hummingbird	
<i>Catharus guttatus</i>	hermit thrush	
<i>Corvus brachyrhynchos</i>	American crow	
<i>Melospiza melodia</i>	song sparrow	
<i>Turdus migratorius</i>	American robin	
Mammals		
<i>Neotoma fuscipes luciana</i>	Monterey dusky-footed woodrat	

Appendix E

Cultural Reports



Appendix E-1

Preliminary Archaeological Reconnaissance



ARCHAEOLOGICAL CONSULTING

P.O. BOX 3377
SALINAS, CA 93912
(831) 422-4912

PRELIMINARY ARCHAEOLOGICAL RECONNAISSANCE FOR ASSESSOR'S PARCELS 015-021-015, 015-021-020, AND 015-021-021, IN CARMEL, MONTEREY COUNTY, CALIFORNIA

by

Mary Doane, B.A., and Gary S. Breschini, Ph.D., RPA

June 26, 2007

Prepared for

Carmel Rio Road, LLC

SUMMARY: PROJECT 4041

RESULTS: NEGATIVE

ACRES: ±8.0

SITES: NONE

UTMG: NE 5.9838/40.4428, SE 5.9838/40.4412, SW 5.9822/40.4412, NW 5.9822/40.4428

MAP: USGS 7.5 MINUTE MONTEREY QUADRANGLE

Required for
MONTEREY Co. Planning Dept.
Evidence of:

Sacred/Religious Site
Native American Remains
Anything of Archaeological Significance
Findings of Historical Significance

Yes	No	N/A	SEE TEXT
		✓	
	✓		
	✓		
	✓		

INTRODUCTION

In June 2007 Archaeological Consulting was authorized by Brian Clark of Carmel Rio Road, LLC to prepare a Preliminary Archaeological Reconnaissance report for a proposed subdivision of three existing parcels in Carmel, Monterey County, California.

As part of our methodology in the preparation of this report, we have conducted: 1) a previous background records search at the Northwest Regional Information Center of the California Historical Resources Information System, located at Sonoma State University, Rohnert Park; and 2) a field reconnaissance of the project area. The following report contains the results of these investigations as well as our conclusions and recommendations.

PROJECT LOCATION AND DESCRIPTION

The project area is located at 25600 Val Verde in Carmel, Monterey County, California (see Maps 1 and 2). The Assessor's Parcel Numbers are 015-021-015, 015-021-020 and 015-021-021. The Universal Transverse Mercator Grid (UTMG) coordinates for the approximate corners of the eight acre project area are as follows: NE 5.9838/40.4428, SE 5.9838/40.4412, SW 5.9822/40.4412, and NW 5.9822/40.4428 on the USGS 7.5 minute Monterey Quadrangle (1947; photorevised 1983). The project proposes a subdivision which would result in thirty one market rate homes and eleven inclusionary units.

At the time of the reconnaissance most of the project area was fallow agricultural land which was vegetated in weeds and volunteer vegetables. A portion of parcel 021 had been covered with imported fill which contained some abalone shell fragments. Parcel 020 contained a house, a small shed, lawns and garden plantings. The southern part of parcel 020 was densely vegetated with brush. Surface soil visibility was fair to good through most of the project area. Overall, soil visibility was considered adequate for the purposes of the reconnaissance.

PROJECT METHODOLOGY

The methodology used in the preparation of this report included two primary steps, as follows:

Background Research

The background research for this project included an examination of the archaeological site records, maps, and project files of the Northwest Regional Information Center of the California Historical Resources Information System, located at Sonoma State University, Rohnert Park, California. In addition, our extensive personal files and maps were examined for supplemental information, such as rumors of historic or prehistoric resources in the general project area.

The Regional Information Centers have been established by the California Office of Historic Preservation as the local repository for all archaeological reports which are prepared under cultural resource management regulations. The background literature search at the appropriate Regional Information Center is required by state guidelines and current professional standards. Following completion of the project, a copy of the report must be deposited with that organization.

These literature searches are undertaken to determine if there are any previously recorded archaeological resources within the project area, and whether the area has been included in any previous archaeological research or reconnaissance projects.

Field Reconnaissance

The field reconnaissance was conducted by Mary Doane, B.A., and Patrick Cave on June 22, 2007. The survey consisted of a "general surface reconnaissance" of all project areas which could reasonably be expected to contain visible cultural resources, and which could be viewed without major vegetation removal or excavation.

RESULTS OF THE RECONNAISSANCE

Background Research

The record search of the files at the Northwest Regional Information Center found that there are two recorded cultural resources located within one kilometer of the project parcels. The nearer site is 300 meters ($\pm 1,000$ feet) to the northwest. The project area appears to have been at least partially included in a previous study (Runnings and Breschini 1988).

In addition, the California Inventory of Historical Resources (March 1976), California Historical Landmarks, and the National Register of Historic Places were checked for listed cultural resources which might be present in the project area; none were discovered.

The project area lies within the currently recognized ethnographic territory of the Costanoan (often called Ohlone) linguistic group. Discussions of this group and their territorial boundaries can be found in Breschini, Haversat, and Hampson (1983), Kroeber (1925), Levy (1978), Margolin (1978), and other sources. In brief, the group followed a general hunting and gathering subsistence pattern with partial dependence on the natural acorn crop. Habitation is considered to have been semi-sedentary and occupation sites can be expected most often at the confluence of streams, other areas of similar topography along streams, or in the vicinity of springs. These original sources of water may no longer be present or adequate. Also, resource gathering and processing areas, and associated temporary campsites, are frequently found on the coast and in other locations containing resources utilized by the group. Factors which influence the location of these sites include the presence of suitable exposures of rock for bedrock mortars or other milling activities, ecotones, the presence of specific resources (oak groves, marshes, quarries, game trails, trade routes, etc.), proximity to water, and the availability of shelter. Temporary camps or other activity areas can also be found along ridges or other travel corridors.

Field Research

The visible surface soil in the project area was a tan to light gray sandy silt. None of the materials frequently associated with prehistoric cultural resources in this area (dark midden soil, eroded marine shell fragments, fire-affected rock, flaked or ground stone, weathered bone fragments, formal artifacts, etc.) were observed during the reconnaissance in the native soil. The imported fill on parcel 021 and the southern part of parcel 015 contained abalone shell fragments.

No potentially significant historic period archaeological materials were seen in the project area.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the background research and the surface reconnaissance, we have concluded that the project area does not contain surface evidence of potentially significant archaeological resources. Because of this, we make the following recommendation:

- The proposed subdivision development should not be delayed for archaeological reasons.

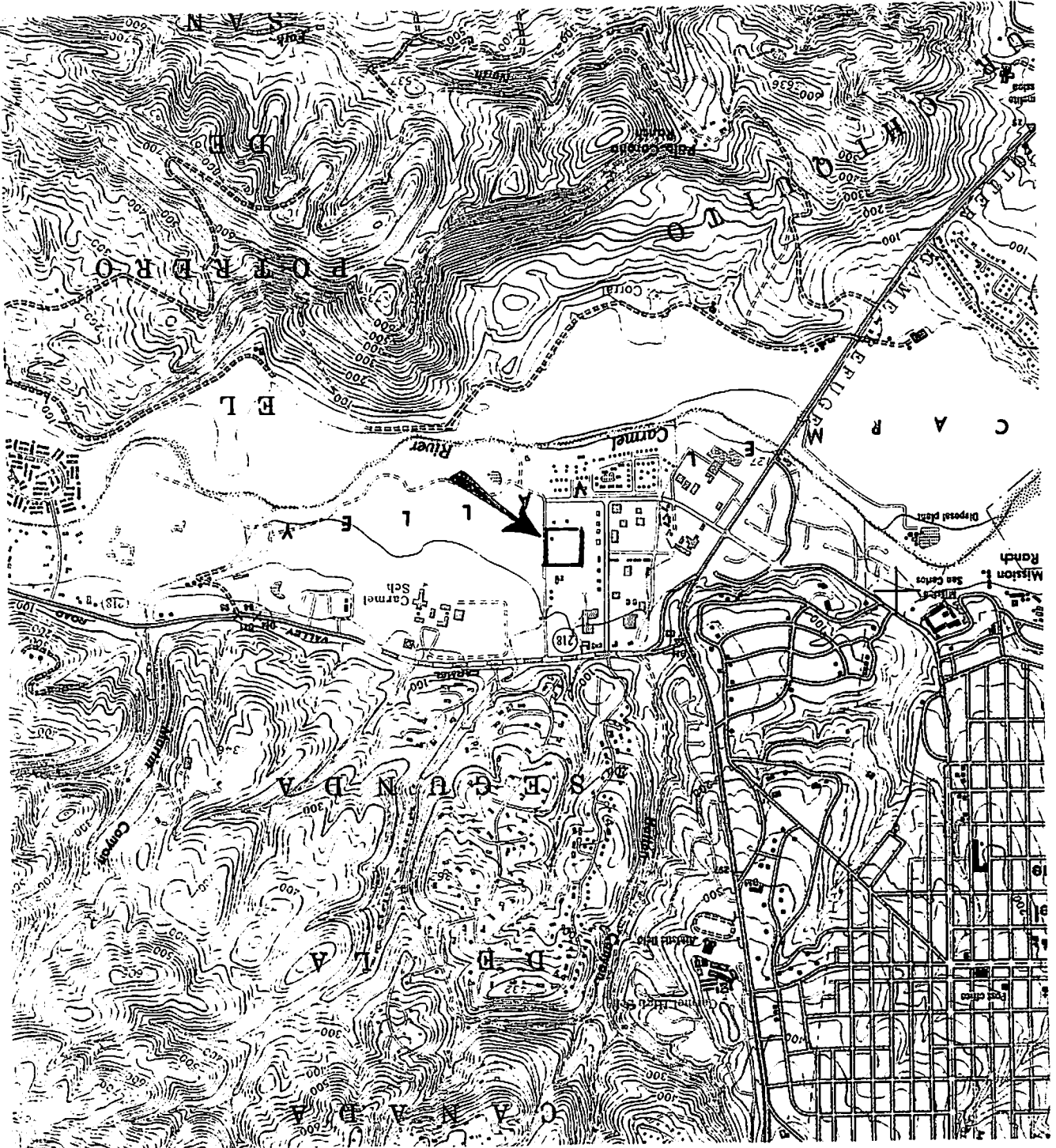
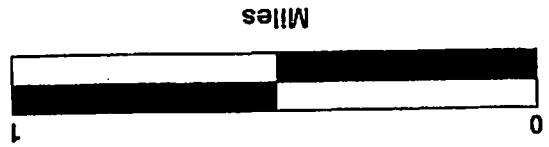
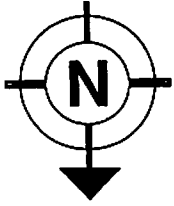
Because of the possibility of unidentified (e.g., buried) cultural resources being found during any construction, we recommend that the following standard language, or the equivalent, be included in any permits issued within the project area:

- If archaeological resources or human remains are accidentally discovered during construction, work shall be halted within 50 meters (150 feet) of the find until it can be evaluated by a qualified professional archaeologist. If the find is determined to be significant, appropriate mitigation measures shall be formulated and implemented.

REFERENCES

- Breschini, G. S., T. Haversat, and R. P. Hampson
1983 **A Cultural Resources Overview of the Coast and Coast-Valley Study Areas [California].** Coyote Press, Salinas.
- Kroeber, A. L.
1925 Handbook of the Indians of California. **Bureau of American Ethnology Bulletin 78.**
- Levy, R.
1978 Costanoan. Pp. 485-495 in **Handbook of North American Indians, Vol. 8, California.** Smithsonian Institution, Washington, D.C.
- Margolin, M.
1978 **The Ohlone Way.** Heyday Books, Berkeley.
- Runnings, A. and G. S. Breschini
1988 **Preliminary Cultural Resources Reconnaissance of a Proposed Development on Via Verde Way, Carmel Valley, Monterey County, California.** On file with the Northwest Information Center, Sonoma State University.

Map 1. Project Location.

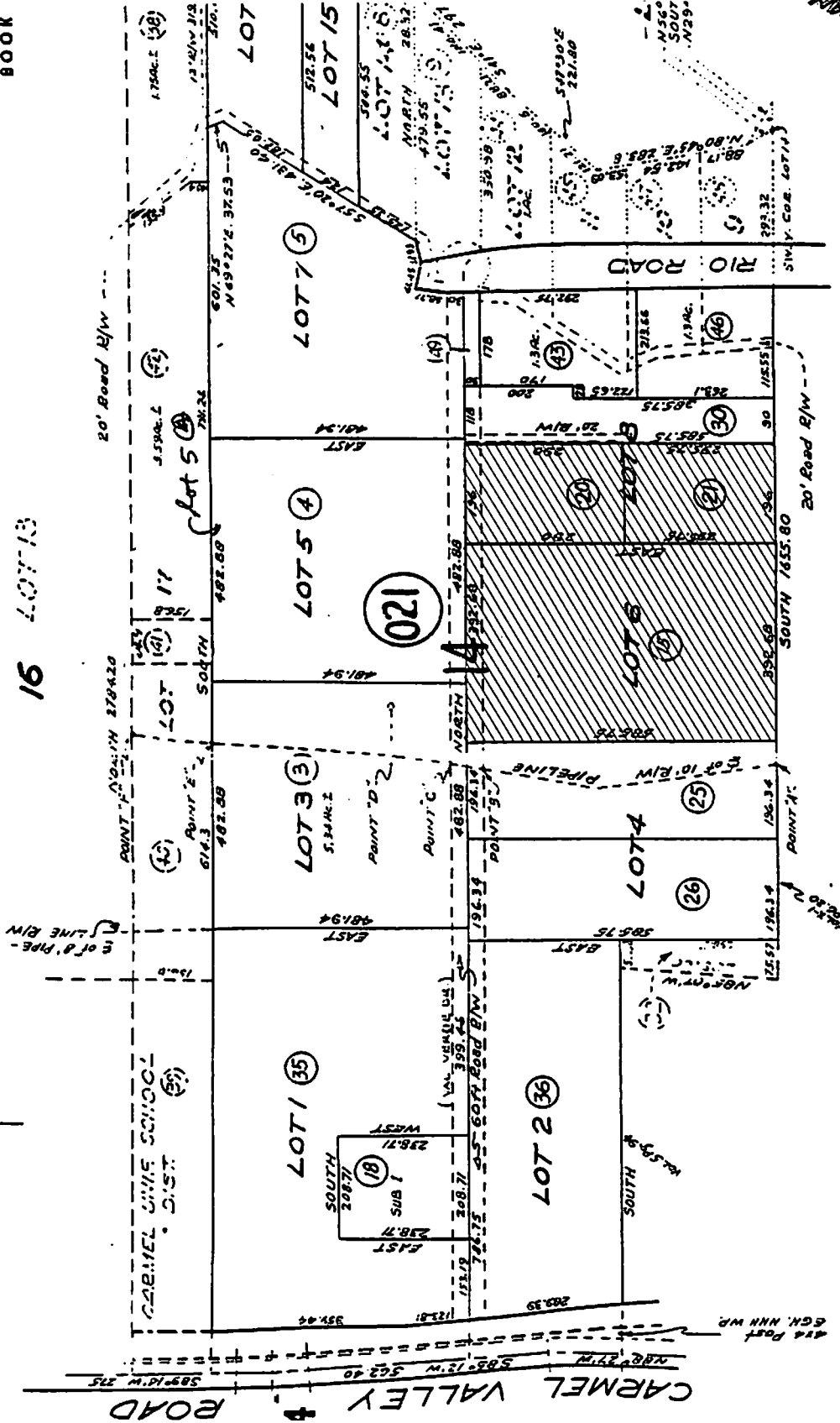


COUNTY
ASSES
BOOK

TAX CODE AREA

16 LOT 13

SCALE: 1 in. = 200 ft.



53

10

LOT 15

ASSE'S MAP-SUBDIVISION
HATTON PARTITION
RANCHO CANADA DE LA

Map 2. Project Location.

Appendix E-2

Addendum to the Preliminary Archaeological Reconnaissance



ARCHAEOLOGICAL CONSULTING

P.O. BOX 3377

SALINAS, CA 93912

(831) 422-4912

E-MAIL COYOTE@COYOTEPRESS.COM

June 8, 2016

Brian Clark
430 Ortiz Ave., Suite B
Sand City, CA 93955
Via email: brian@surfloan.com

Brian:

I am writing, as you requested, concerning a report we did for you in 2007. You indicate that the County wants an update.

In 2007, in our Project 4041, we examined three parcels: APNs 015-021-015, -020, and -021, in Carmel, Monterey County, California. We concluded at that time that there were no potentially significant archaeological resources within those parcels.

Since our previous survey found no evidence of archaeological resources on the parcel, and survey standards have not changed in the intervening years, we see no need for an additional Archaeological Reconnaissance.

Let me know if you need anything additional on this.

Sincerely,

Gary S. Breschini

Gary S. Breschini, Ph.D.

Appendix E-3

Phase I Historic Review



KENT L. SEAVEY
310 LIGHTHOUSE AVENUE
PACIFIC GROVE, CALIFORNIA 93950
(831)375-8739

April 8, 2010

Mr. Brian Clark
430 Ortiz, Unit B
Sand City, CA 93955

Dear Mr. Clark:

Thank you for the opportunity to prepare a Phase I Historic Review of the residential property at 26500 Val Verde Rd. (APN# 015-021-020) near Carmel in Monterey County, as required by the California Environmental Quality Act (CEQA) and the County of Monterey.

Monterey County Assessor's records estimate the subject property as being constructed in 1958. The Assessor's record the wood-framed garage NW of the subject property as being constructed in 1962 (MCBP# 3194), and therefore not a part of this review.

Monterey County Deeds show the original owner of the residence was William Gamboa. Gamboa was a housing developer in the late 1950s who subsequently moved to the Madera area in the central valley. No builder has been identified. Mr. Gamboa purchased the parcel in 1950 from previous owner Howard Hatton. The land was part of the old Wm. Hatton dairy farm that once occupied the site of the Carmel Barnyard shopping center. The property was purchased by the current owner, Mr. Roy Wirta, in 2007.

The subject property is a one-story, wood-framed example of the California Ranch House style of architecture. It is irregular in plan, and rests on a concrete foundation. The exterior wall cladding is a combination of combed wood shingles, with a brick veneer along the entryway.

The roof system is an intersecting hip and gable type with a central hipped roof having a gabled living room wing projecting toward the south, and a hip-roofed two-car garage wing projecting toward the east. The overhanging eaves have closed soffits. The roof on the south side of the main building block projects over the principal entry, forming an open porch supported by large, square wood posts.

The flush board entry door is located on the south side of the main building block where it meets the east side of the living room wing. On the rear (west) elevation, the main building block projects slightly allowing for a covered rear entry where the living room wing meets this this feature. There is one brick exterior eave wall chimney present. It is located about midway along the west elevation of the living room wing. All roof covering is in composition shingles.

Fenestration is irregular, with a combination of large fixed and banked bay windows on the south end of the living room wing, and two-part fixed and casement type industrial steel windows on all other elevations. The nonhistoric 1962 wood-framed, gable-roofed garage is found just NW of the residence.

The residence is sited back from the street on a well wooded parcel on the west side of Val Verde Drive. It is located in a wooded rural residential neighborhood of condominium complexes, single family dwellings and open farmland adjacent to the Carmel Barnyard shopping center at the mouth of Carmel Valley.

The California Environmental Quality Act (CEQA), PRC Sec. 21084.1 requires all properties fifty years of age or older to be reviewed for potential historic significance. Criteria for that significance is addressed in PRC Sec. 5024.1(a). It asks, generally, did any event of importance to the region, state or nation occur on the property ? Did anyone of great importance to the region, state or nation occupy the property during the productive period of their lives ? Does the building represent an important architectural type, period or method of construction, or is it a good example of the work of a noted architect or master-builder ? The criteria also asks if the property is likely to yield information significant to the understanding of the areas history.

The subject property is an example the California Ranch House style, which was one of the most popular and widely constructed residential designs of the pre and post WWII era, especially in mass subdivision housing. The style was derived from Early Californian and American vernacular sources, minimizing decorative detailing. They are characterized by their low, horizontal profiles, use of native materials, and informal open planning that included porches and patios affording easy access from the inside to the outside. California Ranch House style residences still abound in the residential communities Monterey County.

Eligibility for listing buildings, structures, objects, sites, and districts (i.e., resources) in the National register of Historic Places (NRHP) and California Register of Historical Resources (CRHR) rests on twin factors of *historic significance* and *integrity*. A resource must have both significance and integrity to be considered eligible. Loss of integrity, if sufficiently great, will overwhelm the historic significance a resource may possess and render it ineligible. Likewise, a resource can have complete integrity, but if it lacks significance, it must also be considered ineligible.

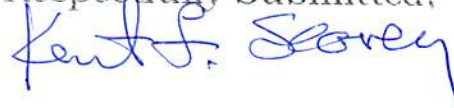
Integrity is determined through applying seven factors to the historic resource: location, design, setting, workmanship, materials, feeling and association. These seven can be roughly grouped into three types of integrity considerations. Location and setting relate to the relationship between the property and its environment. Design, materials, and workmanship, as they apply to historic buildings, relate to construction methods and architectural details. Feeling and association are the least objective of the seven criteria and pertain to the overall ability of the property to convey a sense of historical time and place in which it was constructed.

The subject property is in its original location, however its former rural setting has been compromised by the construction of the Carmel Barnyard shopping center to the immediate west, and a large condominium complex just south of the residence. While the house retains its original design and materials, it is one of hundreds of the same style and type found in Monterey County. The workmanship is consistent with the production of subdivision housing in the post war era. Because of the density of the adjacent development, the subject property evokes little sense of time and place or of feeling and association with the former rural nature of its setting.

No event of significance to the nation, state or region, nor any important individual has been identified with the existing property. William Gamboa, the original owner, soon left the area. No architect or builder has been identified with the design of the residence.

The subject property is one of many California Ranch House style residences constructed in Monterey County and the Carmel Valley in the post WWII era. It retains its physical integrity as constructed in 1958, however, it lacks sufficient architectural distinction or historic significance to be considered eligible for listing in the California Register or qualifying for listing on the Monterey County Historic Resource inventory. Therefore, the structure cannot be considered an historic resource as defined by CEQA.

Respectfully Submitted,



26500 Val Verde Road, Carmel



Photo #1. Looking NW at the south facing facade.
Note attached garage to right. April, 2010.



Photo #2. Looking west at the east side-elev. of the
living room wing. April, 2010.

Appendix E-4

Addendum to the Phase I Historic Review



KENT L. SEAVEY
310 LIGHTHOUSE AVENUE
PACIFIC GROVE, CALIFORNIA 93950
(831)375-8739

June 24, 2016

Mr. Bob Schubert-Senior Planner
Monterey County Resource Management Agency
Planning Department
168 W. Alisal St., 2nd Floor
Salinas, CA 93901

Dear Mr. Schubert:

This letter will act as an Addendum to my Phase I Historic Review of the 1958 residential property located at 26500 Val Verde Rd. (APN# 015-021-020) near Carmel in Monterey County. The Addendum is in response to a five year review of the original historic study dated April 8, 2010 (see copy provided). Rincon Consultants, Inc., of Monterey requested some clarification on the site setting and characteristics.

The subject property is sited on the west side of Val Verde Rd. on a wooded parcel that is part of the subdivision of Lot 14, Hatton Partition of the Rancho Canada De La Segunda, originally surveyed in 1927, and further modified in July, 1950, and again reduced into four smaller parcels April, 1956 (see plat maps provided). Zoning is (LDR/1-D-S-RAZ), Low Density Residential, (PLN#1400890).

The original 1880's Hatton Dairy complex, located west of the subject property at the mouth of Carmel Valley, including all its outbuildings were demolished for a shopping center in the late 1970s, ironically called The Barnyard. The earlier land use for the parcel under review was dairy grazing. The parcel immediately to the north of the subject property is currently in use as an organic garden, but has only been under cultivation since the 1980s.

In 2011 Past Consultants of Alameda, California prepared an Agricultural Resources Evaluation Handbook for Monterey County. The document specifically covered North Monterey County and the Salinas Valley, but not Carmel Valley. However, its themes address the types of agricultural development that occurred over time in the entire county. Under its Theme 2: Intensive Agriculture (ca. 1870-1960) it created property type descriptions including a Dairy Sub-type. Under its description of Physical Characteristics it called for "a primary residence oriented towards a primary transportation route, outbuildings including dairy barns, milk houses, cheese processing houses, tank houses, equipment barns and worker's housing". Eligibility for historic listing requires integrity, the ability of a property to convey its significance.

The Monterey County Agricultural Resource Evaluation Handbook employs the seven aspects of Integrity adopted by the National Register of Historic Places to determine integrity thresholds for its contextual themes. Under the aspect of Location, *the place where significant activities that shaped a property took place*, Intensive Farmsteads are generally located on moderate tracts of open land, near a road or rail transportation link.

The subject property, a single family residential parcel is the result of three periods of subdivision of the Hatton Dairy Farm, from 1927 to 1956 (see plat maps provided). It is just to the east of a major shopping complex that replaced all of the extant buildings of the dairy operation in the late 1970s. Small open fields exist to its north and east, but are rapidly filling up with new housing units. 26500 Val Verde Rd. lacks integrity of location.

Under the aspect of Setting, *the physical environment within and surrounding a property, including large and small scale features in which historic events took place*, would require the main house and dairy outbuildings, aspects of its natural environment and some fencing to be as intact as possible. 26500 Val Verde Rd. lacks integrity of setting.

Under the aspects of design, Materials and Workmanship, *the composition of natural and cultural elements, comprising the form and spatial organization of a property should be intact to communicate the property's historic use*, as a dairy farm. As noted above, nothing of the Hatton Dairy Farm remains. This is also true of the aspects of Materials and Workmanship, *including period construction techniques, or any vegetation similar to historic species in type, scale and visual effect that might convey historic integrity*. 26500 Val Verde Rd. lacks integrity of design, Materials and Workmanship that would connect it with the intensive farming of the former Hatton Dairy Farm.

Under the aspects of Feeling, *any evocation by the presence of physical characteristics that reflect the historic scene through the cumulative effect of setting, Design, Materials and Workmanship creates the sense of past time and place*. Association, *is the direct link between a property and the important events or persons who shaped it*. An intensive farmstead with integrity of Feeling and Association should reflect the historic persons, land use and historic events that shaped the Hatton Dairy Farm as an intensive farmstead. 26500 Val Verde Rd. lacks the integrity of Feeling and Association that would connect it with the intensive farming of the former Hatton Dairy Farm.

As there is no formal historic context statement for Carmel Valley, the existing 2013 Pebble Beach Historic Context Statement, prepared by Page & Turnbull, Inc., of San Francisco was consulted for significance criteria related to residential properties constructed in the post-WWII era, up to 1965.

The context statement includes Monterey County Review criteria, which states, in part, *“Suburban Ranch style buildings are very common in Pebble Beach and California as a whole.*

Thus, architectural significance is best reserved for buildings that demonstrate particularly strong artistic merit, or that clearly demonstrate the influence of a particular architect or builder.” The residence at 26500 Val Verde Rd. does neither of these things.

The original 1958 attached garage at 26500 Val Verde Rd., is located off the NE front elevation of the residence. The detached, 1962 one-story garage/storage unit, located a little NW of the rear of the residence, is front-gabled with paired sliding barn doors, and rests on a mud-sill foundation. The exterior wall cladding is a narrow vertical flush wood siding. It's low-pitched roof slightly overhangs the eave line and is covered in composition shingles. There are two window openings, along the south side-elevation. Its design is unrelated to that of the main house, and in current use as storage. Both the single family residence and its detached garage/storage unit, which also lacks any architectural distinction, are unrelated to agricultural use (see photos provided). There are no additional ancillary structures present.

The Rincon Consultants, Inc. October 14, 2015 Peer Review of the Architectural History Evaluation of the subject property noted that “a letter report format is suitable for projects with minimal potential to impact historical resources”. They also stated that “Rincon did not find any specific evidence that would reverse the conclusions outlined the cultural resources studies prepared for this project”, but suggested strengthening the report to insure the study is in conformance with CEQA and the Monterey County guidelines for cultural resources. This addendum covers the questions asked by the peer reviewers. The conclusions reached in the original review remain valid (see copy provided).

Respectfully Submitted,

Kurt S. Searley

Sources

City of Carmel-by-the-Sea

Harrison Memorial Library, History Annex biographical and historical files.

City of Monterey

Monterey Public Library, California History Room biographical and history files.

County of Monterey

Assessor's records, Monterey County Assessor's office, Salinas, CA.

Recorder's records, Monterey County Recorder's office, Salinas, CA.

2011 *Agricultural Resources Evaluation Handbook, Monterey County California*,
Past Consultants:Alameda, CA, pp. 153-160.

2013 *Pebble Beach Historic Context Statement*, Page & Turnbull, Inc.: San Francisco,
CA, pp. 116-122.

Clark, Donald

1991 *Monterey County Place Names A Geographical Dictionary*, Kestrel Press:
Carmel Valley, CA, pp. 180-181.

DeVoe, Marcia

1979 *The Martins and The Hattons*, Marcia DeVoe:Carmel Valley.

Fink, Augusta

1995 *The Presence of the Past*, Chronicle Books: San Francisco, pp. 196-199.

National Park Service

1995 National Register Bulletin, *How to Apply the National Register Criteria for
Evaluation*, U.S. Department of the Interior.

Seavey, Kent,

2008 *Phase I Historic Review, 6540 Carmel Valley Road, Hatton Dairy Barn (Upper
Hatton Ranch)*, Carmel Valley, Monterey County, California.

26500 Val Verde Road-Carmel Valley

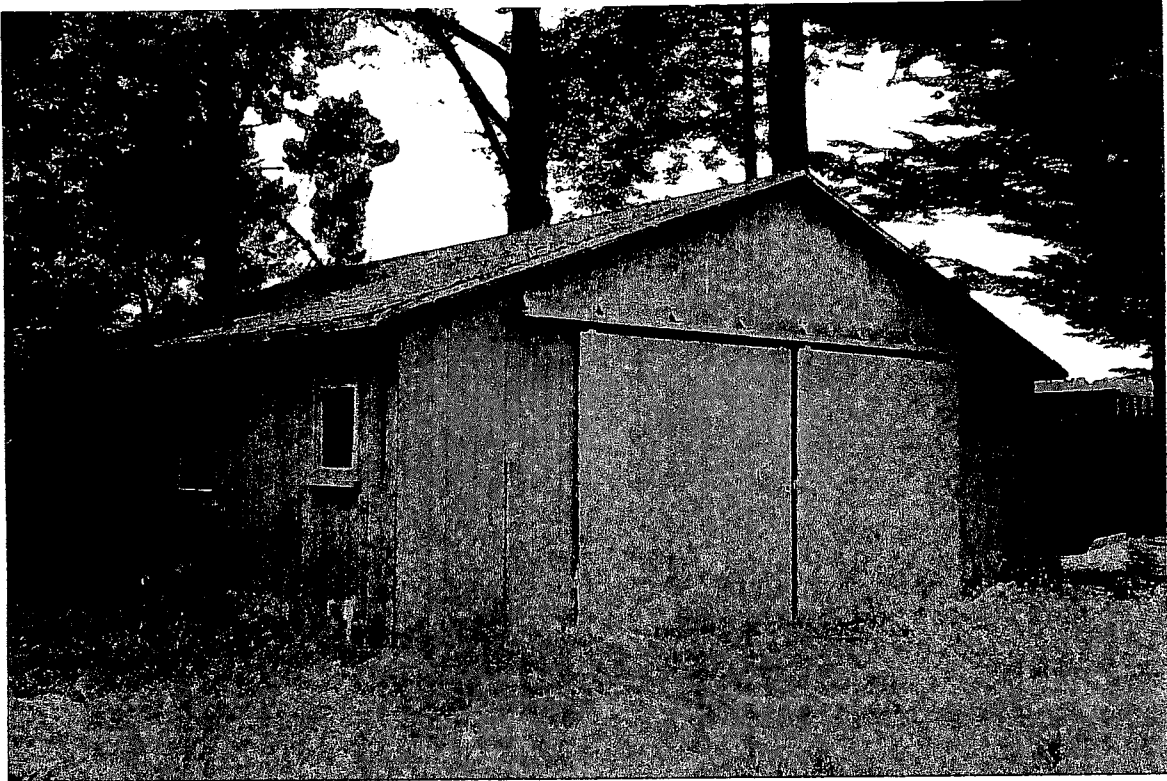


Photo #1. Looking NW at the detached 1962 garage/storage unit,
June, 2016.

RECAPITULATION OF AREAS

55,340 AC - NET
9,530 AC - COUNTY ROAD
3,010 AC - GOV ROAD
60,880 AC TOTAL

RECORD OF SURVEY
SHOWING DIVISION OF PROPERTY IN
LOT 14 PER HATTON PARTITION OF
RANCHO CANADA DE LA SEGUNDA

Maple Ave
THE HEIRS OF HUBERT H. HATTEN
BY
MONTEREY COUNTY SURVEYORS, INC.
SALINAS CALIFORNIA
JULY 1950
SCALE 1" = 100'

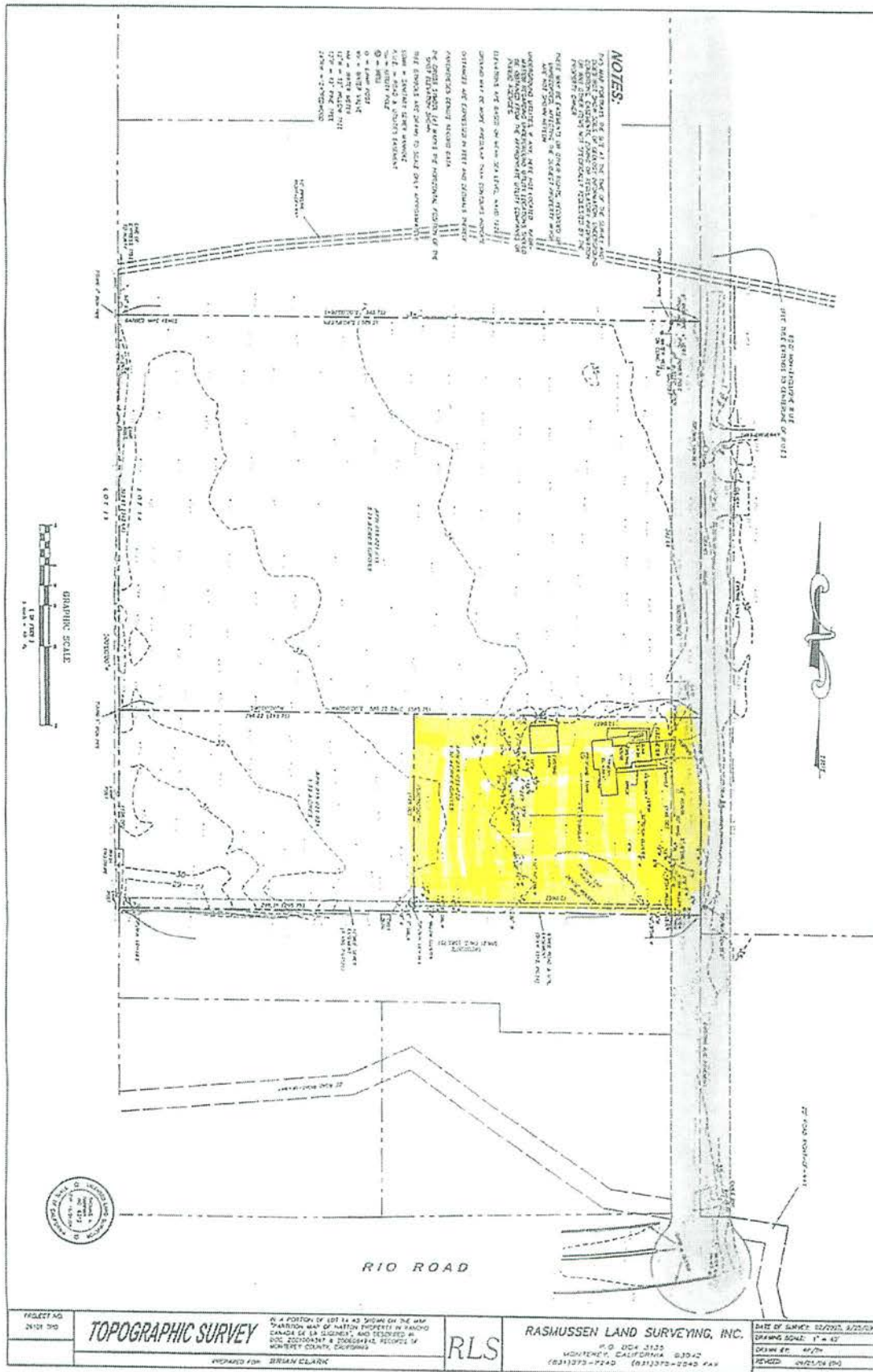
6. 7275-1111-125
 708 9006-1111-125
 7111-125
 7111-125

1. The first of these is the fact that the
 2. of the world is not a uniform one, but
 3. of the world is not a uniform one, but
 4. of the world is not a uniform one, but
 5. of the world is not a uniform one, but
 6. of the world is not a uniform one, but
 7. of the world is not a uniform one, but
 8. of the world is not a uniform one, but
 9. of the world is not a uniform one, but
 10. of the world is not a uniform one, but

"In addition, I received two letters
 nearly every day that my men thought were from
 a woman and that they were lovely. They were
 very nice, like the ones in the book, and I
 thought that the instruments one of the
 children got from the American Indian
 man was quite good, and the boy's idea
 was good."

—Sam Bailey born 1890
 2250 1/2 1st Ave. S.E.
 Minneapolis, Minn.

EXHIBIT B



KENT L. SEAVEY
310 LIGHTHOUSE AVENUE
PACIFIC GROVE, CALIFORNIA 93950
(831)375-8739

April 8, 2010

Mr. Brian Clark
430 Ortiz, Unit B
Sand City, CA 93955

Dear Mr. Clark:

Thank you for the opportunity to prepare a Phase I Historic Review of the residential property at 26500 Val Verde Rd. (APN# 015-021-020) near Carmel in Monterey County, as required by the California Environmental Quality Act (CEQA) and the County of Monterey.

Monterey County Assessor's records estimate the subject property as being constructed in 1958. The Assessor's record the wood-framed garage NW of the subject property as being constructed in 1962 (MCBP# 3194), and therefore not a part of this review.

Monterey County Deeds show the original owner of the residence was William Gamboa. Gamboa was a housing developer in the late 1950s who subsequently moved to the Madera area in the central valley. No builder has been identified. Mr. Gamboa purchased the parcel in 1950 from previous owner Howard Hatton. The land was part of the old Wm. Hatton dairy farm that once occupied the site of the Carmel Barnyard shopping center. The property was purchased by the current owner, Mr. Roy Wirta, in 2007.

The subject property is a one-story, wood-framed example of the California Ranch House style of architecture. It is irregular in plan, and rests on a concrete foundation. The exterior wall cladding is a combination of combed wood shingles, with a brick veneer along the entryway.

The roof system is an intersecting hip and gable type with a central hipped roof having a gabled living room wing projecting toward the south, and a hip-roofed two-car garage wing projecting toward the east. The overhanging eaves have closed soffits. The roof on the south side of the main building block projects over the principal entry, forming an open porch supported by large, square wood posts.

The flush board entry door is located on the south side of the main building block where it meets the east side of the living room wing. On the rear (west) elevation, the main building block projects slightly allowing for a covered rear entry where the living room wing meets this feature. There is one brick exterior eave wall chimney present. It is located about midway along the west elevation of the living room wing. All roof covering is in composition shingles.

Fenestration is irregular, with a combination of large fixed and banked bay windows on the south end of the living room wing, and two-part fixed and casement type industrial steel windows on all other elevations. The nonhistoric 1962 wood-framed, gable-roofed garage is found just NW of the residence.

The residence is sited back from the street on a well wooded parcel on the west side of Val Verde Drive. It is located in a wooded rural residential neighborhood of condominium complexes, single family dwellings and open farmland adjacent to the Carmel Barnyard shopping center at the mouth of Carmel Valley.

The California Environmental Quality Act (CEQA), PRC Sec. 21084.1 requires all properties fifty years of age or older to be reviewed for potential historic significance. Criteria for that significance is addressed in PRC Sec. 5024.1(a). It asks, generally, did any event of importance to the region, state or nation occur on the property? Did anyone of great importance to the region, state or nation occupy the property during the productive period of their lives? Does the building represent an important architectural type, period or method of construction, or is it a good example of the work of a noted architect or master-builder? The criteria also asks if the property is likely to yield information significant to the understanding of the areas history.

The subject property is an example the California Ranch House style, which was one of the most popular and widely constructed residential designs of the pre and post WWII era, especially in mass subdivision housing. The style was derived from Early Californian and American vernacular sources, minimizing decorative detailing. They are characterized by their low, horizontal profiles, use of native materials, and informal open planning that included porches and patios affording easy access from the inside to the outside. California Ranch House style residences still abound in the residential communities Monterey County.

Eligibility for listing buildings, structures, objects, sites, and districts (i.e., resources) in the National register of Historic Places (NRHP) and California Register of Historical Resources (CRHR) rests on twin factors of *historic significance* and *integrity*. A resource must have both significance and integrity to be considered eligible. Loss of integrity, if sufficiently great, will overwhelm the historic significance a resource may possess and render it ineligible. Likewise, a resource can have complete integrity, but if it lacks significance, it must also be considered ineligible.

Integrity is determined through applying seven factors to the historic resource: location, design, setting, workmanship, materials, feeling and association. These seven can be roughly grouped into three types of integrity considerations. Location and setting relate to the relationship between the property and its environment. Design, materials, and workmanship, as they apply to historic buildings, relate to construction methods and architectural details. Feeling and association are the least objective of the seven criteria and pertain to the overall ability of the property to convey a sense of historical time and place in which it was constructed.

The subject property is in its original location, however its former rural setting has been compromised by the construction of the Carmel Barnyard shopping center to the immediate west, and a large condominium complex just south of the residence. While the house retains its original design and materials, it is one of hundreds of the same style and type found in Monterey County. The workmanship is consistent with the production of subdivision housing in the post war era. Because of the density of the adjacent development, the subject property evokes little sense of time and place or of feeling and association with the former rural nature of its setting.

No event of significance to the nation, state or region, nor any important individual has been identified with the existing property. William Gamboa, the original owner, soon left the area. No architect or builder has been identified with the design of the residence.

The subject property is one of many California Ranch House style residences constructed in Monterey County and the Carmel Valley in the post WWII era. It retains its physical integrity as constructed in 1958, however, it lacks sufficient architectural distinction or historic significance to be considered eligible for listing in the California Register or qualifying for listing on the Monterey County Historic Resource inventory. Therefore, the structure cannot be considered an historic resource as defined by CEQA.

Respectfully Submitted,

Kent F. Seavey

26500 Val Verde Road, Carmel



Photo #1. Looking NW at the south facing facade.
Note attached garage to right. April, 2010.



Photo #2. Looking west at the east side-elev. of the
living room wing. April, 2010.

Appendix E-5

Cultural Reports Peer Review





Rincon Consultants, Inc.

437 Figueroa Street, Suite 203
Monterey, California 93940

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info@rinconconsultants.com
www.rinconconsultants.com

October 14, 2015
Rincon Project No. 14-00187

Bob Schubert, Senior Planner
Monterey County Resources Management Agency
Planning Department
168 W. Alisal St., 2nd Floor
Salinas, California 93901

**Subject: Peer Review of an Archaeological Technical Report and Architectural History
Evaluation for the Carmel Rio Road Subdivision Project, Unincorporated Monterey
County, California**

Dear Mr. Schubert:

This letter summarizes the results of a peer review of two cultural resource documents prepared for the property located at 15 and 26500 Val Verde Drive, within the Carmel Valley Master Plan Area, in unincorporated Monterey County, California. The project site lies approximately 0.7 mile southeast of the City of Carmel-by-the-Sea (outside of the City's sphere of influence), approximately 0.3 mile east of Highway 1, and approximately 0.2 mile south of Carmel Valley Road (subject property). The project site is composed of three parcels (Assessor's Parcel Numbers [APN] 015-021-020-000, 015-021-021-000, & 015-021-015-000).

This peer review was conducted as part of the environmental analysis being conducted in conformance with the California Environmental Quality Act (CEQA) by the County of Monterey. The purpose of the review is to determine whether the cultural resources analyses completed for the project site are adequate for the purposes of preparing an Environmental Impact Report (EIR). This letter summarizes the results of a peer review of the following two cultural resources reports prepared for the subject property:

- *Preliminary Archaeological Reconnaissance for Assessor's Parcels 015-021-015, 015-021-020 and 015-021-021 in Carmel, Monterey County, California.* Prepared by Mary Doane and Gary Breschini of Archaeological Consulting (Doane and Breschini 2007).
- *Phase I Historic Review, 26500 Val Verde Road, Carmel, Monterey County, California.* Prepared by Ken Seavey (Seavey 2010).

The peer review was conducted by Cultural Resources Principal Investigator Christopher Duran, M.A., RPA, who meets the Secretary of the Interior's *Professional Qualification Standards* (PQS) for historic and prehistoric archaeology (National Park Service 1983), and Senior Architectural Historian Shannon Carmack, B.A. who meets the PQS for architectural history and history.



Methods

The analysis entailed review of the both cultural resources documents with regard to methods, findings, and the potential for the project to impact significant historical and or archaeological resources as defined in CEQA and the *State CEQA Guidelines*. No site visits were conducted by Rincon cultural resources staff; nor was any supplemental archival research, Native American or historical group coordination or California Historical Resources Inventory records search conducted.

Archaeological Report Peer Review

Doane and Breschini's (2007) *Preliminary Archaeological Reconnaissance for Assessor's Parcels 015-021-015, 015-032-020, and 015-021-021 in Carmel, Monterey County, California* follows a negative letter report format with the results of the records search, methodology, findings, and management recommendations. The letter report format does not include a prehistoric or historic context. This format is common for negative Phase I surveys in many areas; however, reports prepared following the Office of Historic Preservation's (OHP; 1990) *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* typically provide more detail.

The methodology for the field investigation does not provide specific details for the field survey. The report states that the areas "reasonably expected to contain visible cultural resources" were inspected as part of the reconnaissance. The document does not indicate what or where these inspected areas are specifically within the project site. Although much of the site consists of agricultural fields, this does not preclude the area from containing cultural resources. The report also does not indicate if the inspected areas were surveyed using transects which may help to clarify the intensity of the field survey. The report also indicates that a portion parcel 021 is covered with fill material, but fails to indicate what percentage of the parcel consists of fill or how it was determined that the soils consist of fill. This information would also help indicate which areas were inspected during the field investigation.

Doane and Breschini also state that two cultural resources were noted in the research area (1 km) surrounding the project site, but did not identify what types of resources those might be. One resource was noted to be within 300 meters of the project site. This information may assist with determining the archaeological sensitivity of the area. For example, should those resources be prehistoric village sites, the archaeological sensitivity of the area would be greatly increased.

The Doane and Breschini study is approximately eight years old (completed in 2007). Areas are often resurveyed every 5 years as surface conditions change over time and may expose new resources. However, considering that the majority of the project consists of agricultural fields, an argument can be made that the field conditions would have had minimal changes over the eight-year period.

Recommended Changes

To bolster the argument of no impact to archaeological resources, Rincon recommends the following actions to further provide clarity and certainty in this finding:

- Indicate which areas of the project site were inventoried on a map and in the text, as well as which areas and percentage of the project site is covered by fill material.



- Add more details concerning the field methods (e.g., were those areas inspected for cultural resources surveyed using transects?). What was the transect spacing?
- Provide photos of the existing condition of the site.
- List the properties identified during the records search.
- Provide recommendations of archaeological sensitivity based on type and location of nearby resources.

Based on the information provided in *Preliminary Archaeological Reconnaissance for Assessor's Parcels 015-021-015, 015-032-020, and 015-021-021 in Carmel, Monterey County, California* (Doane and Breschini 2007), it is unclear if the field methods used for the investigation meet current professional standards. Additional details are needed to help support the conclusions in the report of no impact to archaeological resources.

Architectural History Peer Review

Ken Seavey's (2010) *Phase I Historic Review, 26500 Val Verde Road, Carmel, Monterey County, California* is a brief letter report that summarizes the results of a pedestrian survey and archival research, which concludes that the single family residence is not eligible for historic designation. Although a letter report format is suitable for projects with minimal potential to impacts historical resources, the methods and evidence used to support the findings should be strengthened to ensure the study is in conformance with CEQA and County of Monterey guidelines for cultural resources.

The site setting and characteristics should be clarified. The subject property appears to be a single-family residence, situated on an agricultural lot that was historically used for farming activities. However the letter lacks supporting information about the history of the property and its function to adequately characterize the property and setting. The letter describes an associated garage, but provides few additional details on the property as a whole. Further, the property does not appear to be within a subdivision; however the author describes the residence as a typical California Ranch-style home that was common amongst post-war tracts. If appropriate, the property should be evaluated for its significance as an agricultural-related resource, as well as any other potential historic themes identified through a developed historic context. It is unknown if there are any additional buildings or structures on the site; given the presumed agricultural function of the property it would be expected that additional ancillary structures are present. The property should be evaluated for consideration at the local level of significance in addition to its significance under the CRHR criteria.

The letter is now five years old, which in terms of cultural resources analysis makes the information out of date. The California Office of Historic Preservation (OHP) notes that surveys should be updated every 5 years to consider properties that may have achieved significance since the survey was originally conducted and to incorporate resources that were initially overlooked. For this project, the associated garage was omitted from evaluation because it had not reached the 50 year eligibility threshold. It is doubtful that the garage would be historically significant or change the evaluation findings for the residence in any way, but it is a technical oversight that could be identified as a flaw in the analysis. It is recommend that any evaluation update to the property include the garage as well as any other buildings and or structures on the property that are older than 50 years of age.



Recommended Changes

To bolster the argument of no impact to historical resources, Rincon recommends the following actions to further provide clarity and certainty in this finding:

- Include references for archival research so that the primary source data collected can easily be verified.
- Update the historic analysis to include an evaluation of the residence and garage as single property, within the appropriate historic contexts. Provide additional information about the historic and setting characteristics. Confirm the presence or absence of additional structures.
- Prepare Department of Parks and Recreation (DPR) forms in accordance with the *County of Monterey Guidelines for Historic Assessments* (County of Monterey 2008).

Conclusions

In summary, Rincon did not find any specific evidence that would reverse the conclusions outlined in the cultural resource studies prepared for this project; however the methodologies and evidence provided in the documents do not strongly support the findings. Both studies were conducted at a cursory “due diligence” level and did not employ the methodologies and level of analysis to substantiate a CEQA-level analysis. This lack of supporting evidence to validate the administrative record could be called into question during the environmental review process. Rincon strongly recommends conducting supplemental studies to update the existing findings and conclude the cultural resources analysis for the project.

Sincerely,
RINCON CONSULTANTS, INC.

Christopher Duran, M.A., RPA
Principal Investigator, Cultural Resources

Shannon Carmack, B.A.
Senior Architectural Historian



References

California Office of Historic Preservation

1990 *Archaeological Resource Management Reports (ARMR) Guidelines: Recommended Contents and Format*. Electronic document accessed September 22, 2015. Online at: <http://ohp.parks.ca.gov/pages/1054/files/armr.pdf>

1995 Instructions for Recording Historical Resources. Electronic document accessed September 22, 2015. Online at: <http://www.scic.org/docs/OHP/manual95.pdf>

County of Monterey

2008 *Guidelines for Historic Assessments*. On file, County of Monterey Planning Department. Electronic document accessed September 22, 2015. Online at http://www.co.monterey.ca.us/planning/cca/HRRB/Guidelines_For_Historic_Assessment_Updated_090908.pdf

National Park Service

1983 Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines. Electronic document accessed May 21, 2013. Online at http://www.nps.gov/history/local-law/Arch_Standards.htm.

Seavey, Ken

2010 *Phase I Historic Review, 26500 Val Verde Road, Carmel, Monterey County, California*. Letter on file with the County of Monterey, California.

Appendix E-6

Cultural Reports Peer Review Addendum





Rincon Consultants, Inc.

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July 22, 2016

Rincon Project No. 14-00187

Bob Schubert, Senior Planner
Monterey County Resources Management Agency
Planning Department
168 W. Alisal St., 2nd Floor
Salinas, California 93901

Subject: Peer Review Addendum regarding Archaeological Technical Report and Architectural History Evaluation for the Carmel Rio Road Subdivision Project, Unincorporated Monterey County, California

Dear Mr. Schubert:

On October 14, 2015, Rincon submitted a memorandum to you presenting the results of a peer review of two cultural resource documents prepared for the property located at 15 and 26500 Val Verde Drive, within the Carmel Valley Master Plan Area, in unincorporated Monterey County, California.

The peer review memorandum regarded the following two cultural resources reports:

- *Preliminary Archaeological Reconnaissance for Assessor's Parcels 015-021-015, 015-021-020 and 015-021-021 in Carmel, Monterey County, California.* Prepared by Mary Doane and Gary Breschini of Archaeological Consulting (Doane and Breschini 2007).
- *Phase I Historic Review, 26500 Val Verde Road, Carmel, Monterey County, California.* Prepared by Ken Seavey (Seavey 2010).

The peer review was conducted by Cultural Resources Principal Investigator Christopher Duran, M.A., RPA, who meets the Secretary of the Interior's *Professional Qualification Standards* (PQS) for historic and prehistoric archaeology (National Park Service 1983), and Senior Architectural Historian Shannon Carmack, B.A. who meets the PQS for architectural history and history.

Archaeological Report (Doane and Breschini 2007)

Rincon recommended the following clarifications to support the conclusions in the report of no impact to archaeological resources:

- Indicate which areas of the project site were inventoried on a map and in the text, as well as which areas and percentage of the project site is covered by fill material.
- Add more details concerning the field methods (e.g., were those areas inspected for cultural resources surveyed using transects?). What was the transect spacing?
- Provide photos of the existing condition of the site.
- List the properties identified during the records search.



- Provide recommendations of archaeological sensitivity based on type and location of nearby resources.

Rincon Cultural Resources Program Manager Kevin Hunt spoke with Gary Breschini of Archaeological Consulting on July 19, 2016. Dr. Breschini confirmed the following regarding the archaeological study:

- Archaeologist Mary Doane conducted the survey. She worked for Archaeological Consulting for 25 years with additional time at State Parks.
- For a parcel this size (small) they conduct tight zig-zig transects and thoroughly cover the entire site.
- They did survey the entire project site and if something [i.e., an archaeological resource] was there they would have found it.
- He believes the project site is not sensitive but included standard unanticipated discovery mitigation language because he has seen cases in the region where burials are found in places with no archaeological materials present on the surface.
- Archaeological Consulting is no longer under contract to the project applicant and will not prepare a revised report or memorandum that responds to the peer review.

Based on these responses Rincon concludes that the project site was adequately surveyed to current professional standards and that the report's findings of no impact to archaeological resources are correct and defensible. Rincon recommends no additional archaeological resources work for the project beyond the implementation of mitigation measures to be identified in the project environmental impact report (EIR).

Architectural History Report (Seavey 2010)

Rincon's peer review memorandum recommended the following actions to bolster the argument of no impact to historical resources:

- Include references for archival research so that the primary source data collected can easily be verified.
- Update the historic analysis to include an evaluation of the residence and garage as single property, within the appropriate historic contexts. Provide additional information about the historic and setting characteristics. Confirm the presence or absence of additional structures.
- Prepare Department of Parks and Recreation (DPR) forms in accordance with the *County of Monterey Guidelines for Historic Assessments* (County of Monterey 2008).

Kent L. Seavey prepared an addendum to the Phase I historic review dated June 24, 2016, that responded to Rincon's peer review memorandum. Seavey's 2016 addendum presented the requested additional information about the historic and setting characteristics as well as the requested references. Based on the content of Seavey's addendum, Rincon finds that the peer review comments were adequately addressed and that the findings of Seavey's 2010 report are correct and defensible. No additional architectural history work is recommended.



In summary, based on the responses to Rincon's cultural resources peer review memorandum, the results of the archaeological and architectural history reports are accepted.

Sincerely,
RINCON CONSULTANTS, INC.

Christopher Duran, M.A., RPA
Principal Investigator, Cultural Resources

Shannon Carmack, B.A.
Senior Architectural Historian



Appendix F

Geology and Soils Reports

Appendix F-1

Geologic Hazards Study



**GEOLOGICAL HAZARDS STUDY
VAL VERDE RESIDENTIAL DEVELOPMENT
VALVERDE DRIVE
CARMEL, CALIFORNIA**

January 2010

Prepared for
Mr. Brian Clark
430 Ortiz Avenue, #B
Sand City, California 93955

Prepared by

Earth Systems Pacific
400 Park Center Drive, Suite 1
Hollister, California

Copyright © 2010



January 4, 2010

File No.: SH-11122-GA

Mr. Brian Clark
430 Ortiz Avenue, #B
Sand City, CA 93955

PROJECT: VAL VERDE DRIVE RESIDENTIAL DEVELOPMENT
VAL VERDE DRIVE
CARMEL, MONTEREY COUNTY, CALIFORNIA

SUBJECT: **Geologic Hazards Study**

REFERENCE: Proposal for a Geologic Hazards Study, Val Verde Residential Development, Val Verde Drive, Carmel, California, by Earth Systems Pacific, dated October 1, 2009.

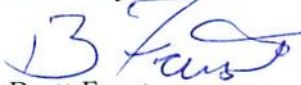
Dear Mr. Clark:

In accordance with your authorization of the above referenced proposal, we are submitting herewith the results of our Geological Hazards Study for the planned residential development on Val Verde Drive in Carmel, California. This report is based upon the results of our review of geologic maps, literature, consultant reports, aerial photographs and geologic mapping. In the report we describe the general geologic characteristics of the site, identify potential geologic hazards, and provide guidance for site development. Three copies of this report have been furnished for your use.

We appreciate the opportunity to have provided geologic services for this project and look forward to working with you again in the future. If there are any questions concerning this report, please do not hesitate to contact the undersigned.

Sincerely,

Earth Systems Pacific


Brett Faust
Engineering Geologist
EG 2386



Distribution: 3 to Addressee

Document No. 1001.509.GEO



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APPENDIX A

Vicinity Map
Site Geologic Map
Regional Geologic Map
Regional Fault Map



1.0 INTRODUCTION

Planned Development

This report presents the results of our geologic hazards study for the proposed Val Verde Drive residential development in Carmel, California. The site consists of three contiguous parcels which encompass a square-shaped area of approximately 8-acres on the west side of Val Verde Drive. The location of the site is shown on Figure 1, Vicinity Map (see Appendix A). Plans for the development were not available at the time of this report.

Purpose and Scope of Work

This study has been conducted to evaluate and define the geologic/seismic conditions and potential geologic/seismic hazards associated with proposed residential development of the site. The scope of our work is intended to satisfy the requirements of California Division of Mines and Geology (CDMG) Note 42: Guidelines to Geologic/Seismic Reports. The scope of work for this geologic hazards study included review of available geologic reports and maps, review of stereo aerial photo pairs covering the site and its immediate vicinity, and review of a Preliminary Geologic Report (Foxy, 1988) and Geotechnical Engineering Report and Liquefaction Study (Buena, 2007), evaluation of the data collected, and preparation of this report.

It is our intent that this report be used exclusively by the client to form the geologic/seismic basis of the design of the project as described herein, and in the preparation of plans and specifications. Application beyond this intent is strictly at the user's risk. If future property owners wish to use this report, such use will be allowed to the extent that the report is applicable, provided the future user is bound by the same contractual conditions as the original client or by conditions that may be applicable at the time of the report's use.

This report does not address issues in the domain of contractors such as, but not limited to, site safety, loss of volume due to stripping of the site, shrinkage of soils during compaction, excavatability, dewatering, shoring, temporary slope angles, construction methods, etc. Analyses of the site for soils engineering parameters, radioisotopes, asbestos (either naturally occurring or man-made), hydrocarbons, mold potential, or chemical properties are beyond the scope of this study. Ancillary features such as access roads, fences, light and flag poles, signage, and fill soils are all not within our scope and are also not addressed.



In the event that there are any changes in the nature, design, or location of improvements, or if any assumptions used in the preparation of this report prove to be incorrect, the conclusions and recommendations contained herein shall not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified in writing by the project geologist. The criteria presented in this report are considered preliminary until such time as any peer review or review by any jurisdiction has been completed, conditions have been observed by the geologist in the field during construction, and the recommendations have been verified as appropriate, or modified in writing by the project geologist.

Site Setting

The site is located on the Monterey, California, 7½-minute topographic quadrangle (U.S. Geological Survey, 1983) at approximate latitude 36.5401N and longitude 121.5401W. Regionally, the site is located on the floor of the Carmel Valley. A residence is present on the southeast site corner. Commercial properties are present on the west and rural residential and agricultural properties are present in the remaining adjacent areas. The site is essentially flat and lies at an elevation of approximately 30 feet.

2.0 FIELD METHODOLOGY

Site Reconnaissance

On November 11, 2009, a site reconnaissance and geologic mapping of the subject property were performed by an Earth Systems Pacific geologist. The purpose of our reconnaissance was to observe exposures of subsurface materials at or near the site and to identify existing or potential geological hazards. The location of the site is shown on a Vicinity Map in Appendix A.

The site is located in the Carmel Valley approximately 1.5 miles east of the mouth of the Carmel River and the Pacific Ocean. It is situated atop an older river terrace about 0.25 miles north of the active Carmel River channel. The site is drained by sheet-flow towards the southwest site corner. There are no significant slopes on or adjacent to the site. At the time of our reconnaissance the site was disked and there were various shrubs and trees along the north and south site boundaries. Val Verde Drive is present along the eastern site boundary and developed commercial properties are present on the west.



Aerial Photographs

We reviewed a pair of stereoscopic aerial photographs available in our files that were taken in 1950 showing the site and its vicinity. The site and surrounding areas are used to grow row-crops. The inboard edge of the river terrace crosses the southwest site corner and blends with native ground surface immediately to the west. We also reviewed historic imagery available through Google Earth. Imagery was available for the years 1998, 2002, 2003, 2004, 2005, 2007 and 2009. These images show the site in agricultural use with a residence on the southeast site corner. There was no significant change to the site between 1998 and 2009.

3.0 GEOLOGY

Geologic Setting

Regional Geology

The site is located within the geologically complex Coast Ranges Geomorphic Province of central coastal California. Discontinuous northwest-southeast trending mountain ranges, valleys and faults formed by tectonic, mountain-building processes characterize the province.

The predominant structural feature in the California Coast Ranges is the San Andreas fault, which is the structural boundary the Pacific and North American tectonic plates. The subject site lies west of the San Andreas fault with basement rocks of Salinian Block metamorphic and granitic rocks of Paleozoic and Cretaceous age. The Salina basement rocks have been detached and moved northward along the San Andreas Fault system to their present position (Hall, 1991). The basement rocks are overlain by younger late Cretaceous to Tertiary, and Quaternary age marine and terrestrial sedimentary rocks with volcanic rocks locally present. The regional site geology is shown on a Regional Geologic Map in Appendix A.

Local Geology

Based on Clark et al. (1997), the site is underlain by older flood-plain deposits (Qof) of Holocene age with younger flood-plain deposits (Qyf) of Holocene age on the southwest site corner. These deposits are described as unconsolidated, relatively fine-grained, heterogeneous deposits of sand and silt with common thin layers of clay. A Site Geologic Map is included in Appendix A.



Geologic Site Conditions

The site is located on a flood-plain terrace on the northern banks of the Carmel River. The terrace extends northward to the valley margin, and approximately 3,000 feet and 4,500 feet to the east and west, respectively. Buena (2007) described soil conditions at the site. For their study, nine borings were drilled on the site to maximum depths of 50 feet. Reported soil types encountered in the borings consisted of sands with some local gravel zones. It was concluded that the potential for liquefaction to occur at depths greater than 23 feet beneath the site is likely.

Groundwater

At the time of Buena's subsurface investigation, groundwater was encountered at a depth of about 23 feet. According to Foxx (1988), groundwater was encountered at depths between 13 feet and 25 feet in several exploratory borings drilled in the site vicinity in connection with their study. They noted that the groundwater table appeared to be inclined towards the Carmel River.

Faulting

The site is located within the seismically active central California Coast Ranges geomorphic province, but is not located in a State Earthquake Fault Zone (Hart and Bryant, 1997). The major active faults capable of producing large magnitude events and that have a high seismic activity rate recognized in the region are the San Andreas, Hayward and San Gregorio faults. Other active faults in the site region include the Zayante-Vergeles, Monterey Bay-Tularcitos, and Calaveras faults (see Regional Fault Map in Appendix A, for the location of these faults relative to the site). Based on Clark et al. (1997) there are no faults mapped on or adjacent to the site.

Landsliding

Based on Clark et al. (1997), there are no landslides mapped on or adjacent to the site. In the site vicinity, large landslide complexes are present about 2,000 feet south of the site on the valley wall. Based on their distance from the site, these landslides do not appear to be capable of impacting the site. Additionally, there was no evidence of landsliding on or adjacent to the site in the 1950 aerial photographs reviewed and we found no evidence of landslides on the site during our reconnaissance.



ANALYSIS AND CONCLUSIONS

Earthquake History

In assessing the seismic hazards for a given area, it is useful to examine records of historic local earthquakes. This information can be extrapolated to estimate the recurrence rate of local earthquakes. A number of strong earthquakes that have damaged man-made structures have occurred on the active faults in the central California region within the last 200 years. Especially notable are the 1836 6.4M (estimated magnitude, M) San Juan Bautista earthquake; the 1838 7.4M San Francisco to San Juan Bautista earthquake; the 1865 6.6M Santa Cruz Mountains earthquake; the 1868 7.0M Hayward earthquake; the 1906 8.3M San Francisco earthquake; the 1926 6.1M Monterey Bay doublet; the August 6, 1979 5.8M Coyote Lake earthquake; the April, 24 1984 6.2M Morgan Hill (Halls Valley) earthquake; and the October 18, 1989 7.1M Loma Prieta earthquake. According to the Working Group on California Earthquake Probabilities (2003), there is a 62 percent probability that a 6.7M or greater earthquake will occur between 2002 and 2031 in the region.

The Northern California Earthquake Data Center (NCEDC) catalog was used to search for earthquakes that have affected the site in historic times. In addition to those mentioned above, many minor to moderate earthquakes have affected the site region with most having magnitudes of less than about 5.0M. Within a 100 kilometer (63 mile) radius of the site, 33 earthquakes with reported magnitudes of 5.0 and greater for the years 1910 through the date of this report are listed. The largest magnitude earthquake within our search radius was the 7.1M Loma Prieta earthquake that occurred about 55 km (34 miles) to the north on October 18, 1989. The closest historic earthquake with a magnitude greater than about 5.0 was a 5.1M earthquake that occurred about 18 km (11 miles) to the south on January 23, 1984.

Primary Seismic Hazards

Surface Ground Rupture

Surface ground rupture generally occurs at sites that are traversed by or that lie very near a causative fault. The site is not located in a State Earthquake Fault Zone, and no faults considered to be active lie on or adjacent to the site. The closest State-mapped active faults to the site are the Monterey Bay-Tularcitos and San Gregorio (south) faults.

In the site vicinity, California Geological Survey (CGS) Fault Evaluation Report FER-167 (CGS,



1985) shows east-west trending parallel traces of the “Tularcitos” fault north and south of the subject site. It is noted that there is no evidence of recent faulting in late Holocene alluvium near the site. According to Probabilistic Seismic Hazard Assessment for the State of California (CGS, 1996), a concealed uncertain fault is mapped north of the site that has roughly the same trend as the fault shown in FER-167 (CGS, 1985). The approximate location of this fault is shown on Regional Geologic Map in Appendix A.

Based on our reconnaissance and aerial photograph review, we found no evidence for the presence of faulting on or adjacent to the site. The potential for surface ground rupture at the site is considered low.

Ground Shaking

The site is in a region of generally high seismicity and has the potential to experience strong ground shaking from earthquakes on regional and/or local causative faults.

The seismic design parameters for the site per Chapter 16 of the California Building Code (2007 Edition) are as follows. The values were determined utilizing the USGS Earthquake Hazards Program Earthquake Ground Motion Parameter Java Application and the NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures.

Site Class = D

Short Term Spectral Response Parameter, $S_s = 1.027g$

1 Second Spectral Response Parameter, $S_1 = 0.643g$

Site Coefficient, $F_a = 1.0$

Site Coefficient, $F_v = 1.5$

Additionally, a deterministic seismic hazard analysis (DSHA) was performed for the site. A deterministic approach evaluates each active fault within the region that may be reasonably expected to generate strong ground shaking at the site. The estimated mean peak ground accelerations presented in Table 1 below are based on the estimated upper bound earthquake at the near point of the fault. The DSHA was performed using the computer program EQFAULT (Blake, 2000) utilizing the attenuation relationship by Boore et al. (1997) for National Earthquake Hazard Reduction Program site class D to estimate the mean peak horizontal ground acceleration at the site. Earthquake magnitude (M_w) and slip rate parameters are based on 2002 updates to Probabilistic Seismic Hazard Assessment for the State of California (CGS, 1996; 2002). Based on the deterministic analysis, it



appears that the greatest site peak ground acceleration will result from an earthquake on the Monterey Bay – Tularcitos or San Gregorio (south) faults.

TABLE 1
ESTIMATES OF PEAK GROUND ACCELERATION
VAL VERDE DRIVE RESIDENTIAL DEVELOPMENT
CARMEL, CALIFORNIA

Fault	Nearest Point (mi/km)	Maximum Magnitude (M _w)	Est. Mean Peak Ground Acceleration (g)	Slip Rate (mm/yr)	Fault Type
Monterey Bay - Tularcitos	3.6/5.8	7.3	0.594	0.5	B
San Gregorio South	5.2/8.3	7.0	0.391	3.0	B
Rinconada	12.4/19.9	7.5	0.260	1.0	B
San Gregorio North	22.9/36.9	7.2	0.164	7.0	B
Zayante – Vergeles	24.9/40.1	7.0	0.119	0.1	B
Hosgri	28.8/46.4	7.5	0.138	2.5	B
San Andreas	29.3/47.1	7.0	0.112	17.0	A
Calaveras South	34.4/55.3	5.8	0.068	15.0	B

Secondary Earthquake Effects

Liquefaction

Soil liquefaction is the loss of soil strength during a significant seismic event. It occurs primarily in saturated, loose to medium-dense, fine to medium grained sands and sandy silts. Common types of liquefaction-related ground failure include differential settlement and lateral spreading. The site lies



within an area deemed to have a moderate susceptibility for liquefaction (Monterey County, 2001). According to Buena Geotechnical Services (2007), soils below a depth of 23 feet at the site are likely to liquefy in the event of a nearby large magnitude earthquake. Overexcavation and recompaction of soils in the building pad areas and construction of mat or post-tensioned foundations were recommended by Buena (2007) to mitigate liquefaction induced settlement.

Seismically Induced Settlement

Seismically-induced settlement of sufficient magnitude to cause structural damage is normally associated with poorly consolidated, predominantly sandy soils or variable consolidation characteristics within the building areas. Buena (2007) noted loose soil conditions and slightly clayey silty fine sands at the site. It is possible that these soils are susceptible to seismically induced settlement. However, Buena's (2007) recommendations include a substantial amount of grading and recompaction, and recommended foundation types which would appear to lower possible seismically induced settlement susceptibility to acceptable levels.

Static/Seismic Slope Stability

The site is essentially flat and there are no significant slopes on or adjacent to the site. According to Monterey County hazard maps (2001), the site lies within an area deemed to have a low susceptibility to earthquake induced landslides. Therefore, the potential for landslides to impact the subject site is considered to be very low.

5.0 SUMMARIZED GEOLOGIC CONCLUSIONS AND RECOMMENDATIONS

Based on our evaluation, the site will be subject to strong earthquake-induced ground shaking and there is the potential for liquefaction to occur at the site. To minimize liquefaction induced settlement, Buena Geotechnical Services (2007) recommended overexcavation and recompaction in the building areas and construction of either mat or post-tension slab foundations. Considering the recommended grading and foundation type, the potential for seismically induced settlement should be low. The potentials for surface fault rupture and landsliding to affect the site should be low to very low.



6.0 CLOSURE

This report is valid for conditions as they exist at this time for the type of project and associated risks described herein. Our intent was to perform this study in a manner consistent with the level of care and skill commonly exercised by members of the geologic profession currently practicing in the locality of this project under similar conditions. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the "Scope of Services" section. Application beyond the stated intent is strictly at the user's risk.

If changes with respect to project type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of this report are not correct, this firm must be notified for modifications to this report. The conclusions presented in this report are based upon the assumption that the site geologic conditions do not deviate substantially from those disclosed during our research and field reconnaissance. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that planned at the present time, Earth Systems Pacific should be notified so that supplemental recommendations can be prepared as applicable.

This document, the data, conclusions, and recommendations contained herein are the property of Earth Systems Pacific. Copies may be made only by Earth Systems Pacific, the client, and the client's authorized agents for use exclusively on the subject project. Any other use is subject to federal copyright laws and the written approval of Earth Systems Pacific.

Thank you for this opportunity to have been of service. If you have any questions, please feel free to contact this office at your convenience.

End of Text



REFERENCES

- Blake, T. F., EQFAULT (ver. 3.00b), 2000, A Computer Program for the Estimation of Peak Acceleration From 3-D Fault Sources," User's Manual, Newbury Park, California.
- Boore, D. M. and others, 1997, "Estimating Response Spectra and Peak Accelerations from Western North American Earthquakes: a Summary of Recent Work," Seismology Research Letters, 68-1, January-February.
- Buena Geotechnical Services, 2007, Geotechnical Engineering Report and Liquefaction Study for Proposed Residential Development, Val Verde Drive, Monterey County, California, unpublished consultant's report.
- California Geological Survey (CGS), Bryant, W.A., 1985, Fault Evaluation Report FER-167, Faults in the Southern Monterey Bay Area.
- California Geological Survey (CGS), Peterson, M.D. et al., 1996, updated 2002, Probabilistic Seismic Hazard Assessment for the State of California.
- Clark, J.C. and others, 1997, Geologic Map of the Monterey and Seaside 7.5-Minute Quadrangles, Monterey County California, U.S. Geological Survey Open File Report 97-30.
- Foxx, Nielsen and Associates, 1988, Preliminary Geologic Report, Proposed Carmel Green Subdivision, Carmel, California, unpublished consultant's report.
- Hart, E.W., and Bryant W.A., 1997, Fault Rupture Hazard Zones in California, California Division of Mines and Geology Special Publication 42, 24 p.
- Working Group on California Earthquake Probabilities, 2003, Probabilities of Large Earthquakes in the San Francisco Bay Region, California, U.S. Geological Survey Circular.
- Hall, C.A., Jr., 1991, Geology of the Point Sur-Lopez Point Region, Coast Ranges, California: A Part of the Southern California Allocthon, Geologic Society of America, Special Paper 226.
- Monterey County, 2001, Relative Liquefaction Susceptibility Map and Earthquake Induced Landslide Susceptibility Map, by Rosenberg, L.I.
- U.S. Geological Survey, 1983, 7½-minute topographic map of the Monterey Quadrangle, California: scale 1:24,000.



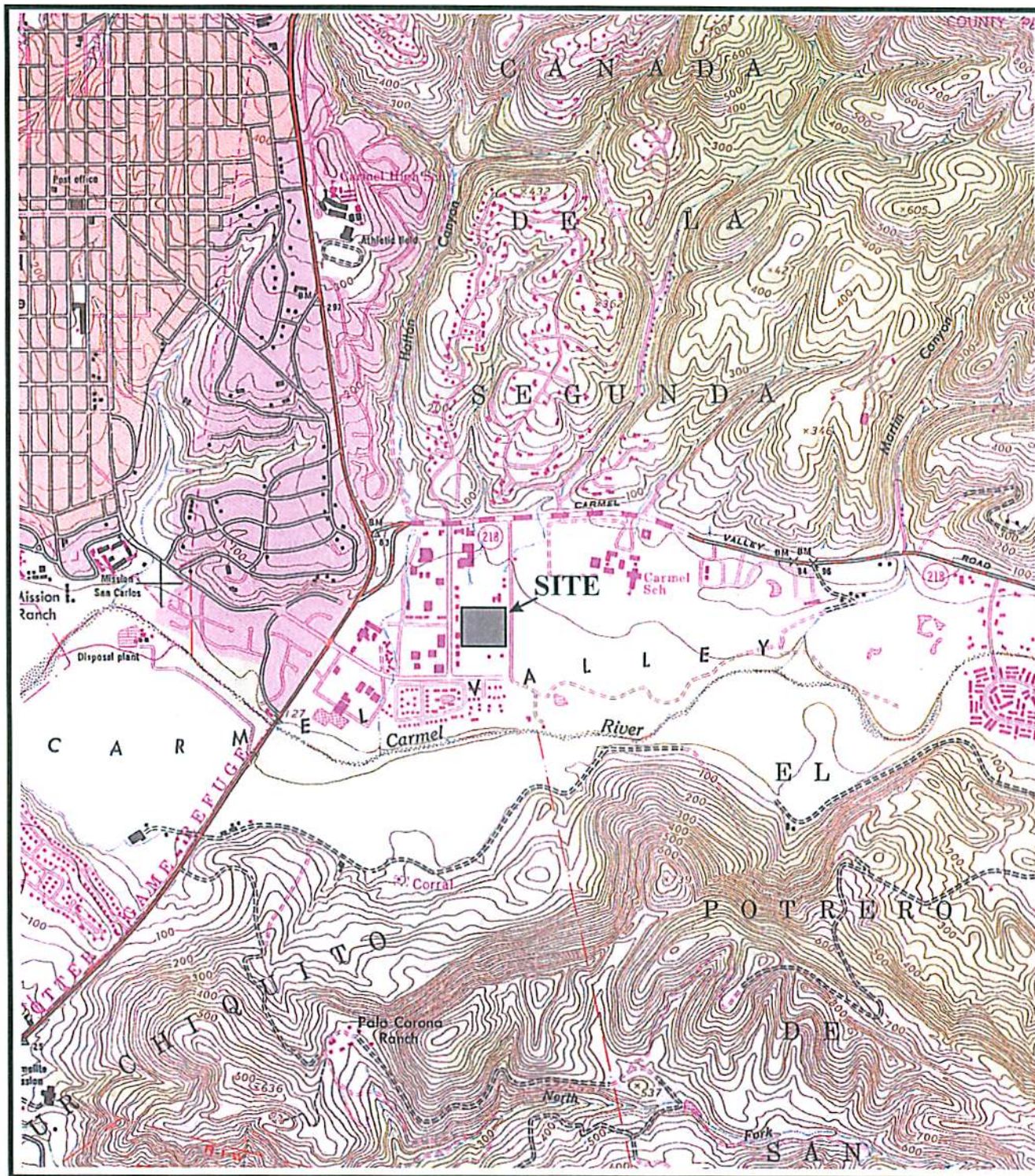
AERIAL PHOTOGRAPHS

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APPENDIX A

Figure 1-Vicinity Map
Figure 2-Site Geologic Map
Figure 4-Regional Geologic Map
Figure 5-Regional Fault Map

Vicinity Map



Base: USGS Monterey 7.5' Topographic Map, 1947, Photorevised 1983

NORTH

Scale 1"=2000'



Earth Systems Pacific

Appendix F-2

Geotechnical Engineering Report and Liquefaction Study



Geotechnical Engineering Report and Liquefaction Study

For

**Proposed Residential Development
Val Verde Drive
Monterey County, California**

June 15, 2007

B-075423

Prepared For

Brian Clark

By

Buena Geotechnical Services
3850 Ramada Drive, Suite A-2
Paso Robles, California



BUENA GEOTECHNICAL SERVICES, LLC

P.O. BOX 2857, ATASCADERO, CA 93423

June 15, 2007

B- 075423

Brian Clark
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Project: Val Verde Drive
Monterey County, California

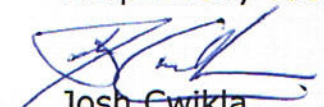
Subject: Geotechnical Engineering Report and Liquefaction Study

As authorized, we have performed a Geotechnical Study for the above referenced project. The accompanying Geotechnical Engineering Report and Liquefaction Study presents the results of our subsurface exploration, laboratory-testing program and conclusions and recommendations for geotechnical engineering aspects of project design. Our services were performed using the standard of care ordinarily exercised in this locality at the time this report was prepared.

Based on our study, it is our opinion that the site is suitable for the proposed development from a geotechnical engineering standpoint provided the recommendations of this report are successfully implemented.

We have appreciated this opportunity to be of service to you on this project. Please call if you have any questions, or if we can be of further service.

Respectfully submitted,


Josh Cwikla
Project Manager

Copies: 3-Clark
1-File



Nicholas A. McClure
Civil Engineer

INTRODUCTION

A. Project Description

This report presents results of a Geotechnical Engineering and Liquefaction Study performed for the proposed Residential Development to be located in Monterey County, California.

1. It should be noted that a grading plan was not provided for the purpose of this report. Prior to any construction, this firm should review the grading plan to verify or modify the recommendations offered herein. We anticipate that the site will be developed by building near existing grade.
2. The proposed structures are assumed to be one (1) or two (2) stories of wood framed or light gage steel stud construction.
3. Structural considerations for maximum wall loads of 1.5 kips per lineal foot were used as a basis for the recommendations of this report. If actual loads vary significantly from these assumed loads, Buena Geotechnical Services should be notified as re-evaluation of the recommendations contained herein may be required.

B. Purpose and Scope of Work

The purpose of the geotechnical investigation that led to this report was to evaluate the soil conditions of the site with respect to the proposed development. These conditions include surface and subsurface soil types, expansion potential, liquefaction potential, settlement potential, bearing capacity, and presence or absence of subsurface water. The scope of our work included:

1. Reconnaissance of the site.
2. Drilling, sampling and logging of nine (9) borings to investigate soils and groundwater conditions.
3. Laboratory testing of soil samples obtained from subsurface exploration to determine their physical and engineering properties.
4. Geotechnical analysis of the data obtained.
5. Consultation with owner representatives and design professionals.
6. Preparation of this report.

Contained in the report are:

1. Discussions on local soil and groundwater conditions.
2. Results of laboratory and field tests.
3. Conclusions and recommendations pertaining to site grading and structural design.

C. Site Setting

1. The site of the proposed development is located in Monterey County, California. See the Vicinity Map in Appendix A.
2. The site is relatively flat and appears to have been used as farmland in the past.
3. The south-east corner of the site contains an existing residence with some surrounding landscaping. The remainder of the site is vacant and unimproved.

SOIL CONDITIONS

- A. Evaluation of the subsurface indicates that soils are generally dark brown slightly clayey silty fine sands within the proposed grading and bearing depths.
- B. Soils encountered at approximate bearing depths are characterized by low in-place densities.
- C. Expansion determination indicates that the bearing soils lie in the "Very Low" range in accordance with the U.B.C.
- D. Groundwater was encountered at an approximate depth of twenty-three (23) feet.

SEISMIC AND LIQUEFACTION CONDITIONS

- A. Earthquake-induced vibrations can be the cause of several significant phenomena, including liquefaction in fine sands and silty sands. Liquefaction results in a complete loss of strength and can cause structures to settle or even overturn if it occurs in the bearing zone. If liquefaction occurs beneath sloping ground, a phenomenon known as lateral spreading can occur. Liquefaction is typically limited to the upper 50 feet of the subsurface soils and to soils that have a relative density of less than 70%.
- B. In order to determine the potential for liquefaction at the project site, the $(N_1)_{60cs}$ modified blow counts and the corresponding liquefaction FoS (Factor of Safety) were determined with the program Liquefy2. The project site boring data was compiled and analyzed in conjunction with the following Liquefy2 program parameters.

r_d Factor – NCEER (1997)	Magnitude Scaling Factor – Idriss (1997)
EQ Mag. (Mw) – 7.3	Peak Acc. (g) – 0.38 (Appendix A)
Boring Water Depth (ft) – 23	Total Boring Depth (ft) – 50
Boring Sample Increments (ft) – 5-10 ft	
D50, varied between layers (in) – 0.006 to 0.024	

- C. An online program made available by the California Geological Survey was used to determine the site specific peak ground acceleration. The acceleration value is based off the USGS/CGS Probabilistic Seismic Hazards Assessment (PSHA) Model, 2002 (revised April 2003) for earthquakes having a 10% probability of being exceeded in 50 years. The site geographical coordinates were provided as an input into the program, which provided an output table of peak ground acceleration values for various soil types.
- D. The soils profile type in UBC Table 16J should be S_e . The seismic zone factor (Z) in UBC Table 16I should be 0.40. The seismic source is the San Gregorio Fault – Sur Region (M7.3, Type B Fault) with a distance of less than 8 km and the Monterey Bay – Tularcitos (M7.1, Type B Fault) with a distance of less than 6 km.
- E. The fines content varied with depth between 15-44%. Surface soils were found to contain approximately 15% fines and soils greater than fifteen (15) feet in depth below grade were found to contain 44% fines.
- F. The Liquefy2 output file data plots (Figures 1 and 2), show the $(N_1)_{60cs}$ values varying with depth and the liquefaction Factor of Safety (FoS) above and below the water table. It should be noted that the liquefaction FoS below the water table ranges between 0.7 and 0.8, whereas minimum desirable FoS values are typically between 1.3 and 1.5.
- G. Based on our study, it is our opinion that if design earthquake conditions are experienced, the potential for liquefaction at depths below twenty-three (23) feet is likely, and that substantial grading, drainage, and special foundation designs should be implemented in order to minimize the effects that liquefaction could have on the proposed structures and development.
- H. Due to the relatively level conditions and absence of any abrupt elevation changes across the building site, the potential for lateral spreading should be low to minimal.

CONCLUSIONS AND RECOMMENDATIONS

The following geotechnical engineering report outlines grading and foundation recommendations that should be incorporated into the design and construction of the development in order to support the proposed structures and to help mitigate the effects of liquefaction at the proposed project site.

Deep foundation designs including the incorporation of vibroflotation, stone columns, or deep driven piles would be most effective in resisting the settlements induced by liquefaction, and recommendations for these systems can be provided upon request. However, due to the substantial costs involved with implementing the above mentioned design methods, specifications for the design and construction of mat or post-tensioned foundations in conjunction with grading recommendations have been provided in this report. Whereas deep foundations work to isolate the structure from liquefaction induced settlement, mat and post-tensioned foundations work to limit differential settlement to tolerable levels while potentially allowing for two to four (2-4) inches of total settlement. The use of either a post tensioned slab or mat foundation to support the proposed structures assumes that the developer or contractor is willing to accept the above mentioned settlements in a seismic event.

It should be noted that buried utilities such as gas and water pipes should be designed with localized automatic shutoff systems and flexible connections at transition locations to structures or service equipment.

A. Grading

1. General Grading

- a. Grading, at a minimum, should conform to Chapter 33 of the Uniform Building Code.
- b. The existing ground surface should be initially prepared for grading by removing all vegetation, trees, large roots, debris, non-complying fill and all other organic material. Voids created by removal of such material should not be backfilled unless the underlying soils have been observed by the Geotechnical Engineer.
- c. The bottom of all excavations should be observed by a representative of this firm prior to processing or placing fill.

- d. Fill and backfill placed at near optimum moisture in layers with loose thickness not greater than eight (8) inches should be compacted to a minimum of 90% of maximum dry density obtainable by the ASTM D 1557 Test Method.
 - e. Import soils used to raise site grade should be equal to or better than on-site soils in strength, expansion and compressibility characteristics. Import soils can be evaluated, but will not be pre-qualified by the Geotechnical Engineer. Final comments on the characteristics of the import soils will be offered after the material is at the project site.
 - f. Roof draining systems should be designed so that water flows into controlled drainage pathways that discharge to municipal storm drains.
 - g. In order to minimize near surface water retention, surface water should not be allowed to pond. All hardscaped and landscaped surfaces should be sloped away from structures and to approved drainage systems.
 - h. It is recommended that Buena Geotechnical Services be retained to provide intermittent geotechnical engineering services during site development, grading and foundation construction phases of the work to observe compliance with the design concepts, specifications and recommendations, and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.
 - i. Plans and specifications should be provided to Buena Geotechnical Services prior to grading. Plans should include the grading plans, foundation plans and foundation details. Structural loads should be shown on the foundation plans.
 - j. Should soils become unstable during grading due to excessive subsurface moisture, alternatives to correct instability may include aeration or the use of gravels and/or geotextiles as stabilizing measures. Recommendations for stabilization should be provided by this firm as needed during construction.
2. Site Grading/Development
- Grading Pads
- a. Overexcavation and recompaction of soils in the building area will be necessary to provide a localized dense mass of soil to support the proposed mat or post tensioned slab foundations, to decrease the potential for differential settlement and to provide more uniform bearing conditions. Soils should be overexcavated to a depth of four (4) feet

below the bottom of footings, five (5) feet below existing grade, or 75% of the deepest fill thickness, whichever is greater. The over-excavation should extend to a distance of five (5) feet beyond the building perimeter. The resulting surface should be scarified to a depth of one (1) foot, moisture conditioned and recompact to a minimum of 90% of maximum dry density and then lined with ProPex 2044 or better woven geotextile fabric. The geotextile fabric is to be pulled level and not allowed to bunch as it is covered with an initial twelve (12) inch layer of native material that is to be moisture conditioned and compacted to 90% of maximum dry density before replacing the remaining of the previously removed material in thin lifts. The replaced material is to be moisture conditioned and recompact to 90% of maximum dry density.

- b. Areas outside the building area to receive fill, exterior slabs-on-grade, sidewalks and paving should be overexcavated to a depth of one (1) foot. The exposed surface should be scarified, moisture conditioned and recompact.
- c. On-site soils may be used for fill once they are cleaned of all organic material, rock, debris and irreducible material larger than eight (8) inches.
- d. Although not encountered in our borings, should any trash, debris or subsurface structures be encountered during grading, removals will be necessary to adequate depths and horizontal limits as recommended by this firm at the time of grading.

3. Estimated Pavement Sections

- a. As considerable grading of the site is planned samples of soils should be taken at the completion of grading to design pavement sections. The following pavement sections are based on assumed R-Value of thirty (30) for the native soils. The sections were calculated by using the Caltrans Highway Design, including the structural section safety factor. The calculated base and asphalt concrete thicknesses are for compacted material.

R-Value	Traffic Index	A.C. In.	CL II Agg. Base In.
Native Soil	4	2.0	5.5
Native Soil	5	2.5	7.0
Native Soil	6	3.0	8.5

- b. The upper twelve (12) inches of subgrade and all aggregate base should be compacted to a minimum of 95% of maximum dry density.

- c. If the pavement is placed before the construction on the project is completed construction loads should be taken into account.

4. Slope Construction

- a. Although not expected for the scope of this project, all hillside grading and construction of fill slopes should conform to the minimum standards listed in Chapter 33 of the Uniform Building Code. It is recommended that the Geotechnical Engineer review the grading plans prior to grading and site development.
- b. Fill slopes should be keyed and benched into firm natural ground when the existing slope to receive fill is 10:1, horizontal to vertical, or steeper. The keys should be tilted into the slope, should be a minimum of one equipment width wide, and should extend a minimum of three (3) feet deep at the outside edge.
- c. Fill slopes should be overfilled, compacted and cut back to planned configurations. This will yield better compaction on the slope faces than other methods.
- d. Lined drainage swales and down drains should be provided at the tops of all cut and fill slopes to divert drainage away from the slope faces.

5. Utility Trenches

- e. Utility trench backfill should be governed by the provisions of this report relating to minimum compaction standards. In general, service lines inside of the property lines may be backfilled with native soils and compacted to a minimum of 90% of maximum dry density. Backfill of offsite service lines will be subject to the specifications of the jurisdictional agency or this report, whichever is more stringent.
- f. Geotechnical Engineer to monitor compliance with these recommendations.

B. Structural Design

1. Foundations

- a. Structures may be supported on a conventionally reinforced mat foundation coupled with an underlying grid network of footings, or on a post tensioned slab foundation underlain with a thickened perimeter footing.
- b. If a mat slab foundation design is used to support the structures, the structural engineer is to design the foundation and reinforcement to span or cantilever over a minimum horizontal distance of eight (8) feet. A modulus of subgrade reaction (K_v) of 60 pci and a maximum bearing capacity for dead and live loads of 1200 psf should be used

in the beam on elastic foundation design process. For planning purposes, mat foundations are expected to be a minimum of ten (10) inches thick with a minimum of two (2) #4 bar mats, with one (1) mat set at the top and one (1) mat set at the bottom of the slab structural section.

- c. Mat slabs should be underlain with a grid network of footings spaced no more than fifteen (15) feet o.c. each way. Underlying footings are expected to a minimum of fifteen (15) inches wide and eighteen (18) inches deep reinforced with a minimum of two (2) #5 bars set at the top and bottom in the footings. The mat slab is to be doweled into the footing by bending and extending the slab reinforcement into the footing. Dowels are to be spaced no greater than twelve (12) inches on center.
- d. If a post tensioned slab system is used to support the structure, slabs should be designed with thickened edges or perimeter footings extending a minimum of eighteen (18) inches below lowest adjacent grade.
- e. Slabs and footings should bear entirely into firm recompacted soils.
- f. Allowable bearing values are net (weight of footing and soils surcharge may be neglected) and are applicable for dead plus reasonable live loads.
- g. Bearing values may be increased by one-third when transient loads such as wind and/or seismicity are included.
- h. Lateral loads may be resisted by soils friction on floor slabs and foundations and by passive resistance of the soils acting on foundation stem walls. Lateral capacity is based on the assumption that any required backfill adjacent to foundations and grade beams is properly compacted.
- i. For structures to be constructed above slopes, the outside faces at the bottom of footings should provide a minimum horizontal distance of five (5) feet from the slope face.
- j. Soils supporting foundation slabs and footings should be lightly moistened prior to pouring concrete.
- k. Foundation excavations should be observed by a representative of Buena Geotechnical Services after excavation, but prior to placing reinforcing steel or forms.
- l. The soils profile type in UBC Table 16J should be S_e . The seismic zone factor (Z) in UBC Table 16I should be 0.40. The seismic source is the San Gregorio Fault – Sur Region (Type B Fault) with a distance of less than 8 km and the Monterey Bay – Tularcitos (Type B Fault) with a distance of less than 6 km.

2. Slabs-On-Grade

- a. Concrete slabs should be supported by compacted structural fill as recommended earlier in this report.
- b. It is recommended that perimeter slabs (walks, patios, etc.) be designed relatively independent of footing stems (i.e. free floating) so foundation adjustment will be less likely to cause cracking.
- c. Slabs should be underlain with a minimum of four (4) inches of clean and free draining sand. Areas where floor wetness would be undesirable should be underlain with a moisture barrier to reduce moisture transmission from the subgrade soils to the slab. The membrane should be placed at mid-height in the clean sand.

3. Frictional and Lateral Coefficients

The following foundation design load conditions assume that the foundation is founded into firm recompacted material as described in the Site Grading/Development section of this report.

- a. Resistance to lateral loading may be provided by friction acting on the base of foundations. A coefficient of friction of 0.35 may be applied to dead load forces. This value does not include a factor of safety.
- b. Passive resistance acting on the sides of foundation stems equal to 350 pcf of equivalent fluid weight may be included for resistance to lateral load. This value does not include a factor of safety. However, when passive resistance is used in conjunction with friction, the coefficient of friction should be reduced by one-third in determining the total lateral resistance.
- c. A one-third increase in the quoted passive value may be used when considering transient loads such as wind and seismicity.

4. Settlement Considerations

- a. If mat or post tensioned slab foundations are used to support the proposed structures, maximum expected differential settlements during a severe seismic event of approximately one (1) inch are anticipated for foundations and floor slabs designed as recommended. Total settlement may occur on the order of two to four (2-4) inches as described earlier in this report.
- b. Differential settlement between adjacent load bearing members should be less than one-half the total settlement.

5. Retaining Wall

The following retaining wall foundation design load conditions assume that the retaining wall foundation is founded into firm recompacted material as described in the Site Grading/Development section of this report.

- a. Conventional cantilever retaining walls bearing in soils prepared in accordance with Section A-2 of this report and backfilled with compacted on-site soils may be designed for the lateral pressures listed below:

Active Case	35 pcf
At Rest Case	65 pcf
Passive Case	350 pcf
Max. Toe Pressure	1200 psf
Coefficient of Sliding Friction	0.35

- b. The pressures listed above were based on the assumption that backfilled soils will be compacted to 90% of maximum dry density as determined by ASTM D 1557 Test Method.
- c. The lateral earth pressure to be resisted by the retaining walls or similar structures should include the loads from any structures or temporary loads that influence the wall design.
- d. A back drain or an equivalent system of backfill drainage should be incorporated into the retaining wall design. Backfill immediately behind the retaining structure should be a free-draining granular material. Alternatively, the back of the wall could be lined with a geodrain system.
- e. Compaction on the uphill side of the wall within a horizontal distance equal to one wall height should be performed by hand-operated or other lightweight compaction equipment. This is intended to reduce potential "locked-in" lateral pressures caused by compaction with heavy grading equipment.
- f. Water should not be allowed to pond near the top of the wall. To accomplish this, the final backfill site grade should be such that all water is diverted away from the retaining wall.

ADDITIONAL SERVICES

This report is based on the assumption that an adequate program of monitoring and testing will be performed by Buena Geotechnical Services during construction to check compliance with the recommendations given in this report. The recommended tests and observations include, but are not necessarily limited to the following:

1. Review of the building and grading plans during the design phase of the project.
2. Observation and testing during site preparation, grading, placing of engineered fill, and foundation construction.
3. Consultation as required during construction.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The analysis and recommendations submitted in this report are based in part upon the data obtained from the borings drilled on site. The nature and extent of variations between and beyond the borings may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

The scope of our services did not include environmental assessment or geological study. The scope of services did not include investigation for the presence or absence of wetlands, hazardous or toxic materials in the soil, surface water, groundwater or air. Any statements in this report or on the soil boring logs regarding odors, unusual or suspicious items or conditions observed are strictly for the information of the client.

Findings of this report are valid as of this date, however, changes in a condition of a property can occur with passage of time whether they be due to natural processes or works of man on this or adjacent properties. In addition, changes in applicable or appropriate standard may occur whether they result from legislation or broadening knowledge. Accordingly, findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of one (1) year.

In the event that any changes in the nature, design, or location of the structure and other improvements are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

This report is issued with the understanding that it is the responsibility of the owner or his representatives to insure the information and recommendations offered herein are called to the attention of the project architect and engineers. It is also the responsibility of the

owner or his representatives to insure the information and recommendations offered herein are incorporated into the project plans and specifications and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

Buena Geotechnical Services has prepared this report for the exclusive use of the client and authorized agents. This report has been prepared in accordance with generally accepted geotechnical engineering practices. No other warranties, either expressed or implied, are made as to the professional advice provided under the terms of this agreement.

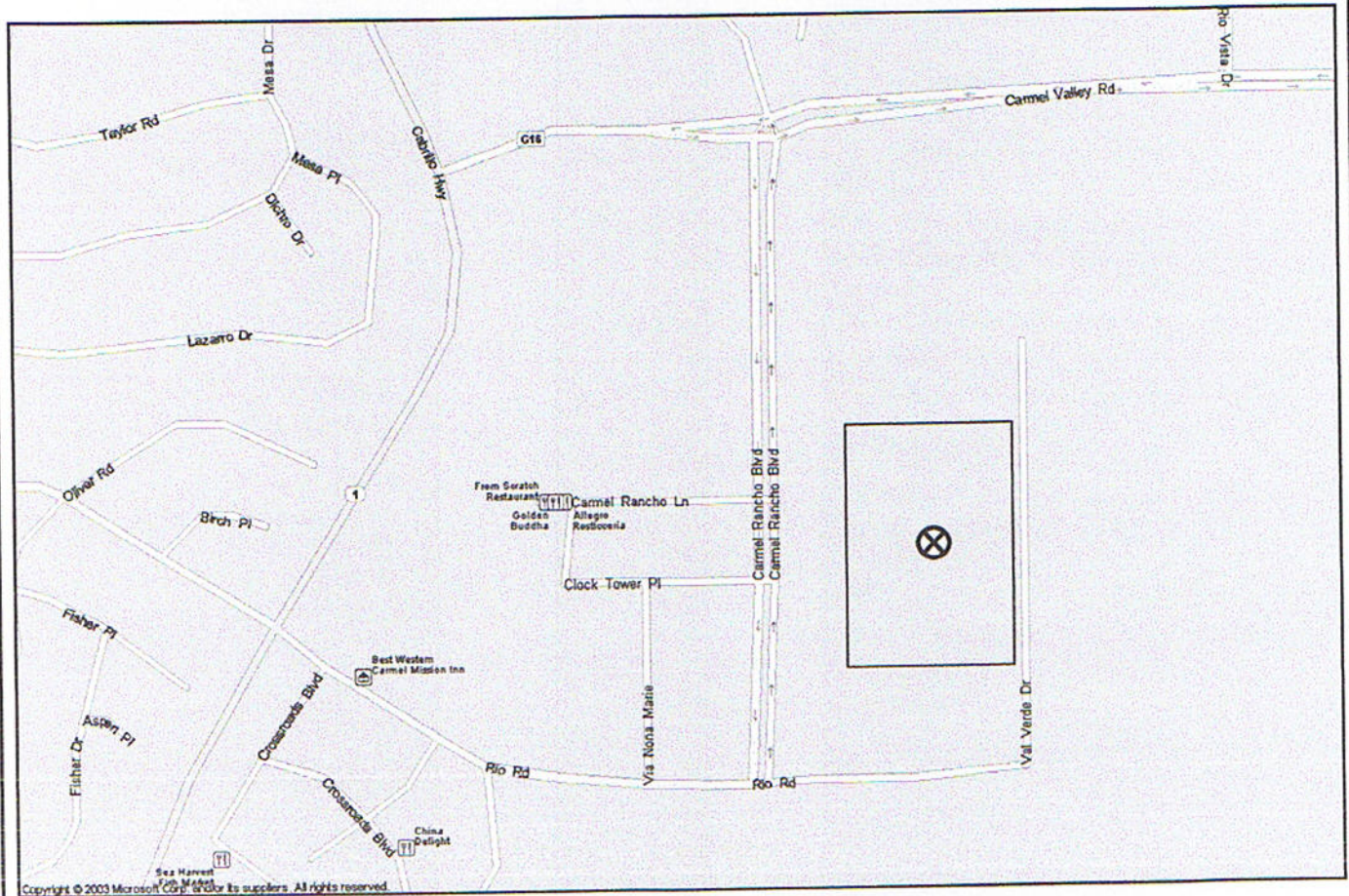
It is recommended that Buena Geotechnical Services be provided the opportunity for a general review of final design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications. If Buena Geotechnical Services is not accorded the privilege of making this recommended review, we can assume no responsibility for misinterpretation of our recommendations.

END OF TEXT
Appendices

APPENDIX A

Vicinity Map
Site Maps
Field Investigation
Boring Logs
Unified Soil Classification

Note: ⊗ = Approximate Project Location –
26500 Val Verde Drive, Monterey County, California

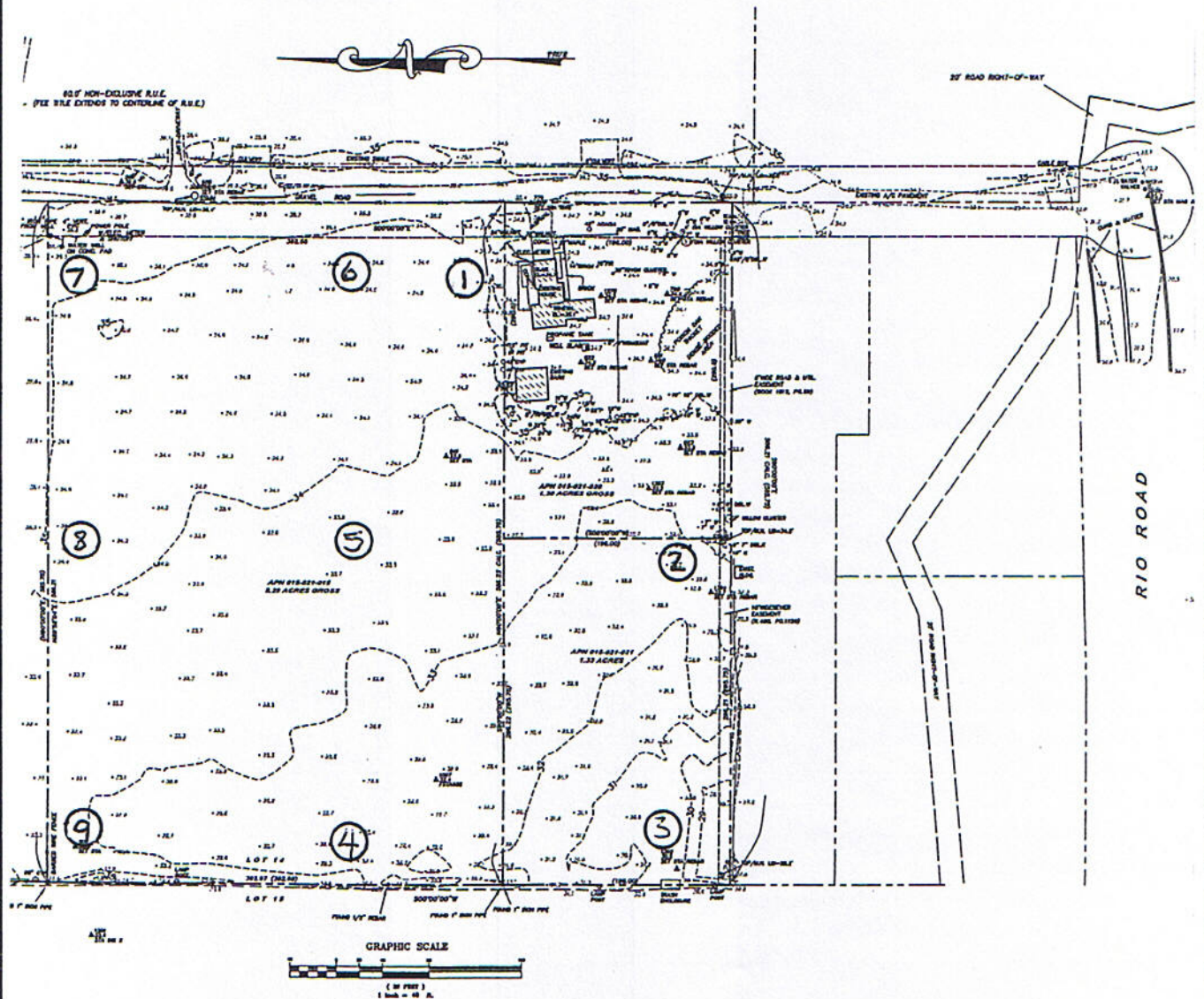


PROJECT No. B-075423

BUENA GEOTECHNICAL SERVICES

VICINITY MAP

Key: # = Approximate Soils Boring Location



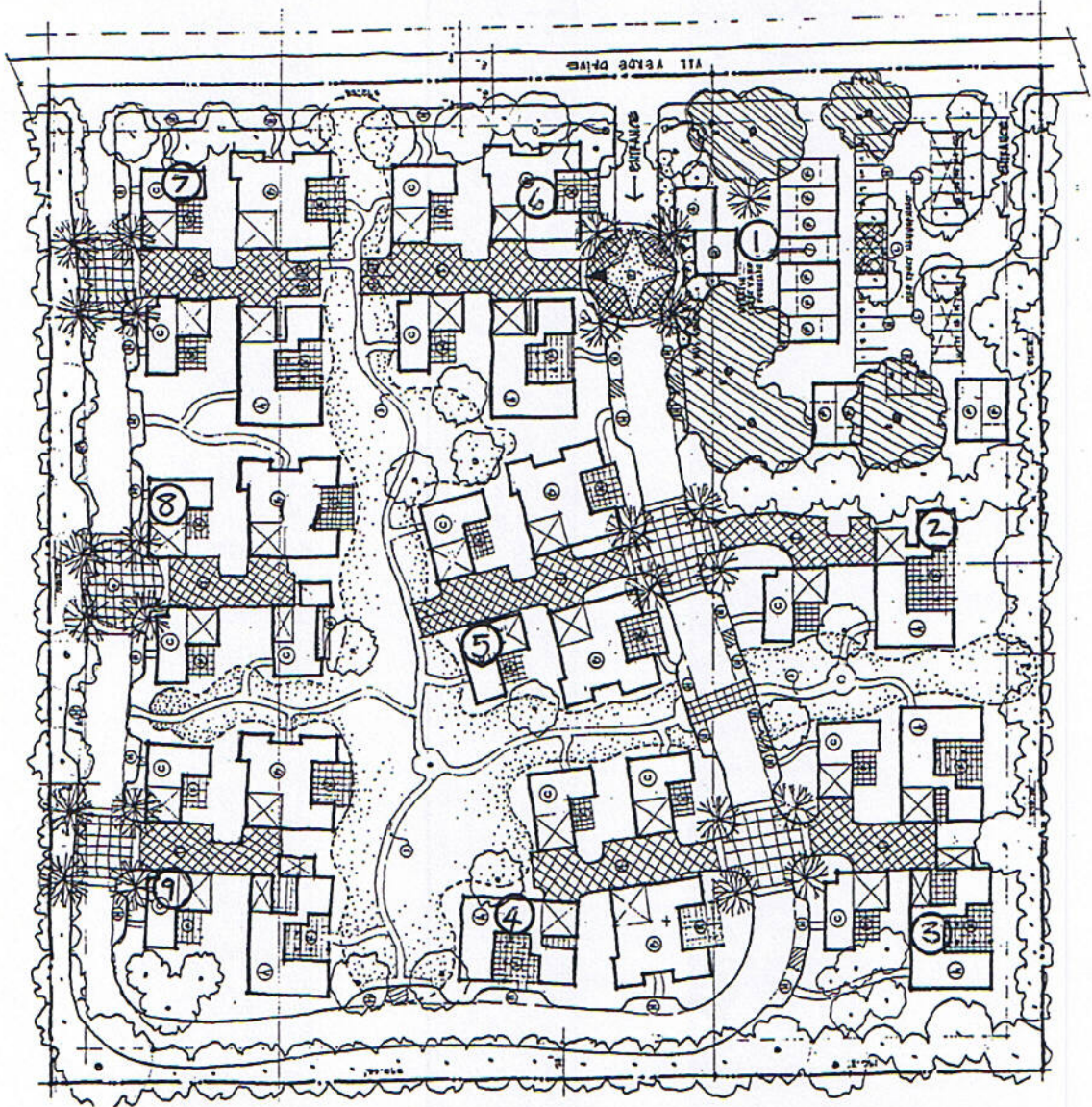
Note: Site Map is for reference only and is not to scale

PROJECT No. B-075423

BUENA GEOTECHNICAL SERVICES

SITE MAP - VACANT LOT

Key: (⊕) = Approximate Soils Boring Location



Note: Site Map is for reference only and is not to scale

PROJECT No. B-075423

BUENA GEOTECHNICAL SERVICES

SITE MAP -
PROPOSED DEVELOPMENT



Appendix G

Hydrology and Water Quality Studies

Appendix G-1

Review of Stormwater Management and Flood Control Issues



MEMO

To: Megan Jones (Rincon Consultants)
From: Edward D. Ballman, P.E.
Date: August 16, 2016

**Subject: Review of Stormwater Management and Flood Control Issues at
the Carmel Rio Road Project, County of Monterey**

Per your request, Balance Hydrologics has completed a technical review of issues associated with stormwater management and flood control at the proposed Carmel Rio Road project in the County of Monterey. The intent of the review is to identify issues that must be addressed in documentation to satisfy the California Environmental Quality Act, and to assess the degree to which information submitted by the project proponent addresses those issues.

Stormwater Management

Stormwater management strategies and infrastructure are typical aspects to be considered in any change of land use. The approach for dealing with stormwater runoff is most often predicated on (or required by) local and regional guidelines and regulations. For this site, the primary guidance comes from the County in the form of guidelines for control of peak flow rates and from regulations promulgated by the Central Coast Regional Water Quality Control Board (RWQCB). The latter are spelled out in detail in the Central Coast Post-Construction Stormwater Requirements (PCRs) adopted as Resolution Number R3-2013-0032.

The PCRs specifically require the Project to complete a Stormwater Control Plan, and we understand that one has not been submitted at this time. Therefore, the following comments are based on the review of site plans prepared by Bestor Engineers dated March 10, 2014 and a set of preliminary hydrologic calculations also prepared by Bestor Engineers and dated December 7, 2011.

Peak flow control. Sheet C-4 of the plan set indicates that the site will generally drain via gutter flow in a westerly direction and eventually enter a gravity-flow storm drain system that will connect to an existing 42-inch diameter trunk storm drain line that runs from north to south along the western boundary of the project. This trunk line is the main drainage conduit for County Drainage Area 28 (DA-28), a watershed of 184 acres that extends from north of Carmel Valley Road to eventually discharge directly into the Carmel River south of the Riverwood Townhomes. Storm drain modeling presented in the County Services Area 50 Final Lower Carmel River Stormwater Management and Flood Control Report (County of Monterey, October 2014, “CSA-50 Report”) identified this trunk line as a potentially large source of drainage overflow that could lead to localized flooding along Rio Road and as far north as the retail businesses located just

south of Carmel Valley Road. The primary causes of the predicted overflow are insufficient trunk line capacity, high tailwater conditions in the main river, and lack of back flow prevention at the outfall.

The fact that the DA-28 trunk storm drain line has been identified as inadequate in its existing condition implies additional stormwater runoff likely cannot be added to the system without impacts. Therefore, it is reasonable to assume that the project will pursue measures to control peak runoff flow rates from the site. The current County of Monterey design guideline in this regard calls for the post-project 100-year peak discharge to be reduced to, or below, the pre-project 10-year value. Application of this standard at the Project would likely be sufficient to avoid impacts with respect to increases in peak flow.

The Bestor calculations from 2011 include a preliminary estimate of the required detention storage needs to meet the County criteria. The storage volume identified in the calculations is approximately 18,000 cubic feet, though the actual value may be considerably larger.¹ The site plans imply that the required storage volume will be provided in the form of a large underground perforated pipe along the western edge of the property. The pipe is called out as 6.5 feet in diameter with a total length of 401 feet. Such a pipe would have a total storage volume (without any allotment for freeboard) of roughly 13,300 cubic feet. No explanation is provided for the discrepancy between the calculated volume and that indicated on the plans.

Conceptually, underground detention storage can be made to work if properly designed and sized. However, additional details will need to be resolved including how the storage and flow routing will work with potentially high hydraulic gradients in the existing trunk storm drain.

Stormwater quality. The Project location is such that it qualifies as a Special Circumstances case under Performance Requirement 5 of the PCRs. This is due to the fact that runoff from the project would be routed in an underground storm drain system to a discharge point in the Carmel River where the watershed area is greater than the threshold value of 200 square miles. Qualification under Performance Requirement 5 essentially exempts the Project from Requirement 4 (Peak Management) that would otherwise apply given the Watershed Management Zone 1 designation for the site. However, the site does overlie a designated groundwater basin and such sites with a WMZ 1 designation are not exempt from Performance Requirement 3 (Runoff Retention). Therefore, the Project needs to comply with the Performance Requirement 1 Site Design and Runoff Reduction, Requirement 2 Water Quality Treatment, and Requirement 3.

Performance Requirement 1 should be generally straightforward at the site. However, this does not appear to be the case for the latter two Requirements.

¹ The calculations will need to be revised as site plans evolve, but we note that a number of non-conservative factors appear to have been used. These include: a runoff coefficient of 0.8 for impervious surfaces during a 100-year event, site impervious cover of roughly 56 percent (markedly at odds with the values cited in the landscaping plans), and identical times of concentration for pre- and post-project conditions (when development will almost certainly speed runoff from the site). Preliminary review by Balance engineers indicate that a more conservative value would be on the order of 25,000 cubic feet.

The site plans do not appear to include treatment controls capable of meeting the Low Impact Development (LID) standards enumerated in Performance Requirement 2. The site is underlain by relatively high permeability Pico sandy loam soils, and infiltration of stormwater could potentially be used as a component of the management approach, notably in a manner that would help to preserve groundwater recharge capacity at the site. However, the percolation capacity of the perforated pipe shown on the site plans appears to be considerably less than that required to meet the treatment requirements stipulated by the PCRs solely through infiltration of runoff.

Additionally, Performance Requirement 3 will require that the site retain (rather than detain) the entire volume of runoff associated with storms up to the 95th-percentile 24-hour storm event. Per reference materials supplied by the RWQCB, this storm event represents 1.3 inches of rainfall in a 24-hour period. Calculations demonstrating compliance with this criterion have apparently not been completed, but comparison with similar projects indicates that a substantial area will need to be utilized. One viable approach would be through use of a stormwater infiltration basin with a floor area sufficiently large to percolate the required runoff volume given the infiltration characteristics of the underlying soils. The floor area of such a basin could be reduced if ponding depth is allowed, but will likely be on the order of 6,000 square feet or more. Appropriately designed, such a basin could also be used to limit peak flow rates to the off-site DA-28 storm drain system.

Flood Control

Per the CSA-50 Report, the site is exposed to flood risks from two distinct flooding sources: overbank flows from the Carmel River and overland flows from the current downstream end of the relatively large north bank tributary known as County Drainage Area 27 (DA-27).

Riverine flooding. A small portion of the Project at the southwest corner of the property is located within a Special Flood Hazard Area (100-year floodplain) mapped by the Federal Emergency Management Agency (FEMA) and analyzed in the CSA-50 Report. The primary source of this flood hazard is overbank flows from the main stem of the Carmel River due to channel overtopping east of Val Verde Drive and, to a lesser extent along the Riverwood Townhomes.² The site plans appropriately identify and map the boundaries of the floodplain, though it is important to note that the plans use a different vertical datum for elevations than that used on the currently-effective Flood Insurance Rate Map.

The site plans show that the lower existing ground elevation portions of the property will be raised through use of retaining walls and fill so that they are above the elevation of the 100-year flood. This is an appropriate measure for protecting the Project site from the riverine flood risk. However, the placement of fill will remove some floodplain storage and could potentially alter overbank flow paths as well. The Project documentation available for review did not address the latter issues, though the impact on residual flood elevations is likely to be very small.

The CSA-50 report identified a number of potential measures that could be implemented with the objective of eliminating the riverine flood risk in the north overbank area (including the Project

² The CSA-50 Report also shows that backwater flooding through the DA-28 trunk storm drain line can also contribute to localized flooding in the same low elevation areas at the site.

site). Such measures would have the benefit of removing the flood hazard at the site without the potential for adverse flooding impacts to other occupied structures. One such measure would be raising the elevation of Val Verde Drive so that it can function as a levee protecting areas to the west from the 100-year flood. An alternative configuration could use a tie-back levee from Rio Road to Rancho Cañada. However, it must be acknowledged that the required work would extend well beyond the Project site and would require addressing tributary drainage issues described below.

Flooding from DA-27. Modeling of overland flow break-outs from DA-27 was a component of the work for the CSA-50 Report. DA-27 is a moderately large local tributary to the Carmel River, with a total drainage area of 567 acres (0.88 square miles) extending to the ridgelines of Jack's Peak to the north. Flow paths within this drainage area are well defined in the steep canyon setting north of Carmel Valley Road, but essentially disappear on the south side of the road where a small ditch carries flow for a short distance before ending at a point approximately 700 feet north and west of the northeast corner of the Project. The overland flow modeling presented in the CSA-50 Report shows that the intervening topography is such that much of the runoff originating in DA-27 would flow south and west to cross Val Verde Drive at the Project site and into CSA-50. The modeling shows that as much as 46 acre-feet could enter CSA-50 from DA-27 and much of this would be overland flow through the site.

The site plans do not appear to include any accommodation of this potentially large overland flow. In fact, the street layout in the March 10, 2014 plans are configured such that there is a risk they would collect overland flow and route it into the Project with no clear indication of a means to avoid localized flooding on-site and/or an overland release compatible with adjacent properties. The on-site problem could be eliminated by raising the elevation of Val Verde Drive sufficiently to protect the Project from the DA-27 overland flows, but doing so would block the natural flow release across the property and would require some means of redirecting the flows in a manner that does not impair or endanger adjacent properties to the east. Absent measures to redirect runoff from DA-27, the Project site plan will need to be modified to explicitly address the means to safely collect and convey flow through the site and then disperse them at the downslope project boundary in a way that does not adversely impact adjacent parcels.

Appendix G-2

Groundwater Supply Technical Report



August 3, 2016

MEMORANDUM

To: Megan Jones, Senior Program Manager, Rincon Consultants, Inc.

From: Gus Yates, Senior Hydrologist

Re: Carmel Rio Road EIR—Groundwater Supply Technical Report

INTRODUCTION

The Carmel Rio Road development project would convert three parcels with a combined area of 8.12 acres in the lower Carmel Valley from a primarily agricultural land use to a residential subdivision with 24 single-family market-rate homes and 7 inclusionary housing units. The site is located between Carmel Valley Road and the Carmel River, 0.5 mile upstream of State Highway 1 (**Figure 1**). Two-thirds of the total site area was actively used to farm truck crops until the property changed hands and development was first contemplated in 2005. A single rural residence and natural vegetation occupied the remaining area. Prior to 2005, almost all of the irrigation supply was obtained from the Old Travers well located near the northeast corner of the site, and domestic supply was obtained from the Old Gamboa well in the southeastern part of the site. Both wells have since been replaced, and the replacement wells are located near one another in the southeastern part of the site (Figure 1). The Carmel Rio project proposes to use the Gamboa Replacement well as the primary source of supply, and the New Travers well would serve as a backup supply.

This report addresses several issues relevant to compliance with the California Environmental Quality Act and Monterey Peninsula Water Management District's (MPWMD) permit requirements for water distribution systems that rely on groundwater. These include evaluation of:

- average annual water use before and after construction of the project ("baseline" and "project" conditions),
- changes in water-table drawdown at nearby wells during the maximum-demand day and single pumping cycles,
- the adequacy of pumping rates at the primary and backup wells to meet peak day demand,
- groundwater quality with respect to drinking water standards,
- changes in on-site groundwater recharge, and
- potential induced percolation from the Carmel River due to changes in the annual groundwater balance.

This memorandum does not address several other hydrologic and water-system issues that need evaluation to complete the permitting and environmental review process, including water rights, fire flow adequacy, water system management, and site drainage.

ANNUAL WATER USE

Most of the Carmel Rio project's potential impacts related to groundwater depend on the amount of groundwater pumped. If the project would use less water than was used on the site under historical baseline conditions, it would not adversely impact groundwater conditions. Conversely, any increase in water pumping above pre-project levels would constitute an adverse and significant environmental impact, mandating mitigation. This general premise was described as "undisputed" by Monterey County Superior Court judge Bamattre-Manoukian in the 2001 decision regarding the September Ranch Project, which also proposed to build houses on undeveloped land in the Carmel Valley (87 Cal.App.4th 99 , 104 Cal.Rptr.2d 326). The comparison of baseline and project water use is commonly done on the basis of average annual water use, and those calculations are presented in this section. Subsequent sections address potential impacts for which additional factors play a role.

Baseline Water Use

Unlike the September Ranch case, historical land and water use on the Carmel Rio project site are both well documented. Aerial photographs during the late 1990s and early 2000s show that the site was used to grow truck crops (Google Earth images for 1998, 2002 and 2004). Plans for development commenced in 2005, and the fields were fallow during 2005-2009. Agricultural activities resumed in 2010 and gradually increased to the pre-2005 level of intensity by 2013.

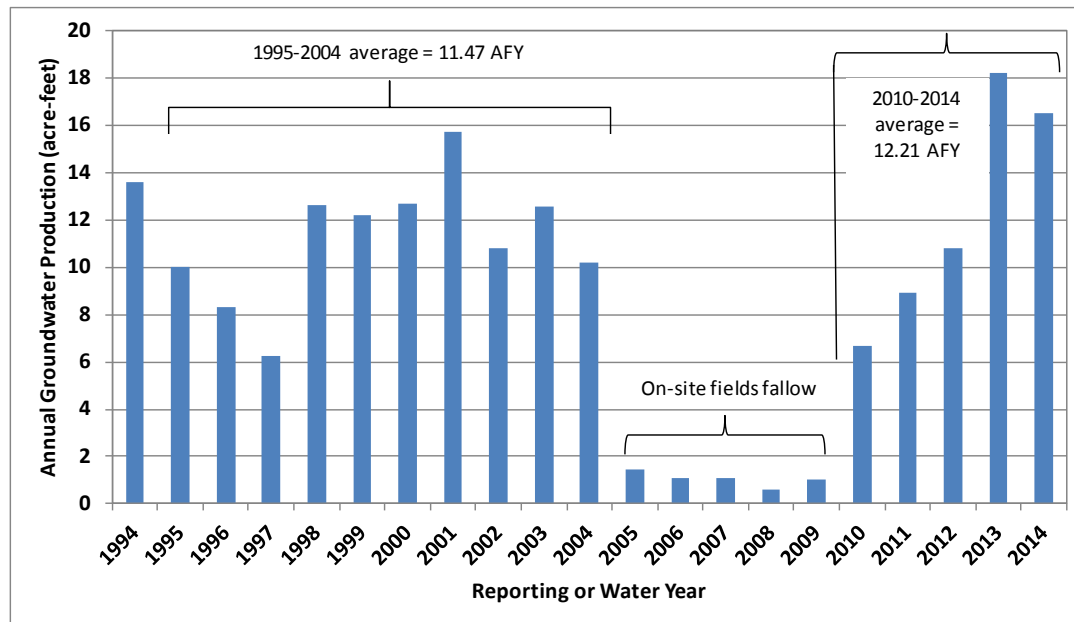
Production from wells at the site is metered and annual volumes have been recorded by MPWMD since 1994. Annual production during 1994-2014 is shown in **Figure 2**. Given the variability of water use during that period, it is important to select a baseline period that represents the most recent historical period prior to the beginning of the development process. The September Ranch decision expressed this criterion as follows:

"An EIR must include a description of the environment in the vicinity of the project, as it exists before the commencement of the project, from both a local and regional perspective."

The Decision suggested that the date of the notice of preparation of the EIR or the time when environmental analysis commenced would be appropriate to use as the date representing existing conditions. The notice of preparation for the Carmel Rio project EIR issued on July 17, 2015, a decade after on-site land and water use changed markedly relative to the prior historical period of continuous farming. Therefore, the notice of preparation date is not suitable for evaluating baseline water use in this case.

The September Ranch decision allowed that "the date for establishing baseline cannot be a rigid one." It discussed the concern that the project applicant might have intentionally increased water use during the environmental review period—which stretched out over several years—in an attempt to establish a high baseline. In the Carmel Rio case the opposite occurred. The applicant ceased agricultural activities entirely once the development process was initiated in 2005. The applicant resumed agricultural activities in 2010 and water use returned to a level that equaled and in one year slightly exceeded amounts used prior to 2005. Thus, the 2005-2009 period is clearly not representative of water use on the site immediately before the development process commenced.

Figure 2. Metered Annual Groundwater Use at the Carmel Rio Site, 1994-2014



Note: Reporting year is July-June (1993-2001 data); water year is October-September (2002-2014 data)

The baseline period that best represents water use before the development process commenced is 1995-2004. The period includes wet, dry and normal years and is long enough that the average is not unduly influence by any unusual years. Metered water use during that period averaged 11.47 AFY.

MPWMD has suggested that the 2010-2014 period might also be appropriate for calculating baseline water use (Hampson, 2015). Average water use during that period (12.21 AFY) was slightly greater than during 1995-2004. However, the difference does not affect impact conclusions because project water use would be less than water use during either of the two possible baseline periods. Including 2005-2009 in the baseline period results in a much lower average water use but is not truly representative of conditions prior to the development effort. For example, average water use during the most recent 10 year of data (2005-2014) was 6.63 AFY, and average use during the entire period of record was 9.11 AFY. The remainder of this memorandum focuses on the 1995-2004 baseline period, which is considered more representative of pre-project conditions. However, comparisons with alternative baseline periods are included for informational purposes.

Water Use after Development

Average annual water use following development has been estimated by the project applicant using indoor water use factors provided by MPWMD and outdoor water use estimated using the procedures of the State Model Water-Efficient Landscape Ordinance¹ (Kane, 2014). Indoor water use is for 24 market-rate single-family homes plus seven inclusionary homes. Those values are summarized in **Table 1**.

¹ Information on the State Model Water Efficient Landscape Ordinance is available on the California Department of Water Resources website: <http://www.water.ca.gov/wateruseefficiency/landscapeordinance/>

Table 1. Estimated Average Annual Water Use after Project Completion

Water Use Item	Number of Residences	Number of Bathrooms	Water Demand Factor (AFY) ¹	Annual Water Use (AFY)
Indoor Use				
Single family	24	2.5	0.201	4.82
Inclusionary type 1	3	2	0.101	0.30
Inclusionary type 2	4	1.5	0.081	0.32
Total				5.45
Landscape Irrigation -- entire site ²				1.09
Water treatment and system losses -- entire site ³				0.76
Total water use				7.30

AFY = acre-feet per year

¹ Based on water demand factors per plumbing fixture. Factors are those used by MPWMD as of 2007 except that the factor for single-family residential toilets is scaled down from 1.6 to 1.28 gallons per flush. Single-family residences will have 2 bathtubs, 1 shower, 3 wash basins, 3 toilets, 1 kitchen sink, 1 laundry sink and 1 bar sink. Three inclusionary residences will have 2 bathtubs, 1 shower, 2 washbasins, 2 toilets and 1 kitchen sink. Four inclusionary residences will have 1 bathtub with shower, 2 washbasins, 2 toilets and 1 kitchen sink.

² Applicant's estimate, assuming 53,980 square feet of irrigated area, annual ET_0 of 49.7 inches, a plant factor of 0.2, effective precipitation equal to 10 percent of ET_0 , and an irrigation efficiency of 85 percent (Kane, 2014).

³ Average of estimates by Monterey County Health Department and MPWMD in 2009 decreased to reflect the smaller number of dwelling units and irrigated landscape area in the current project description (see text).

Indoor residential water use would average 5.45 AFY. The consumption per dwelling unit is based on the number and types of fixtures, as presented by the applicant.

The landscape irrigation water use estimate is based on a detailed site plan with a total irrigated area of 53,980 square feet, or 15 percent of the total site area (Kane, 2014). The site plan estimated annual irrigation demand using reference evapotranspiration (ET_0) equal to 49.7 in/yr, effective precipitation equal to 10 percent of annual ET_0 , a plant factor (crop coefficient) equal to 0.2 year-round, and an irrigation efficiency of 85 percent. The resulting estimate of annual water use was 1.09 AFY. However, several factors in the analysis warrant reconsideration, and reasonable alternative assumptions and data values could substantially alter the estimated irrigation demand for the project. These are as follows:

1. **Type of vegetation.** The water use estimate assumed that all of the irrigated vegetation would consist of drought-tolerant groundcovers, shrubs and trees that are in the “very low” category of water use according to the Water Use Classification of Landscape Species (Costello and Jones, 1999). This category is assigned a “plant factor” of 0.2, and irrigation demand is directly

proportional to the plant factor. It may be optimistic to assume that homeowners would not want a certain amount of landscaping that is more verdant.

2. **Irrigation method and efficiency.** Plants in the “very low” water use category are drought-tolerant shrubs, which are almost always irrigated by drip hoses. The efficiency of drip irrigation is much higher than for sprinkler irrigation. An efficiency of 95 percent would be a reasonable assumption.
3. **Effective precipitation.** Because of their relatively large root depth and low plant factor, drought-tolerant shrubs meet much of their annual evapotranspiration demand from rainfall stored in the root zone. The “10 percent of ET_0 ” rule of thumb might be appropriate for plants with higher irrigation requirements but underestimates the use of rainfall by drought-tolerant vegetation.
4. **Irrigated area.** The water use estimate was based on a detailed but concept-level site map that assumed irrigation would occur only along strips of ground along the side and rear lot boundaries. No irrigation was assumed between the house and the street. This pattern would be very unconventional and not likely appealing to prospective home buyers. Furthermore, the assumed total irrigated area was only 1.24 acres, or 15 percent of the total project site. Allowing for the area occupied by streets, houses and other impervious surfaces, non-irrigated vegetation would occupy 3.46 acres, or three times the amount of irrigated landscaping. This contrasts sharply with landscaping in the Mission Fields development across Highway 1, where lot sizes are similar to those proposed for Carmel Rio, lawns are ubiquitous, and nearly all landscaping appears to be irrigated in aerial photographs.
5. **Reference evapotranspiration.** Irrigation requirements are driven by several climatic variables, which are typically consolidated into a single factor called reference evapotranspiration (ET_0). Estimated irrigation water use is directly proportional to ET_0 . The water use estimate by Kane (2014) assumed an annual ET_0 value of 49.7 inches, which corresponds to Zone 6 in a statewide map of climate zones published by the California Irrigation Management Information System (CIMIS) (Jones, 1999). However, the Carmel Rio site is actually in Zone 1, which occupies a strip along the coast. The influence of cool marine air—particularly in summer—greatly reduces ET_0 . The annual value for Zone 1 is only 33.0 inches. Fortunately, a California Department of Water Resources CIMIS climate station has been in operation in the lower Carmel Valley since 2008, and data for that site confirm the steep coastal gradient in ET_0 . Average ET_0 at the station is 40.0 in/yr, and the station is twice as far inland as the Carmel Rio site. Thus, ET_0 at Carmel Rio is probably in the neighborhood of 37 in/yr.

Alternative estimates of irrigation demand that incorporate different assumptions regarding average plant factor, effective precipitation, ET_0 and irrigation efficiency were developed using a soil moisture balance model. The model concurrently simulates groundwater recharge (from rainfall and irrigation deep percolation) and was applied to a range of vegetation types. The modeling is described below under “Groundwater Balance and Carmel River Percolation” and was used to obtain pumping and recharge estimates for the calculation of net consumptive water use.

Water treatment consumes a small amount of water for back-flushing filters, and water distribution systems inevitably leak to some extent. In 2009, Monterey County Health Department and MPWMD

estimated treatment would consume 0.52-0.75 AFY and system losses would amount to 0.45 AFY (Bierman, 2009b). However, the project description at that time included 31 single-family market-rate homes and 11 inclusionary affordable homes. The treatment and pipe-leak losses would be proportional to the number of residences and annual volume of residential water use. The current project description includes 24 single-family and 7 inclusionary homes, and water use is expected to be about 70 percent as large as for the original project description. The original loss estimates were decreased in proportion to the decrease in water use, resulting in an estimate of 0.76 AFY for treatment and system losses combined.

The sum of the applicant's estimates of indoor and irrigation water use and the scaled-down estimate of treatment and leakage losses is 7.30 AFY, or 64 percent of baseline water use. If the estimate of irrigation use were doubled—per the discussion of possible errors above—total water use would be 8.39 AFY, which is 73 percent of baseline water use. Because water use would decrease relative to baseline conditions, there would be no long-term adverse impacts directly related to well pumping. However, this does not preclude the possibility of short-term impacts related to pumping rates during the peak demand month or individual pumping cycles. Also, groundwater recharge would decrease under project conditions, so there remains a possibility that net consumptive use of groundwater would increase and thereby adversely impact Carmel River base flow. These issues are explored below.

PEAK WATER USE

Drawdown at Nearby Wells

To obtain a Water Distribution System permit, MPWMD requires an evaluation of drawdown impacts on neighboring wells. These impacts are greatest during periods of above-average pumping. If water use for the proposed project were more strongly seasonal than water use for baseline agricultural conditions, or if individual pumping cycles were longer than for crop irrigation, then short-term drawdown at neighboring wells could potentially be greater than under baseline conditions even if annual water use is smaller.

Records of monthly historical water use on the site are not available (only annual use is recorded), but a conservative assumption is that crops were grown year-round and that the monthly pattern of irrigation followed the monthly pattern of net irrigation demand. Non-irrigation uses including indoor use, water treatment and system losses are relatively constant year-round. **Table 2** shows the estimated monthly patterns of water use under baseline and project conditions, given these assumptions. Under baseline conditions the maximum monthly water use was 1.93 acre-feet in July. Under project conditions, the maximum would be 0.78 acre-feet, also in July. Thus, maximum monthly water use would decrease by more than half under project conditions.

The duration of individual pumping cycles would also be less under project conditions. Residential water use follows a fairly constant diurnal pattern, so wells typically operate about the same number of hours each day. Each daily pumping cycle would produce approximately one-thirtieth of the monthly volume. In contrast, crops do not need irrigating every day. An irrigation interval of 7 days would be typical in July. If the grower divided the site into four crops, there would be a total of roughly 16 irrigation events each month. Each irrigation event would produce one-sixteenth of the monthly volume. Thus, the duration of individual pumping cycles would decrease under project conditions.

The location of pumping would change under the project. Under baseline conditions, 90 percent of groundwater produced by on-site wells was pumped from the Old Travers well, whereas nearly 100 percent would be pumped from the Gamboa Replacement well following project construction (see Figure 1). Consequently, the center of pumping would be shifted 465 feet to the south. At both locations, wells produce groundwater from the Carmel Valley Alluvial Aquifer. The Old Travers well was screened from 90 to 130 feet below ground surface in material described as “river sand and gravel” on the well completion report. The Gamboa Replacement well is screened from 80 to 160 feet below ground surface in “sand, gravels and cobbles”. The well completion reports do not reveal any major confining layers within the aquifer. The similar screen depths and alluvial textures indicate that the two wells tap the same aquifer.

The impact of the project on water-level drawdown at nearby wells is the net effect of changes in pumping location and duration of individual pumping cycles. These factors are listed in **Table 3**, along with estimated drawdown at nearby wells at the end of each pumping cycle. Drawdowns were calculated for this investigation using the non-equilibrium formula for wells in confined aquifers (Theis, 1935). Results are shown only for neighboring wells that are closer to the Gamboa Replacement well than they were to the Old Travers well, putting them at risk of increased drawdown. Calculated drawdowns in all cases are small (less than 0.02 foot), mainly because the aquifer storage coefficient is large enough to supply the pumped water from a relatively small radius around the pumping well for the 1-4 hours of pumping duration. Also, the shorter duration of pumping cycles under project conditions more than offset the smaller distance to the potentially impacted wells. In other words, the small drawdowns at neighboring wells under baseline conditions would become even smaller under project conditions.

Table 3. Drawdown at Nearby Wells at end of Pumping Cycle under Baseline and Project Conditions

Table 2. Drawdown at Nearby Wells at end of Pumping Cycle under Baseline and Project Conditions				
Drawdown Factor	Baseline Conditions		Project Conditions	
Maximum monthly production (AF)	1.93		0.78	
Pumping cycles per month	16		31	
Volume per pumping cycle (gallons)	39,306		8,199	
Well pumping rate (gpm)	150		150	
Pumping cycle duration (hours)	4.37		0.91	
Aquifer transmissivity (gpd/ft)	4750		4750	
Aquifer storage coefficient (dimensionless)	0.026		0.026	
Drawdown at nearby wells at end of pumping cycle (ft)	Distance to well (ft)	Drawdown (ft)	Distance to well (ft)	Drawdown (ft)
Carmel Presbyterian Church	565	0.0128	400	0.0002
Howe	620	0.0073	410	0.0002
Russell	730	0.0020	340	0.0010
Emerson	780	0.0009	390	0.0003
"Not reported"	642	0.0055	440	0.0001

In summary, the impact of the project on groundwater levels would be less than under baseline conditions at all neighboring well locations and at all time scales ranging from a single pumping cycle to an average year.

Adequacy of Water System Flow Capacity

MPWMD requires that the capacity of wells supplying a water distribution system be sufficient to meet peak day demand with no more than 12 hours of pumping. Fire flows at Carmel Rio would be supplied by a connection to an off-site regional water distribution system and thus do not need to be added to the flow capacity requirement for the on-site wells.² The target well capacity in gallons per minute (gpm) is estimated by converting the average annual water demand to a continuous pumping rate, multiplying that by 1.5 to obtain the maximum day continuous pumping rate, and doubling that number to obtain the equivalent 12-hour pumping rate. Under project conditions, average annual water demand would be 7.73 AFY, and the corresponding maximum-day 12-hour pumping rate would be 14.4 gpm. MPWMD specifies procedures for calculating the theoretical yield of a well based on several factors, and those calculations produced estimates exceeding 1,000 gallons per minute for the Old Travers and Gamboa Replacement wells (Marks, 2009). A more realistic estimate of the actual pumping rate is the rate at which the Gamboa Replacement and Old Travers wells operated during an 8-hour constant-rate pumping tests in 2008, which was 150 gpm (Bierman Hydrogeologic, 2009a). That rate exceeds the required rate by a factor of ten. Given a similar diameter and screened interval, the New Travers well would pump almost certainly at a rate substantially greater than the required rate. Serving in a backup role, the New Travers well would be capable of supplying the maximum day demand pumping 12 hours per day if the Gamboa Replacement well were off-line for any reason. Therefore, pumping capacity for the project would be adequate.

GROUNDWATER BALANCE AND CARMEL RIVER PERCOLATION

Change in Net Consumptive Water Use

The impact of the project on the water balance of the Carmel Valley alluvial aquifer and on flow in the Carmel River stems from the change in net consumptive use of groundwater at the project site. Net consumptive use is the amount of groundwater pumping minus the amount of groundwater recharge. The preceding sections demonstrated that the change in pumping by itself would not adversely impact groundwater levels. However, if the project caused a large decrease in on-site groundwater recharge, the overall groundwater balance could become more negative. The effects of such a change in water balance would spread off-site and could potentially lower groundwater levels beneath the Carmel River, which passes 1,100 feet south of the site. This could induce additional percolation from the river.

Groundwater recharge at the site depends on the amount of impervious area, the amount of irrigated area, the characteristics of irrigated and non-irrigated vegetation, the disposition of stormwater runoff and the presence of septic systems. Interactions among some of these variables are complex, and a soil-moisture-balance model was used to simulate the various land covers on the site. The model simulates the hydrologic processes of rainfall, interception, runoff, infiltration, evapotranspiration, irrigation, root zone soil moisture storage, and deep percolation (groundwater recharge). The model has been used to prepare groundwater recharge estimates and time series input for groundwater models in several Central Coast basins (Todd Groundwater, 2015). The model simulates the processes continuously on a daily basis, and water years 1984-2010 were selected for this analysis. This period includes wet and dry

² Empirical studies have found that average annual fire-fighting water use is 210 gallons per year per residence for unsprinklered buildings (Code Consultants, Inc., 2012). For the 31 Carmel Rio residences that would amount to 0.02 AFY. The addition of this small demand is not likely to significantly impact the reliability of the regional system.

periods and is long enough to represent long-term average conditions. Daily rainfall from the gage at San Clemente Dam and daily ET_0 from the Carmel Valley CIMIS station were both scaled to match long-term averages at the Carmel Rio site. ET_0 varies much less than rainfall from year to year, so it was reasonable to obtain daily values of ET_0 for the pre-CIMIS period (1984-2007) by replicating the data for 2008-2015.

Each type of land cover present on the site under existing and project conditions was simulated in one dimension, and the resulting recharge rate was multiplied by land cover area to obtain volumetric estimates of average annual applied irrigation water and groundwater recharge in acre-feet per year. Under existing conditions, the small amount of impervious area was assumed to be “disconnected”, which means runoff does not flow to a storm drain system but rather flows onto adjacent pervious soils, where it typically ponds in a small area and contributes much more infiltration than the rain falling directly on that area. The additional infiltration can quickly fill the soil-moisture capacity of the soil and initiate deep percolation, which becomes groundwater recharge. A conservative estimate is that 20 percent of this impervious runoff is retained as soil moisture storage and 80 percent percolates through the root zone. Under project conditions, roads and parking lots were assumed to flow to a piped storm drain system that discharges into the Carmel River and leaves the valley. None of it was assumed to become groundwater recharge. Those “connected” areas account for 1.84 acres, or 54 percent of total impervious area. Runoff from rooftops, driveways, patios and walkways (1.58 acres) was assumed to be “disconnected”.

Results of the soil-moisture-budget simulations are shown in **Table 4**. Groundwater recharge from pipe leaks and the one existing on-site septic systems are included, so that the table presents a complete picture of groundwater recharge at the Carmel Rio site under baseline and project conditions. Groundwater recharge under irrigated areas includes water derived from rainfall and from irrigation. Simulated irrigation of the baseline period truck crops was within a few percent of the measured historical irrigation pumping. For the simulation of irrigated landscape vegetation, the irrigated area and summer plant factor were as specified by the applicant. However, annual ET_0 was 37.0 inches, root depth was 36 inches, and irrigation efficiency was 95 percent (assuming drip irrigation). The vegetation draws on rainfall stored in the root zone during winter and spring. Irrigation events were simulated whenever soil moisture storage dropped below 30 percent of available water capacity. The existing rural residence was estimated to use 0.5 AFY of water—which is the value assumed for rural residences in the September Ranch decision—of which half was assumed to be for irrigation. The other half was assumed to be indoor use that flowed to the septic system and became groundwater recharge.

The simulated net impact of the project on groundwater recharge was a decrease of 1.92 AFY. Net consumptive use of groundwater under project conditions was 3.16 AFY, or 53 percent of the baseline value.

This net result is strongly affected by assumptions regarding irrigation and stormwater management under project conditions. If the landscape vegetation includes lawns, flowers and shrubs with higher plant factors, several variables in the soil moisture balance model would be affected, including root depth, plant factor, irrigation threshold, and irrigation efficiency. Those variables affect rainfall recharge in addition to irrigation demand and irrigation return flow. The model was used to simulate vegetation corresponding to three plant factors, and simulated irrigation, recharge and net consumptive use were all essentially linear functions of plant factor. To illustrate the change in variables, a plant factor of 0.8 (lawn) was assigned a root depth of 18 inches, irrigation threshold of 70 percent of available water

Table 4. Net Consumptive Use of Groundwater under Baseline and Project Conditions

PUMPING							
Land Cover	Baseline			Project			
	Area (ac)	Pumping		Area (ac)	Plant Factor	Pumping	
		(in/yr)	(AF/yr)			(in/yr)	(AF/yr)
Baseline water use			11.47				
Project indoor use							5.45
Water treatment and pipe leaks							0.76
Landscape irrigation				1.24	0.20	5.59	0.58
Total			11.47				6.79
RECHARGE							
Land Cover	Baseline			Project			
	Area (ac)	Recharge		Area (ac)	Plant Factor	Recharge	
		(in/yr)	(AF/yr)			(in/yr)	(AF/yr)
Irrigated truck crops	5.52	10.23	4.71	0.00		10.23	0.00
Irrigated lawn	0.02	15.99	0.03	0.00		15.99	0.00
Irrigated xeriscape	0.00	8.72	0.00	1.24	0.20	5.31	0.55
Non-irrigated natural vegetation	2.26	0.73	0.14	3.46		1.93	0.56
Connected impervious			0.00	1.84			0.00
Disconnected impervious	0.32		0.42	1.58			2.08
Water system leaks	n/a	n/a	0.00	n/a		n/a	0.45
Septic system recharge	n/a	n/a	0.25	n/a		n/a	0.00
Total	8.12		5.54	8.12			3.63
NET CONSUMPTIVE USE							
Volume (AF/yr)			5.93				3.16
Percent of baseline							53%

capacity, and an irrigation efficiency of 75 percent (sprinkler). With these relationships, the maximum plant factor and/or irrigated area that could be implemented without exceeding the significance threshold for net consumptive groundwater use was determined. The significance thresholds are different for CEQA analysis than for state and local policy compliance, as described in the following sections.

Impact Evaluation for CEQA

Environmental impact analysis under the California Environmental Quality Act (CEQA) compares physical environmental conditions that would result if a project were implemented with existing environmental conditions. For the Carmel Rio project, existing conditions with respect to groundwater are the conditions present during the baseline period. As described above, the recommended baseline period is 1995-2004. The key variable with respect to water quantity is net consumptive use of groundwater. If the project would increase net consumptive use, seepage losses from the Carmel River would tend to increase, which would adversely affect fish. Because fish populations in the watershed are already stressed, any increase in net consumptive use would be significant. Even a *de minimus* increase would be significantly adverse. Conversely, any decrease would be beneficial.

The preceding paragraphs concluded that net consumptive use would decrease under project conditions. This conclusion was based on simulated landscape irrigation and recharge for a plant factor of 0.2 and on the assumption that rainfall runoff from streets and driveways is connected to a piped storm drainage system while rainfall runoff from rooftops, patios and walkways is not.

The irrigation assumptions were adjusted to identify the maximum amount of landscape irrigation that could be allowed without increasing net consumptive use above the baseline level. The amount of irrigated area was held constant, and the average plant factor of the vegetation was increased until overall project net consumptive use equaled baseline net consumptive use.³ Simulation results showed that the plant factor could be increased to as much as 1.0 (pasture) without causing net consumptive use of groundwater to exceed baseline conditions. If the estimated irrigated area is increased to 25 percent of the project site, the average plant factor could be as high as 0.84 (lawn) without causing an increase in net consumptive use of groundwater over baseline conditions.

Thus, it appears that even with more realistic estimates of landscape irrigated area and vegetation type, the project would not increase net consumptive use of groundwater over baseline levels.

Compliance with State and Local Water Management Policies

The State of California adopted a Model Water Efficient Landscape Ordinance that provides formulas for calculating the Maximum Applied Water Allowance (MAWA) and the Estimated Total Water Use (ETWU) for residential landscape irrigation (CCR Title 23, Div. 2, Ch. 2.7 Sections 490 et. seq.). The calculated MAWA for the project site is 2.33 AFY, and the ETWU is 0.80 AFY⁴. Therefore, the proposed landscaping complies with the ordinance.

Revisions to the Monterey County General Plan in 2010 included the addition of policies PS-3.1 and PS-3.2. Policy PS-3.1 states that new development for which a discretionary permit is required must demonstrate by specific evidence and findings that there is a long-term, sustainable water supply available for the project. Policy PS-3.2 lists specific factors to be used in determining the availability of such a supply. The factor most relevant to the Carmel Rio project is “cumulative impacts of existing and projected future demand for water from the source, and the ability to reverse trends contributing to an overdraft condition or otherwise affecting supply.” The source for the Carmel Rio project is the Carmel Valley Alluvial Aquifer (CVAA). The CVAA has not been declared to be in overdraft. Groundwater levels still recover to a “full” level by the end of winter in most years. However, groundwater extractions during the rest of the year deplete Carmel River base flow and adversely impact fish.

A single development project cannot be expected to reverse a regional historical trend caused by all pumpers in the valley. However, it can be expected to contribute its share toward reversing the adverse condition. It is the role of local water management agencies to determine how much an individual project needs to contribute toward a collective solution, based on analysis that evaluates the cumulative

³ Key parameters for the calculations include the following: Total irrigated area = 53,980 square feet (Kane 2014); average annual rainfall and reference ET at the site are 17.93 and 37.0 inches per year, respectively; the average root depth of irrigated vegetation decreases from 36 inches for a plant factor of 0.2 to 18 inches for plant factors greater than or equal to 0.8; irrigation efficiency decreases from 95 percent for a plant factor of 0.2 to 75 percent for a plant factor of 0.8.

⁴ Factors for the calculations include: ET₀ = 37.0 in/yr; effective precipitation = 25% of annual precipitation = 4.48 in/yr; plant factor = 0.2; landscape area = 53,980 square feet; special landscape area = 0 square feet; irrigation efficiency = 95 percent.

effect of many projects on the hydrologic system. Toward that end, Monterey Peninsula Water Management District's Water Supply Planning Committee developed a draft policy in July 2016 specifying that proposed developments in Carmel Valley must decrease net consumptive use of groundwater by 25 percent relative to baseline conditions.

The simulated net consumptive use for the project with the applicant's proposed landscape vegetation would be 53 percent of the baseline amount (see Table 4) and therefore would comply with local water management policies. The plant factor could be increased to as much as 0.74 while still meeting this target. This corresponds to a mix of lawn, flowers and typical shrubs. However, the simulated annual irrigation volume for that plant factor slightly exceeds the MAWA (2.87 versus 2.33 AFY). The average plant factor would have to be at most 0.59 to comply with the State Model Landscape Ordinance. This corresponds to typical flowers and shrubs but little lawn area. If the irrigated area is increased to 25 percent of the total site, the maximum plant factor that would meet the MPWMD ordinance would be 0.48, which corresponds to typical shrubs with no lawn. This is also the maximum plant factor that would comply with the State Model Landscape Ordinance. Therefore, the project could decrease net consumptive use of groundwater to 75 percent of baseline use with landscaping more lush than proposed by the applicant but with less lawn than in nearby residential areas.

Additional reductions in net consumptive use of groundwater could be achieved by percolating rainfall runoff from streets and driveways in roadside drainage swales. This type of stormwater management is an example of "low impact development", or LID. To estimate the additional groundwater recharge benefit from LID stormwater management, unpaved drainage swales were assumed to be present along both sides of Val Verde Drive and the loop road within the project site. Assuming a flow width of 2 feet, the total percolation area of the swales would be 10,187 square feet, or about one-ninth of the area of pavement and driveways draining to the swales. The percolation capacity of the Metz sandy loam soils is at least 14 inches per day (Natural Resources Conservation Service, Web Soil Survey on-line at <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm> accessed 28 July 2016). Evaporation of depression storage on paved surfaces was assumed to be 0.06 inch for each day of rain (or total rainfall that day, whichever is less). There are an average of 59 rainy days each year in Carmel Valley, so annual loss to evaporation of depression storage averages about 3.0 inches. Net available runoff is thus 14.93 inches. Furthermore, rain that falls at intensities greater than the percolation capacity of the swales would simply flow through the swales and out to the Carmel River without percolating. Given the ratio of pavement area to swale area and the losses to depression storage, the swales could infiltrate rainfall up to 1.66 inch per day, or 0.069 inch per hour. A comparison of hourly and daily rainfall for the Salinas 2E gage—scaled to the Carmel Rio location—indicated that 71 percent of annual rainfall occurs at intensities less than or equal to 0.069 inch per hour. Multiplying these factors by the 1.84 acres of street and driveway surfaces produced an estimate of 1.67 AFY of additional groundwater recharge that would result by implementing the LID stormwater design. This LID recharge would decrease net consumptive use at the project site by an additional 28 percent of the baseline amount.

Comparison with Alternative Baseline Periods

The above consumptive use calculations assumed the 1995-2004 baseline period, which is considered most representative of pre-development conditions. For comparison, calculations were also done for the 2005-2014 and 1994-2014 periods. Both of those periods include the five years when cropland at the site was fallow (2005-2009). Noting that groundwater recharge also changes under fallow conditions, the average net consumptive use amounts for the two alternative periods was calculated. The maximum plant factor that could be allowed in the proposed irrigated area while still achieving a 25

percent decrease in net consumptive use was then identified. For the 2005-2014 baseline period, completely eliminating landscape irrigation would not be sufficient to achieve a 25 percent reduction in consumptive use. If LID stormwater management were implemented, the proposed irrigated area could be planted with a maximum plant factor of 0.59, which corresponds to flowers and traditional shrubs but little or no lawn. For the 1994-2014 baseline period, a maximum plant factor of 0.32 would be needed to achieve a 25 percent reduction in net consumptive use. This corresponds to a mix of xeriscape and traditional shrubs.

WATER QUALITY

Water quality at the Gamboa Replacement well met all primary drinking water standards when it was tested in 2008, except that it tested positive for coliform bacteria (Bierman Hydrogeologic, 2009a; Marks, 2009). Bacteria can generally be eliminated by disinfecting the well and do not represent a long-term water-quality issue. Two constituents regulated under secondary drinking water standards that reflect aesthetics and consumer acceptability greatly exceeded the secondary MCLs: iron and manganese. Elevated concentrations of these minerals are common in Central Coast groundwater basins, and they are usually remedied by treatment at the wellhead. The applicant is planning to install a treatment system such as the Filtronics EM-1 ion-exchange package treatment system (Bierman Hydrogeologic, 2011), which is capable of bringing the delivered water quality into compliance with all drinking water standards.

Water quality data are not yet available for the New Travers well, which would serve as the backup to the Gamboa Replacement well. However, the well is located only 67 feet from the Gamboa Replacement well, so the water quality is assumed to be nearly identical. This assertion is supported by data from the Old Travers well, which is seven times farther away and had water quality substantially similar to the Gamboa Replacement well (Bierman Hydrogeologic, 2009a).

In summary, assuming the Gamboa Replacement well is disinfected and an iron and manganese treatment unit is installed and operated, delivered water quality should meet all drinking water standards and thus not adversely impact public health.

SUMMARY AND CONCLUSIONS

Groundwater pumping at the Carmel Rio site after development would be less than under baseline conditions for all time scales ranging from single pumping cycles to annual. Using simulation results for irrigated landscaping proposed by the applicant, average annual water use at the site after development would be 6.79 AFY, or about 59 percent of baseline use.

Drawdown impacts at nearby wells would be less than under baseline conditions even though the location of pumping would shift from primarily near the north edge of the site (Old Travers well) to the southeastern part of the site (Gamboa Replacement well). Available data indicate that groundwater quality will meet drinking water standards if treatment is provided to remove iron and manganese and if wells and piping are disinfected prior commencing water deliveries.

The capacities of the Gamboa Replacement well and New Travers well—which would serve as the primary and backup wells for the water distribution system—are large enough to easily meet peak day demand pumping only 12 hours per day.

Groundwater recharge at the site would decrease as a result of the project. Net consumptive use of groundwater with the landscaping proposed by the applicant would be 3.16 AFY, or 53 percent of baseline consumptive use. This complies with the State Model Landscape Ordinance, meets the target specified in local water management policies (75 percent of baseline or less) and is a beneficial impact under CEQA. Landscape vegetation could include flowers and traditional shrubbery, possibly some lawn and/or an increase in irrigated area and still meet the MAWA, MPWMD policy and CEQA criteria.

Additional groundwater recharge could be achieved by percolating rainfall runoff from streets and driveways in roadside swales. The estimated recharge (1.67 AFY) would further reduce net consumptive use of groundwater by 28 percent of the baseline amount.

Water quality concerns at the existing supply well (coliform, iron and manganese) are readily addressed through treatment. Assuming the project water system incorporates treatment facilities, the delivered water quality would meet drinking water standards.

REFERENCES CITED

Bierman Hydrogeologic. January 30, 2009a. Two 8-hour constant-rate well pumping and aquifer recovery tests with pumping impact assessment for Travers and Gamboa wells. Aptos, CA. Prepared for Carmel Rio Road LLC, Sand City, CA.

Bierman Hydrogeologic. September 24, 2009b. Report addendum for Val Verde Mutual Water Company. Aptos, CA. Prepared for Carmel Rio Road LLC, Sand City, CA.

Bierman Hydrogeologic. March 4, 2010. Letter to Monterey County Resource Management Agency addressing MCRMA comments on Carmel Rio project dated September 17, 2009.

Bierman Hydrogeologic. October 24, 2011. Letter to Monterey County Resource Management Agency addressing MCRMA comments on Carmel Rio project dated September 29, 2011.

California-American Water Company (Cal-Am). April 2015. Cal-Am Monterey Peninsula water supply project. Draft Environmental Impact Report. Monterey, CA

Costello, L.R. and K.S. Jones. 1999. WUCOLS III, 1999 edition. University of California Cooperative Extension. Half Moon Bay, CA.

Hampson, L. September 2, 2015. Carmel Rio water distribution system: MPWMD response to existing water use and request on a production baseline. Letter to Brian Clark, project applicant. MPWMD, Monterey, CA.

Jones, D.W. 1999. California Irrigation Management Information System (CIMIS) reference evapotranspiration. Statewide map. California Department of Water Resources, Sacramento, CA.

Kane, Anita. March 25, 2014. Val Verde preliminary site plan and irrigation water calculations. Hollister, CA.

Marks, R. February 25, 2009. Review of well source and pumping impact assessment for Travers and Gamboa wells, APN 015-021-015, -020 and -021. Technical memorandum. Pueblo Water Resources, Inc., Ventura, CA. Prepared for Monterey Peninsula Water Management District, Monterey, CA.

Theis, C.V. 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage. Trans. Amer. Geophysical Union 2:519-524.

Todd Groundwater. June 2015. Northern San Benito County groundwater model update and enhancement. Alameda, CA. Prepared for San Benito County Water District, Hollister, CA.

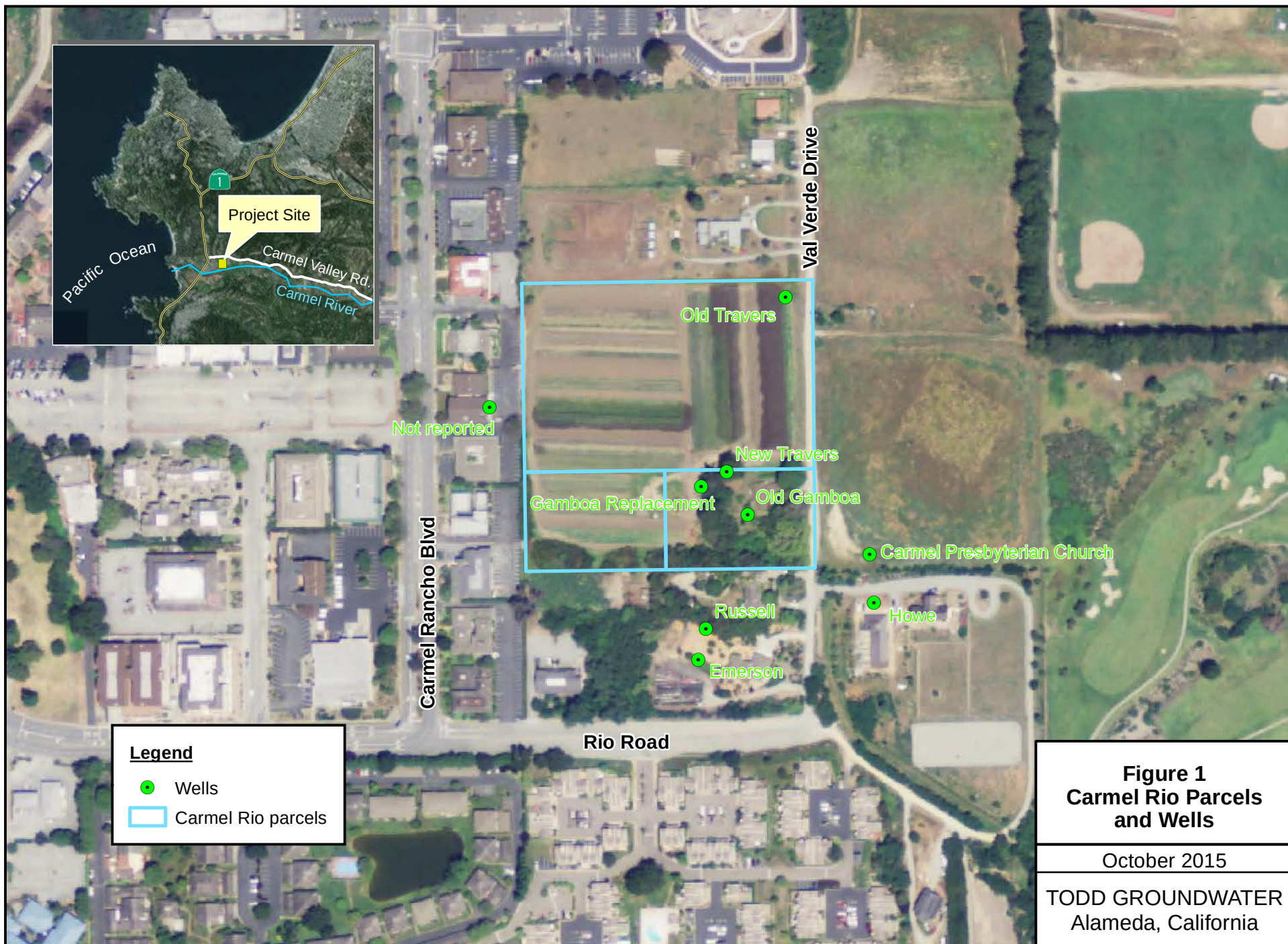


Table 2. Monthly Pattern of Groundwater Pumping under Baseline and Project Conditions

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Irrigation factors													
Eto (in)	1.77	1.94	3.09	3.93	4.23	4.30	4.20	3.96	3.49	2.86	1.82	1.40	37.00
Rain (in)	4.46	3.32	3.2	1.45	0.5	0.18	0.06	0.08	0.24	0.85	2.07	3.32	19.73
Net ETo (in)	0.00	0.00	0.00	2.48	3.73	4.12	4.14	3.88	3.25	2.01	0.00	0.00	23.61
Net ETo (% of annual)	0%	0%	0%	11%	16%	17%	18%	16%	14%	9%	0%	0%	100%
Baseline water use (AF)													
Irrigation	0.00	0.00	0.00	1.15	1.73	1.92	1.92	1.80	1.51	0.93	0.00	0.00	10.97
Residence	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.50
Total	0.04	0.04	0.04	1.19	1.77	1.96	1.97	1.84	1.55	0.98	0.04	0.04	11.47
Project water use (AF)													
Irrigation	0.00	0.00	0.00	0.06	0.09	0.10	0.10	0.10	0.08	0.05	0.00	0.00	0.58
Indoor	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	5.45
Treatment and losses	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.76
Total	0.52	0.52	0.52	0.58	0.61	0.62	0.62	0.61	0.60	0.57	0.52	0.52	6.79



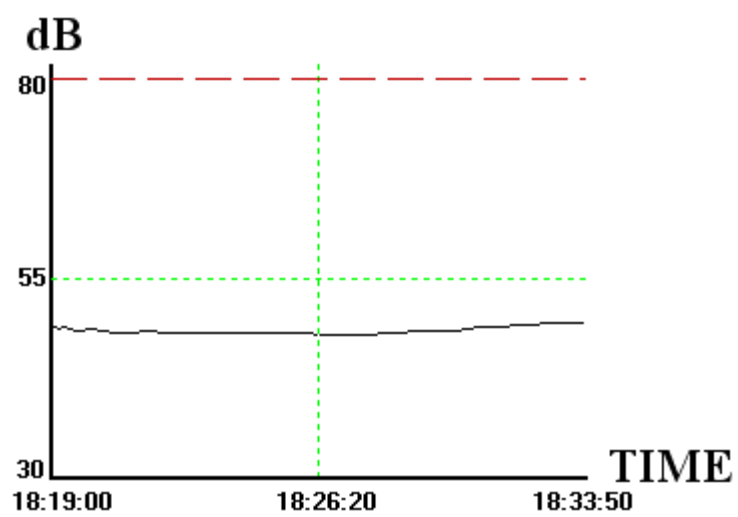
Appendix H

Sound Level Measurements

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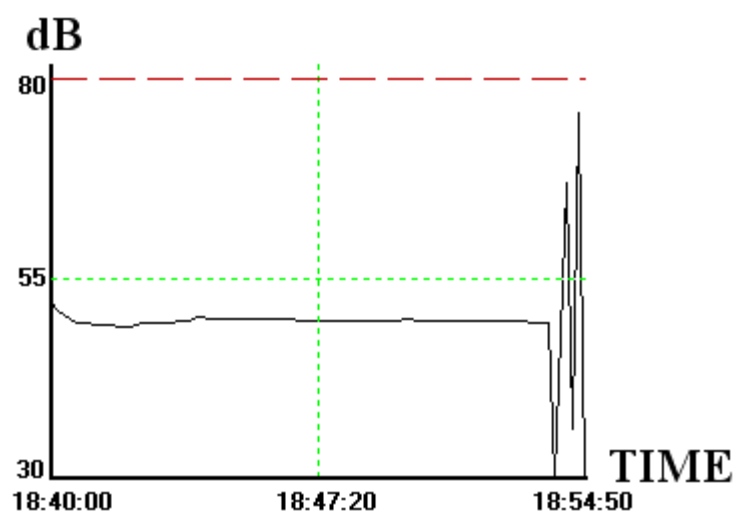
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L(10)	49.9	49.9	49.9	49.9	49.9	49.9	49.9	49.9	49.8
L(20)	49.8	49.8	49.8	49.8	49.8	49.8	49.8	49.7	49.7
L(30)	49.7	49.7	49.7	49.7	49.7	49.7	49.7	49.7	49.7
L(40)	49.7	49.7	49.7	49.7	49.7	49.7	49.7	49.7	49.6
L(50)	49.6	49.6	49.6	49.6	49.6	49.6	49.6	49.6	49.6
L(60)	49.6	49.6	49.6	49.6	49.6	49.6	49.6	49.6	49.6
L(70)	49.6	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5
L(80)	49.4	49.4	49.4	49.3	49.3	49.2	49.1	49.1	49.1
L(90)	49.1	48.9	48.9	48.9	48.0	36.2	0.0	0.0	0.0



AMBIENT NOISE SURVEY DATA SHEET

Project: Carmel Rio Road EIR Job Number: 14-00187
 Date: 11/4/15
 Operator: Chris Bersbach

Station: A Begin: 4:25pm
 Measurement No. 1 Finish: 4:40pm
 Wind: <5 mph Direction: NE

Temperature: 65
 Cloud Cover Class

- Daytime ☐ 1 - Overcast >80%
☐ 2 - Light 20-80%
☒ 3 - Sunny <20%
 Nighttime ☐ 4 - Clear <50%
☐ 5 - Overcast >50%

Primary Noise Source: Val Verde Dr. Carmel Valley Rd/Hwy 1
 Distance: 15ft from Val Verde Dr.

Secondary Noise Sources: Carmel Middle School

Notes: Occasional wind gusts around 7mph

Traffic LDA/T: 1

MDT: _____
 HDT: _____

Leq: 49.4 L(10): _____
 Lmin: _____ L(33): _____
 Lmax: _____ L(50): _____
 Peak: _____ L(90): _____

Calibration Start: 94 dB
 End: 94 dB

Response: ☐ Slow ☒ Fast
☐ Peak ☐ Impulse

Weighting: ☒ A ☐ B
☐ C ☐ Linear

Octave Filter: ☐ NA ☐ _____ Hz

Station: B Begin: 4:50
 Measurement No. 2 Finish: 5:05
 Wind: <5 mph Direction: NE

Temperature: 65
 Cloud Cover Class

- Daytime ☐ 1 - Overcast >80%
☐ 2 - Light 20-80%
☒ 3 - Sunny <20%
 Nighttime ☐ 4 - Clear <50%
☐ 5 - Overcast >50%

Primary Noise Source: Carmel Rancho Blvd & parking lot
 Distance: ~25ft from as well as other roadways, incl. Carmel Valley Rd & Hwy 1

Secondary Noise Sources: Carmel Middle School

Notes: occasional wind gusts around 7mph

Traffic LDA/T: (no adjacent roadways)

MDT: _____
 HDT: _____

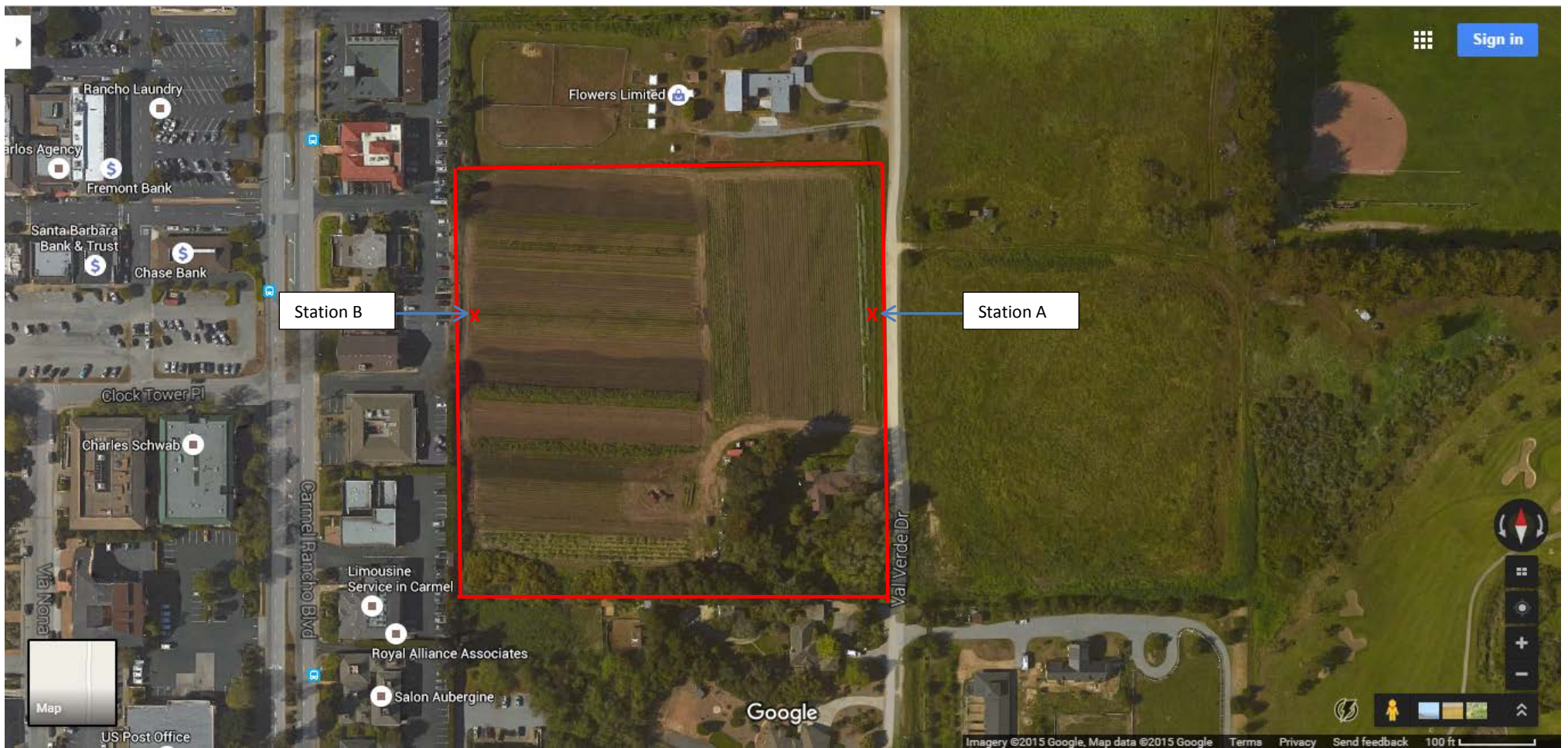
Leq: 49.4 L(10): _____
 Lmin: _____ L(33): _____
 Lmax: _____ L(50): _____
 Peak: _____ L(90): _____

Calibration Start: 94 dB
 End: 94 dB

Response: ☐ Slow ☒ Fast
☐ Peak ☐ Impulse

Weighting: ☒ A ☐ B
☐ C ☐ Linear

Octave Filter: ☐ NA ☐ _____ Hz





Appendix I

Traffic Impact Analysis



Hatch Mott
MacDonald

VAL VERDE SUBDIVISION TRAFFIC IMPACT ANALYSIS

DRAFT REPORT

MONTEREY COUNTY, CALIFORNIA

Prepared for

Carmel Rio Road, LLC

June 16, 2016

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- A LOS Descriptions for Signalized Intersections
- B LOS Descriptions for Unsignalized Intersections
- C LOS Descriptions for Road Segments – HCM Exhibits 14-4, 15-2, 15-3
- D New Raw Counts & New vs. Previously Published Volumes – Comparison and Adjustments
- E Proposed Project Scenarios Intersection Level of Service Calculation Worksheets
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- K AMBAG Model Plots
- L Project Alternative Scenarios Intersection Level of Service Calculation Worksheets
- M Project Alternative Scenarios Road Segment Level of Service Calculation Worksheets

1 Executive Summary

This traffic study evaluates the potential traffic impacts associated with the development of the Val Verde Subdivision project located on the west side of Val Verde Drive and north of Rio Road in Carmel Valley, Monterey County, California.

The Proposed Project consists of 31 residential dwelling units. Twenty-four of these units will be market rate, single-family detached homes, and 7 will be inclusionary housing units (condos or apartments). There is one existing single-family dwelling unit on the site that would be replaced by the 31 new residential units. Access to the project site would be via two driveways on Val Verde Drive.

This study also evaluates the potential traffic impacts associated with two Project Alternatives. Project Alternative 1 involves the development of a 200-bed assisted living facility on the project site. Project Alternative 2, a scaled down version of Project Alternative 1, involves the development of a 150-bed assisted living facility.

This following intersections and road segments were analyzed during the weekday morning (7:00 – 9:00 a.m.) and evening (4:00 – 6:00 p.m.) time periods.

Intersections:

1. State Route (SR) 1 / Carmel Valley Road
2. Carmel Rancho Boulevard / Carmel Valley Road
3. Rio Road / SR 1
4. Crossroads Boulevard / Rio Road
5. Carmel Center Place / Rio Road
6. Carmel Rancho Boulevard / Rio Road
7. SR 1 / Ocean Avenue
8. SR 1 / Carpenter Street
9. Carmel Rancho Boulevard / Shopping Center Driveway

Road Segments:

1. SR 1, Carpenter Street to Ocean Avenue
2. SR 1, Ocean Avenue to Carmel Valley Road
3. SR 1, Carmel Valley Road to Rio Road
4. SR 1, Rio Road to Ribera Road
5. Rio Road, west of SR 1
6. Carmel Valley Road, Robinson Canyon Road to Schulte Road
7. Carmel Valley Road, Schulte Road to Rancho San Carlos Road
8. Carmel Valley Road, Rancho San Carlos Road to Rio Road
9. Carmel Valley Road, Rio Road to Carmel Rancho Boulevard
10. Carmel Valley Road, Carmel Rancho Boulevard to SR 1
11. Carmel Rancho Boulevard, Carmel Valley Road to Shopping Center Driveway
12. Carmel Rancho Boulevard, Shopping Center Driveway to Rio Road
13. Rio Road, SR 1 to Crossroads Boulevard
14. Rio Road, Crossroads Boulevard to Carmel Center Place
15. Rio Road, Carmel Center Place to Carmel Rancho Boulevard

The study intersections and road segments were analyzed under the following development scenarios for the Proposed Project and Project Alternatives 1 and 2:

1. Existing Conditions
2. Existing Plus Project Conditions
3. Background Conditions
4. Background Plus Project Conditions
5. Cumulative Conditions
6. Cumulative Plus Project Conditions

The traffic impacts associated with the Proposed Project and Project Alternatives 1 and 2, and potential mitigations for those impacts, are described below.

1.1 Project Relationship to SB 743

On September 27, 2013, Governor Brown signed Senate Bill (SB) 743 (Steinberg, 2013), which creates a process to change the way that transportation impacts are analyzed under CEQA. SB 743 supports AB 32, the California Global Warming Solutions Act of 2006, and SB 375, the Sustainable Communities and Climate Protection Act of 2008, which call for substantial reductions in greenhouse gas (GHG) emissions. SB 743 mandates a change in the way that public agencies evaluate transportation impacts of projects under CEQA. Under the new CEQA Guidelines, aspects of project location and design that influence travel choices, and thereby improve or degrade air quality, safety, and health, must be considered. The new CEQA Guidelines will eliminate the use of automobile delay, including Level of Service (LOS), in evaluating transportation impacts and replace it with Vehicle Miles Traveled (VMT), based on a goal of reducing statewide GHG emissions by 15% by the year 2020.

The new CEQA Guidelines will measure whether a project contributes to various state goals, such as reducing greenhouse gas emissions (GHG), developing multimodal transportation, preserving open spaces, and promoting diverse land uses and infill development. Projects that are shown to decrease vehicle miles traveled — for example, bike lanes or pedestrian paths, or a grocery store that allows local residents to travel shorter distances to shop — may be automatically considered to have a “less than significant” impact under CEQA. Under the new CEQA Guidelines, projects may be able to mitigate transportation impacts by funding better transit, creating better access to transit, designing more walkable communities, or implementing other improvements that increase travel choices.

The cities of San Francisco and Pasadena have already modified their local environmental review process by removing automobile delay (i.e., Level of Service) and replacing it with Vehicle Miles Traveled when determining significant traffic impacts on the environment pursuant to CEQA. The statewide revisions to the CEQA Guidelines are expected to be completed in about one year, and the implementation of the revised guidelines may be phased in over the course of two years.

A VMT analysis has not been performed for the Val Verde Subdivision project. However, the project has a unique location that is in close proximity to three major shopping centers (i.e., The Barnyard, Crossroads and Carmel Rancho Shopping Centers) and public transportation. The Proposed Project likely would meet the primary goal of SB 743 by reducing VMT and greenhouse gas emissions.

The project site is located in close proximity to a wide variety of public-serving businesses, including the following:

- Grocery Stores: 3
- Banks: 5
- Restaurants: 14
- Coffee Shops: 3
- Bakery: 2
- Post Office: 1
- Brokerage Houses: 2
- Gas Stations: 2
- Hair Salons: 3
- Hardware Stores: 2
- Pet Supply and Vet Services: 3
- Clothing & Jewelry Stores: 8
- Various Home Decorator Stores: 6
- Title Companies: 2
- Real Estate Offices: 3
- Doctors and Dentists: 7
- Copy Center: 1
- Book Store: 1
- Liquor Stores: 4
- Law Offices: 3
- Galleries: 3

All of the businesses listed above are within about an 8 to 18-minute walk of the proposed project. In addition, there are four transit stops in the project area, providing access to County-wide public transportation.

1.2 Existing Plus Proposed Project Conditions

Intersections

Int. #3 – SR 1 / Rio Road

This intersection operates at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.1 seconds. Based on the Caltrans impact criteria the project would have an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts. However, funding for these improvements is not guaranteed.

Int. #7 – SR 1 / Ocean Avenue

This intersection operates at a deficient LOS D during the AM and PM peak hours and traffic generated by the project is expected to increase the average delay by 0.5 and 0.4 seconds during the AM and PM peak hours, respectively. Based on the Caltrans impact criteria the project would have an impact. There are no known planned or feasible improvements at this intersection.

Int. #8 – SR 1 / Carpenter Street

This intersection operates at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.3 seconds. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at this intersection would eliminate the project's impacts.

Road Segments

Seg. #1 SR 1 between Carpenter Street and Ocean Avenue

This segment is projected to operate at a deficient LOS D in the northbound (PM) and southbound (AM) directions and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at the SR 1 / Carpenter Street intersection would eliminate the project's impacts in the northbound direction. There are no known planned or feasible improvements for this segment in the southbound direction.

Seg. #3 – SR 1 between Carmel Valley Road and Rio Road

This segment operates at a deficient LOS F (AM & PM) in the northbound direction and LOS E (PM) in the southbound direction and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts in the northbound direction. However, funding for these improvements is not guaranteed. Widening SR 1 would eliminate the project's impacts in the southbound direction; however, this is not considered feasible.

1.3 Background Plus Proposed Project Conditions**Intersections****Int. #3 – SR 1 / Rio Road**

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.1 seconds. Based on the Caltrans impact criteria the project would have an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts. However, funding for these improvements is not guaranteed.

Int. #7 – SR 1 / Ocean Avenue

This intersection is projected to operate at a deficient LOS D during the AM and PM peak hours and traffic generated by the project is expected to increase the average delay by 0.5 and 0.6 seconds during the AM and PM peak hours, respectively. Based on the Caltrans impact criteria the project would have an impact. There are no known planned or feasible improvements at this intersection.

Int. #8 – SR 1 / Carpenter Street

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.4 seconds. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at this intersection would eliminate the project's impacts.

Road Segments**Seg. #1 – SR 1 between Carpenter Street and Ocean Avenue**

This segment is projected to operate at a deficient LOS D in the northbound (PM) and southbound (AM) directions and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at the SR 1 / Carpenter Street intersection would eliminate the project's impacts in the northbound direction. There are no known planned or feasible improvements for this segment in the southbound direction.

Seg. #2 SR 1 between Ocean Avenue and Carmel Valley Road

This road segment is projected to operate at a deficient LOS F in the northbound direction during the AM peak hour and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. There are no known planned or feasible improvements for this road segment.

Seg. #3 – SR 1 between Carmel Valley Road and Rio Road

This segment is projected to operate at an unacceptable LOS F in the northbound direction during the AM and PM peak hours and LOS E in the southbound direction during the PM peak hour and the project will add

traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts. However, funding for these improvements is not guaranteed.

Seg. #6 – Carmel Valley Road between Robinson Canyon Road and Schulte Road

The Carmel Valley Master Plan (CVMP) average daily traffic (ADT) thresholds are projected to be exceeded under Background traffic conditions and the project would add traffic to this segment. Based on the CVMP ADT threshold, the project would have an impact. The impacts to segment #6 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #7 – Carmel Valley Road between Schulte Road and Rancho San Carlos Road

The CVMP ADT thresholds are projected to be exceeded under Background traffic conditions and the project would add traffic to this segment. Based on the CVMP ADT threshold, the project would have an impact. The impacts to segment #7 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

1.4 Cumulative Plus Proposed Project Conditions**Intersections****Int. #1 – SR 1 / Carmel Valley Road**

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.5 seconds. Based on the Caltrans impact criteria the project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Int. #3 – SR 1 / Rio Road

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.4 seconds. Based on the Caltrans impact criteria the project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Int. #7 – SR 1 / Ocean Avenue

This intersection is projected to operate at a deficient LOS E during the AM and PM peak hours and traffic generated by the project is expected to increase the average delay by 0.4 and 0.9 seconds during the AM and PM peak hours, respectively. Based on the Caltrans impact criteria the project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Int. #8 – SR 1 / Carpenter Street

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.4 seconds. Based on the Caltrans impact criteria the project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Road Segments

Seg. #1 – SR 1 between Carpenter Street and Ocean Avenue

This segment is projected to operate at a deficient LOS D in the northbound (PM) and southbound (AM) directions and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Seg. #2 – SR 1 between Ocean Avenue and Carmel Valley Road

This segment is projected to operate at an unacceptable LOS F in the northbound direction during the AM peak hour and the project will add traffic to this segment. Based on the Caltrans impact criteria, the Proposed Project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Seg. #3 – SR 1 between Carmel Valley Road and Rio Road

This segment is projected to operate at a deficient LOS F (AM & PM) in the northbound and LOS E (PM) in the southbound direction and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Seg. #6 – Carmel Valley Road between Robinson Canyon Road and Schulte Road

The CVMP ADT thresholds are projected to be exceeded under Background and Cumulative traffic conditions and the project would add traffic to this segment. Based on the CVMP ADT threshold, the project would have an impact. The impacts to segment #6 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #7 – Carmel Valley Road between Schulte Road and Rancho San Carlos Road

The CVMP ADT thresholds are projected to be exceeded under Background and Cumulative traffic conditions and the project would add traffic to this segment. Based on the CVMP ADT threshold, the project would have an impact. The impacts to segment #7 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #13 – Rio Road between SR 1 and Crossroads Boulevard

This segment is projected to operate at a deficient LOS F (PM) in the westbound direction without the project. Traffic generated by the project is not expected to decrease the average travel speed; however, any traffic added to a segment operating at LOS F is considered an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts. However, funding for these improvements is not guaranteed.

Seg. #14 – Rio Road between Crossroads Boulevard and Carmel Center Place

This segment is projected to operate at a deficient LOS F (AM & PM) in the westbound direction without the project. Traffic generated by the project is not expected to decrease the average travel speed; however, any traffic added to a segment operating at LOS F is considered a potential impact. However, this road segment is bounded by two closely spaced signalized intersections (approximately 220 feet

apart), and the flow of traffic on this segment is controlled by the adjacent signal operations, which are projected to operate at an acceptable LOS C and LOS A under Cumulative Plus Proposed Project conditions. As a result, the Proposed Project is not expected to have an impact on this segment.

1.5 Existing Plus Project Alternative 1 Conditions

Intersections

Int. #7 – SR 1 / Ocean Avenue

This intersection is projected to operate at a deficient LOS D during the AM and PM peak hours and traffic generated by the project is expected to increase the average delay by 0.1 and 0.2 seconds during the AM and PM peak hours, respectively. Based on the Caltrans impact criteria the project would have an impact. There are no known planned or feasible improvements at this intersection.

Int. #8 – SR 1 / Carpenter Street

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.2 seconds. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at this intersection would eliminate the project's impacts.

Road Segments

Seg. #1 SR 1 between Carpenter Street and Ocean Avenue

This segment is projected to operate at a deficient LOS D in the northbound (PM) and southbound (AM) directions and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at the SR 1 / Carpenter Street intersection would eliminate the project's impacts in the northbound direction. There are no known planned or feasible improvements for this segment in the southbound direction.

Seg. #3 – SR 1 between Carmel Valley Road and Rio Road

This segment operates at a deficient LOS F (AM & PM) in the northbound direction and LOS E (PM) in the southbound direction and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts in the northbound direction. However, funding for these improvements is not guaranteed. Widening SR 1 would eliminate the project's impacts in the southbound direction; however, this is not considered feasible.

1.6 Background Plus Project Alternative 1 Conditions

Intersections

Int. #7 – SR 1 / Ocean Avenue

This intersection is projected to operate at a deficient LOS D during the AM and PM peak hours and traffic generated by the project is expected to increase the average delay by 0.1 and 0.3 seconds during the AM and PM peak hours, respectively. Based on the Caltrans impact criteria the project would have an impact. There are no known planned or feasible improvements at this intersection.

Int. #8 – SR 1 / Carpenter Street

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.2 seconds. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at this intersection would eliminate the project's impacts.

Road Segments**Seg. #1 – SR 1 between Carpenter Street and Ocean Avenue**

This segment is projected to operate at a deficient LOS D in the northbound (PM) and southbound (AM) directions and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at the SR 1 / Carpenter Street intersection would eliminate the project's impacts in the northbound direction. There are no known planned or feasible improvements for this segment in the southbound direction.

Seg. #2 SR 1 between Ocean Avenue and Carmel Valley Road

This segment is projected to operate at a deficient LOS F in the northbound direction during the AM peak hour and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. There are no known planned or feasible improvements for this road segment.

Seg. #3 SR 1 between Carmel Valley Road and Rio Road

This segment is projected to operate at an unacceptable LOS F in the northbound direction during the AM and PM peak hours and LOS E in the southbound direction during the PM peak hour and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts. However, funding for these improvements is not guaranteed.

Seg. #6 – Carmel Valley Road between Robinson Canyon Road and Schulte Road

The CVMP ADT thresholds are projected to be exceeded under Background traffic conditions and the project would add traffic to this segment. Based on the CVMP ADT threshold, the project would have an impact. The impacts to segment #6 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #7 – Carmel Valley Road between Schulte Road and Rancho San Carlos Road

The CVMP ADT thresholds are projected to be exceeded under Background traffic conditions and the project would add traffic to this segment. Based on the CVMP ADT threshold, the project would have an impact. The impacts to segment #7 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

1.7 Cumulative Plus Project Alternative 1 Conditions**Intersections****Int. #1 – SR 1 / Carmel Valley Road**

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.3 seconds. Based on the Caltrans impact criteria the project would have an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts.

Int. #3 – SR 1 / Rio Road

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.2 seconds. Based on the Caltrans impact criteria the project would have an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts.

Int. #7 – SR 1 / Ocean Avenue

This intersection is projected to operate at a deficient LOS E during the AM and PM peak hours and traffic generated by the project is expected to increase the average delay by 0.1 and 0.4 seconds during the AM and PM peak hours, respectively. Based on the Caltrans impact criteria the project would have an impact. There are no known planned or feasible improvements at this intersection.

Int. #8 – SR 1 / Carpenter Street

This intersection is projected to operate at a deficient LOS E during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.3 seconds. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at this intersection would eliminate the project's impacts.

Road Segments**Seg. #1 – SR 1 between Carpenter Street and Ocean Avenue**

This segment is projected to operate at a deficient LOS D in the northbound (PM) and southbound (AM) directions and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Seg. #2 – SR 1 between Ocean Avenue and Carmel Valley Road

This segment is projected to operate at an unacceptable LOS F in the northbound direction during the AM peak hour and the project will add traffic to this segment. Based on the Caltrans impact criteria, the Proposed Project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Seg. #3 – SR 1 between Carmel Valley Road and Rio Road

This segment is projected to operate at a deficient LOS F (AM & PM) in the northbound and LOS E (PM) in the southbound direction and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Seg. #6 – Carmel Valley Road between Robinson Canyon Road and Schulte Road

The CVMP ADT thresholds are projected to be exceeded under Cumulative traffic conditions and the project would add traffic to this segment. Based on the CVMP ADT threshold, the project would have an impact. The impacts to segment #6 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #7 – Carmel Valley Road between Schulte Road and Rancho San Carlos Road

The CVMP ADT thresholds are projected to be exceeded under Cumulative traffic conditions and the project would add traffic to this segment. Based on the CVMP ADT threshold, the project would have an impact. The impacts to segment #7 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #13 – Rio Road between SR 1 and Crossroads Boulevard

This segment is projected to operate at a deficient LOS F (PM) in the westbound direction without the project. Traffic generated by the project is not expected to decrease the average travel speed; however, any traffic added to a segment operating at LOS F is considered a potential impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminated the project's impacts.

Seg. #14 – Rio Road between Crossroads Boulevard and Carmel Center Place

This segment is projected to operate at a deficient LOS F (AM & PM) in the westbound direction without the project. Traffic generated by the project is not expected to decrease the average travel speed; however, any traffic added to a segment operating at LOS F is considered a potential impact. However, this road segment is bounded by two closely spaced signalized intersections (approximately 220 feet apart), and the flow of traffic on this segment is controlled by the adjacent signal operations, which are projected to operate at an acceptable LOS C and LOS A under Cumulative Plus Project Alternative 1 conditions. As a result, the project is not expected to have an impact on this segment.

1.8 Existing Plus Project Alternative 2 Conditions**Intersections****Int. #7 – SR 1 / Ocean Avenue**

This intersection is projected to operate at a deficient LOS D during the AM and PM peak hours and traffic generated by the project is expected to increase the average delay by 0.1 seconds. Based on the Caltrans impact criteria the project would have an impact. There are no known planned or feasible improvements at this intersection.

Int. #8 – SR 1 / Carpenter Street

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.2 seconds. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at this intersection would eliminate the project's impacts.

Road Segments**Seg. #1 SR 1 between Carpenter Street and Ocean Avenue**

This segment is projected to operate at a deficient LOS D in the northbound (PM) and southbound (AM) directions and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at the SR 1 / Carpenter Street intersection would eliminate the project's impacts in the northbound direction. There are no known planned or feasible improvements for this segment in the southbound direction.

Seg. #3 – SR 1 between Carmel Valley Road and Rio Road

This segment operates at a deficient LOS F (AM & PM) in the northbound direction and LOS E (PM) in the southbound direction and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts in the northbound direction. However, funding for these improvements is not guaranteed. Widening SR 1 would eliminate the project's impacts in the southbound direction; however, this is not considered feasible.

1.9 Background Plus Project Alternative 2 Conditions**Intersections****Int. #7 – SR 1 / Ocean Avenue**

This intersection is projected to operate at a deficient LOS D during the AM and PM peak hours and traffic generated by the project is expected to increase the average delay by 0.1 and 0.2 seconds during the AM and PM peak hours, respectively. Based on the Caltrans impact criteria the project would have an impact. There are no known planned or feasible improvements at this intersection.

Int. #8 – SR 1 / Carpenter Street

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.1 seconds. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at this intersection would eliminate the project's impacts.

Road Segments**Seg. #1 – SR 1 between Carpenter Street and Ocean Avenue**

This segment is projected to operate at a deficient LOS D in the northbound (PM) and southbound (AM) directions and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at the SR 1 / Carpenter Street intersection would eliminate the project's impacts in the northbound direction. There are no known planned or feasible improvements for this segment in the southbound direction.

Seg. #2 SR 1 between Ocean Avenue and Carmel Valley Road

This segment is projected to operate at a deficient LOS F in the northbound direction during the AM peak hour and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. There are no known planned or feasible improvements for this road segment.

Seg. #3 SR 1 between Carmel Valley Road and Rio Road

This segment is projected to operate at an unacceptable LOS F in the northbound direction during the AM and PM peak hours and LOS E in the southbound direction during the PM peak hour and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts. However, funding for these improvements is not guaranteed.

Seg. #6 – Carmel Valley Road between Robinson Canyon Road and Schulte Road

The CVMP ADT thresholds are projected to be exceeded under Background traffic conditions and the project would add traffic to this segment. Based on the CVMP ADT threshold, the project would have an impact. The

impacts to segment #6 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #7 – Carmel Valley Road between Schulte Road and Rancho San Carlos Road

The CVMP ADT thresholds are projected to be exceeded under Background traffic conditions and the project would add traffic to this segment. Based on the CVMP ADT threshold, the project would have an impact. The impacts to segment #7 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

1.10 Cumulative Plus Project Alternative 2 Conditions**Intersections****Int. #1 – SR 1 / Carmel Valley Road**

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.2 seconds. Based on the Caltrans impact criteria the project would have an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts.

Int. #3 – SR 1 / Rio Road

This intersection is projected to operate at a deficient LOS D during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.1 seconds. Based on the Caltrans impact criteria the project would have an impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts.

Int. #7 – SR 1 / Ocean Avenue

This intersection is projected to operate at a deficient LOS E during the AM and PM peak hours and traffic generated by the project is expected to increase the average delay by 0.1 and 0.2 seconds during the AM and PM peak hours, respectively. Based on the Caltrans impact criteria the project would have an impact. There are no known planned or feasible improvements at this intersection.

Int. #8 – SR 1 / Carpenter Street

This intersection is projected to operate at a deficient LOS E during the PM peak hour and traffic generated by the project is expected to increase the average delay by 0.2 seconds. Based on the Caltrans impact criteria the project would have an impact. Implementing a dedicated northbound SR 1 right-turn lane at this intersection would eliminate the project's impacts.

Road Segments**Seg. #1 – SR 1 between Carpenter Street and Ocean Avenue**

This segment is projected to operate at a deficient LOS D in the northbound (PM) and southbound (AM) directions and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Seg. #2 SR 1 between Ocean Avenue and Carmel Valley Road

This segment is projected to operate at an unacceptable LOS F in the northbound direction during the AM

peak hour and the project will add traffic to this segment. Based on the Caltrans impact criteria, the Proposed Project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Seg. #3 – SR 1 between Carmel Valley Road and Rio Road

This segment is projected to operate at a deficient LOS F (AM & PM) in the northbound and LOS E (PM) in the southbound direction and the project will add traffic to this segment. Based on the Caltrans impact criteria the project would have a cumulative impact. Both TAMC and Caltrans consider payment of regional development impact fees as mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the project's cumulative impacts.

Seg. #6 – Carmel Valley Road between Robinson Canyon Road and Schulte Road

The CVMP ADT thresholds are projected to be exceeded under Cumulative traffic conditions and the project would add traffic to this segment. Based on the CVMP ADT threshold, the project would have an impact. The impacts to segment #6 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #7 – Carmel Valley Road between Schulte Road and Rancho San Carlos Road

The CVMP ADT thresholds are projected to be exceeded under Cumulative traffic conditions and the project would add traffic to this segment. Based on the CVMP ADT threshold, the project would have an impact. The impacts to segment #7 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #13 – Rio Road between SR 1 and Crossroads Boulevard

This segment is projected to operate at a deficient LOS F (PM) in the westbound direction without the project. Traffic generated by the project is not expected to decrease the average travel speed; however, any traffic added to a segment operating at LOS F is considered a potential impact. Participating in funding improvements in the TAMC Regional Transportation Plan (RTP) could potentially eliminate the project's impacts.

Seg. #14 – Rio Road between Crossroads Boulevard and Carmel Center Place

This segment is projected to operate at a deficient LOS F (AM & PM) in the westbound direction without the project. Traffic generated by the project is not expected to decrease the average travel speed; however, any traffic added to a segment operating at LOS F is considered a potential impact. However, this road segment is bounded by two closely spaced signalized intersections (approximately 220 feet apart), and the flow of traffic on this segment is controlled by the adjacent signal operations, which are projected to operate at an acceptable LOS C and LOS A under Cumulative Plus Project Alternative 2 conditions. As a result, the project is not expected to have an impact on this segment.

2 Introduction

This traffic study was prepared to analyze the impacts associated with the development of the proposed Val Verde Subdivision located on Val Verde Drive in Carmel Valley, Monterey County, California. **Exhibit 1** shows the location of the Proposed Project with respect to the local road network. **Exhibit 2** shows the Proposed Project site plan.

2.1 Project Description

The project site is located on the west side of Val Verde Drive north of Rio Road. The Proposed Project consists of 31 residential dwelling units. Twenty-four of these units will be market rate, single-family detached homes, and 7 will be inclusionary housing units (condos or apartments). There is one existing single-family dwelling unit on the site that would be replaced by the 31 new residential units. Access to the project site would be via two driveways on Val Verde Drive. The project includes the addition of pedestrian and bicycle facilities along the west side of Val Verde Drive.

2.2 Scope of Work

This study analyzes the traffic impacts of the proposed Val Verde Subdivision project on the surrounding roadway network. The study includes the evaluation of the following intersections:

1. State Route (SR) 1 / Carmel Valley Road
2. Carmel Rancho Boulevard / Carmel Valley Road
3. Rio Road / SR 1
4. Crossroads Boulevard / Rio Road
5. Carmel Center Place / Rio Road
6. Carmel Rancho Boulevard / Rio Road
7. SR 1 / Ocean Avenue
8. SR 1 / Carpenter Street
9. Carmel Rancho Boulevard / Shopping Center Driveway

The study includes the evaluation of the following road segments:

1. SR 1, Carpenter Street to Ocean Avenue
2. SR 1, Ocean Avenue to Carmel Valley Road
3. SR 1, Carmel Valley Road to Rio Road
4. SR 1, Rio Road to Ribera Road
5. Rio Road, west of SR 1
6. Carmel Valley Road, Robinson Canyon Road to Schulte Road
7. Carmel Valley Road, Schulte Road to Rancho San Carlos Road
8. Carmel Valley Road, Rancho San Carlos Road to Rio Road
9. Carmel Valley Road, Rio Road to Carmel Rancho Boulevard
10. Carmel Valley Road, Carmel Rancho Boulevard to SR 1
11. Carmel Rancho Boulevard, Carmel Valley Road to Shopping Center Driveway
12. Carmel Rancho Boulevard, Shopping Center Driveway to Rio Road
13. Rio Road, SR 1 to Crossroads Boulevard
14. Rio Road, Crossroads Boulevard to Carmel Center Place
15. Rio Road, Carmel Center Place to Carmel Rancho Boulevard

The study intersections are shown in **Exhibit 3**. Beyond the limits of the study area, the project trips disperse onto numerous local streets or onto regional facilities. The impact of trips that disperse on the local road network lessens as they move away from the project site. The local intersections included in the analysis were identified as potentially having the greatest impact from the project.

Weekday AM and PM peak hour traffic operations were analyzed for the following conditions:

1. Existing Conditions
2. Existing Plus Project Conditions
3. Background Conditions
4. Background Plus Project Conditions
5. Cumulative Conditions
6. Cumulative Plus Project Conditions

2.3 Traffic Operation Evaluation Methodologies and Level of Service Standards

The study area covers the jurisdictions of the County of Monterey and Caltrans, and is within the Carmel Valley Master Plan area. Levels of service standards and analysis methodologies for each jurisdiction and/or planning area have been applied as follows:

Traffic Operation Evaluation Methodologies

Intersection and road segment traffic operations were evaluated based on the Level of Service (LOS) concept, and the LOS standard adopted by the jurisdiction within which the intersection is located. LOS is a quantitative description of an intersection'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 what is commonly considered unacceptable delay to vehicles at intersections. The intermediate levels of service represent incremental levels of congestion and delay between these two extremes. LOS descriptions for signalized intersections are included as **Appendix A**. LOS descriptions for unsignalized intersections with two-way stop control are included as **Appendix B**.

Intersection traffic operations were evaluated using the Synchro analysis software (Version 8) which is based on the *Highway Capacity Manual (HCM) 2010* methodologies for signalized and un-signalized intersections. HCM 2000 methods were used in cases where the HCM 2010 methods do not allow the analysis of specific lane configurations or signal phasing.

Intersection operations are based upon the average vehicular delay at the intersection. The average delay is then correlated to a level of service. For two-way stop controlled intersections, the vehicle delay for side street traffic is analyzed. LOS for each side street movement is based on the distribution of gaps in the major street traffic stream and driver judgment in selecting gaps. Improvements are warranted when a side street approach reaches LOS F for two-way stop controlled intersections. When using the HCM 2010 and HCM 2000 methods for the analysis of signalized intersections, the overall intersection delay is used to determine LOS.

Per direction from Monterey County Department of Public Works staff, road segment operations for study segments #1 - #4 are referenced from the *Rancho Cañada Draft Transportation Impact Study* prepared by Central Coast Transportation Consulting (CCTC, January 2016). Study segments #1 - #4 are the northbound and southbound segments of SR 1 between Carpenter Street and Ribera Road. These segments were

analyzed by CCTC using National Cooperative Highway Research Program (NCHRP) Report 3-70; *Multi-Modal Level of Service for Urban Streets Methodology*.

Road segment operations for study segments #5 and #11 – #15 were evaluated using the Synchro software arterial analysis module which is based on HCM 2000 methodologies. The arterial LOS is based on the travel speed and Urban Street Class of the roadway as shown in **Appendix C** (HCM 2000 Exhibit 15-2).

Road segment operations for study segments on Carmel Valley Road (segments #6 – #10) were evaluated in accordance with the Carmel Valley Master Plan (CVMP) using Average Daily Traffic (ADT) volumes and HCM 2010 methodologies. The HCM 2010 methods include the evaluation of multi-lane and two-lane highways. The methodology for two-lane highways is based on the “percent time-spent-following” (PTSP), which is correlated to a level of service (HCM 2010 Exhibit 15-3). The HCM 2010 LOS methodology for multi-lane highways is based on vehicle density in passenger cars per mile per lane (pcpmpl). The density is correlated to a level of service (HCM 2010 Exhibit 14-4). HCM 2010 Exhibits 14-4 and 15-3 are provided in **Appendix C**.

The 2010 CVMP also provides the following average daily traffic (ADT) thresholds for segments of Carmel Valley Road. The ADT thresholds for the Carmel Valley Road study segments (#6 – #10) are provided in **Table 1**.

Table 1 – Carmel Valley Road ADT Thresholds

Segment	CVMP Threshold
6. CVR between Robinson Canyon Rd & Schulte Rd	15,499
7. CVR between Schulte Rd & Rancho San Carlos Rd	16,340
8. CVR between Rancho San Carlos Rd & Rio Rd	48,487
9. CVR between Rio Rd & Carmel Rancho Blvd	51,401
10. CVR between Carmel Rancho Blvd & SR 1	27,839

Monterey County Level of Service Standards

The Monterey County General Plan has established LOS D as the minimum acceptable level of service for signalized intersections and road segments. For un-signalized intersections LOS E is considered the maximum acceptable level of service (based on the delay at the worst approach for two-way stop controlled intersections and the average delay at all-way stop and roundabout controlled intersections). All of the intersections in this study fall under the jurisdiction of Caltrans or the Carmel Valley Master Plan. Roadway segment #5 falls under the jurisdiction of Monterey County with an LOS D standard.

Carmel Valley Master Plan Level of Service Standards

With the exception of some road segments along Carmel Valley Road, LOS C has been established as the minimum acceptable level of service for roadways and intersections within Carmel Valley. Per CVMP Policy 2.18, LOS D has been established as the minimum acceptable level of service for several segments along Carmel Valley Road.

Study intersections that fall under the jurisdiction of the Carmel Valley Master Plan with an LOS C standard include intersections #2, #4, #5, #6 and #9. Roadway segments that fall under the jurisdiction of the Carmel

Valley Master Plan with an LOS D standard include segments #6 and #7, while segments #8, #9, #10, #11, #12, #13, #14 and #15 have an LOS C standard.

Caltrans Level of Service Standards

Per the Caltrans *Guide for Preparation of Traffic Impact Studies* publication, “Caltrans endeavors to maintain a target LOS at the transition between LOS “C” and LOS “D” on State highway facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than the appropriate target LOS, the existing MOE should be maintained.” MOE refers to the measures of effectiveness which are used to describe the measures best suited for analyzing State highway facilities.

Study intersections that fall under the jurisdiction of Caltrans with an LOS C/D standard include intersections #1, #3, #7 and #8. Roadway segments that fall under the jurisdiction of Caltrans with an LOS C/D standard include segments #1, #2, #3 and #4.

2.4 Criteria for Project Impacts

According to the California Environmental Quality Act (CEQA) guidelines, a project may have a significant effect on the environment if it would cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system. In accordance with CEQA, specific impact criteria have been applied to the study intersections and road segments to determine if the project specific increase in traffic is substantial in relation to the existing traffic load and capacity of the street system.

The study area falls within multiple jurisdictions and planning areas, as described in Section 1.3. The impact criteria for the relevant jurisdictions and planning areas are listed below and have been applied to the analysis results.

Monterey County Impact Criteria

An impact at a **signalized study intersection** is defined to occur under the following conditions:

- An impact would occur if an intersection operating at LOS A, B, C, or D degrades by one or more letter grades to LOS E or F. For intersections already operating at LOS E, an impact would occur if operations degrade to LOS F. For intersections already operating at LOS F, the addition of any project traffic to the facility is considered an impact.

An impact at an **unsignalized study intersection** is defined to occur under the following conditions:

- An impact would occur if an **all-way stop controlled** or **roundabout controlled** intersection, based on the average delay, operates at LOS F or any traffic signal warrant is met.
- An impact would occur if a **two-way stop controlled** intersection, based on the worst approach delay, operates at LOS F or any traffic signal warrant is met.

An impact at a **study road segment** is defined to occur under the following conditions:

- An impact would occur if a roadway segment operating at LOS A through LOS E degrades to a lower level of service E or F. If a segment is already operating at LOS F any increase during the peak hour (one vehicle) is considered an impact.

Carmel Valley Master Plan (CVMP) Impact Criteria

The following impact criteria are based on the Monterey County General Plans' Carmel Valley Master Plan (CV 2.17(f)) and apply to study intersections 2, 4, 5, 6 and 9:

An impact at a **signalized study intersection** is defined to occur under the following conditions:

- An impact would occur if an intersection operating at LOS A, B or C degrades by one or more letter grades to LOS D, E or F. If an intersection is already operating at LOS D or E, an impact would occur the LOS degrades by one or more letter grades to LOS E or F. If an intersection is already operating at LOS F, the addition of any project traffic to the facility is considered an impact.

An impact at an **unsignalized study intersection** is defined to occur under the following conditions:

- An impact would occur if an **all-way stop controlled** or **roundabout controlled** intersection, based on the average delay, operates at LOS F or any traffic signal warrant is met.
- An impact would occur if a **two-way stop controlled** intersection, based on the worst approach delay, operates at LOS F or any traffic signal warrant is met.

An impact on a **study road segments #8, #9, #10, #11, #12, #13, #14, #15** would occur if operations degrade from LOS C or better to LOS D, E or F; or if operations degrade on **study road segments #6 or #7** from LOS D or better to LOS E or F; or if project traffic worsens the LOS of a segment operating at LOS E by one letter grade to LOS F; or if project traffic is added to a segment operating at LOS F; or if the CVMP ADT threshold is exceeded.

Caltrans Impact Criteria

Caltrans perceives an impact when there is any degradation in the performance measure below the cusp of C/D. If a facility is currently operating at or below LOS D, then any trips added represent a potential impact, and the performance measure should be brought back to predevelopment conditions. While a single trip added to a degraded facility is not usually reflected in the performance measure, Caltrans reserves the ability to consider a single trip as an impact.

SB 743 Implications

On September 27, 2013, Governor Brown signed Senate Bill (SB) 743 (Steinberg, 2013), which creates a process to change the way that transportation impacts are analyzed under CEQA. SB 743 supports AB 32, the California Global Warming Solutions Act of 2006, and SB 375, the Sustainable Communities and Climate Protection Act of 2008, which call for substantial reductions in greenhouse gas (GHG) emissions. SB 743 mandates a change in the way that public agencies evaluate transportation impacts of projects under CEQA. Under the new CEQA Guidelines, aspects of project location and design that influence travel choices, and thereby improve or degrade air quality, safety, and health, must be considered. The new CEQA Guidelines will eliminate the use of automobile delay, including Level of Service (LOS), in evaluating transportation impacts and replace it with Vehicle Miles Traveled (VMT), based on a goal of reducing statewide GHG emissions by 15% by the year 2020.

The new CEQA Guidelines will measure whether a project contributes to various state goals, such as reducing greenhouse gas emissions (GHG), developing multimodal transportation, preserving open spaces, and promoting diverse land uses and infill development. Projects that are shown to decrease vehicle miles traveled — for example, bike lanes or pedestrian paths, or a grocery store that allows local residents to travel shorter distances to shop — may be automatically considered to have a “less than significant” impact under CEQA. Under the new CEQA Guidelines, projects may be able to mitigate transportation impacts by funding better transit, creating better access to transit, designing more walkable communities, or implementing other improvements that increase travel choices.

The cities of San Francisco and Pasadena have already modified their local environmental review process by removing automobile delay (i.e., Level of Service) and replacing it with Vehicle Miles Traveled when determining significant traffic impacts on the environment pursuant to CEQA. The statewide revisions to the CEQA Guidelines are expected to be completed in about one year, and the implementation of the revised guidelines may be phased in over the course of two years.

2.5 Funding for Transportation Improvements

Carmel Valley Traffic Impact Improvement Program

The Carmel Valley Traffic Improvement Program (CVTIP) includes a list of projects to relieve congestion and improve traffic operations on Carmel Valley Road. The CVTIP collects fees from new developments to contribute to these improvements. The traffic fees apply to projects within Carmel Valley and to projects in the Greater Carmel Valley Area that will add traffic to Carmel Valley Road. Per the Carmel Valley Traffic Improvement Program EIR, the fee amounts are updated on an annual basis.

TAMC Fee

The Transportation Agency for Monterey County (TAMC) and its member jurisdictions have adopted a county-wide, regional impact fee to cover the costs for studies and construction of many improvements throughout Monterey County. This impact fee, which went into effect on August 27, 2008, is applied to all new development within Monterey County. The governing document for the fee is the *Regional Impact Fee Nexus Study Update* (March 26, 2008) prepared by Kimley-Horn Associates, Inc. The *Regional Impact Fee Nexus Study Update* was updated again in 2013.

Monterey County Traffic Impact Fee

The 2010 Monterey County General Plan, which was adopted October 26, 2010, includes the following policies:

- Policy C-1.8 Development proposed in cities and adjacent counties shall be carefully reviewed to assess the proposed development’s impact on the County’s circulation system. The County, in consultation with TAMC and Monterey County cities shall, within 18 months of adoption of the General Plan, develop a County Traffic Impact fee that addresses Tier 2 impacts of development in cities and unincorporated areas. From the time of adoption of the General Plan until the time of adoption of a County Traffic Impact Fee, the County shall impose an ad hoc fee on its applicants based upon a fair share traffic impact fee study.
- Policy C-1.9 All available public and private sources shall be used for the funding of road and highway development, improvement and maintenance.

- Policy C-1.10 The County, in coordination with TAMC and other affected agencies, shall continue efforts to improve traffic congestion at critical locations.
- Policy C-1.11 In addition to the County Traffic Impact Fee established in Policy C-1.8, the County shall require new development to pay a Regional Traffic Impact Fee developed collaboratively between TAMC, the County, and other local and state agencies to ensure a funding mechanism for regional transportation improvements mitigating Traffic Tier 3 impacts.

3 Existing Traffic Conditions

This section describes the existing street network relevant to the Proposed Project and the existing operational traffic conditions.

3.1 Existing Roadway Network

The key roadways in the vicinity of the Proposed Project are described below:

State Route 1 (SR 1) provides regional access to the project site. SR 1 is a major north-south roadway that connects the Monterey Peninsula with San Luis Obispo County to the south, and with Santa Cruz County and the San Francisco Bay Area to the north. SR 1 is a four-lane freeway north of Carpenter Street, a four- to five-lane (the five-lane section has a two-way center left-turn lane) roadway between Carpenter Street and Ocean Avenue, a three-lane roadway (two lanes northbound and one lane southbound) between Ocean Avenue and Carmel Valley Road, and a two-lane roadway south of Carmel Valley Road. SR 1 is part of the Monterey County Congestion Management Program (CMP) highway network and is designated as a State Scenic Highway. The speed limit on SR 1 in the vicinity of the project is 45 miles per hour.

Local access to the site is provided by Carmel Valley Road, Rio Road, Carmel Rancho Boulevard and Val Verde Drive. These roadways are described below.

Carmel Valley Road is an east-west roadway that begins at SR 1 and continues east to the City of Greenfield. Carmel Valley Road has four lanes from SR 1 to approximately 1,800 feet west of Rancho San Carlos Road. Carmel Valley Road has two lanes east of Rancho San Carlos Road. Carmel Valley Road is classified as a major arterial. The speed limit on Carmel Valley Road in the vicinity of the project is 45 miles per hour.

Rio Road includes two discontinuous segments of roadway east and west of the project site. The eastern part is a short north-south two-lane segment that connects to Carmel Valley Road and provides access to Rancho Canada Golf Club and the Community Church of the Monterey Peninsula. The western part is an east-west roadway with two lanes between SR 1 and Junipero Street, and four lanes between SR 1 and Val Verde Drive. Rio Road would provide access to the project site via Val Verde Drive. The speed limit on Rio Road in the vicinity of the project is 25 miles per hour.

Carmel Rancho Boulevard is a four-lane north-south roadway that extends from Carmel Valley Road to Rio Road. It provides access to various commercial developments and also serves through traffic between Carmel Valley Road and SR 1 south of Rio Road. The speed limit on Carmel Rancho Boulevard in the vicinity of the project is 35 miles per hour.

Val Verde Drive is a two-lane unimproved road that runs north-south for approximately one-quarter mile north of the western portion of Rio Road. Val Verde Drive provides access to several single-family homes and will provide direct access to the project site. There is no posted speed limit on Val Verde Drive.

3.2 Existing Bicycle, Pedestrian and Transit Facilities

The County of Monterey adopted the Monterey County Bikeway Plan in 2008 and the Transportation Agency for Monterey County (TAMC) adopted their Bicycle and Pedestrian Master Plan in 2011. These documents designate routes along roadways that can be used by bicycling commuters and recreational riders for safe access to major employers, shopping centers and schools. Consistent with State and Federal designations,

there are three basic types of bicycle facilities. Each type is described below:

1. Bike path (Class I) - A completely separate right-of-way designed for the exclusive use of cyclists and pedestrians, with minimal crossings for motorists.
2. Bike lane (Class II) - A lane on a regular roadway, separated from the motorized vehicle right-of-way by paint striping, designated for the exclusive or semi-exclusive use of bicycles. Bike lanes allow one-way bike travel. Through travel by motor vehicles or pedestrians is prohibited, but crossing by pedestrians and motorists is permitted.
3. Bike route (Class III) - Provides shared use of the roadway with motorists, designated by signs or permanent markings.

In the vicinity of the Proposed Project, Class II bike lanes are provided on the north side of Carmel Valley Road east of Carmel Rancho Boulevard, and on the south side Carmel Valley Road east of Carmel Middle School.

Sidewalks in the vicinity of the project site are provided on portions of Rio Road between Val Verde Drive and SR 1 and a Class I multi-use path is provided on the east side of SR 1 beginning at the Crossroads Shopping Center and continuing north to Canyon Drive.

The primary public transit service in the County of Monterey is the bus service provided by Monterey-Salinas Transit (MST). In the vicinity of the project site, MST Route 24 provides bus service along Rio Road, Carmel Rancho Boulevard and Carmel Valley Road between Carmel Valley Village and the Monterey Transit Plaza with 60-minute headways during weekday peak hours. MST Route 94 provides bus service along Rio Road and Carmel Rancho Boulevard to and from Carmel-by-the-Sea with about 30 minute headways during weekday mornings between about 7:00 and 9:00 a.m. Bus stops within the study area are located on Carmel Rancho Boulevard north and south of Clock Tower Lane and on Rio Road between Carmel Center Place and Via Nona Marie.

3.3 Existing Intersection Operations

New weekday AM and PM peak hour turning movement counts were conducted at all 9 study intersections in July and August, 2015. A review of the new traffic volumes showed that the new volumes were lower than previously published volumes from other traffic studies at a majority of the study intersections. As a result, adjustments were made to proportionally increase the volumes per the previous (higher) volumes. The adjusted volumes were then balanced where appropriate between study intersections, with consideration given to driveways and intersections between study intersections. The new raw counts and a comparison of the new raw counts, the previously published volumes, and the adjusted and balanced volumes are shown in **Appendix D**.

The Existing conditions peak hour traffic volumes used in the analysis are presented in **Exhibit 4**. Intersection levels of service are summarized in **Exhibit 5**. LOS calculation worksheets are included as **Appendix E**.

Based on the aforementioned level of service standards, the following study intersections operate at unacceptable levels of service under Existing conditions:

- Intersection #3 – SR 1 / Rio Road (LOS D – PM)

- Intersection #7 – SR 1 / Ocean Avenue (LOS D – AM & PM)
- Intersection #8 – SR 1 / Carpenter Street (LOS D – PM)

3.4 Existing Road Segment Operations

Existing peak hour segment volumes for study segments #5 and #11 – #15 were derived from the peak hour intersection volumes described in Section 2.3. In order to be consistent with the Monterey County monitoring program for Carmel Valley Road, existing peak hour segment volumes and ADT's on Carmel Valley Road (segments #6 – #10) were obtained from Monterey County Department of Public Works staff.

Road segment levels of service are summarized in **Exhibits 6 and 7**. LOS calculation worksheets for road segments #5 and #11 - #15 are included as **Appendix F**. Existing peak hour levels of service for study segments #1 - #4 are referenced from the *Rancho Cañada Draft Transportation Impact Study* prepared by CCTC (January 2016).

Under Existing conditions, the ADT's on the Carmel Valley Road study segments (#6 – #10) are below the CVMP ADT thresholds.

Based on the aforementioned level of service standards, the following study road segments operate at unacceptable levels of service under Existing conditions:

- Segment #1 – SR 1 between Carpenter Street and Ocean Avenue
- Segment #3 – SR 1 between Carmel Valley Road and Rio Road
- Segment #6 – Carmel Valley Road between Robinson Canyon Rd and Schulte Rd
- Segment #7 – Carmel Valley Road between Schulte Rd and Rancho San Carlos Road
- Segment #11 – Carmel Rancho Blvd between Carmel Valley Rd and Shopping Ctr Dwy
- Segment #13 – Rio Road between SR 1 and Crossroads Blvd
- Segment #14 – Rio Road between Crossroads Blvd and Carmel Center Place

4 Proposed Project Trip Generation, Distribution and Assignment

The procedures for generating and assigning project trips to the local road network are described in this section.

4.1 Proposed Project Trip Generation

The Proposed Project consists of 24 market rate single family homes and 7 inclusionary units (condos or apartments). Trip generation rates for condos and apartments are lower than for single family homes; however, due to the location of the Proposed Project (i.e., with limited access to regional public transportation), the trip generation rates for single family detached housing was used for all 31 units. This represents a conservative analysis. A trip generation credit was given for the one existing single family house located on the project site.

Trip generation rates published by the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th Edition (2012) were used to estimate the trips that will be generated by the Proposed Project using the ITE land use code for single-family detached housing (210). The Proposed Project trip generation estimate is presented in **Exhibit 8**.

The Proposed Project is estimated to generate 285 daily trips, with 22 trips occurring during the AM peak hour (6 in, 16 out) and 30 trips occurring during the PM peak hour (19 in, 11 out).

4.2 Proposed Project Trip Distribution

The Proposed Project trip distribution is based on existing traffic patterns, land uses in the study area and engineering judgment. The Proposed Project trip distribution percentages are shown graphically in **Exhibit 9**.

4.3 Proposed Project Trip Assignment

The trips generated by the Proposed Project were assigned to the road network using the trip distribution percentages shown in **Exhibit 9**. The Proposed Project trip assignment is shown in **Exhibit 10**.

5 Existing Plus Proposed Project Traffic Conditions

This section describes Existing Plus Proposed Project conditions. Traffic related impacts associated with project development are discussed in this section.

5.1 Existing Plus Proposed Project Traffic Volumes

The Proposed Project traffic assignments were added to the existing traffic volumes to obtain Existing Plus Proposed Project traffic volumes. Existing Plus Proposed Project traffic volumes for the AM and PM peak hours are presented in **Exhibit 11**.

5.2 Existing Plus Proposed Project Intersection Operations

Intersection levels of service are summarized in **Exhibit 5**. LOS calculation worksheets are included as **Appendix E**. Based on the aforementioned level of service standards, the following intersections are projected to operate at unacceptable levels of service under Existing Plus Proposed Project conditions:

- Intersection #3 – SR 1 / Rio Road (LOS D – PM)
- Intersection #7 – SR 1 / Ocean Avenue (LOS D – AM & PM)
- Intersection #8 – SR 1 / Carpenter Street (LOS D – PM)

Int. #3 SR 1 / Rio Road

This intersection is under Caltrans jurisdiction. The Proposed Project would add traffic to this intersection, which operates at an unacceptable LOS D during the PM peak hour.

Impacts and Mitigations: The Proposed Project would increase the delay at this intersection, which already operates at a deficient LOS D during the PM peak hour. Based on the Caltrans impact criteria, the Proposed Project would have an impact at this intersection during the PM peak hour.

The TAMC Regional Transportation Plan (RTP) includes a list of projects to improve traffic operations within the project study area. Planned improvements at the SR 1 / Rio Road intersection include:

- a. Convert the northbound right-turn lane to a shared through/right-turn lane*
- b. Add a second westbound right-turn lane*
- c. Add an exclusive southbound right-turn lane*

The Proposed Project's impact would be eliminated with these improvements. The construction of these improvements is dependent on State Transportation Improvement Program (STIP) funding, which is not guaranteed at this time. However, participation in funding these improvements could potentially eliminate the Proposed Project's impacts.

Int. #7 SR 1 / Ocean Avenue

This intersection is under Caltrans jurisdiction. The Proposed Project would add traffic to this intersection, which operates at an unacceptable LOS D during the AM and PM peak hours.

Impacts and Mitigations: The Proposed Project would increase the delay at this intersection, which already operates at a deficient LOS D during the AM and PM peak hours. Based on the Caltrans impact criteria, the

Proposed Project would have an impact at this intersection during the AM and PM peak hours. There are no known planned or feasible improvements at this intersection.

Int. #8 SR 1 / Carpenter Street

This intersection is under Caltrans jurisdiction. The Proposed Project would add traffic to this intersection, which operates at an unacceptable LOS D during the PM peak hour.

Impacts and Mitigations: The Proposed Project would increase the delay at this intersection, which already operates at a deficient LOS D during the PM peak hour. Based on the Caltrans impact criteria, the Proposed Project would have an impact at this intersection during the PM peak hour.

There are no known planned improvements at this intersection. The addition of a dedicated northbound right-turn lane would still result in LOS D operations during the PM peak hour; however, it would eliminate the Proposed Project's impacts by reducing the delay to pre-project conditions.

This improvement is not included in the TAMC Regional Transportation Plan (RTP) list of projects. Operations at this intersection are projected to degrade to LOS E under cumulative traffic conditions, with or without the Proposed Project. A possible improvement at this location for cumulative conditions could be the addition of a third northbound through lane that could be extended north through the intersection before merging back to two northbound SR 1 lanes. This would allow the addition of a third eastbound left-turn lane and would result in acceptable LOS C operations during the AM and PM peak hours under Cumulative Plus Proposed Project traffic conditions.

It is recommended that a dedicated northbound right-turn lane be implemented at this intersection prior to or in conjunction with the Proposed Project. This right-turn lane could then be converted to a northbound shared through/right-turn lane if a third northbound lane is implemented under cumulative conditions.

5.3 Existing Plus Proposed Project Road Segment Operations

Road segment levels of service are summarized in **Exhibits 6 and 7**. LOS calculation worksheets for road segments #5 and #11 - #15 are included as **Appendix F**. Levels of service for study segments #1 - #4 are referenced from the *Rancho Cañada Draft Transportation Impact Study* prepared by CCTC (January 2016). The levels of service for study segments #1 - #4 are reported to remain the same under Existing and Existing Plus 130-Unit Alternative conditions in the Rancho Cañada report. Since the Val Verde Subdivision project includes fewer units (i.e., 31 vs 130 units), the Rancho Cañada report represents a conservative analysis for study segments #1 - #4 for this report.

Under Existing Plus Proposed Project conditions, the ADT's on the Carmel Valley Road study segments (#6 – #10) are projected to be below the CVMP ADT thresholds.

Based on the aforementioned level of service standards, the following road segments are projected to operate at unacceptable levels of service under Existing Plus Proposed Project conditions:

- Segment #1 – SR 1 between Carpenter Street and Ocean Avenue
- Segment #3 – SR 1 between Carmel Valley Road and Rio Road
- Segment #6 – Carmel Valley Road between Robinson Canyon Rd and Schulte Rd
- Segment #7 – Carmel Valley Road between Schulte Rd and Rancho San Carlos Road

- Segment #11 – Carmel Rancho Blvd between Carmel Valley Rd and Shopping Ctr Dwy
- Segment #13 – Rio Road between SR 1 and Crossroads Blvd
- Segment #14 – Rio Road between Crossroads Blvd and Carmel Center Place

Seg. #1 SR 1 between Carpenter Street and Ocean Avenue

This road segment is under Caltrans jurisdiction. The Proposed Project would add traffic to this segment, which operates at an unacceptable LOS D in the southbound direction during the AM peak hour and LOS D in the northbound direction during the PM peak hour.

Impacts and Mitigations: The Proposed Project would add traffic to this road segment, which already operates at a deficient LOS D during the AM and PM peak hours. Based on the Caltrans impact criteria, the Proposed Project would have an impact on this road segment.

There are no known planned improvements on this road segment. However, the addition of a dedicated northbound right-turn lane at the SR 1 / Carpenter Street intersection would improve operations in the northbound direction during the PM peak hour.

It is recommended that a dedicated northbound right-turn lane be implemented at the SR 1 / Carpenter Street intersection prior to or in conjunction with the Proposed Project.

There are no known planned or feasible improvements for this road segment in the southbound direction. As a result, the Proposed Project's would have an impact in the southbound direction.

Seg. #3 SR 1 between Carmel Valley Road and Rio Road

This road segment is under Caltrans jurisdiction. The Proposed Project would add traffic to this segment, which operates at an unacceptable LOS F in the northbound direction during the AM and PM peak hours and LOS E in the southbound direction during the PM peak hour.

Impacts and Mitigations: The Proposed Project would add traffic to this road segment, which already operates at a deficient LOS E and LOS F during the AM and PM peak hours. Based on the Caltrans impact criteria, the Proposed Project would have an impact on this road segment.

The TAMC Regional Transportation Plan (RTP) includes a list of projects to improve traffic operations within the project study area. These improvements include:

1. *Add a second northbound through lane on SR 1 between Rio Road and Carmel Valley Road*
2. *SR 1 / Rio Road Intersection:*
 - a. *Convert the northbound right-turn lane to a shared through/right-turn lane*
 - b. *Add a second westbound right-turn lane*
 - c. *Add an exclusive southbound right-turn lane*
3. *SR 1 / Carmel Valley Road Intersection:*
 - a. *Convert the northbound right-turn lane to a shared through/right-turn lane*

The Proposed Project's impacts to Segment #3 in the northbound direction would be eliminated with these improvements. However, the construction of these improvements is dependent on State Transportation

Improvement Program (STIP) funding, which is not guaranteed at this time. Participation in funding these improvements could potentially mitigate the Proposed Project's impacts in the northbound direction. Widening SR 1 would eliminate the project's impacts in the southbound direction; however, this is not considered feasible.

Seg. #6 Carmel Valley Road between Robinson Canyon Road and Schulte Road

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which operates at an unacceptable LOS E during the AM and PM peak hours. This segment is not projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Existing Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS E during the AM and PM peak hours. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would not have an impact on this road segment because it would not worsen the LOS by one letter grade.

Seg. #7 Carmel Valley Road between Schulte Road and Rancho San Carlos Road

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which operates at an unacceptable LOS E during the AM and PM peak hours. This segment is not projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Existing Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS E during the AM and PM peak hours. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would not have an impact on this road segment because it would not worsen the LOS by one letter grade to LOS F.

Seg. #11 Carmel Rancho Boulevard between Carmel Valley Road and Shopping Center Driveway

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which operates at an unacceptable LOS D and LOS E during the AM and PM peak hours. This segment is not projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Existing Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS D and LOS E during the AM and PM peak hours. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would not have an impact on this road segment because it would not worsen the LOS by one letter grade.

Seg. #13 Rio Road between SR 1 and Crossroads Boulevard

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which operates at an unacceptable LOS D and LOS E during the AM and PM peak hours. This segment is not projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Existing Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS D and LOS E during the AM and PM peak hours. Based on the Carmel Valley Master Plan impact

criteria, the Proposed Project would not have an impact on this road segment because it would not worsen the LOS by one letter grade.

Seg. #14 Rio Road between Crossroads Boulevard and Carmel Center Place

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which operates at an unacceptable LOS D and LOS E during the AM and PM peak hours. This segment is not projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Existing Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS D and LOS E during the AM and PM peak hours. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would not have an impact on this road segment because it would not worsen the LOS by one letter grade.

5.4 Project Relationship to SB 743

On September 27, 2013, Governor Brown signed Senate Bill (SB) 743 (Steinberg, 2013), which creates a process to change the way that transportation impacts are analyzed under CEQA. SB 743 supports AB 32, the California Global Warming Solutions Act of 2006, and SB 375, the Sustainable Communities and Climate Protection Act of 2008, which call for substantial reductions in greenhouse gas (GHG) emissions. SB 743 mandates a change in the way that public agencies evaluate transportation impacts of projects under CEQA. Under the new CEQA Guidelines, aspects of project location and design that influence travel choices, and thereby improve or degrade air quality, safety, and health, must be considered. The new CEQA Guidelines will eliminate the use of automobile delay, including Level of Service (LOS), in evaluating transportation impacts and replace it with Vehicle Miles Traveled (VMT), based on a goal of reducing statewide GHG emissions by 15% by the year 2020.

The new CEQA Guidelines will measure whether a project contributes to various state goals, such as reducing greenhouse gas emissions (GHG), developing multimodal transportation, preserving open spaces, and promoting diverse land uses and infill development. Projects that are shown to decrease vehicle miles traveled — for example, bike lanes or pedestrian paths, or a grocery store that allows local residents to travel shorter distances to shop — may be automatically considered to have a “less than significant” impact under CEQA. Under the new CEQA Guidelines, projects may be able to mitigate transportation impacts by funding better transit, creating better access to transit, designing more walkable communities, or implementing other improvements that increase travel choices.

The cities of San Francisco and Pasadena have already modified their local environmental review process by removing automobile delay (i.e., Level of Service) and replacing it with Vehicle Miles Traveled when determining significant traffic impacts on the environment pursuant to CEQA. The statewide revisions to the CEQA Guidelines are expected to be completed in about one year, and the implementation of the revised guidelines may be phased in over the course of two years.

A VMT analysis has not been performed for the Val Verde Subdivision project. However, the project has a unique location that is in close proximity to three major shopping centers (i.e., The Barnyard, Crossroads and Carmel Rancho Shopping Centers) and public transportation. The Proposed Project likely would meet the primary goal of SB 743 by reducing VMT and greenhouse gas emissions.

The project site is located in close proximity to a wide variety of public-serving businesses, including the

following:

- Grocery Stores: 3
- Banks: 5
- Restaurants: 14
- Coffee Shops: 3
- Bakery: 2
- Post Office: 1
- Brokerage Houses: 2
- Gas Stations: 2
- Hair Salons: 3
- Hardware Stores: 2
- Pet Supply and Vet Services: 3
- Clothing & Jewelry Stores: 8
- Various Home Decorator Stores: 6
- Title Companies: 2
- Real Estate Offices: 3
- Doctors and Dentists: 7
- Copy Center: 1
- Book Store: 1
- Liquor Stores: 4
- Law Offices: 3
- Galleries: 3

All of the businesses listed above are within about an 8 to 18-minute walk of the proposed project. In addition, there are four transit stops in the project area, providing access to County-wide public transportation.

6 Background Traffic Conditions

This section of the report describes the analyses of the study road network under Background traffic conditions. Background conditions models traffic conditions with traffic from approved but not yet constructed developments added to the study intersections.

6.1 Background Traffic Volumes

AM and PM peak hour traffic generated by projects approved for development, but not yet constructed or occupied, was estimated based on trip generation rates within the Institute of Transportation Engineers' *Trip Generation* handbook, 9th Edition, 2012. The list of approved but not yet built projects is provided in **Appendix G** with a trip generation estimate for each project. The location of each approved but not yet built project is provided in **Appendix H**. Most of the projects listed in **Appendix G** were approved within the last 4 years but none of them have commenced with active construction to date.

It should be noted that trips generated by the Carmel Canine Sports Center project are included in the Background conditions analysis as the project was considered to be approved at the time of the analysis. The project was subsequently denied and has been removed from the list of approved projects. It was determined that removing the trips generated by the Carmel Canine Sports Center project from the analysis would not change the conclusions of this report. As a result, these trips remain in the level of service calculations and the results of the analysis can be considered conservative.

The trips generated by the approved but not yet built or occupied projects were assigned to the road network and combined with the existing peak hour volumes to obtain Background traffic volumes. The Background peak hour volumes are shown in **Exhibit 12**.

6.2 Background Intersection Operations

Intersection levels of service are summarized in **Exhibit 5**. LOS calculation worksheets are included as **Appendix E**.

Based on the aforementioned level of service standards, the following study intersections are projected to operate at unacceptable levels of service under Background conditions:

- Intersection #3 – SR 1 / Rio Road (LOS D – PM)
- Intersection #7 – SR 1 / Ocean Avenue (LOS D – AM & PM)
- Intersection #8 – SR 1 / Carpenter Street (LOS D – PM)

6.3 Background Road Segment Operations

Road segment levels of service are summarized in **Exhibits 6** and **7**. LOS calculation worksheets for road segments #5 and #11 - #15 are included as **Appendix F**. Levels of service for study segments #1 - #4 are referenced from the worst-case levels of service reported in the *Rancho Cañada Draft Transportation Impact Study* prepared by CCTC (January 2016).

Under Background conditions, the ADT's on Carmel Valley Road study segments #6 and #7 are projected to exceed the CVMP ADT thresholds.

Based on the aforementioned level of service standards, the following road segments are projected to operate at unacceptable levels of service under Background conditions:

- Segment #1 – SR 1 between Carpenter Street and Ocean Avenue
- Segment #2 – SR 1 between Ocean Avenue and Carmel Valley Road
- Segment #3 – SR 1 between Carmel Valley Road and Rio Road
- Segment #6 – Carmel Valley Road between Robinson Canyon Rd and Schulte Rd
- Segment #7 – Carmel Valley Road between Schulte Rd and Rancho San Carlos Road
- Segment #11 – Carmel Rancho Blvd between Carmel Valley Rd and Shopping Ctr Dwy
- Segment #13 – Rio Road between SR 1 and Crossroads Blvd
- Segment #14 – Rio Road between Crossroads Blvd and Carmel Center Place

7 Background Plus Proposed Project Traffic Conditions

This section of the report describes the analyses of the study road network under the Background Plus Proposed Project traffic conditions. Background Plus Proposed Project conditions includes traffic from approved but not yet constructed developments and traffic generated by the Proposed Project added to the study intersections.

7.1 Background Plus Proposed Project Traffic Volumes

The trips generated by the Proposed Project were assigned to the road network and combined with the background peak hour volumes to obtain Background Plus Proposed Project conditions traffic volumes. Background Plus Proposed Project AM and PM peak hour traffic volumes are shown in **Exhibit 13**.

7.2 Background Plus Proposed Project Intersection Operations

Intersection levels of service are summarized in **Exhibit 5**. LOS calculation worksheets are included as **Appendix E**.

Based on the aforementioned level of service standards, the following study intersections are projected to operate at unacceptable levels of service under Background Plus Proposed Project conditions:

- Intersection #3 – SR 1 / Rio Road (LOS D – PM)
- Intersection #7 – SR 1 / Ocean Avenue (LOS D – AM & PM)
- Intersection #8 – SR 1 / Carpenter Street (LOS D – PM)

Int. #3 SR 1 / Rio Road

This intersection is under Caltrans jurisdiction. The Proposed Project would add traffic to this intersection, which is projected to operate at an unacceptable LOS D during the PM peak hour.

Impacts and Mitigations: The Proposed Project would increase the delay at this intersection, which is projected to operate at a deficient LOS D during the PM peak hour. Based on the Caltrans impact criteria, the Proposed Project would have an impact at this intersection during the PM peak hour.

The TAMC Regional Transportation Plan (RTP) includes a list of projects to improve traffic operations within the project study area. Planned improvements at the SR 1 / Rio Road intersection include:

- a. *Convert the northbound right-turn lane to a shared through/right-turn lane*
- b. *Add a second westbound right-turn lane*
- c. *Add an exclusive southbound right-turn lane*

The Proposed Project's impact would be eliminated with these improvements. However, the construction of these improvements is dependent on State Transportation Improvement Program (STIP) funding, which is not guaranteed at this time. Participation in funding these improvements could potentially mitigate the Proposed Project's impacts.

Int. #7 SR 1 / Ocean Avenue

This intersection is under Caltrans jurisdiction. The Proposed Project would add traffic to this intersection, which is projected to operate at an unacceptable LOS D during the AM and PM peak hours.

Impacts and Mitigations: The Proposed Project would increase the delay at this intersection, which is projected to operate at a deficient LOS D during the AM and PM peak hours. Based on the Caltrans impact criteria, the Proposed Project would have an impact at this intersection during the AM and PM peak hours. There are no known planned or feasible improvements at this intersection.

Int. #8 SR 1 / Carpenter Street

This intersection is under Caltrans jurisdiction. The Proposed Project would add traffic to this intersection, which is projected to operate at an unacceptable LOS D during the PM peak hour.

Impacts and Mitigations: The Proposed Project would increase the delay at this intersection, which is projected to operate at a deficient LOS D during the PM peak hour. Based on the Caltrans impact criteria, the Proposed Project would have an impact at this intersection during the PM peak hour. There are no known planned improvements at this intersection. The addition of a dedicated northbound right-turn lane would still result in LOS D operations during the PM peak hour; however, it would eliminate the Proposed Project's impacts by reducing the delay to pre-project conditions.

This improvement is not included in the TAMC Regional Transportation Plan (RTP) list of projects. Operations at this intersection are projected to degrade to LOS E under cumulative traffic conditions, with or without the Proposed Project. A possible improvement at this location for cumulative conditions could be the addition of a third northbound through lane that could be extended north through the intersection before merging back to two northbound SR 1 lanes. This would allow the addition of a third eastbound left-turn lane and would result in acceptable LOS C operations during the AM and PM peak hours under Cumulative Plus Project traffic conditions.

It is recommended that a dedicated northbound right-turn lane be implemented at this intersection prior to or in conjunction with the Proposed Project. This right-turn lane could then be converted to a northbound shared through/right-turn lane if a third northbound lane is implemented under cumulative conditions.

7.3 Background Plus Proposed Project Road Segment Operations

Road segment levels of service are summarized in **Exhibits 6 and 7**. LOS calculation worksheets for road segments #5 and #11 - #15 are included as **Appendix F**. Levels of service for study segments #1 - #4 are referenced from the worst-case levels of service reported in the *Rancho Cañada Draft Transportation Impact Study* prepared by CCTC (January 2016).

Based on the aforementioned level of service standards, the following study road segments are projected to operate at unacceptable levels of service under Background Plus Proposed Project conditions:

- Segment #1 – SR 1 between Carpenter Street and Ocean Avenue
- Segment #2 – SR 1 between Ocean Avenue and Carmel Valley Road
- Segment #3 – SR 1 between Carmel Valley Road and Rio Road
- Segment #6 – Carmel Valley Road between Robinson Canyon Rd and Schulte Rd
- Segment #7 – Carmel Valley Road between Schulte Rd and Rancho San Carlos Road
- Segment #11 – Carmel Rancho Blvd between Carmel Valley Rd and Shopping Ctr Dwy
- Segment #13 – Rio Road between SR 1 and Crossroads Blvd
- Segment #14 – Rio Road between Crossroads Blvd and Carmel Center Place

Seg. #1 SR 1 between Carpenter Street and Ocean Avenue

This road segment is under Caltrans jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS D in the northbound direction during the PM peak hour and LOS D in the southbound direction during the AM peak hour.

Impacts and Mitigations: The Proposed Project would add traffic to this road segment, which is projected to operate at a deficient LOS D during the AM and PM peak hours. Based on the Caltrans impact criteria, the Proposed Project would have an impact on this road segment.

There are no known planned improvements on this road segment. However, the addition of a dedicated northbound right-turn lane at the SR 1 / Carpenter Street intersection would improve operations in the northbound direction during the PM peak hour.

It is recommended that a dedicated northbound right-turn lane be implemented at the SR 1 / Carpenter Street intersection prior to or in conjunction with the Proposed Project.

There are no known planned or feasible improvements for this road segment in the southbound direction. As a result, the Proposed Project's would have an impact in the southbound direction.

Seg. #2 SR 1 between Ocean Avenue and Carmel Valley Road

This road segment is under Caltrans jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS F in the northbound direction during the AM peak hour.

Impacts and Mitigations: The Proposed Project would add traffic to this road segment, which is projected to operate at a deficient LOS F during the AM peak hour. Based on the Caltrans impact criteria, the Proposed Project would have an impact on this road segment. There are no known planned or feasible improvements for this road segment.

Seg. #3 SR 1 between Carmel Valley Road and Rio Road

This road segment is under Caltrans jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS F in the northbound direction during the AM and PM peak hours and LOS E in the southbound direction during the PM peak hour.

Impacts and Mitigations: The Proposed Project would add traffic to this road segment, which is projected to operate at a deficient LOS E and LOS F during the AM and PM peak hours. Based on the Caltrans impact criteria, the Proposed Project would have an impact on this road segment.

The TAMC Regional Transportation Plan (RTP) includes a list of projects to improve traffic operations within the project study area. These improvements include:

1. *Add a second northbound through lane on SR 1 between Rio Road and Carmel Valley Road*
2. *SR 1 / Rio Road Intersection:*
 - a. *Convert the northbound right-turn lane to a shared through/right-turn lane*
 - b. *Add a second westbound right-turn lane*
 - c. *Add an exclusive southbound right-turn lane*

3. SR 1 / Carmel Valley Road Intersection:
 - a. Convert the northbound right-turn lane to a shared through/right-turn lane

The Proposed Project's impacts to Segment #3 in the northbound direction would be eliminated with these improvements. However, the construction of these improvements is dependent on State Transportation Improvement Program (STIP) funding, which is not guaranteed at this time. Participation in funding these improvements could potentially mitigate the Proposed Project's impacts.

Seg. #6 Carmel Valley Road between Robinson Canyon Road and Schulte Road

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS E during the AM and PM peak hours. This segment is also projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Background Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS E during the AM and PM peak hours and a segment that exceeds the CVMP ADT threshold. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would have an impact on this road segment because it would exceed the CVMP ADT threshold.

The impacts to segment #6 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #7 Carmel Valley Road between Schulte Road and Rancho San Carlos Road

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS E during the AM and PM peak hours. This segment is also projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Background Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS E during the AM and PM peak hours and a segment that exceeds the CVMP ADT threshold. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would have an impact on this road segment because it would exceed the CVMP ADT threshold.

The impacts to segment #7 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #11 Carmel Rancho Boulevard between Carmel Valley Road and Shopping Center Driveway

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS D and LOS E during the AM and PM peak hours. This segment is not projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Background Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS D and LOS E during the AM and PM peak hours. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would not have an impact on this road segment because it would not worsen the LOS by one letter grade.

Seg. #13 Rio Road between SR 1 and Crossroads Boulevard

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS D and LOS E during the AM and PM peak hours. This segment is not projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Background Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS D and LOS E during the AM and PM peak hours. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would not have an impact on this road segment because it would not worsen the LOS by one letter grade.

Seg. #14 Rio Road between Crossroads Boulevard and Carmel Center Place

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS D and LOS E during the AM and PM peak hours. This segment is not projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Background Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS D and LOS E during the AM and PM peak hours. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would not have an impact on this road segment because it would not worsen the LOS by one letter grade.

8 Cumulative Traffic Conditions

This section describes the analysis and results for 2035 Cumulative conditions.

8.1 Cumulative Roadway Network

As discussed in Section 1.5 of this report, the Transportation Agency for Monterey County (TAMC) and its member jurisdictions have adopted a county-wide, regional impact fee to cover the costs for studies and the construction of many improvements throughout Monterey County. This impact fee, which went into effect on August 27, 2008, is applied to all new development within Monterey County.

The TAMC Regional Transportation Plan (RTP) includes a list of projects to improve traffic operations within the project study area. These improvements include:

1. Add a second northbound through lane on SR 1 between Rio Road and Carmel Valley Road
2. SR 1 / Rio Road Intersection:
 - a. Convert the northbound right-turn lane to a shared through/right-turn lane
 - b. Add a second westbound right-turn lane
 - c. Add an exclusive southbound right-turn lane
3. SR 1 / Carmel Valley Road Intersection:
 - a. Convert the northbound right-turn lane to a shared through/right-turn lane

The construction of these improvements is dependent on State Transportation Improvement Program (STIP) funding, which is not guaranteed at this time. As a result, these improvements are not assumed to be in place under Cumulative traffic conditions. However, participation in funding these improvements has been included as a potential mitigation measure.

8.2 2035 Cumulative Traffic Volume Forecasts

The Cumulative conditions analysis is based upon the 2035 traffic volume forecasts from the 2014 AMBAG Regional Traffic Demand Model (RTDM) as well as a list of pending but not yet approved projects located within Carmel Valley. Traffic increases due to the list of pending projects were given precedence over the RTDM forecasts in the vicinity of the project as they are local in nature, result in higher volume forecasts than the RTDM, and provide a more conservative estimate of future traffic volumes. The RTDM forecasts were used in areas where the addition of traffic from pending projects resulted in lower volumes than the RTDM forecasts, again providing a more conservative analysis.

AM and PM peak hour traffic generated by pending projects was estimated based on trip generation rates within the Institute of Transportation Engineers' *Trip Generation* handbook, 9th Edition, 2012. The list of pending projects is provided in **Appendix I** with a trip generation estimate for each project. The location of each pending project is provided in **Appendix J**. The AMBAG 2014 and 2035 daily traffic model plots for the study area are provided in **Appendix K**. Cumulative conditions AM and PM peak hour traffic volumes are included in **Exhibit 14**.

8.3 Cumulative Intersection Operations

Intersection levels of service are summarized in **Exhibit 5**. LOS calculation worksheets are included as

Appendix E.

Based on the aforementioned level of service standards, the following study intersections are projected to operate at unacceptable levels of service under Cumulative conditions:

- Intersection #1 – SR 1 / Carmel Valley Road (LOS D – PM)
- Intersection #3 – SR 1 / Rio Road (LOS D – PM)
- Intersection #7 – SR 1 / Ocean Avenue (LOS E – AM & PM)
- Intersection #8 – SR 1 / Carpenter Street (LOS E – PM)

8.4 Cumulative Road Segment Operations

Road segment levels of service are summarized in **Exhibits 6 and 7**. LOS calculation worksheets for road segments #5 and #11 - #15 are included as **Appendix F**. Levels of service for study segments #1 - #4 are referenced from the worst-case levels of service reported in the *Rancho Cañada Draft Transportation Impact Study* prepared by CCTC (January 2016).

Under Cumulative conditions, the ADT's on Carmel Valley Road study segments #6 and #7 are projected to exceed the CVMP ADT thresholds.

Based on the aforementioned level of service standards, the following study road segments are projected to operate at unacceptable levels of service under Cumulative conditions:

- Segment #1 – SR 1 between Carpenter Street and Ocean Avenue
- Segment #2 – SR 1 between Ocean Avenue and Carmel Valley Road
- Segment #3 – SR 1 between Carmel Valley Road and Rio Road
- Segment #6 – Carmel Valley Road between Robinson Canyon Rd and Schulte Rd
- Segment #7 – Carmel Valley Road between Schulte Rd and Rancho San Carlos Road
- Segment #11 – Carmel Rancho Blvd between Carmel Valley Rd and Shopping Ctr Dwy
- Segment #13 – Rio Road between SR 1 and Crossroads Blvd
- Segment #14 – Rio Road between Crossroads Blvd and Carmel Center Place

9 Cumulative Plus Proposed Project Traffic Conditions

This section describes the analysis and results for 2035 Cumulative conditions with the Proposed Project.

Trips generated by the Proposed Project were added to the 2035 cumulative volumes to obtain Cumulative Plus Proposed Project traffic volumes. Cumulative Plus Proposed Project traffic volumes are presented in **Exhibit 15**.

9.1 Cumulative Plus Proposed Project Intersection Operations

Intersection levels of service are summarized in **Exhibit 5**. LOS calculation worksheets are included as **Appendix E**.

Based on the aforementioned level of service standards, the following study intersections are projected to operate at unacceptable levels of service under Cumulative Plus Proposed Project conditions:

- Intersection #1 – SR 1 / Carmel Valley Road (LOS D – PM)
- Intersection #3 – SR 1 / Rio Road (LOS D – PM)
- Intersection #7 – SR 1 / Ocean Avenue (LOS E – AM & PM)
- Intersection #8 – SR 1 / Carpenter Street (LOS E – PM)

Int. #1 SR 1 / Carmel Valley Road

This intersection is under Caltrans jurisdiction. The Proposed Project would add traffic to this intersection, which is projected to operate at an unacceptable LOS D during the PM peak hour.

Impacts and Mitigations: The Proposed Project would increase the delay at this intersection, which is projected to operate at a deficient LOS D during the PM peak hour. Based on the Caltrans impact criteria, the Proposed Project would have an impact at this intersection during the PM peak hour.

The TAMC Regional Transportation Plan (RTP) includes a list of projects to improve traffic operations within the project study area. Planned improvements at the SR 1 / Carmel Valley Road intersection include:

- a. Convert the northbound right-turn lane to a shared through/right-turn lane

This would result in acceptable LOS B operations and the Proposed Project's impact would be eliminated with these improvements. However, the construction of these improvements is dependent on State Transportation Improvement Program (STIP) funding, which is not guaranteed at this time. Participation in funding these improvements could potentially mitigate the Proposed Project's impacts.

Both TAMC and Caltrans consider payment of regional development impact fees as adequate mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the Proposed Project's contribution to cumulative impacts at this location.

Int. #3 SR 1 / Rio Road

This intersection is under Caltrans jurisdiction. The Proposed Project would add traffic to this intersection, which is projected to operate at an unacceptable LOS D during the PM peak hour.

Impacts and Mitigations: The Proposed Project would increase the delay at this intersection, which is projected to operate at a deficient LOS D during the PM peak hour. Based on the Caltrans impact criteria, the Proposed Project would have an impact at this intersection during the PM peak hour.

The TAMC Regional Transportation Plan (RTP) includes a list of projects to improve traffic operations within the project study area. Planned improvements at the SR 1 / Rio Road intersection include:

- a. Convert the northbound right-turn lane to a shared through/right-turn lane*
- b. Add a second westbound right-turn lane*
- c. Add an exclusive southbound right-turn lane*

The Proposed Project's impact would be eliminated with these improvements. However, the construction of these improvements is dependent on State Transportation Improvement Program (STIP) funding, which is not guaranteed at this time. Participation in funding these improvements could potentially mitigate the Proposed Project's impacts.

Both TAMC and Caltrans consider payment of regional development impact fees as adequate mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the Proposed Project's contribution to cumulative impacts at this location.

Int. #7 SR 1 / Ocean Avenue

This intersection is under Caltrans jurisdiction. The Proposed Project would add traffic to this intersection, which is projected to operate at an unacceptable LOS E during the AM and PM peak hours.

Impacts and Mitigations: The Proposed Project would increase the delay at this intersection, which is projected to operate at a deficient LOS E during the AM and PM peak hours. Based on the Caltrans impact criteria, the Proposed Project would have an impact at this intersection during the AM and PM peak hours. There are no known planned or feasible improvements at this intersection.

Both TAMC and Caltrans consider payment of regional development impact fees as adequate mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the Proposed Project's contribution to cumulative impacts at this location.

Int. #8 SR 1 / Carpenter Street

This intersection is under Caltrans jurisdiction. The Proposed Project would add traffic to this intersection, which is projected to operate at an unacceptable LOS E during the PM peak hour.

Impacts and Mitigations: The Proposed Project would increase the delay at this intersection, which is projected to operate at a deficient LOS E during the PM peak hour. Based on the Caltrans impact criteria, the Proposed Project would have an impact at this intersection during the PM peak hour.

There are no known planned improvements at this intersection. The addition of a dedicated northbound right-turn lane would still result in LOS E operations during the PM peak hour; however, it would reduce the delay to pre-project conditions. This improvement is not included in the TAMC Regional Transportation Plan (RTP) list of projects. A possible improvement at this location for Cumulative conditions could be the addition of a third northbound through lane that could be extended north through the intersection before merging back to two northbound SR 1 lanes. This would allow the addition of a third eastbound left-turn lane and

would result in acceptable LOS C operations during the AM and PM peak hours under Cumulative Plus Proposed Project traffic conditions.

Both TAMC and Caltrans consider payment of regional development impact fees as adequate mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the Proposed Project's contribution to cumulative impacts at this location.

9.2 Cumulative Plus Proposed Project Road Segment Operations

Road segment levels of service are summarized in **Exhibits 6 and 7**. LOS calculation worksheets for road segments #5 and #11 - #15 are included as **Appendix F**. Levels of service for study segments #1 - #4 are referenced from the worst-case levels of service reported in the *Rancho Cañada Draft Transportation Impact Study* prepared by CCTC (January 2016).

Based on the aforementioned level of service standards, the following study road segments are projected to operate at unacceptable levels of service under Cumulative Plus Proposed Project conditions:

- Segment #1 – SR 1 between Carpenter Street and Ocean Avenue
- Segment #2 – SR between Ocean Avenue and Carmel Valley Road
- Segment #3 – SR 1 between Carmel Valley Road and Rio Road
- Segment #6 – Carmel Valley Road between Robinson Canyon Rd and Schulte Rd
- Segment #7 – Carmel Valley Road between Schulte Rd and Rancho San Carlos Road
- Segment #11 – Carmel Rancho Blvd between Carmel Valley Rd and Shopping Ctr Dwy
- Segment #13 – Rio Road between SR 1 and Crossroads Blvd
- Segment #14 – Rio Road between Crossroads Blvd and Carmel Center Place

Seg. #1 SR 1 between Carpenter Street and Ocean Avenue

This road segment is under Caltrans jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS D in the northbound (PM) southbound (AM) directions.

Impacts and Mitigations: The Proposed Project would add traffic to this road segment, which is projected to operate at a deficient LOS D during the AM and PM peak hours. Based on the Caltrans impact criteria, the Proposed Project would have a cumulative impact on this road segment.

There are no known planned improvements on this road segment. However, the addition of a dedicated northbound right-turn lane at the SR 1 / Carpenter Street intersection would improve operations to pre-project conditions in the northbound direction during the PM peak hour which would eliminate the Proposed Project's impact for the northbound direction.

It is recommended that a dedicated northbound right-turn lane be implemented at the SR 1 / Carpenter Street intersection prior to or in conjunction with the Proposed Project.

There are no known planned or feasible improvements for this road segment in the southbound direction. As a result, the Proposed Project's impacts in the southbound direction would remain a cumulative impact.

Both TAMC and Caltrans consider payment of regional development impact fees as adequate mitigation for

cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the Proposed Project's contribution to cumulative impacts at this location.

Seg. #2 SR 1 between Ocean Avenue and Carmel Valley Road

This road segment is under Caltrans jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS F in the northbound direction during the AM peak hour.

Impacts and Mitigations: The Proposed Project would add traffic to this road segment, which is projected to operate at a deficient LOS F during the AM peak hour. Based on the Caltrans impact criteria, the Proposed Project would have a cumulative impact on this road segment.

There are no known planned or feasible improvements for this road segment. As a result, the Proposed Project would have a cumulative impact.

Both TAMC and Caltrans consider payment of regional development impact fees as adequate mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of the TAMC fee would mitigate the Proposed Project's contribution to cumulative impacts at this location.

Seg. #3 SR 1 between Carmel Valley Road and Rio Road

This road segment is under Caltrans jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS F in the northbound direction during the AM and PM Peak hours and LOS E in the southbound direction during the PM peak hour.

Impacts and Mitigations: The Proposed Project would add traffic to this road segment, which is projected to operate at a deficient LOS E and LOS F during the AM and PM peak hours. Based on the Caltrans impact criteria, the Proposed Project would have a cumulative impact on this road segment.

The TAMC Regional Transportation Plan (RTP) includes a list of projects to improve traffic operations within the project study area. These improvements include:

- 1. Add a second northbound through lane on SR 1 between Rio Road and Carmel Valley Road*
- 2. SR 1 / Rio Road Intersection:*
 - a. Convert the northbound right-turn lane to a shared through/right-turn lane*
 - b. Add a second westbound right-turn lane*
 - c. Add an exclusive southbound right-turn lane*
- 3. SR 1 / Carmel Valley Road Intersection:*
 - a. Convert the northbound right-turn lane to a shared through/right-turn lane*

The Proposed Project's impacts to Segment #3 in the northbound direction would be eliminated with these improvements. However, the construction of these improvements is dependent on State Transportation Improvement Program (STIP) funding, which is not guaranteed at this time. However, participation in funding these improvements could potentially mitigate the Proposed Project's impacts.

In addition, both TAMC and Caltrans consider payment of regional development impact fees as adequate mitigation for cumulative impacts to state highways and the regional road network. Therefore, payment of

the TAMC fee would mitigate the Proposed Project's contribution to cumulative impacts at this location.

Seg. #6 Carmel Valley Road between Robinson Canyon Road and Schulte Road

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS E during the AM and PM peak hours. This segment is also projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Cumulative Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS E during the AM and PM peak hours and a segment that exceeds the CVMP ADT threshold. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would have a cumulative impact on this road segment because it would exceed the CVMP ADT threshold.

The impacts to segment #6 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #7 Carmel Valley Road between Schulte Road and Rancho San Carlos Road

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS E during the AM and PM peak hours. This segment is also projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Cumulative Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS E during the AM and PM peak hours and a segment that exceeds the CVMP ADT threshold. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would have a cumulative impact on this road segment because it would exceed the CVMP ADT threshold.

The impacts to segment #7 would be eliminated by widening Carmel Valley Road at this location to four lanes; however, this is not considered feasible.

Seg. #11 Carmel Rancho Boulevard between Carmel Valley Road and Shopping Center Driveway

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS D and LOS E during the AM and PM peak hours. This segment is not projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Cumulative Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS D and LOS E during the AM and PM peak hours. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would not have an impact on this road segment because it would not worsen the LOS by one letter grade.

Seg. #13 Rio Road between SR 1 and Crossroads Boulevard

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS D, LOS E and LOS F during the AM and PM peak hours. This segment is not projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Cumulative Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS D, LOS E and LOS F during the AM and PM peak hours. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would have a cumulative impact on this road segment because it would add traffic to a road segment operating at LOS D, LOS E and LOS F.

The TAMC Regional Transportation Plan (RTP) includes a list of projects to improve traffic operations within the project study area. Improvements at the SR 1 / Rio Road intersection include:

- a. Convert the northbound right-turn lane to a shared through/right-turn lane*
- b. Add a second westbound right-turn lane*
- c. Add an exclusive southbound right-turn lane*

Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would not have an impact on this road segment in the eastbound direction because it would not worsen the LOS by one letter grade.

The Proposed Project's impacts to this segment in the westbound direction would be eliminated with the aforementioned improvements. However, the construction of these improvements is dependent on State Transportation Improvement Program (STIP) funding, which is not guaranteed at this time. Participation in funding these improvements could potentially mitigate the Proposed Project's impacts.

Seg. #14 Rio Road between Crossroads Boulevard and Carmel Center Place

This road segment is under the Carmel Valley Master Plan's jurisdiction. The Proposed Project would add traffic to this segment, which is projected to operate at an unacceptable LOS E and LOS F during the AM and PM peak hours. This segment is not projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Cumulative Plus Proposed Project conditions.

Impacts and Mitigations: The Proposed Project would add trips to a road segment already operating at a deficient LOS E and LOS F during the AM and PM peak hours. Based on the Carmel Valley Master Plan impact criteria, the Proposed Project would not have an impact on this road segment in the eastbound direction because it would not worsen the LOS by one letter grade.

The Proposed Project would have a cumulative impact in the westbound direction as it would add traffic to a road segment operating at LOS F. However, this road segment is bounded by two closely spaced signalized intersections (approximately 220 feet apart), and the flow of traffic on this segment is controlled by the adjacent signal operations, which are projected to operate at an acceptable LOS C and LOS A under Cumulative Plus Proposed Project conditions. As a result, the Proposed Project would not have an impact on this segment.

10 Alternatives Analysis

This section describes the analysis of two Project Alternatives. Project Alternative 1 involves the development of a 200-bed assisted living facility on the project site. Project Alternative 2, a scaled down version of Project Alternative 1, involves the development of a 150-bed assisted living facility. Traffic related impacts associated with the development of the Project Alternatives are discussed in this section.

10.1 Project Alternative 1 Trip Generation

Trip generation rates published by the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th Edition (2012) were used to estimate the trips that would be generated by the development of a 200-bed assisted living facility using the ITE Land Use Code 254, Assisted Living.

Based on the ITE trip generation rates, Project Alternative 1 is estimated to generate 538 daily trips, with 35 trips occurring during the AM peak hour (24 in, 11 out) and 57 trips occurring during the PM peak hour (28 in, 29 out). A comparison of Project Alternative 1 and the Proposed Project trip generation estimate (shown in **Exhibit 8**) indicates that Project Alternative 1 (a 200-bed assisted living facility) would generate more traffic than the Proposed Project (a 31-unit single family housing development).

A study cited by the ITE *Trip Generation Manual* found that less than 5 percent of the residents of these types of facilities owned cars, which were rarely driven. The majority of trips generated by these facilities are made by employees, visitors and delivery trucks, with very low truck traffic that for the most part occurred during the middle of the day on weekdays.

The ITE *Trip Generation Manual* also acknowledges that these types of facilities can have employee shifts that do not coincide with the peak hour of adjacent street traffic. The morning peak hour in the project study area is between 8:00 a.m. and 9:00 a.m., and the evening peak period ranges from 4:00 p.m. to 5:45 p.m. Therefore, as an example, employees working shifts beginning at 6:30 a.m., 2:30 p.m., and 10:30 p.m. would avoid being on the road in the study area during the peak commute hours. The management teams at these types of facilities typically work a more traditional office schedule, such as between 9:00 a.m. and 6:00 p.m. Management teams could avoid being on the road in the study area during the peak commute hours by adjusting their shifts, for example, to between 9:30 a.m. and 6:30 p.m.

Even with the adjusted employee shifts noted above, it is reasonable to assume that a small amount of traffic from visitors and deliveries could occur during the peak commute hours. Based on analyses at other Assisted Living facilities, 4 morning and 10 evening peak hour trips are anticipated. The Project Alternative 1 trip generation estimate is presented in **Exhibit 16** with the adjusted employee shift changes. Based on the project trip distribution shown in **Exhibit 9**, the trips generated by Project Alternative 1 were assigned to the road network and are shown in **Exhibit 17**.

10.2 Project Alternative 1 Intersection Operations

The Project Alternative 1 traffic volumes were added to the Existing, Background and Cumulative traffic volumes to obtain Existing Plus Project Alternative 1, Background Plus Project Alternative 1 and Cumulative Plus Project Alternative 1 traffic volumes. These traffic volumes are presented in **Exhibits 18, 19 and 20**, respectively. Intersection levels of service are summarized in **Exhibit 21**. LOS calculation worksheets are included as **Appendix L**.

The lower AM and PM peak hour trip generation for Project Alternative 1 is expected to result in the same or slightly lower average delays than the Proposed Project, with the same levels of service at the study intersections. The same impacts and mitigations for the Proposed Project apply to Project Alternative 1 with the following exceptions.

Int. #3 SR 1 / Rio Road

Project Alternative 1 is not expected to have an impact at this intersection until Cumulative Plus Project Alternative 1 conditions, versus under Existing Plus Project conditions with the Proposed Project. Under Cumulative conditions the same mitigation is recommended (i.e., payment of the TAMC fee).

10.3 Project Alternative 1 Road Segment Operations

Road segment levels of service for Project Alternative 1 conditions are summarized in **Exhibit 22** (segments #1 – #5 and #11 – #15). LOS calculation worksheets for road segments #5 and #11 - #15 are included as **Appendix M**. Levels of service for study segments #1 - #4 are referenced from the worst-case levels of service reported in the *Rancho Cañada Draft Transportation Impact Study* prepared by CCTC (January 2016).

The Proposed Project is not expected to have a level of service impact on segments #6 – #10. Since Project Alternative 1 would generate fewer trips than the Proposed Project, it would also have no level of service impacts on those segments; therefore it was not necessary to perform the LOS calculations for segments #6 – #10.

Road segment Average Daily Traffic (ADT) volumes for Segments #6 – #10 are summarized in **Exhibit 23**. Segments #6 and #7 are projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Background and Cumulative traffic conditions. Based on the Carmel Valley Master Plan impact criteria, the project would have an impact on these road segments because they would exceed their CVMP ADT thresholds.

The lower trip generation for Project Alternative 1 is expected to result in the same levels of service on the study road segments as the Proposed Project. The same impacts and mitigations for the Proposed Project are recommended for Project Alternative 1.

10.4 Project Alternative 2 Trip Generation

Project Alternative 2 is the development of a 150-bed assisted living facility, which is a scaled down version of Project Alternative 1. Trip generation rates published by the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th Edition (2012) were used to estimate the trips that would be generated by the development of a 150-bed assisted living facility using the ITE Land Use Code 254, Assisted Living.

Based on the ITE trip generation rates, Project Alternative 2 is estimated to generate 401 daily trips, with 26 trips occurring during the AM peak hour (18 in, 8 out) and 43 trips occurring during the PM peak hour (21 in, 22 out). A comparison of Project Alternative 2 and the Proposed Project trip generation estimate (shown in **Exhibit 8**) indicates that Project Alternative 2 (a 150-bed assisted living facility) would generate more traffic than the Proposed Project (a 31-unit single family housing development).

As with Project Alternative 1, even with the adjusted employee shifts described in Section 10.1, it is reasonable to assume that a small amount of traffic from visitors and deliveries could occur during the peak

commute hours. Based on analyses at other Assisted Living facilities, 3 morning and 8 evening peak hour trips are anticipated. The Project Alternative 2 trip generation estimate is presented in **Exhibit 16** with the adjusted employee shift changes. Based on the project trip distribution shown in **Exhibit 9**, the trips generated by Project Alternative 2 were assigned to the road network and are shown in **Exhibit 24**.

10.5 Project Alternative 2 Intersection Operations

The Project Alternative 2 traffic volumes were added to the Existing, Background and Cumulative traffic volumes to obtain Existing Plus Project Alternative 2, Background Plus Project Alternative 2 and Cumulative Plus Project Alternative 2 traffic volumes. These traffic volumes are presented in **Exhibits 25, 26 and 27**, respectively. Intersection levels of service are summarized in **Exhibit 28**. LOS calculation worksheets are included as **Appendix L**.

As with Project Alternative 1, the lower trip generation for Project Alternative 2 is expected to result in the same or slightly lower average delays than the Proposed Project, with the same levels of service at the study intersections. For intersection operations, the same impacts and mitigations for Project Alternative 1 apply to Project Alternative 2.

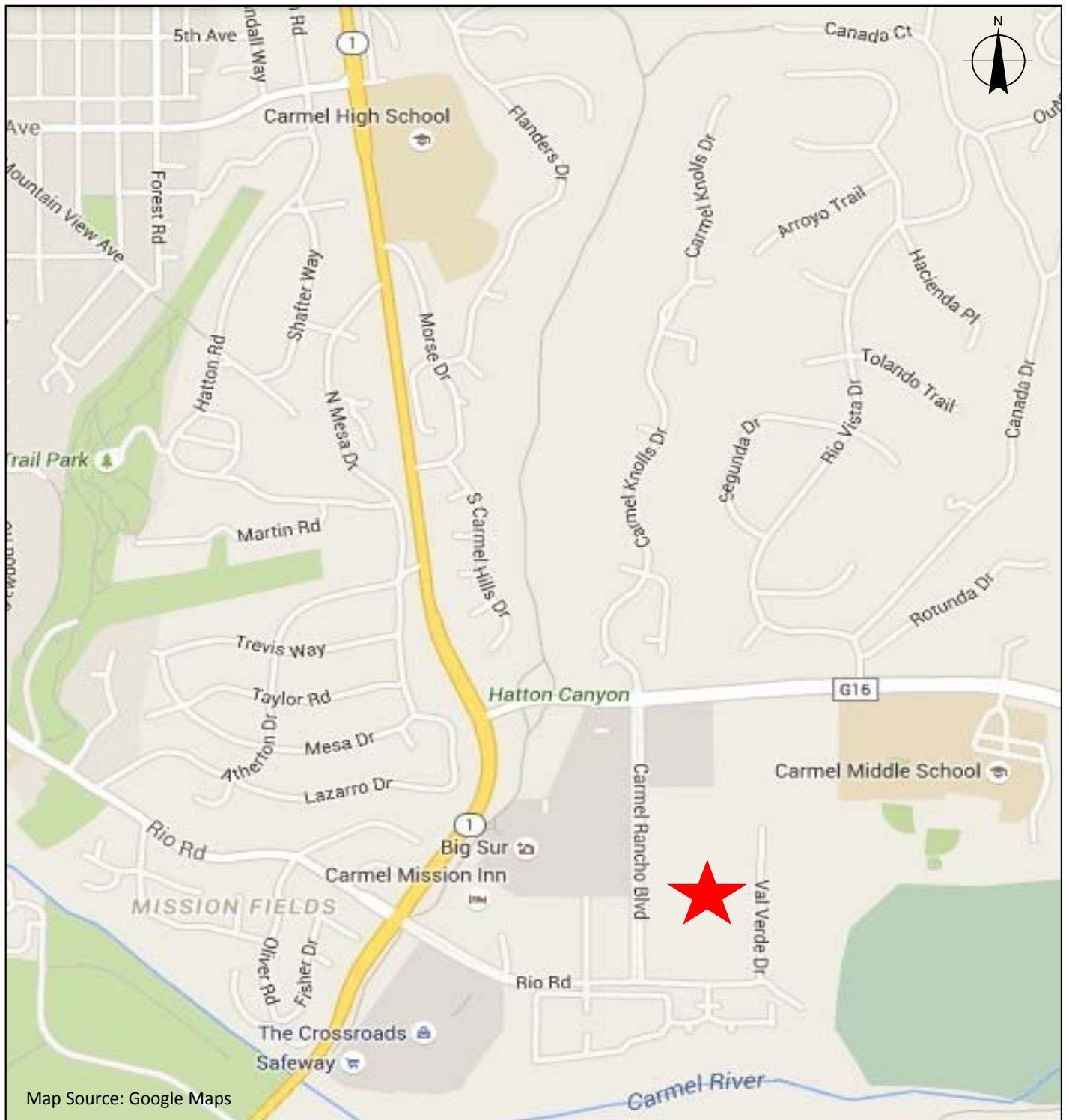
10.6 Project Alternative 2 Road Segment Operations

Road segment levels of service for Project Alternative 2 conditions are summarized in **Exhibit 29** (segments #1 – #5 and #11 – #15). LOS calculation worksheets for road segments #5 and #11 - #15 are included as **Appendix M**. Levels of service for study segments #1 - #4 are referenced from the worst-case levels of service reported in the *Rancho Cañada Draft Transportation Impact Study* prepared by CCTC (January 2016).

The Proposed Project is not expected to have a level of service impact on segments #6 – #10. Since Project Alternative 2 would generate fewer trips than the Proposed Project, it would also have no level of service impacts on those segments; therefore it was not necessary to perform the LOS calculations for segments #6 – #10.

Road segment Average Daily Traffic (ADT) volumes for Segments #6 – #10 are summarized in **Exhibit 30**. Segments #6 and #7 are projected to exceed the Carmel Valley Master Plan (CVMP) ADT threshold under Background and Cumulative traffic conditions. Based on the Carmel Valley Master Plan impact criteria, the project would have an impact on these road segments because they would exceed their CVMP ADT thresholds.

The lower trip generation for Project Alternative 2 is expected to result in the same or slightly higher travel speeds than the Proposed Project, with the same levels of service on the study road segments. The same impacts and mitigations for Project Alternative 1 apply to Project Alternative 2.

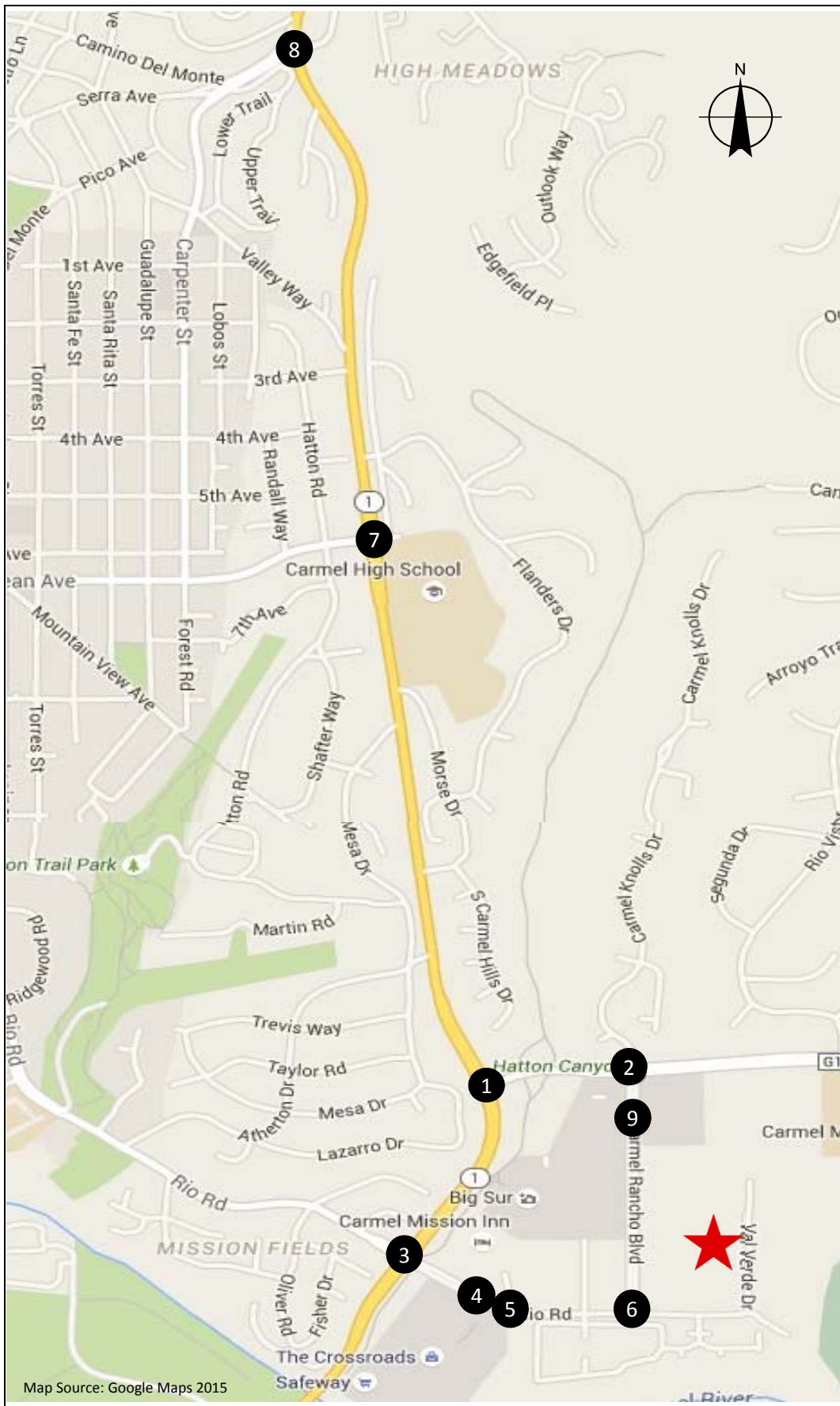


LEGEND

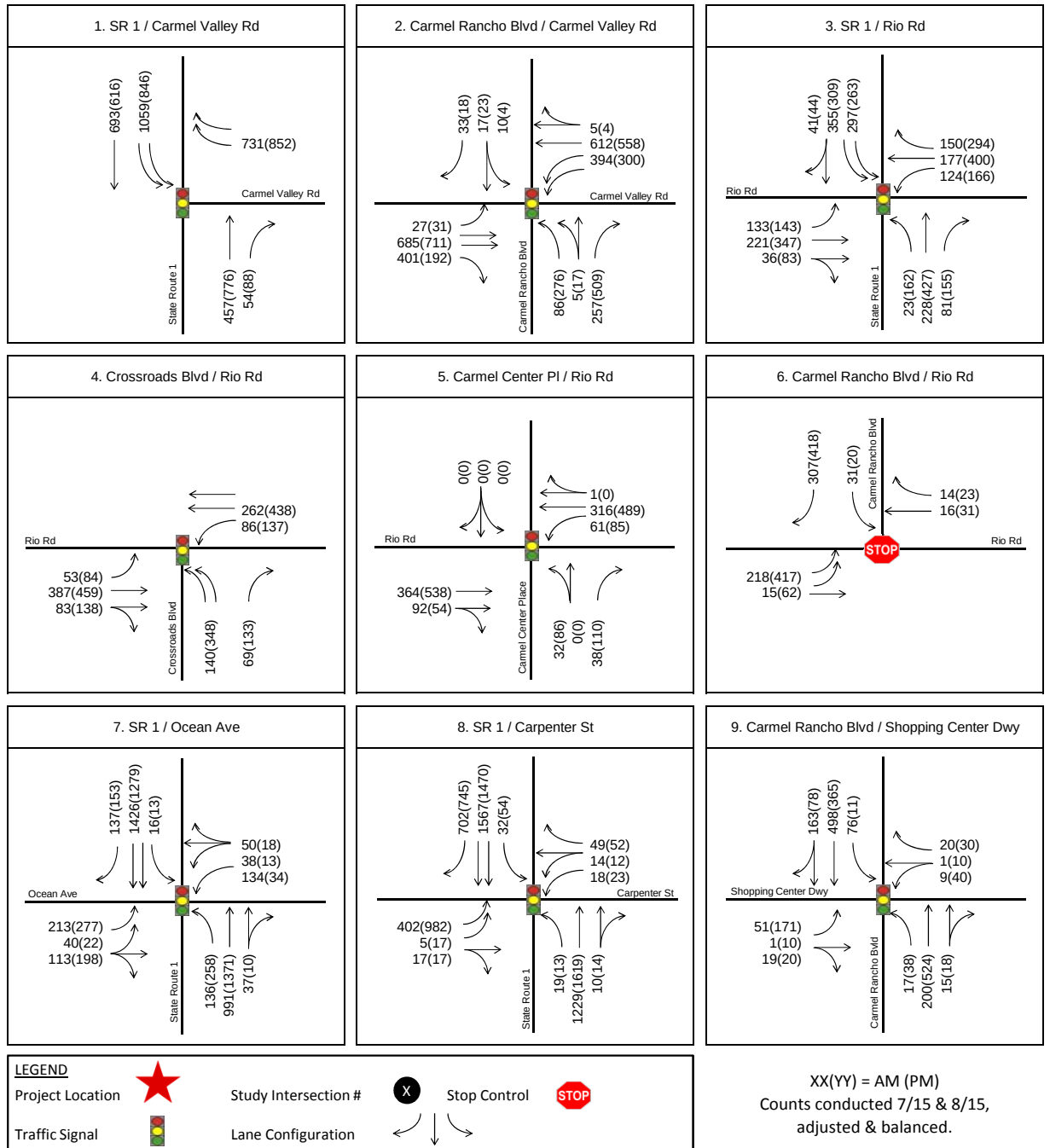
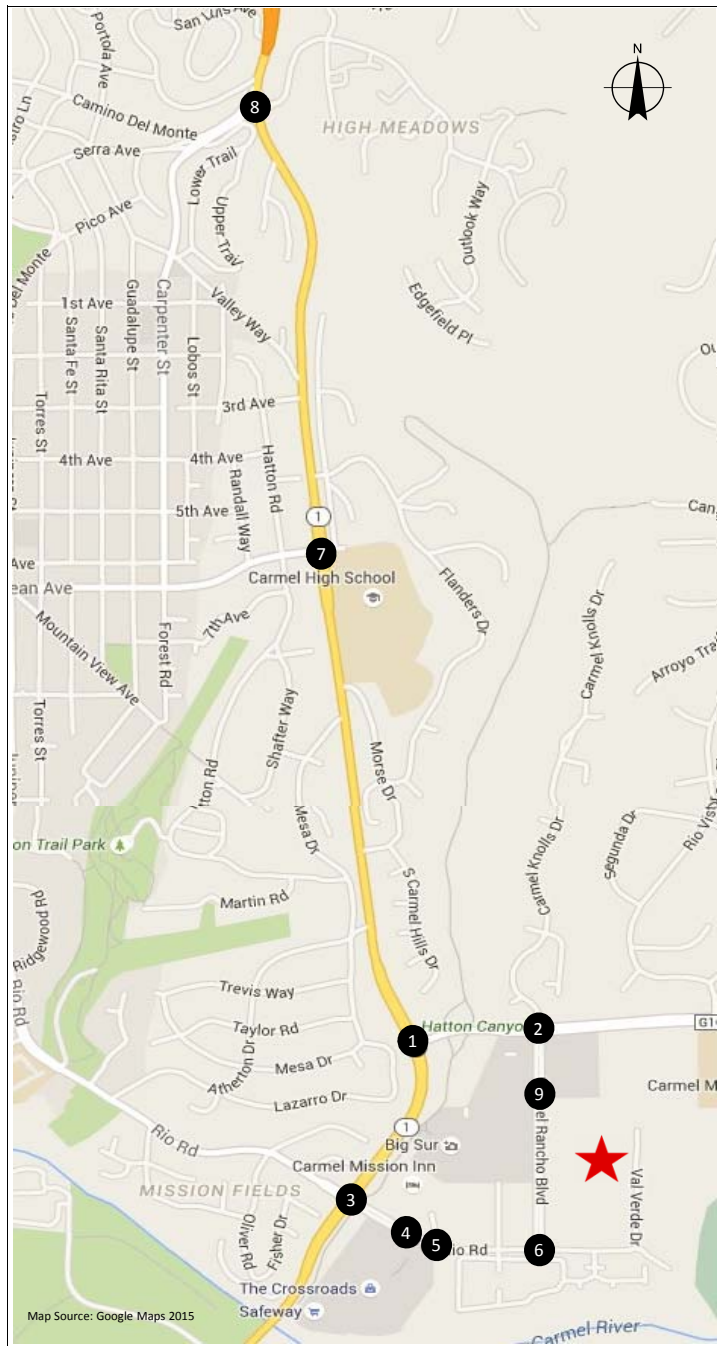
 Project Location



Source: Bestor Engineers, Inc.



★ Project Location



N-S Street	E-W Street	Existing Lane Configuration ^{1,2}	Existing Intersection Control	LOS Standard Jurisdiction	Existing Conditions		Existing Plus Project Conditions		Background Conditions		Background Plus Project Conditions		Cumulative Conditions		Cumulative Plus Project Conditions	
					AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.
					Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)
1	SR 1	Carmel Valley Road NB 1-T, 1-R SB 2-L, 1-T WB 2-R <i>With RTP Improvements</i>	Signal	C/D Caltrans	11.3 B	18.1 B	11.4 B	18.2 B	11.9 B	21.0 C	12.0 B	21.1 C	14.1 B	43.5 D	14.3 B	44.0 D
2	Carmel Rancho Blvd	Carmel Valley Road NB 1-L, 1-L/T, 1-R SB 1-L/T, 1-R EB 1-L, 2-T, 1-R WB 2-L, 1-T, 1-T/R	Signal	C CVMP	16.9 B	19.3 B	17.0 B	19.4 B	18.4 B	20.2 C	18.4 B	20.2 C	22.0 C	22.6 C	22.2 C	22.7 C
3	SR 1	Rio Road NB 1-L, 1-T, 1-R SB 2-L, 1-T/R EB 1-L, 1-T, 1-T/R WB 1-L, 1-T, 1-R <i>With RTP Improvements</i>	Signal	C/D Caltrans	22.6 C	37.9 D	22.8 C	38.0 D	22.8 C	38.6 D	22.9 C	38.7 D	26.7 C	54.0 D	26.9 C	54.4 D
4	Crossroads Blvd	Rio Road NB 2-L, 1-T/R EB 1-L, 1-T, 1-T/R WB 1-L, 2-T	Signal	C CVMP	9.9 A	12.0 B	9.9 A	11.9 B	10.2 B	12.5 B	10.1 B	12.5 B	20.2 C	32.9 C	20.1 C	32.7 C
5	Carmel Center Place	Rio Road NB 1-L/T, 1-R SB 1-L/T/R EB 1-T, 1-T/R WB 1-L, 1-T, 1-T/R	Signal	C CVMP	9.3 A	6.0 A	9.3 A	6.0 A	9.1 A	5.9 A	9.1 A	5.9 A	6.1 A	7.8 A	6.1 A	7.8 A
6	Carmel Rancho Blvd	Rio Road SB 1-L, 1-R EB 2-L, 1-T WB 1-T, 1-R	Two-Way Stop	C CVMP	10.2 B 7.7 A 15.2 C	10.7 B 8.1 A 19.8 C	10.2 B 7.7 A 15.7 C	10.7 B 8.1 A 19.5 C	10.4 B 7.8 A 15.9 C	10.9 B 8.1 A 20.8 C	10.4 B 7.8 A 16.5 C	10.9 B 8.1 A 20.4 C	10.9 B 7.8 A 17.7 C	11.7 B 8.3 A 23.5 C	10.9 B 7.8 A 18.3 C	11.7 B 8.3 A 22.2 C
7	SR 1	Ocean Avenue NB 1-L, 1-T, 1-T/R SB 1-L, 2-T, 1-R EB 1-L, 1-L/T/R WB 1-L, 1-L/T/R	Signal	C/D Caltrans	43.6 D	37.1 D	44.1 D	37.5 D	49.8 D	43.1 D	50.3 D	43.7 D	71.4 E	67.5 E	71.8 E	68.4 E
8	SR 1	Carpenter Street NB 1-L, 1-T, 1-T/R SB 1-L, 2-T, 1-R EB 2-L, 1-T/R WB 1-L, 1-L/T, 1-R <i>With NB RT Lane</i>	Signal	C/D Caltrans	23.8 C	47.1 D	23.8 C	47.4 D	25.0 C	52.4 D	25.1 C	52.8 D	32.3 C	77.2 E	32.4 C	77.9 E
9	Carmel Rancho Blvd	Shopping Center Dwy NB 1-L, 1-T, 1-T/R SB 1-L, 1-T, 1-T/R EB 1-L, 1-T/R WB 1-L/T, 1-R	Signal	C CVMP	4.0 A	5.5 A	4.0 A	5.6 A	4.0 A	5.6 A	4.0 A	5.7 A	4.0 A	5.8 A	4.0 A	5.8 A

Notes:

- 1 L, T, R = Left, Through, Right
- 2 NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound
- 3 Level of service highlighted in red indicates that LOS exceeds the LOS standard.
- 4 Yellow highlight indicates project impact.
- 5 Bold type indicates unmitigated impact.

Seg # Road Segment		Existing AM vs Existing + Project AM				Existing PM vs Existing + Project PM				Background AM vs Background + Project AM				Background PM vs Background + Project PM				Cumulative AM vs Cumulative + Project AM				Cumulative PM vs Cumulative + Project PM			
		Existing AM		Exist+Proj AM		Existing PM		Exis+Proj PM		Background AM		Back+Proj AM		Background PM		Back+Proj PM		Cumulative AM		Cum+Proj AM		Cumulative PM		Cum+Proj PM	
		Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS		
NB Carmel Rancho Blvd																									
12	From Rio Rd to Shopping Center Dwy	27.3	A	27.3	A	24.9	B	24.9	B	27.3	A	27.3	A	24.8	B	24.8	B	27.2	A	27.3	A	24.6	B	24.7	B
11	From Shopping Center Dwy to Carmel Valley Rd	9.5	D	9.5	D	8.9	E	8.9	E	9.2	D	9.2	D	8.6	E	8.5	E	9.1	D	9.1	D	8.3	E	8.2	E
Total		17.5	C	17.5	C	16.2	C	16.2	C	17.2	C	17.2	C	15.8	C	15.8	C	17.1	C	17.1	C	15.4	C	15.4	C
SB Carmel Rancho Blvd																									
		Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS		
11	From Carmel Valley Rd to Shopping Center Dwy	18.3	C	18.3	C	16.8	C	16.8	C	18.2	C	18.2	C	16.7	C	16.6	C	18.1	C	18.1	C	16.4	C	16.5	C
12	From Shopping Center Dwy to Rio Rd	22.9	B	22.9	B	22.6	B	22.6	B	22.8	B	22.8	B	22.5	B	22.5	B	22.5	B	22.5	B	22.1	B	22.1	B
Total		21.3	B	21.3	B	20.5	B	20.5	B	21.2	B	21.2	B	20.4	B	20.4	B	21.0	B	21.0	B	20.0	B	20.1	B
EB Rio Rd																									
		Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS		
5	From Atherton Dr to SR 1	17.3	C	17.3	C	17.3	C	17.3	C	17.3	C	17.3	C	17.3	C	17.3	C	17.1	C	17.1	C	17.0	C	17.0	C
13	From SR 1 to Crossroads Blvd	12.9	D	12.9	D	11.7	D	11.7	D	12.6	D	12.6	D	11.7	D	11.6	D	10.9	D	10.9	D	9.2	D	9.1	D
14	From Crossroads Blvd to Carmel Center Pl	12.2	D	12.2	D	11.0	D	11.0	D	12.1	D	12.1	D	10.9	D	10.9	D	8.9	E	8.9	E	7.8	E	7.8	E
15	From Carmel Center Pl to Carmel Rancho Blvd	16.1	C	16.1	C	17.1	C	17.1	C	16.0	C	16.0	C	17.1	C	17.1	C	16.0	C	16.0	C	17.0	C	17.0	C
Total		15.8	C	15.8	C	15.7	C	15.7	C	15.8	C	15.8	C	15.6	C	15.6	C	14.9	C	14.8	C	14.3	C	14.3	C
WB Rio Rd																									
		Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS		
15	From Carmel Rancho Blvd to Carmel Center Pl	20.3	B	20.3	B	19.6	B	19.6	B	20.3	B	20.3	B	19.6	B	19.6	B	20.2	B	20.3	B	19.6	B	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	9.6	D	9.6	D	8.3	E	8.3	E	9.6	D	9.6	D	8.4	E	8.3	E	6.8*	F	6.8*	F	4.8*	F	4.8*	F
13	From Crossroads Blvd to SR 1	7.3	E	7.3	E	7.2	E	7.2	E	7.3	E	7.3	E	7.2	E	7.2	E	7.2	E	7.2	E	6.9	F	6.9	F
5	From SR 1 to Atherton Dr	19.6	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B
Total		15.1	C	16.3	C	15.9	C	15.9	C	16.3	C	16.3	C	15.9	C	15.9	C	15.6	C	15.6	C	14.6	C	14.5	C
NB SR 1		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS	
1	From Ocean Ave to Carpenter St	C		C		D		D		C		C		D		D		C		C		D		D	
2	From Carmel Valley Rd to Ocean Ave	C		C		C		C		F		F		C		C		F		F		C		C	
3	From Rio Rd to Carmel Valley Rd	F		F		F		F		F		F		F		F		F		F		F		F	
4	From Ribera Rd to Rio Rd	B		B		B		B		B		B		B		B		B		B		B		B	
SB SR 1		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS	
1	From Carpenter St to Ocean Ave	D		D		C		C		D		D		C		C		D		D		C		C	
2	From Ocean Ave to Carmel Valley Rd	C		C		C		C		C		C		C		C		C		C		C		C	
3	From Carmel Valley Rd to Rio Rd	C		C		E		E		C		C		E		E		C		C		E		E	
4	From Rio Rd to Ribera Rd	B		B		B		B		B		B		B		B		B		B		B		B	

- Notes:
- Level of service highlighted in red indicates LOS exceeds LOS standard.
 - Text highlighted in yellow indicates potential project impact.
 - * = Traffic flow on this segment is controlled by closely spaced intersections that operate acceptably. Therefore, project does not have an impact.
 - SR 1 road segment levels of service are referenced from the *Rancho Cañada Draft Transportation Impact Study Report* prepared by Central Coast Transportation Consulting (CCTC, January 2015)

Carmel Valley Road				Existing Conditions							Existing Plus Project Conditions							Background Conditions						
Segment	From	To	CVMP ADT Threshold	ADT	AM Peak Hour			PM Peak Hour			ADT	AM Peak Hour			PM Peak Hour			ADT	AM Peak Hour			PM Peak Hour		
					2-Way Volume	PTSF	LOS	2-Way Volume	PTSF	LOS		2-Way Volume	PTSF	LOS	2-Way Volume	PTSF	LOS		2-Way Volume	PTSF	LOS	2-Way Volume	PTSF	LOS
6	Robinson Canyon Rd	Schulte Rd	15,499	14,611	1,070	85.3%	E	1,293	85.3%	E	14,654	1,073	85.2%	E	1,298	85.0%	E	15,847	1,165	86.2%	E	1,429	86.5%	E
7	Schulte Rd	Rancho San Carlos Rd	16,340	15,974	1,157	87.3%	E	1,402	87.7%	E	16,017	1,160	87.0%	E	1,407	87.5%	E	17,865	1,305	89.6%	E	1,610	90.0%	E

Carmel Valley Road				Background + Project Conditions							Cumulative Conditions						Cumulative + Project Conditions							
Segment	From	To	CVMP ADT Threshold	ADT	AM Peak Hour			PM Peak Hour			ADT	AM Peak Hour			PM Peak Hour			ADT	AM Peak Hour			PM Peak Hour		
					2-Way Volume	PTSF	LOS	2-Way Volume	PTSF	LOS		2-Way Volume	PTSF	LOS	2-Way Volume	PTSF	LOS		2-Way Volume	PTSF	LOS			
6	Robinson Canyon Rd	Schulte Rd	15,499	15,890	1,168	86.1%	E	1,434	86.3%	E	17,107	1,242	87.7%	E	1,555	88.0%	E	17,150	1,245	87.8%	E	1,560	87.9%	E
7	Schulte Rd	Rancho San Carlos Rd	16,340	17,908	1,308	89.3%	E	1,615	90.1%	E	19,125	1,382	89.4%	E	1,736	90.7%	E	19,168	1,385	89.5%	E	1,741	90.6%	E

Carmel Valley Road				Existing Conditions										Existing Plus Project Conditions										Background Conditions									
Segment	From	To	CVMP ADT Threshold	ADT	Direction	AM Peak Hour				PM Peak Hour				ADT	Direction	AM Peak Hour				PM Peak Hour				ADT	Direction	AM Peak Hour				PM Peak Hour			
						Volume (veh/hr)	Flow Rate (pcphpl)	Density pc/mi/ln	LOS	Volume (veh/hr)	Flow Rate (pcphpl)	Density pc/mi/ln	LOS			Volume (veh/hr)	Flow Rate (pcphpl)	Density pc/mi/ln	LOS	Volume (veh/hr)	Flow Rate (pcphpl)	Density pc/mi/ln	LOS			Volume (veh/hr)	Flow Rate (pcphpl)	Density pc/mi/ln	LOS	Volume (veh/hr)	Flow Rate (pcphpl)	Density pc/mi/ln	LOS
8	Rancho San Carlos Rd	Rio Rd	48,487	18,982	EB	547	298	5.4	A	900	524	9.5	A	19,025	EB	549	299	5.4	A	902	525	9.5	A	21,046	EB	625	340	6.2	A	1,020	594	10.8	A
					WB	815	485	8.8	A	727	396	7.2	A			816	486	8.8	A	730	398	7.2	A			915	545	9.9	A	834	454	8.3	A
9	Rio Rd	Carmel Rancho Blvd	51,401	24,228	EB	706	393	7.1	A	1,100	606	11.0	B	24,271	EB	708	395	7.2	A	1,102	607	11.0	B	26,319	EB	779	433	7.9	A	1,223	673	12.2	B
					WB	993	598	10.9	A	938	506	9.2	A			994	599	10.9	A	941	507	9.2	A			1,090	657	11.9	B	1,045	563	10.2	A
10	Carmel Rancho Blvd	SR 1	27,839	22,006	EB	944	514	9.3	A	846	442	8.0	A	22,137	EB	946	515	9.4	A	848	443	8.1	A	23,606	EB	1,006	548	10.0	A	945	494	9.0	A
					WB	789	470	8.5	A	962	530	9.6	A			790	470	8.5	A	965	531	9.7	A			860	512	9.3	A	1,039	572	10.4	A

Carmel Valley Road				Background Plus Project										Cumulative Conditions										Cumulative Plus Project Conditions									
Segment	From	To	CVMP ADT Threshold	ADT	Direction	AM Peak Hour				PM Peak Hour				ADT	Direction	AM Peak Hour				PM Peak Hour				ADT	Direction	AM Peak Hour				PM Peak Hour			
						Volume (veh/hr)	Flow Rate (pcphpl)	Density pc/mi/ln	LOS	Volume (veh/hr)	Flow Rate (pcphpl)	Density pc/mi/ln	LOS			Volume (veh/hr)	Flow Rate (pcphpl)	Density pc/mi/ln	LOS	Volume (veh/hr)	Flow Rate (pcphpl)	Density pc/mi/ln	LOS			Volume (veh/hr)	Flow Rate (pcphpl)	Density pc/mi/ln	LOS	Volume (veh/hr)	Flow Rate (pcphpl)	Density pc/mi/ln	LOS
8	Rancho San Carlos Rd	Rio Rd	48,487	21,089	EB	627	341	6.2	A	1,022	595	10.8	A	22,706	EB	670	365	6.6	A	1,099	640	11.6	B	22,749	EB	672	366	6.7	A	1,101	641	11.7	B
					WB	916	545	9.9	A	837	456	8.3	A			963	573	10.4	A	921	502	9.1	A			964	574	10.4	A	924	503	9.1	A
9	Rio Rd	Carmel Rancho Blvd	51,401	26,362	EB	781	435	7.9	A	1,225	675	12.3	B	28,699	EB	830	462	8.4	A	1,354	746	13.6	B	28,742	EB	832	463	8.4	A	1,356	747	13.6	B
					WB	1,091	657	11.9	B	1,048	565	10.3	A			1,188	716	13.0	B	1,152	621	11.3	B			1,189	716	13.0	B	1,155	623	11.3	B
10	Carmel Rancho Blvd	SR 1	27,839	23,737	EB	1,008	549	10.0	A	947	495	9.0	A	24,626	EB	1,032	562	10.2	A	1,009	527	9.6	A	24,757	EB	1,034	563	10.2	A	1,011	528	9.6	A
					WB	861	513	9.3	A	1,042	574	10.4	A			911	542	9.9	A	1,077	593	10.8	A			912	543	9.9	A	1,080	595	10.8	A

- Notes:
1. LOS/ADT highlighted in red indicates LOS/ADT exceeds LOS/ADT standard/threshold.

1. ADT highlighted in yellow indicates ADT exceeds Carmel Valley Master Plan (CVMP) ADT Threshold and is a project impact.

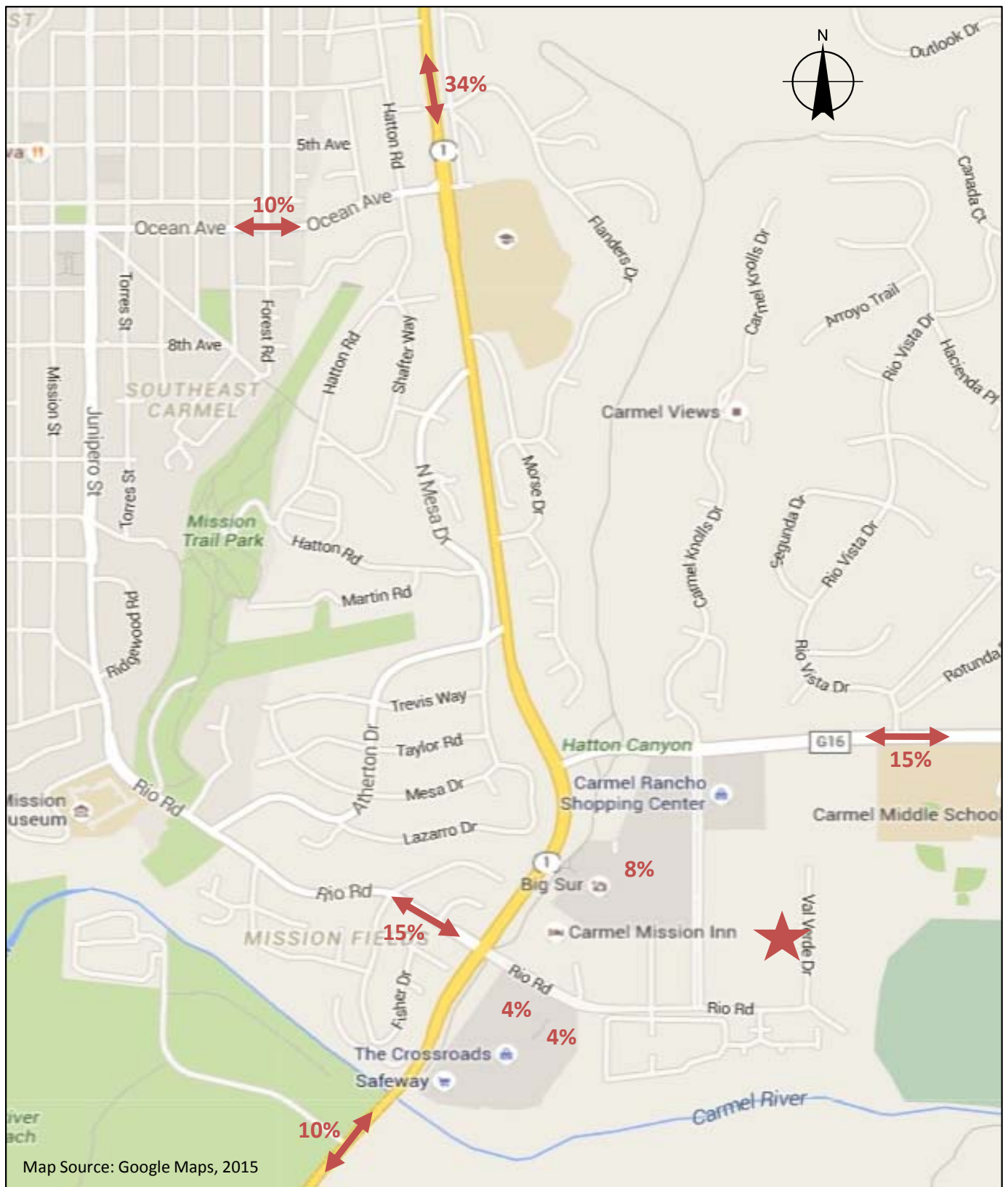
2. PTSF = Percent Time Spent Following.

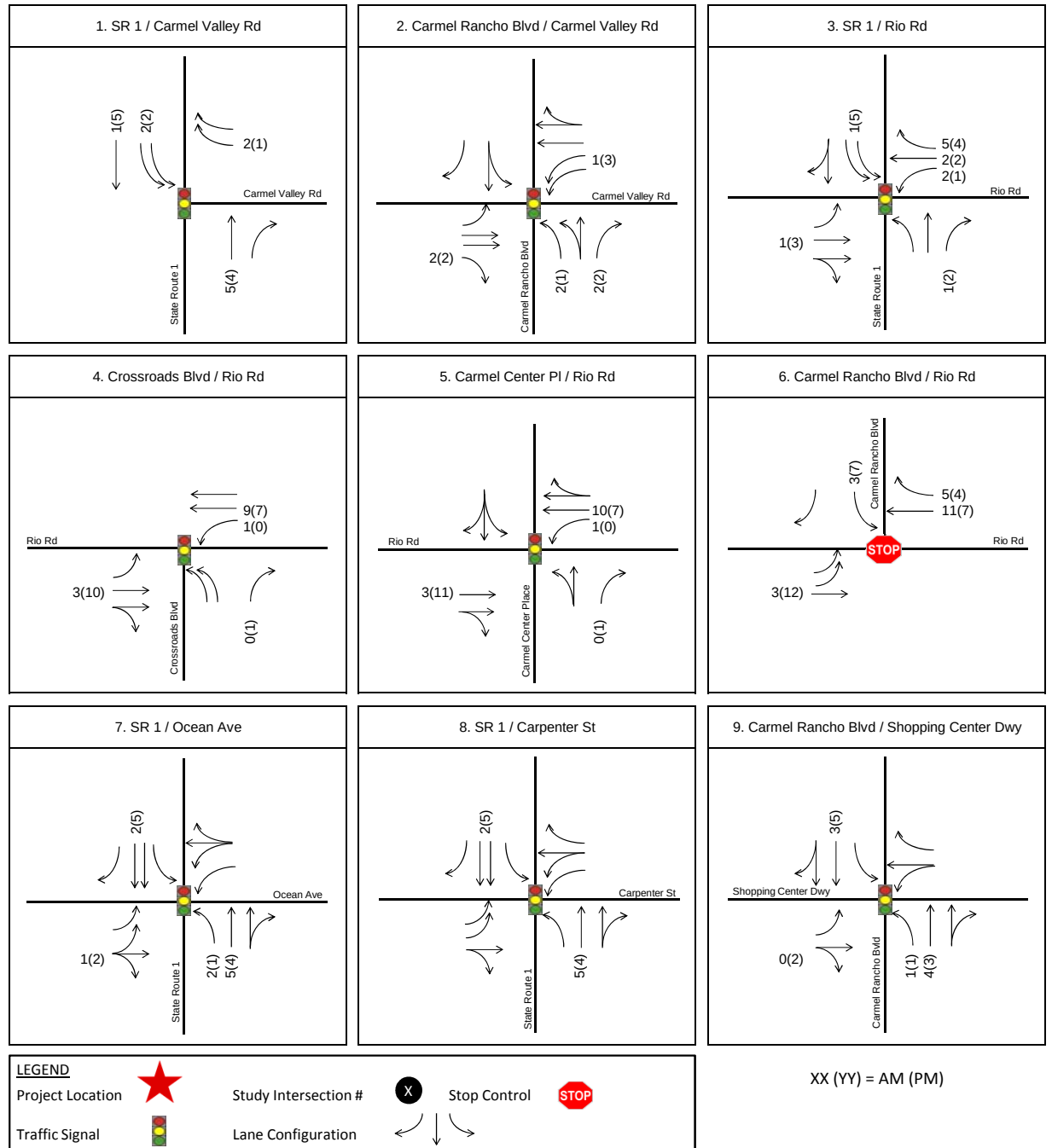
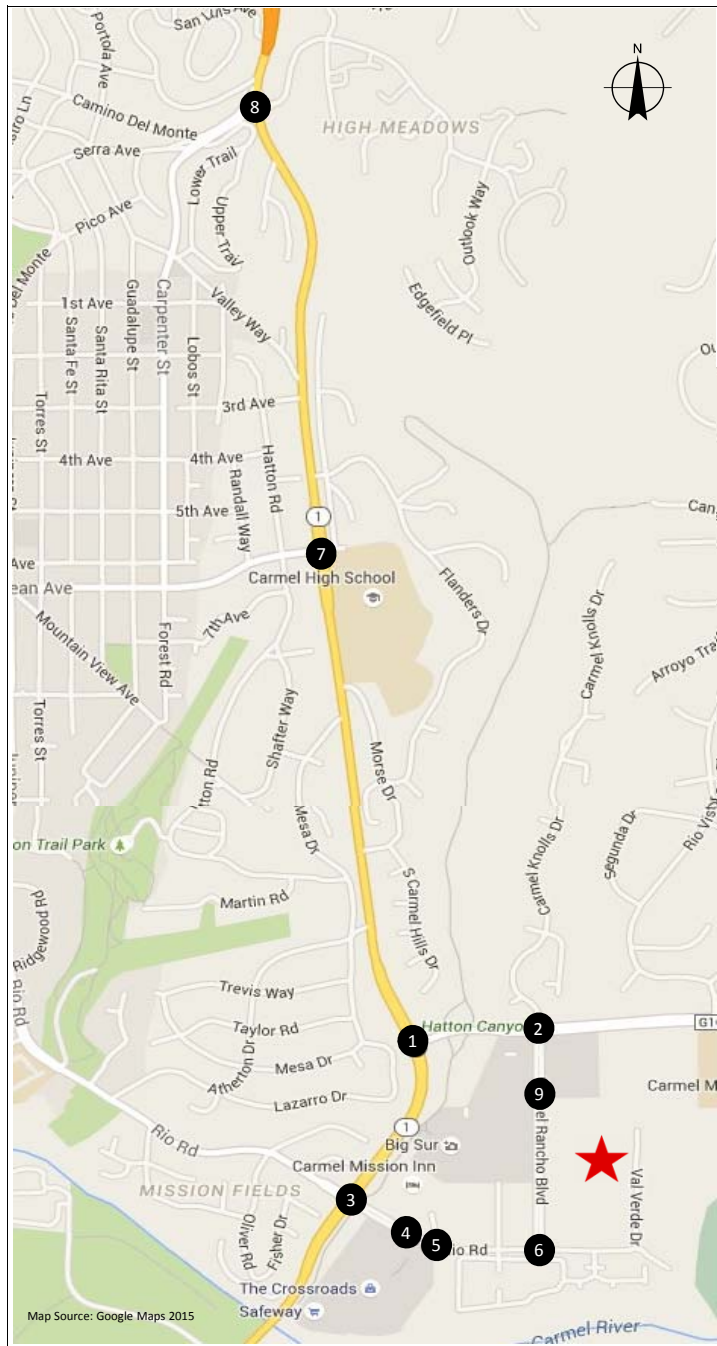
3. Bold type indicates unmitigated impact.

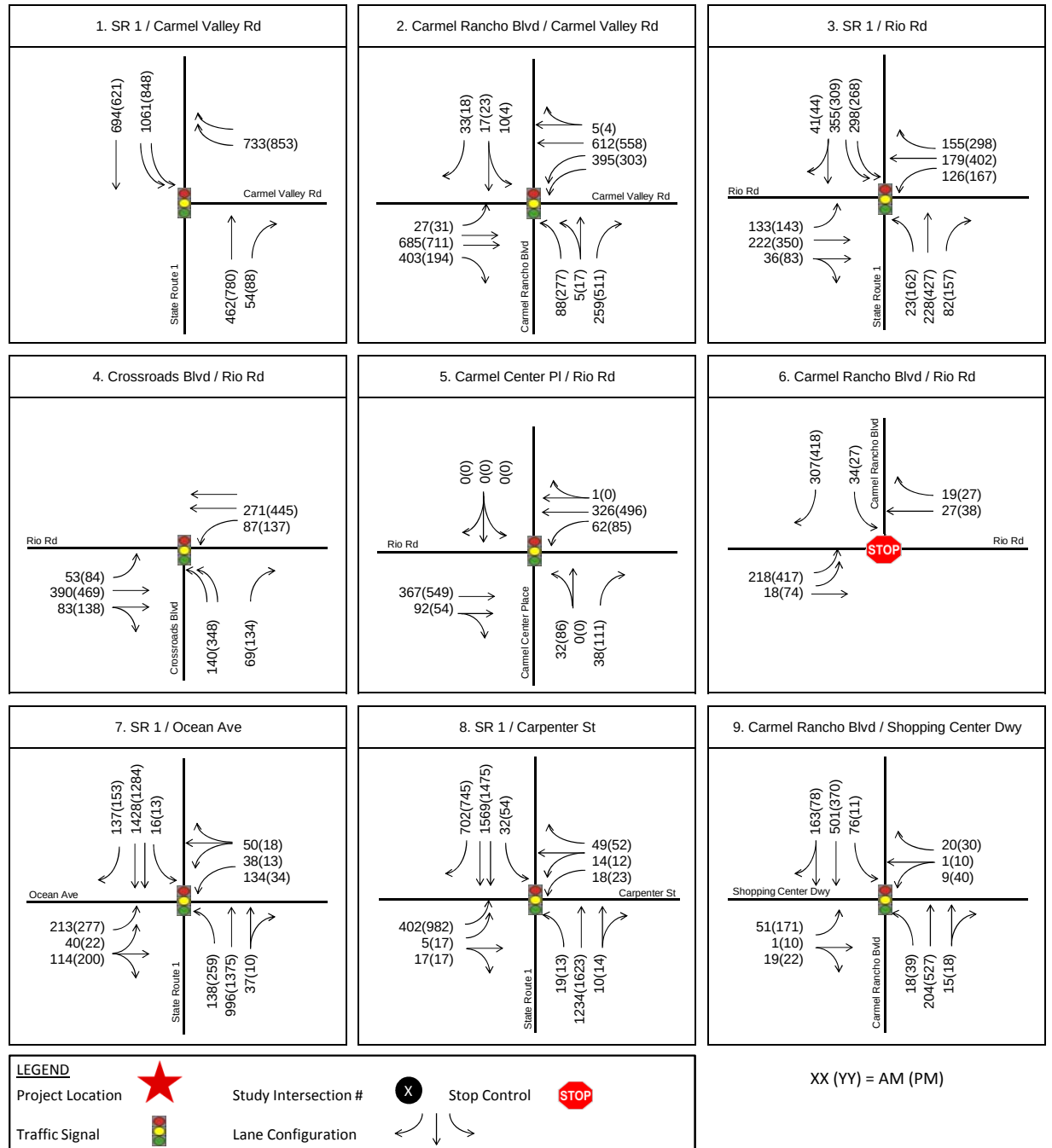
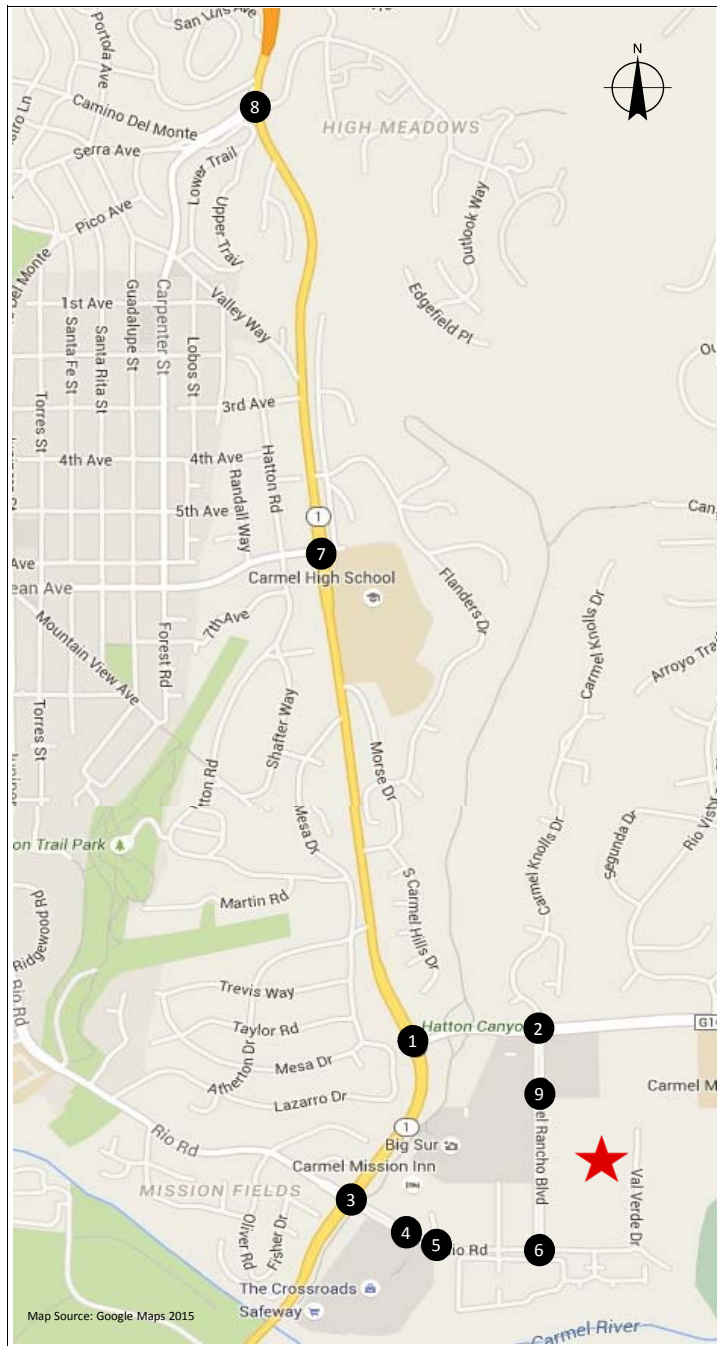
<u>TRIP GENERATION RATES (per DU)¹</u>	LAND USE CODE	DAILY TRIP RATE	AM PEAK HOUR				PM PEAK HOUR			
			PEAK HOUR RATE	% OF ADT	% IN	% OUT	PEAK HOUR RATE	% OF ADT	% IN	% OUT
Single-Family Detached Housing	210	9.52	0.75	8%	25%	75%	1.00	11%	63%	37%
<u>PROPOSED USE</u>	PROJECT SIZE	DAILY TRIPS	AM PEAK HOUR				PM PEAK HOUR			
			PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT	PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT
Single-Family Detached Housing	31 DU	295	23	8%	6	17	31	11%	20	11
Gross Trips Generated		295	23		6	17	31		20	11
<u>CREDIT FOR EXISTING USE</u>	PROJECT SIZE	DAILY TRIPS	AM PEAK HOUR				PM PEAK HOUR			
			PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT	PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT
Single-Family Detached Housing	-1 DU	-10	-1	10%	0	-1	-1	10%	-1	0
Total Net New Trips Generated		285	22		6	16	30		19	11

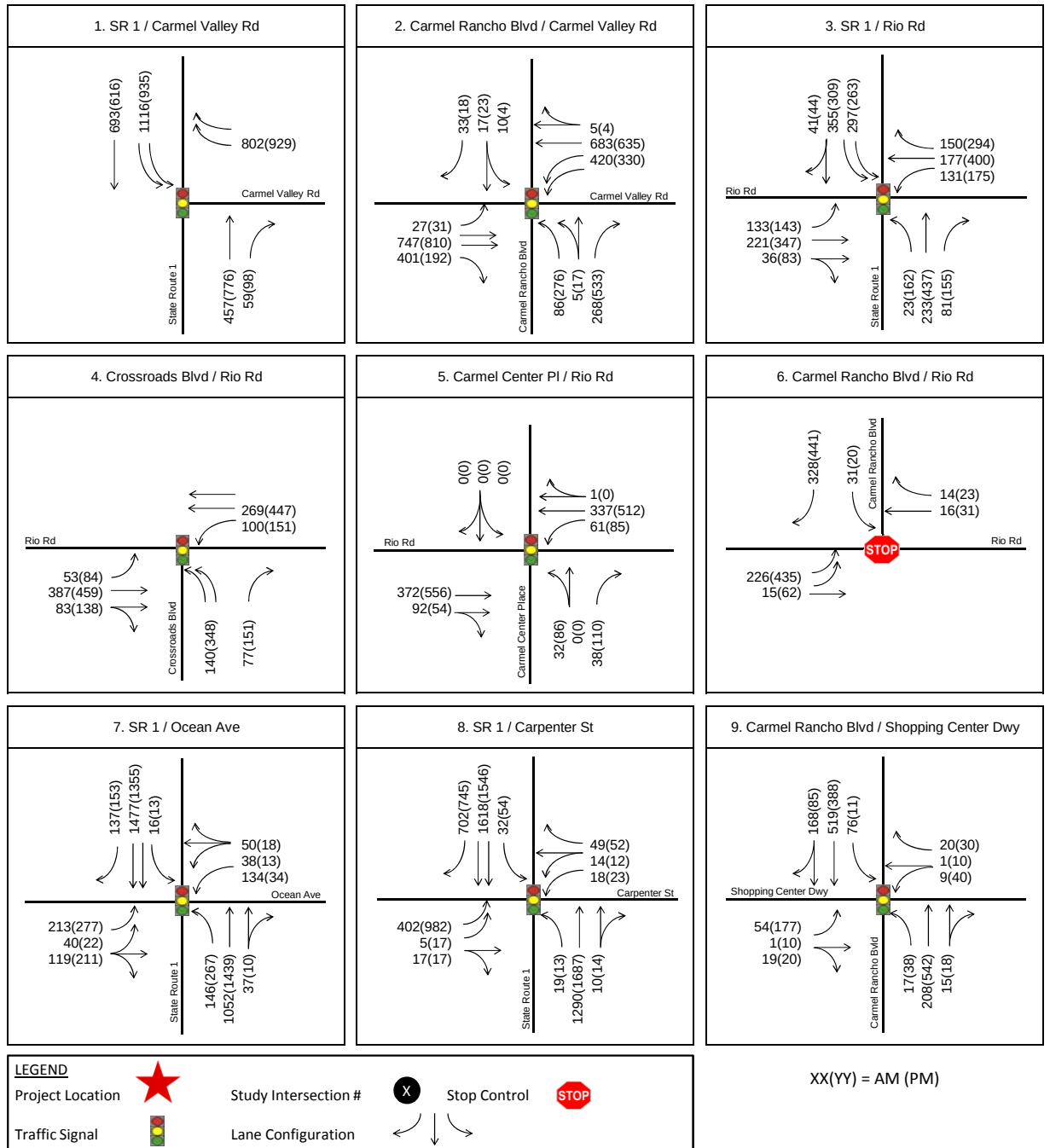
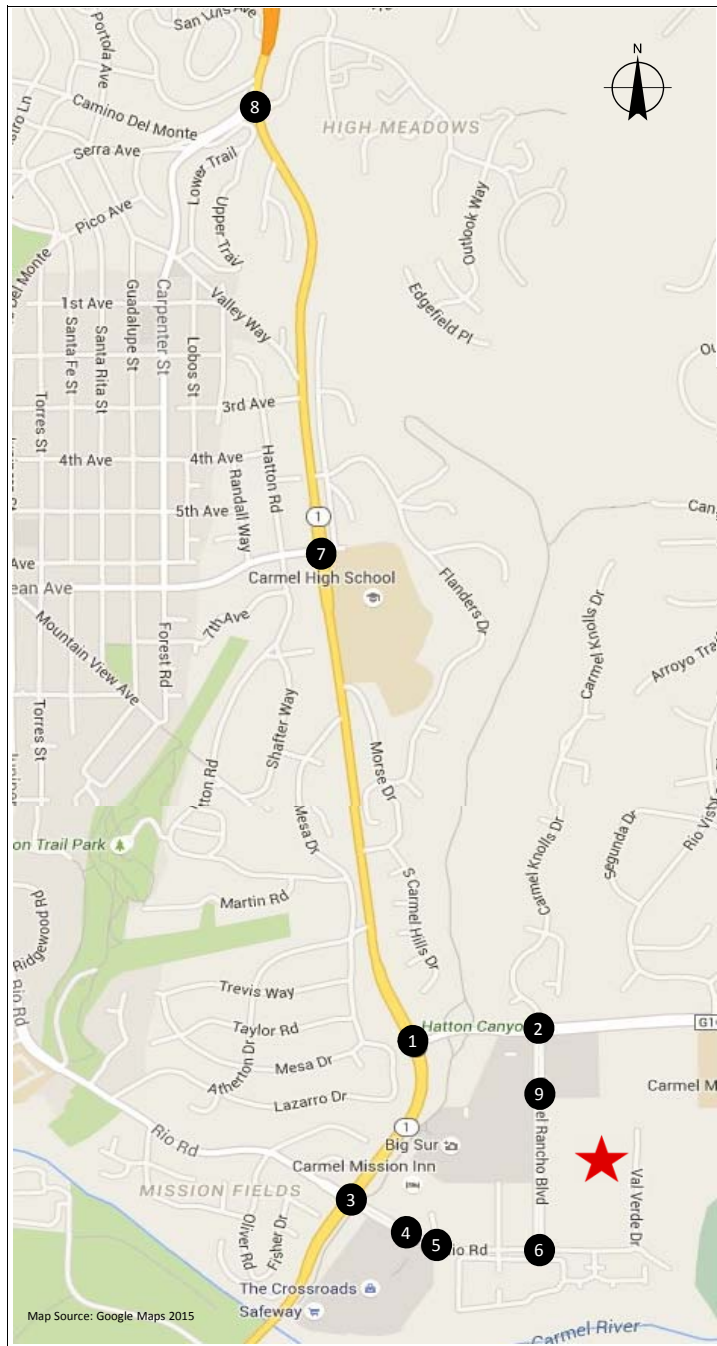
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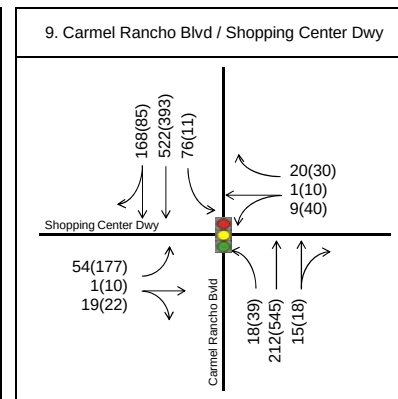
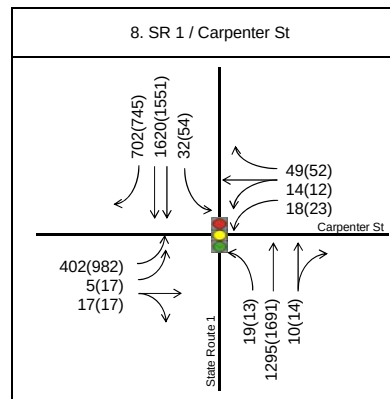
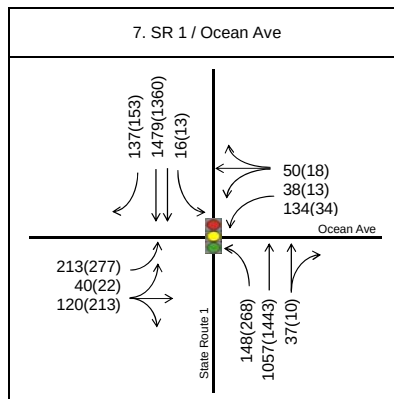
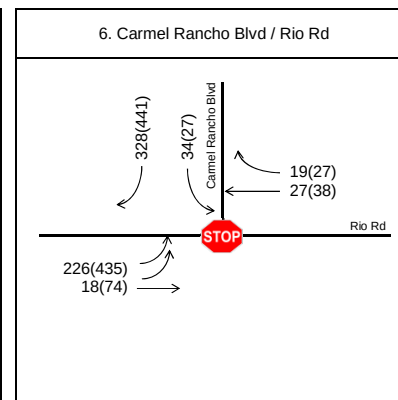
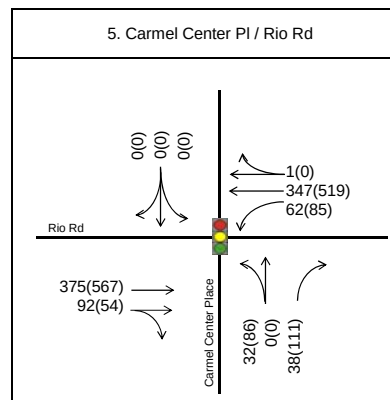
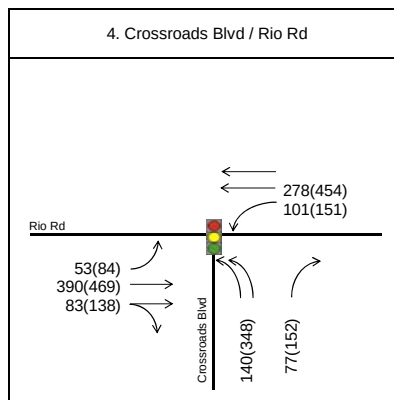
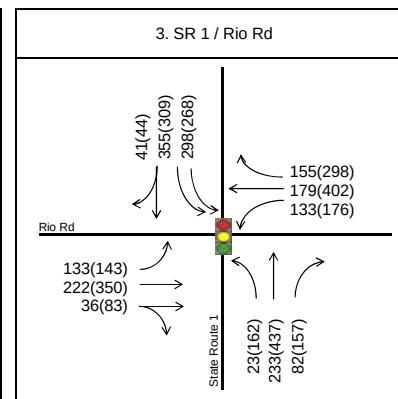
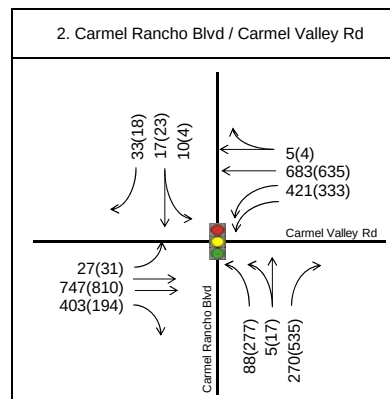
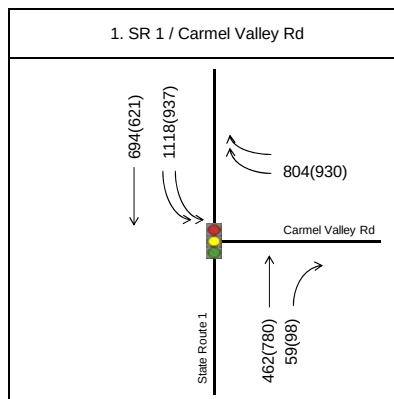
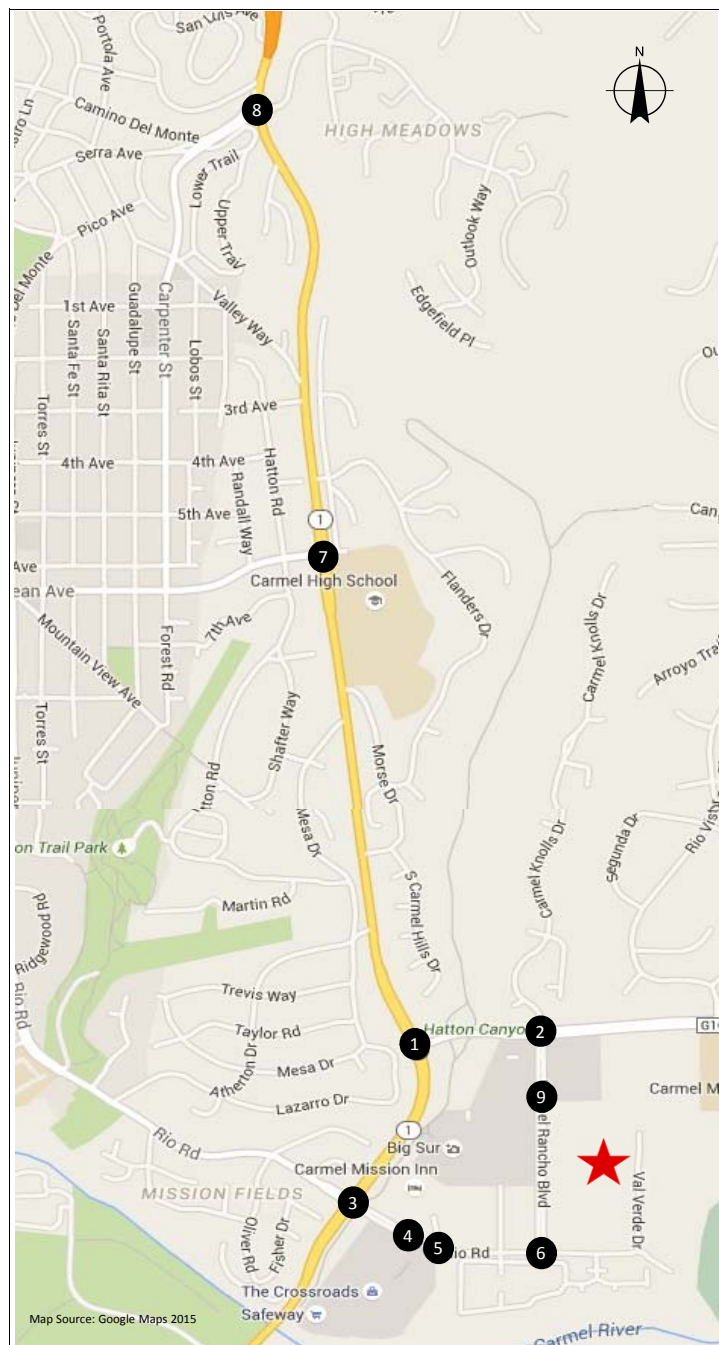
1. Trip generation rates per dwelling unit (DU), published by Institute of Transportation Engineers (ITE) "Trip Generation Manual," 9th Edition, 2012.



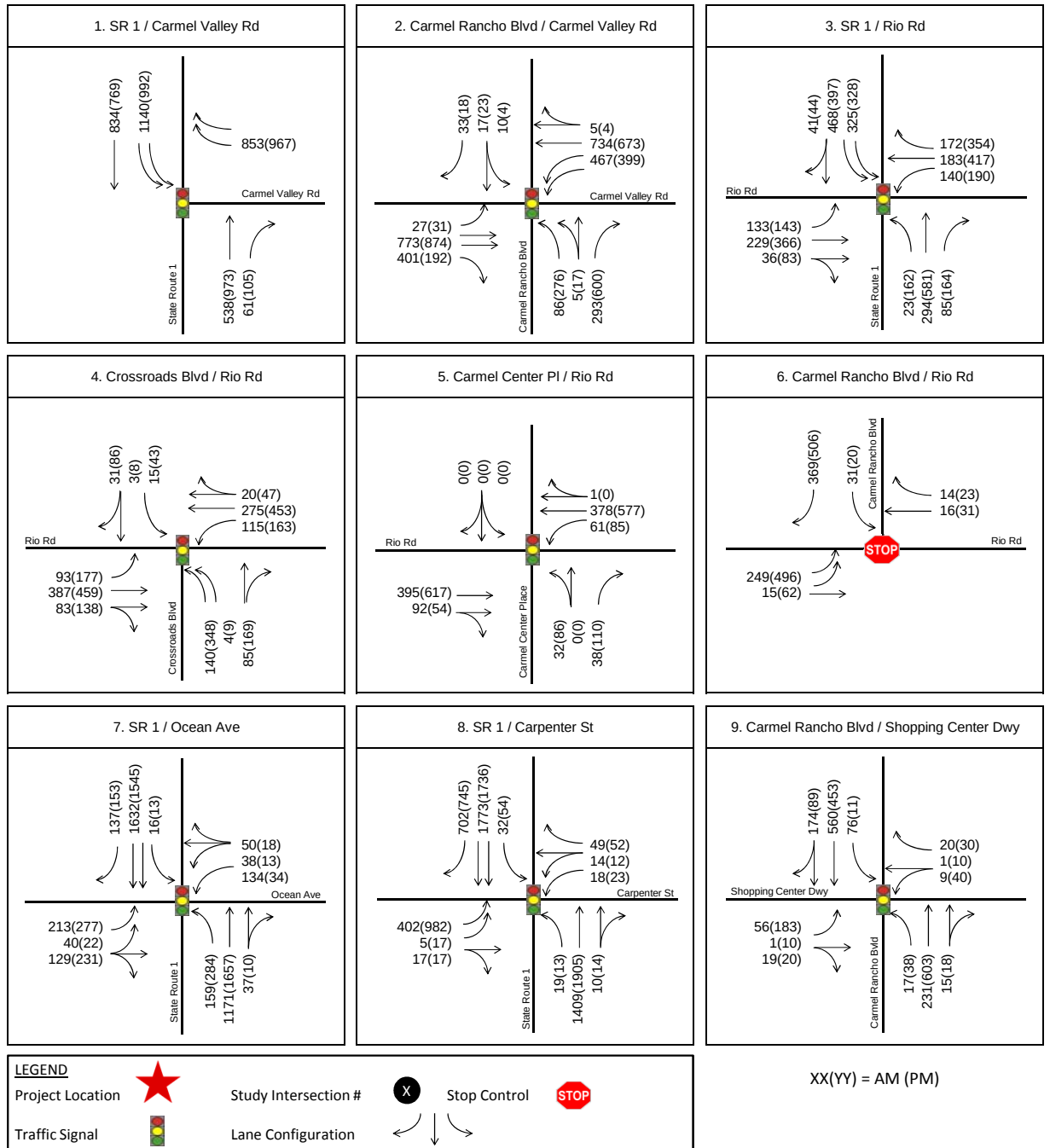
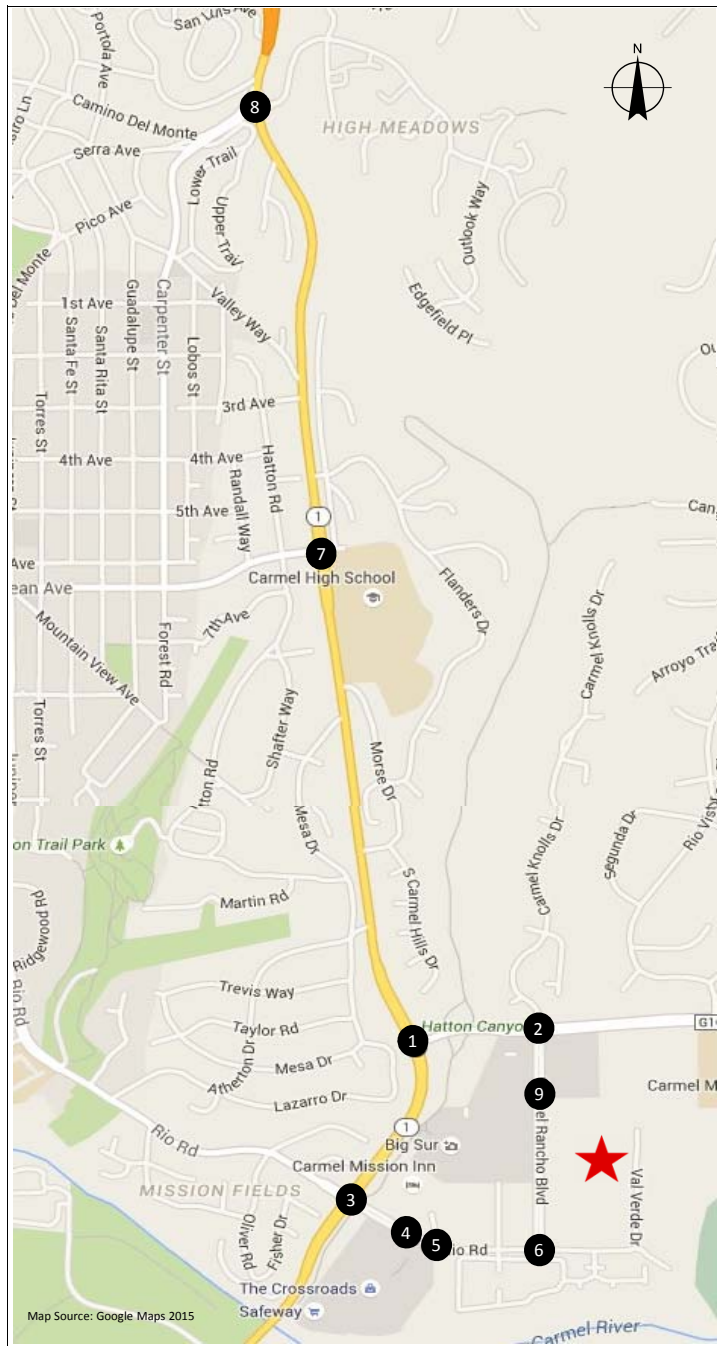


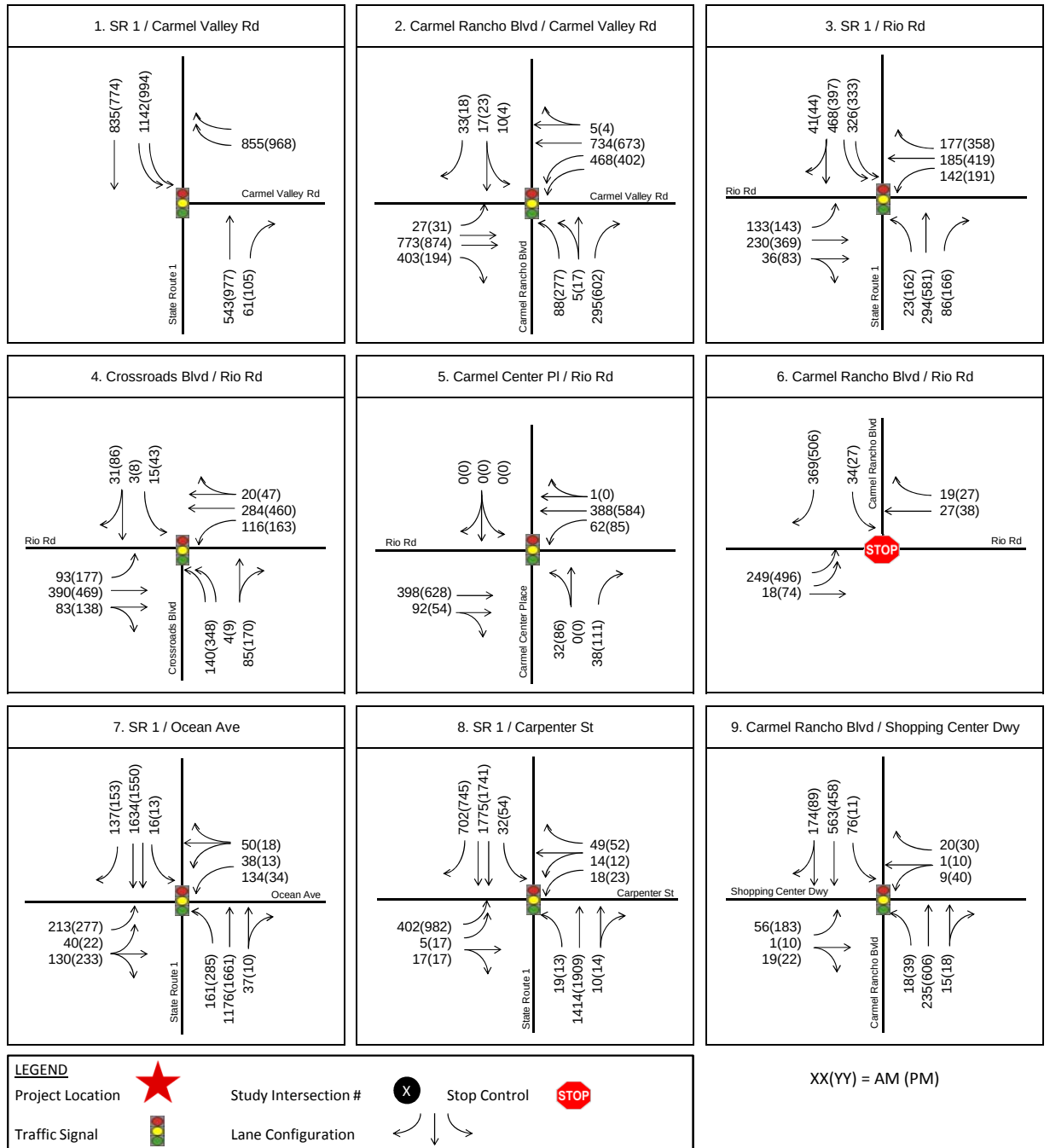
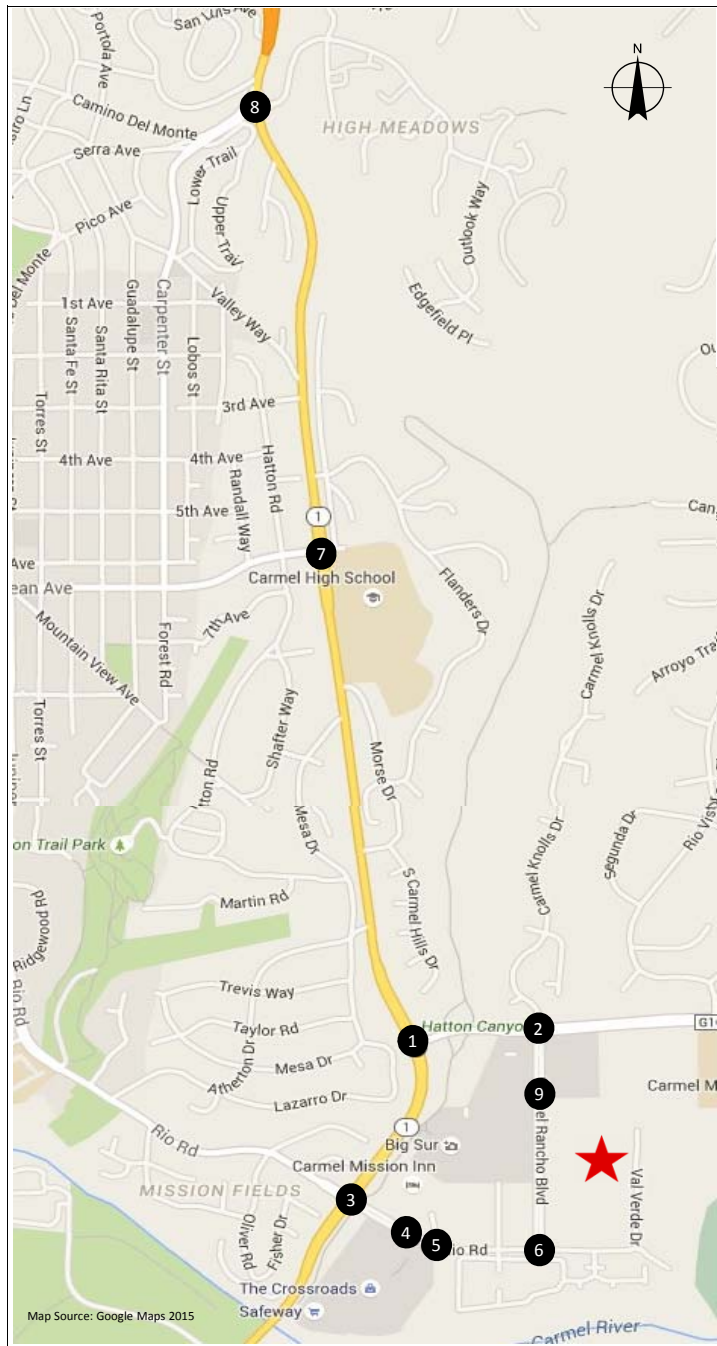






XX(YY) = AM (PM)





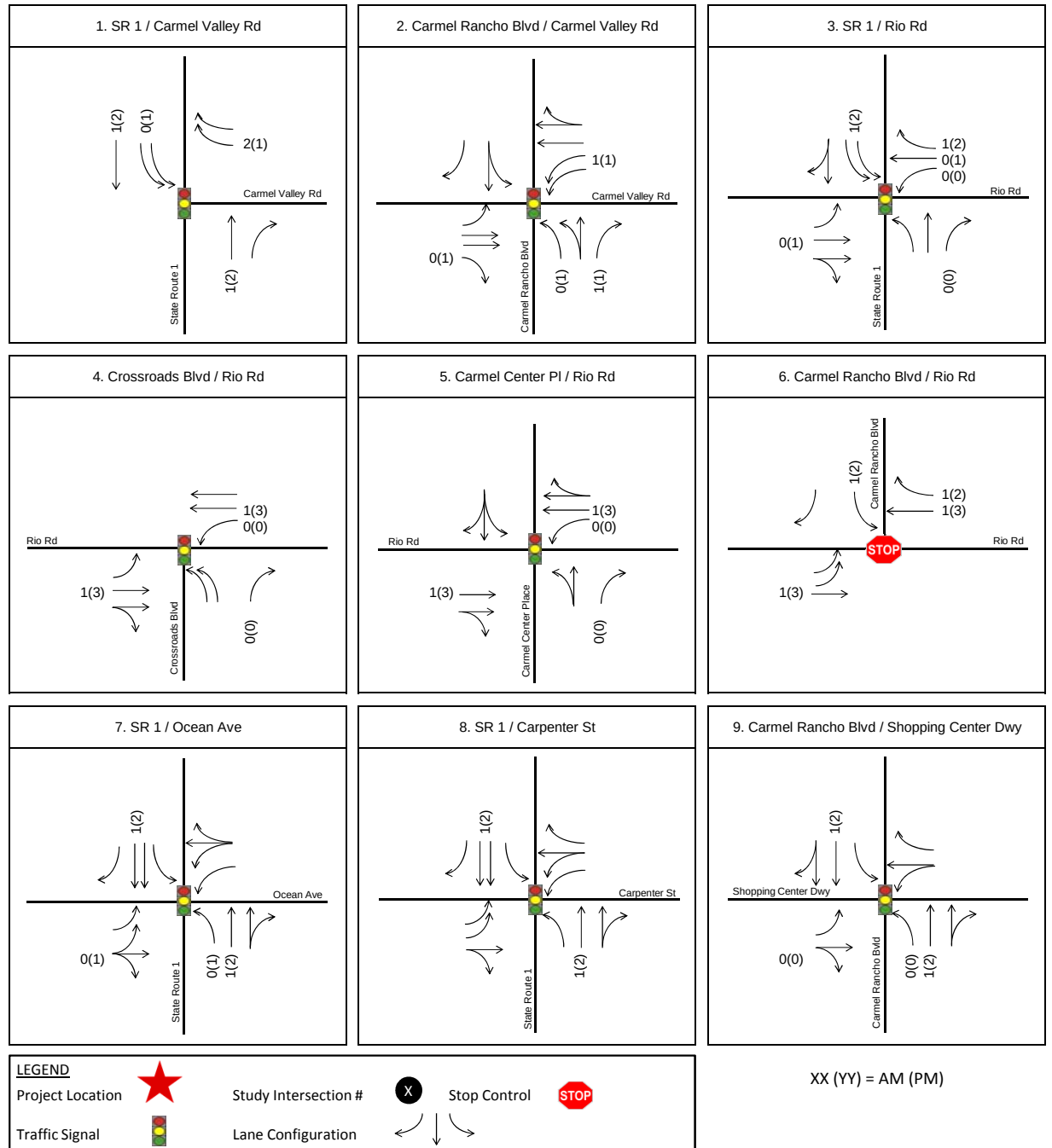
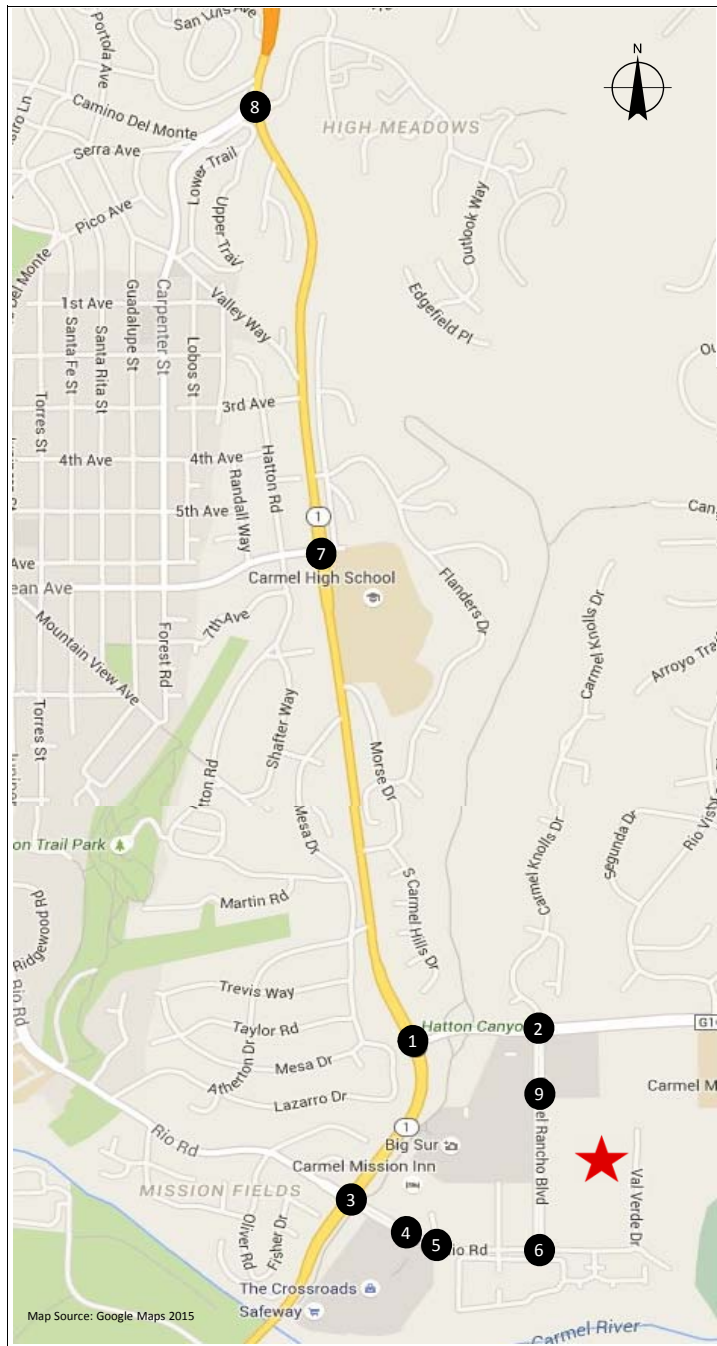
Project Alternative 1 Trip Generation										
TRIP GENERATION RATES ¹	LAND USE CODE	DAILY TRIP RATE	AM PEAK HOUR				PM PEAK HOUR			
			PEAK HOUR RATE	% OF ADT	% IN	% OUT	PEAK HOUR RATE	% OF ADT	% IN	% OUT
Assisted Living (per bed)	254	2.74	0.18	7%	68%	32%	0.29	11%	50%	50%
Single-Family Detached Housing (per DU)	210	9.52	0.75	8%	25%	75%	1.00	11%	63%	37%
PROPOSED USE	PROJECT SIZE	DAILY TRIPS	AM PEAK HOUR				PM PEAK HOUR			
			PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT	PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT
Assisted Living	200 Beds	548	36	7%	24	12	58	11%	29	29
Gross Trips Generated		548	36		24	12	58		29	29
CREDIT FOR EXISTING USE	PROJECT SIZE	DAILY TRIPS	AM PEAK HOUR				PM PEAK HOUR			
			PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT	PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT
Single-Family Detached Housing	-1 DU	-10	-1	10%	0	-1	-1	10%	-1	0
Trips Generated Per ITE Rates		538	35		24	11	57		28	29
Trips Generated with Adjusted Employee Shifts²			4		2	2	10		5	5

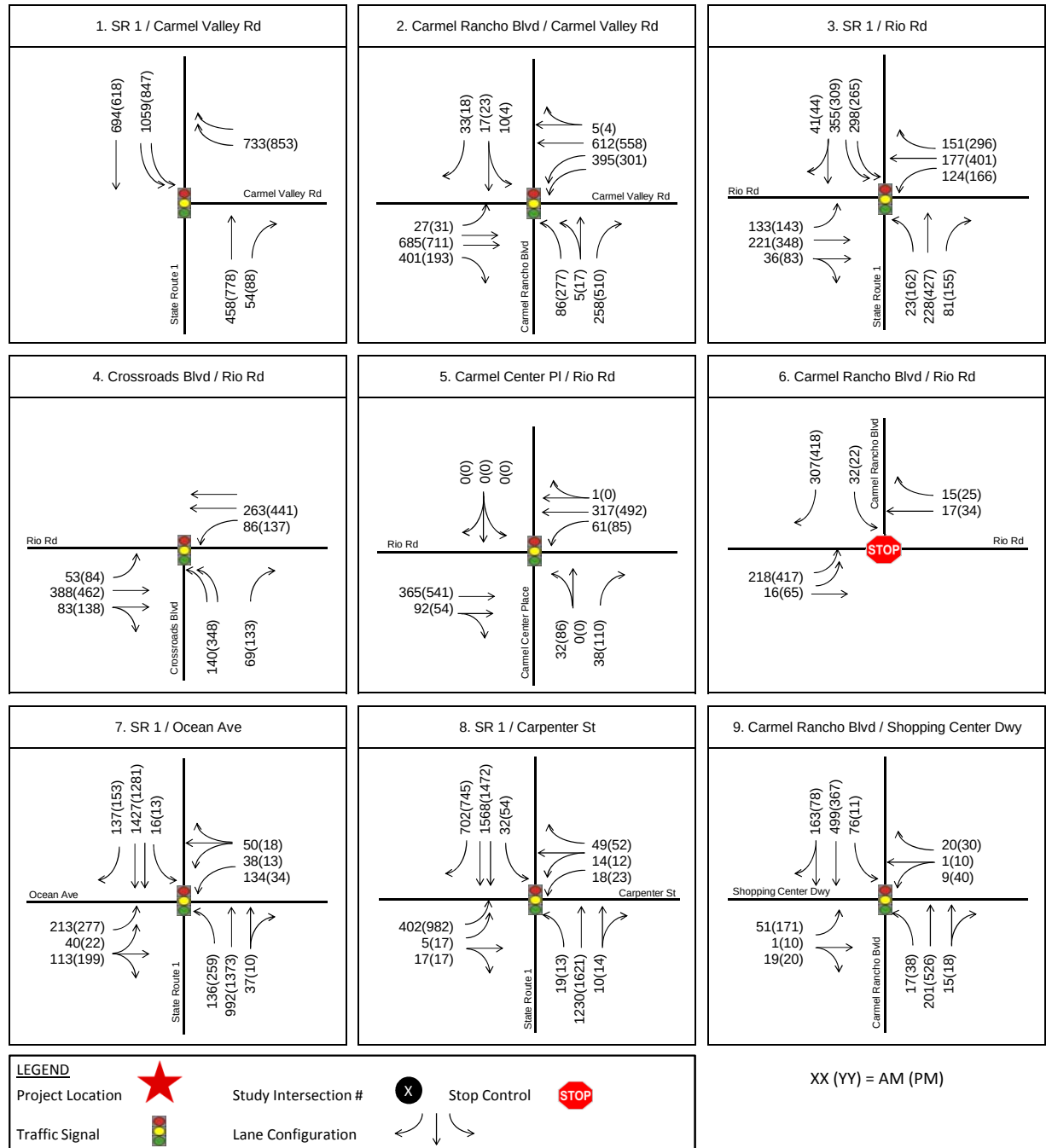
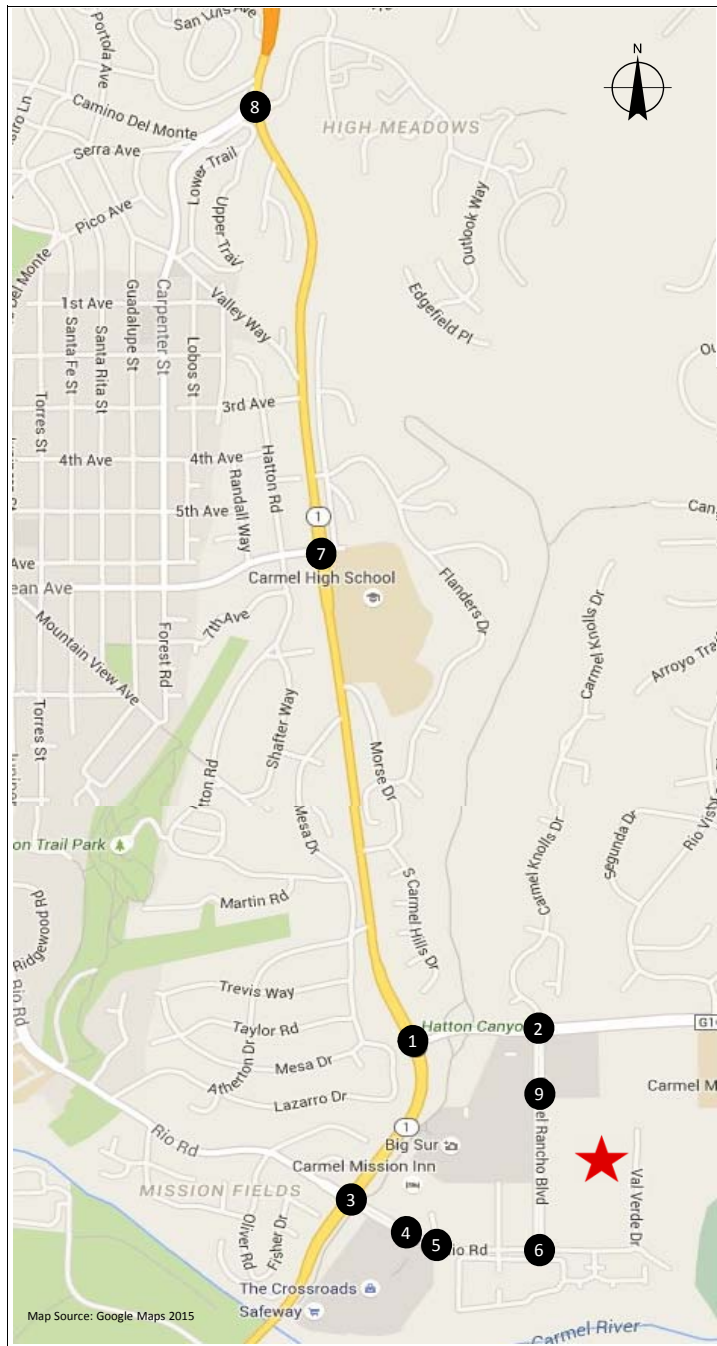
Project Alternative 2 Trip Generation										
TRIP GENERATION RATES ¹	LAND USE CODE	DAILY TRIP RATE	AM PEAK HOUR				PM PEAK HOUR			
			PEAK HOUR RATE	% OF ADT	% IN	% OUT	PEAK HOUR RATE	% OF ADT	% IN	% OUT
Assisted Living (per bed)	254	2.74	0.18	7%	68%	32%	0.29	11%	50%	50%
Single-Family Detached Housing (per DU)	210	9.52	0.75	8%	25%	75%	1.00	11%	63%	37%
PROPOSED USE	PROJECT SIZE	DAILY TRIPS	AM PEAK HOUR				PM PEAK HOUR			
			PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT	PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT
Assisted Living	150 Beds	411	27	7%	18	9	44	11%	22	22
Gross Trips Generated		411	27		18	9	44		22	22
CREDIT FOR EXISTING USE	PROJECT SIZE	DAILY TRIPS	AM PEAK HOUR				PM PEAK HOUR			
			PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT	PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT
Single-Family Detached Housing	-1 DU	-10	-1	10%	0	-1	-1	10%	-1	0
Trips Generated Per ITE Rates		401	26		18	8	43		21	22
Trips Generated with Adjusted Employee Shifts²			3		2	1	8		4	4

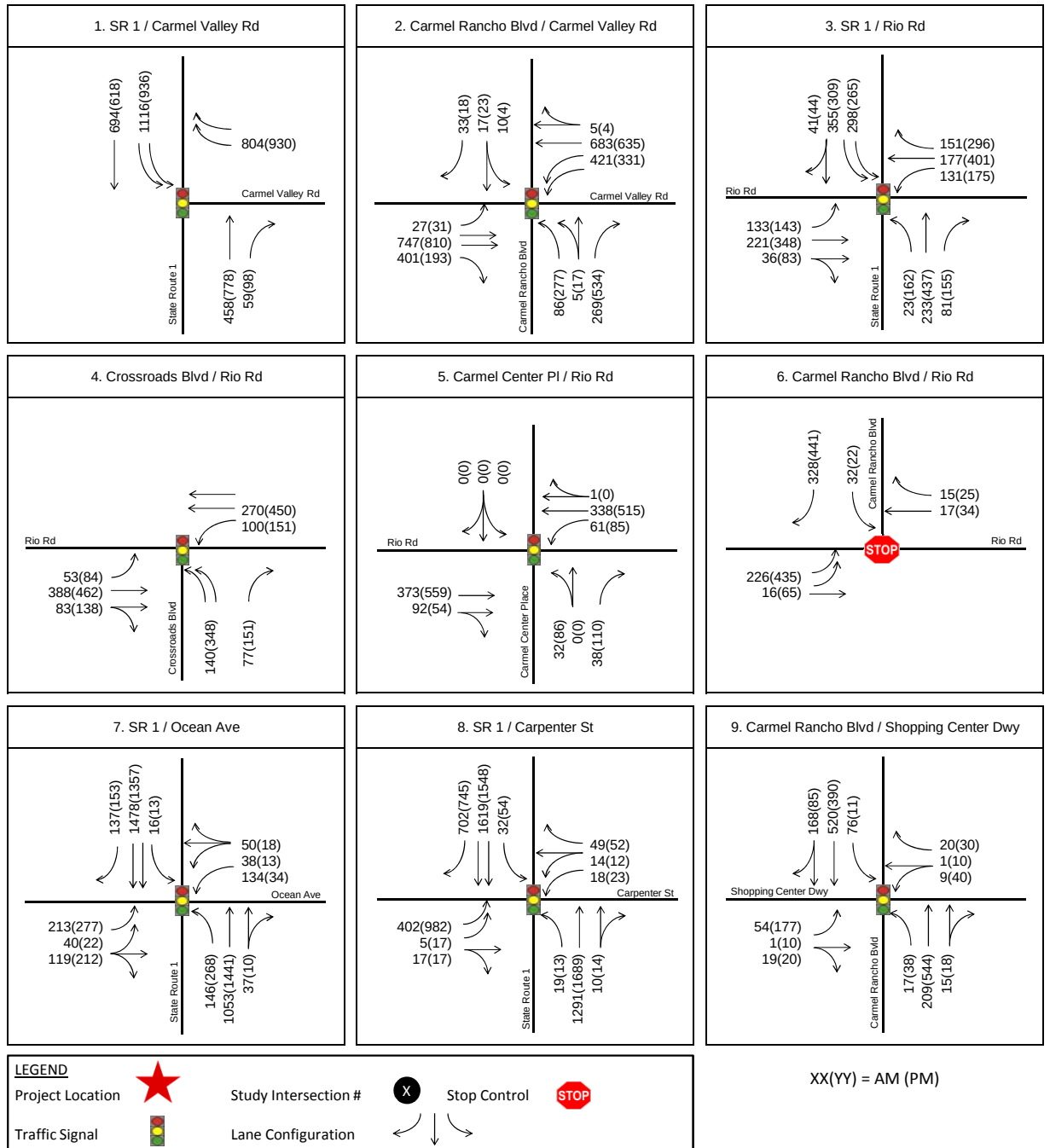
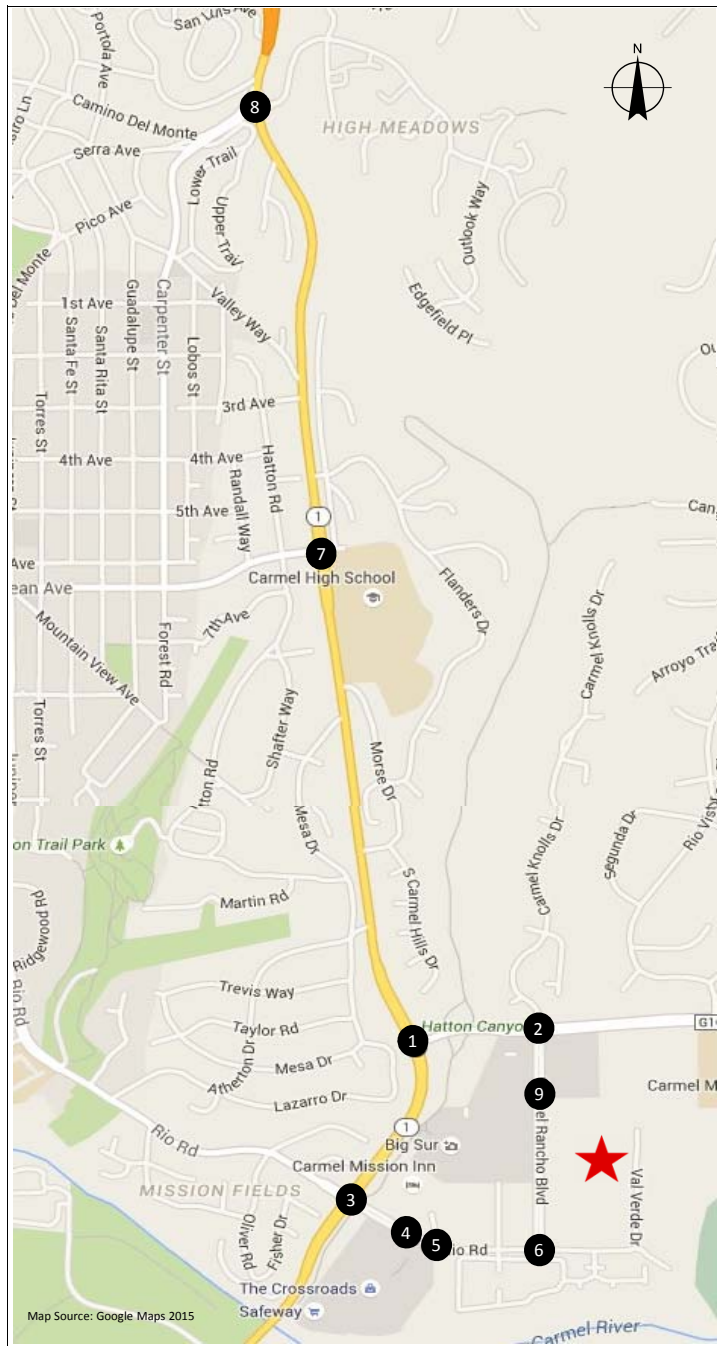
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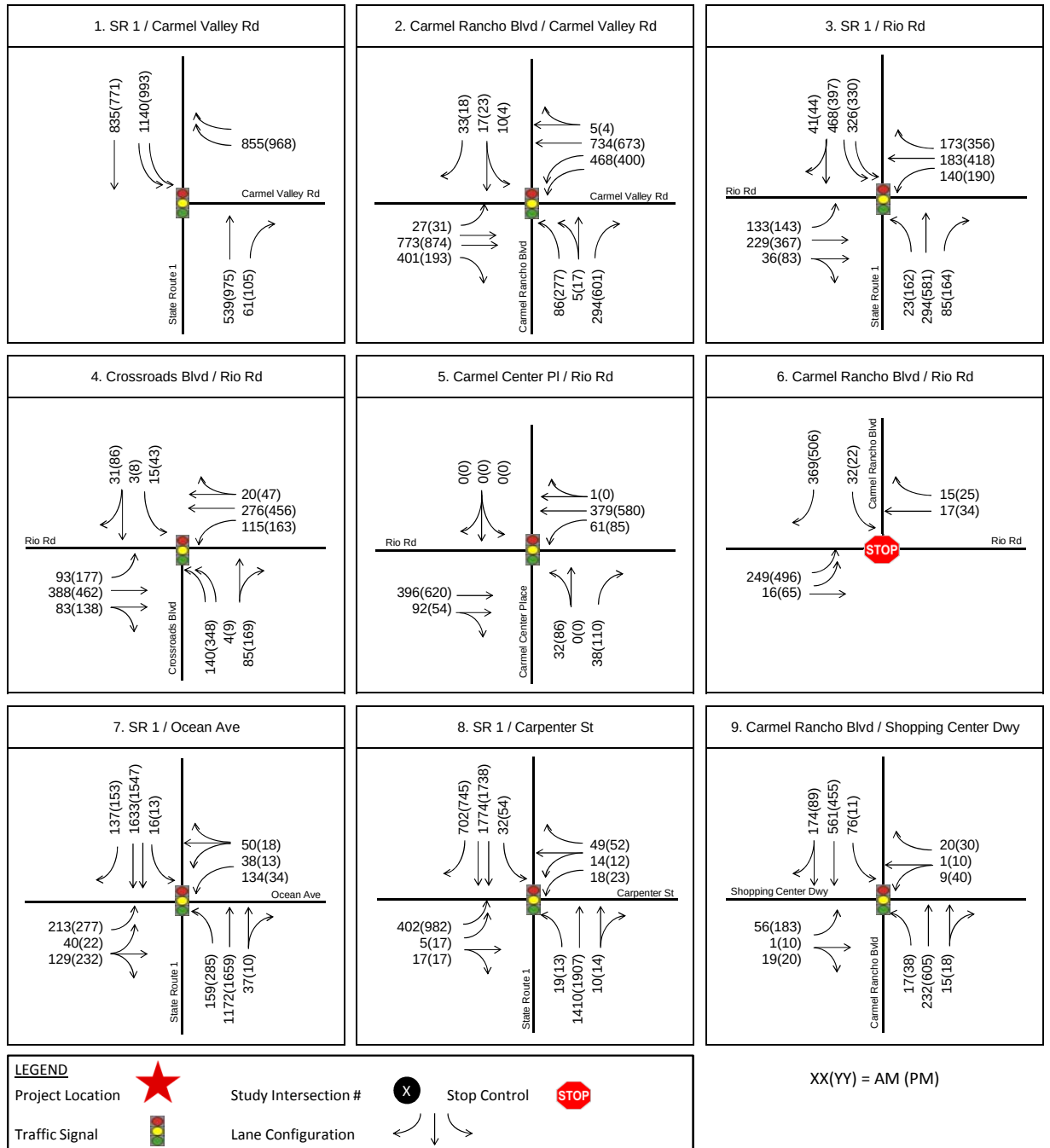
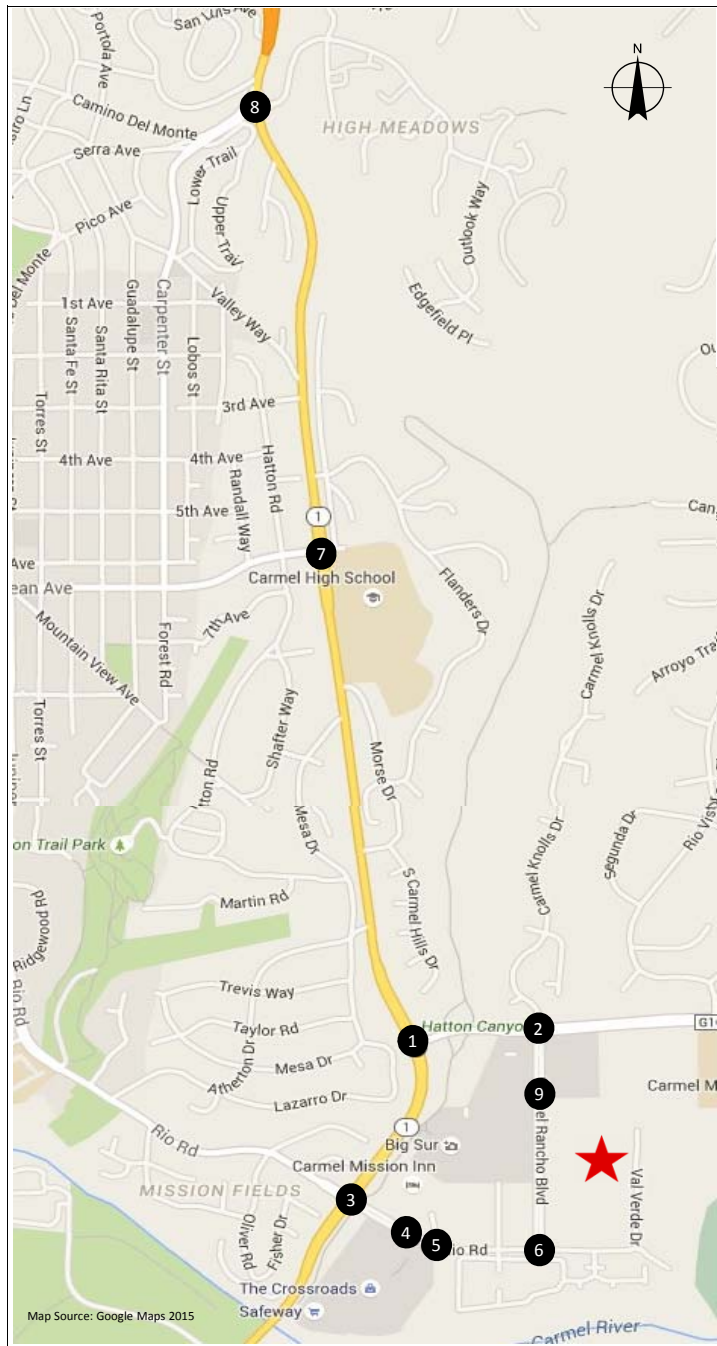
1. Trip generation rates based on Institute of Transportation Engineers (ITE) "Trip Generation Manual," 9th Edition, 2012.
2. Assumes all employees are scheduled to arrive and leave outside the AM and PM peak hours.
Includes anticipated incidental delivery and/or visitor trips during the peak hours.

Exhibit 16
Project Alternatives 1 and 2
Trip Generation Estimates









N-S Street	E-W Street	Existing Lane Configuration ^{1,2}	Existing Intersection Control	LOS Standard Jurisdiction	Existing Conditions		Existing Plus Project Alt 1 Conditions		Background Conditions		Background Plus Project Alt 1 Conditions		Cumulative Conditions		Cumulative Plus Project Alt 1 Conditions	
					AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.
					Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	SR 1	Carmel Valley Road NB 1-T, 1-R SB 2-L, 1-T WB 2-R <i>With RTP Improvements</i>	Signal	C/D Caltrans	11.3	B	18.1	B	11.3	B	18.1	B	11.9	B	21.0	C
															14.1	B
															43.5	D
															14.1	B
															9.5	A
															18.3	B
2	Carmel Rancho Blvd	Carmel Valley Road NB 1-L, 1-L/T, 1-R SB 1-L/T, 1-R EB 1-L, 2-T, 1-R WB 2-L, 1-T, 1-T/R	Signal	C CVMP	16.9	B	19.3	B	16.9	B	19.3	B	18.4	B	20.2	C
															22.0	C
															22.6	C
															22.1	C
															22.6	C
3	SR 1	Rio Road NB 1-L, 1-T, 1-R SB 2-L, 1-T/R EB 1-L, 1-T, 1-T/R WB 1-L, 1-T, 1-R <i>With RTP Improvements</i>	Signal	C/D Caltrans	22.6	C	37.9	D	22.6	C	37.9	D	22.8	C	38.6	D
															26.7	C
															54.0	D
															26.7	C
															24.1	C
															40.7	D
4	Crossroads Blvd	Rio Road NB 2-L, 1-T/R EB 1-L, 1-T, 1-T/R WB 1-L, 2-T	Signal	C CVMP	9.9	A	12.0	B	9.9	A	12.0	B	10.2	B	12.5	B
															10.2	B
															12.5	B
															20.2	C
															32.9	C
															20.1	C
															32.8	C
5	Carmel Center Place	Rio Road NB 1-L/T, 1-R SB 1-L/T/R EB 1-T, 1-T/R WB 1-L, 1-T, 1-T/R	Signal	C CVMP	9.3	A	6.0	A	9.3	A	6.0	A	9.1	A	5.9	A
															6.1	A
															7.8	A
															6.0	A
															7.8	A
6	Carmel Rancho Blvd	Rio Road SB 1-L, 1-R EB 2-L, 1-T WB 1-T, 1-R	Two-Way Stop	C CVMP	10.2	B	10.7	B	10.2	B	10.7	B	10.4	B	10.9	B
			SB		7.7	A	8.1	A	7.7	A	8.1	A	7.8	A	8.1	A
			EB		15.2	C	19.8	C	15.3	C	19.8	C	15.9	C	20.8	C
			WB												16.0	C
															20.7	C
															10.9	B
															11.7	B
															10.9	B
															8.3	A
															7.8	A
															23.5	C
															17.7	C
															23.2	C
7	SR 1	Ocean Avenue NB 1-L, 1-T, 1-T/R SB 1-L, 2-T, 1-R EB 1-L, 1-L/T/R WB 1-L, 1-L/T/R	Signal	C/D Caltrans	43.6	D	37.1	D	43.7	D	37.3	D	49.8	D	43.1	D
															49.9	D
															43.4	D
															71.4	E
															67.5	E
															71.5	E
															67.9	E
8	SR 1	Carpenter Street NB 1-L, 1-T, 1-T/R SB 1-L, 2-T, 1-R EB 2-L, 1-T/R WB 1-L, 1-L/T, 1-R <i>With NB RT Lane</i>	Signal	C/D Caltrans	23.8	C	47.1	D	23.8	C	47.3	D	25.0	C	52.4	D
															25.1	C
															52.6	D
															32.3	C
															77.2	E
															32.4	C
															77.5	E
															30.3	C
															67.6	E
9	Carmel Rancho Blvd	Shopping Center Dwy NB 1-L, 1-T, 1-T/R SB 1-L, 1-T, 1-T/R EB 1-L, 1-T/R WB 1-L/T, 1-R	Signal	C CVMP	4.0	A	5.5	A	4.0	A	5.6	A	4.0	A	5.6	A
															4.0	A
															5.8	A
															4.0	A
															5.8	A

Notes:

- 1 L, T, R = Left, Through, Right
- 2 NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound
- 3 Level of service highlighted in red indicates that LOS exceeds the LOS standard.
- 4 Yellow highlight indicates project impact.
- 5 Bold type indicates unmitigated impact.

Exhibit 21

Project Alternative 1 Scenarios

Intersection Levels of Service

Seg # Road Segment		Existing AM vs Existing + Project Alt 1 AM				Existing PM vs Existing + Project Alt 1 PM				Background AM vs Background + Project Alt 1 AM				Background PM vs Background + Project Alt 1 PM				Cumulative AM vs Cumulative + Project Alt 1 AM				Cumulative PM vs Cumulative + Project Alt 1 PM			
		Existing AM		Exist+Proj AM		Existing PM		Exis+Proj PM		Background AM		Back+Proj AM		Background PM		Back+Proj PM		Cumulative AM		Cum+Proj AM		Cumulative PM		Cum+Proj PM	
NB Carmel Rancho Blvd		Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS		
12	From Rio Rd to Shopping Center Dwy	27.3	A	27.3	A	24.9	B	24.9	B	27.3	A	27.3	A	24.8	B	24.8	B	27.2	A	27.2	A	24.6	B	24.7	B
11	From Shopping Center Dwy to Carmel Valley Rd	9.5	D	9.5	D	8.9	E	8.9	E	9.2	D	9.2	D	8.6	E	8.5	E	9.1	D	9.1	D	8.3	E	8.2	E
Total		17.5	C	17.5	C	16.2	C	16.2	C	17.2	C	17.2	C	15.8	C	15.8	C	17.1	C	17.1	C	15.4	C	15.4	C
SB Carmel Rancho Blvd		Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS		
11	From Carmel Valley Rd to Shopping Center Dwy	18.3	C	18.3	C	16.8	C	16.8	C	18.2	C	18.2	C	16.7	C	16.7	C	18.1	C	18.1	C	16.4	C	16.5	C
12	From Shopping Center Dwy to Rio Rd	22.9	B	22.9	B	22.6	B	22.6	B	22.8	B	22.8	B	22.5	B	22.5	B	22.5	B	22.5	B	22.1	B	22.1	B
Total		21.3	B	21.3	B	20.5	B	20.5	B	21.2	B	21.2	B	20.4	B	20.4	B	21.0	B	21.0	B	20.0	B	20.1	B
EB Rio Rd		Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS		
5	From Atherton Dr to SR 1	17.3	C	17.3	C	17.3	C	17.3	C	17.3	C	17.3	C	17.3	C	17.3	C	17.1	C	17.1	C	17.0	C	17.0	C
13	From SR 1 to Crossroads Blvd	12.9	D	12.9	D	11.7	D	11.7	D	12.6	D	12.6	D	11.7	D	11.6	D	10.9	D	10.9	D	9.2	D	9.2	D
14	From Crossroads Blvd to Carmel Center Pl	12.2	D	12.2	D	11.0	D	11.0	D	12.1	D	12.1	D	10.9	D	10.9	D	8.9	E	8.9	E	7.8	E	7.8	E
15	From Carmel Center Pl to Carmel Rancho Blvd	16.1	C	16.1	C	17.1	C	17.1	C	16.0	C	16.0	C	17.1	C	17.1	C	16.0	C	16.0	C	17.0	C	17.0	C
Total		15.8	C	15.8	C	15.7	C	15.7	C	15.8	C	15.8	C	15.6	C	15.6	C	14.9	C	14.9	C	14.3	C	14.3	C
WB Rio Rd		Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS		
15	From Carmel Rancho Blvd to Carmel Center Pl	20.3	B	20.3	B	19.6	B	19.6	B	20.3	B	20.3	B	19.6	B	19.6	B	20.2	B	20.3	B	19.6	B	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	9.6	D	9.6	D	8.3	E	8.3	E	9.6	D	9.6	D	8.4	E	8.4	E	6.8*	F	6.8*	F	4.8*	F	4.8*	F
13	From Crossroads Blvd to SR 1	7.3	E	7.3	E	7.2	E	7.2	E	7.3	E	7.3	E	7.2	E	7.2	E	7.2	E	7.2	E	6.9	F	6.9	F
5	From SR 1 to Atherton Dr	19.6	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B
Total		15.1	C	16.3	C	15.9	C	15.9	C	16.3	C	16.3	C	15.9	C	15.9	C	15.6	C	15.6	C	14.6	C	14.6	C
NB SR 1		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS			
1	From Ocean Ave to Carpenter St	C		C		D		D		C		C		D		D		C		C		D		D	
2	From Carmel Valley Rd to Ocean Ave	C		C		C		C		F		F		C		C		F		F		C		C	
3	From Rio Rd to Carmel Valley Rd	F		F		F		F		F		F		F		F		F		F		F		F	
4	From Ribera Rd to Rio Rd	B		B		B		B		B		B		B		B		B		B		B		B	
SB SR 1		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS		Arterial LOS			
1	From Carpenter St to Ocean Ave	D		D		C		C		D		D		C		C		D		D		C		C	
2	From Ocean Ave to Carmel Valley Rd	C		C		C		C		C		C		C		C		C		C		C		C	
3	From Carmel Valley Rd to Rio Rd	C		C		E		E		C		C		E		E		C		C		E		E	
4	From Rio Rd to Ribera Rd	B		B		B		B		B		B		B		B		B		B		B		B	

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Text highlighted in yellow indicates potential project impact.

3. * = Traffic flow on this segment is controlled by closely spaced intersections that operate acceptably. Therefore, project does not have an impact.

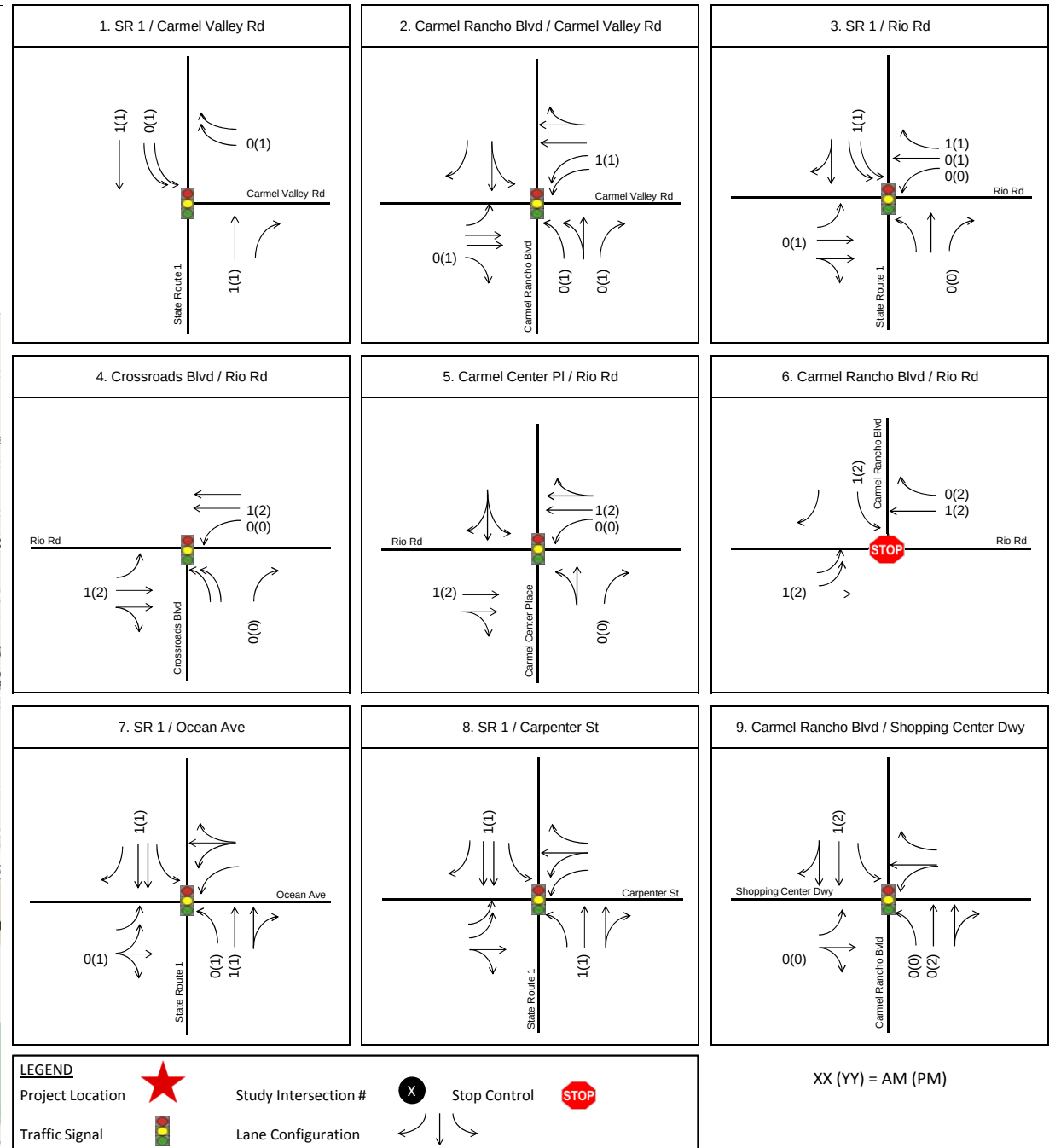
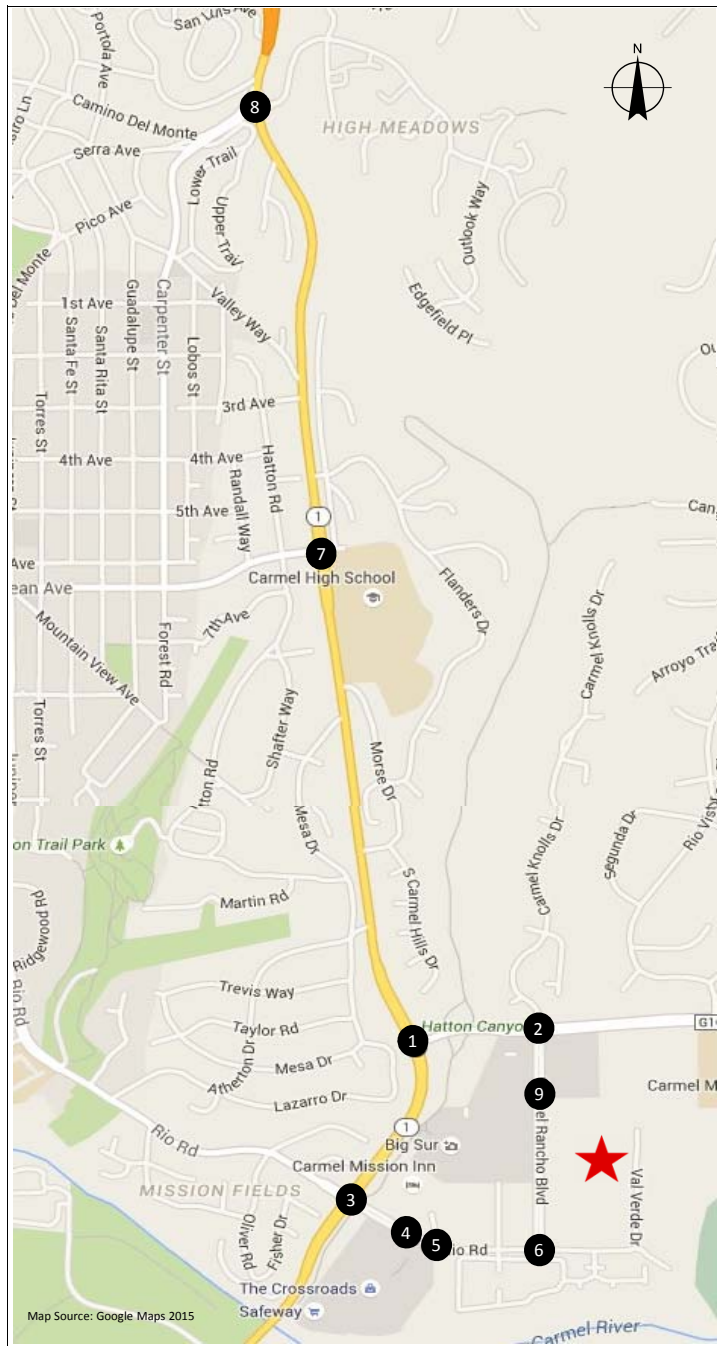
4. SR 1 road segment levels of service are referenced from the *Rancho Cañada Draft Transportation Impact Study Report* prepared by Central Coast Transportation Consulting (CCTC, January 2015)

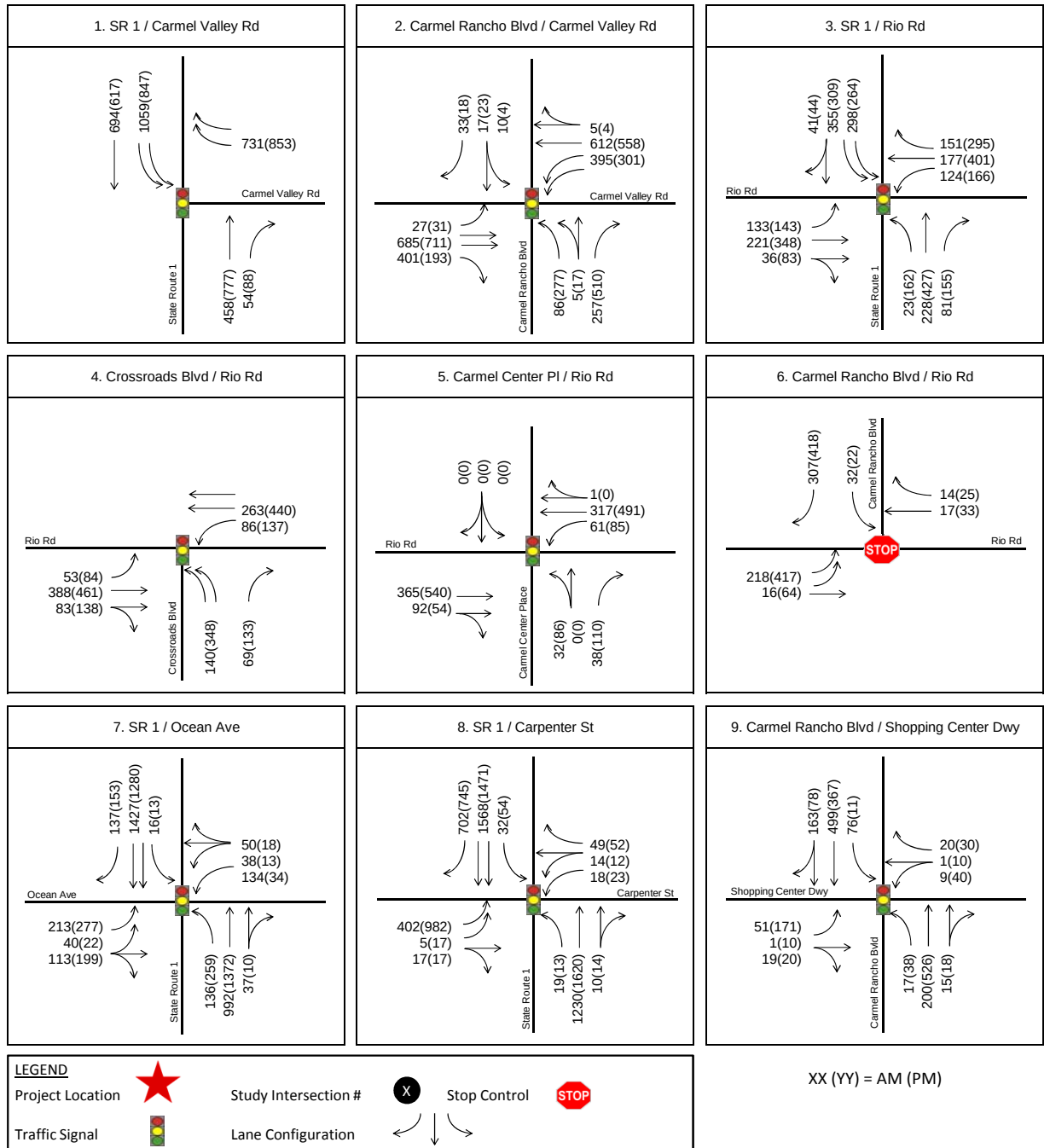
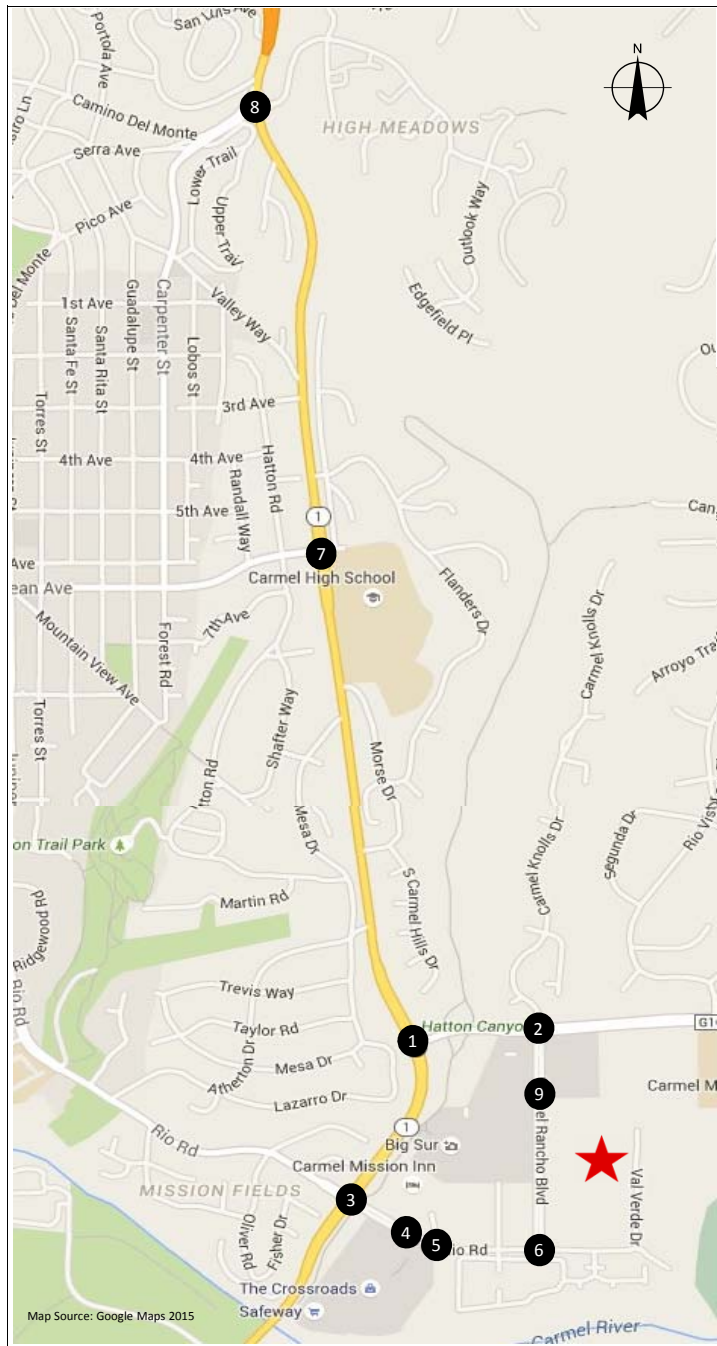
Carmel Valley Road				Existing Conditions	Existing Plus Project Alt 1 Conditions	Background Conditions	Background + Project Alt 1 Conditions	Cumulative Conditions	Cumulative + Project Alt 1 Conditions
Segment	From	To	CVMP ADT Threshold	ADT	ADT	ADT	ADT	ADT	ADT
6	Robinson Canyon Rd	Schulte Rd	15,499	14,611	14,692	15,847	15,928	17,107	17,188
7	Schulte Rd	Rancho San Carlos Rd	16,340	15,974	16,055	17,865	17,946	19,125	19,206
8	Rancho San Carlos Rd	Rio Rd	48,487	18,982	19,063	21,046	21,127	22,706	22,787
9	Rio Rd	Carmel Rancho Blvd	51,401	24,228	24,309	26,319	26,400	28,699	28,780
10	Carmel Rancho Blvd	SR 1	27,839	22,006	22,243	23,606	23,843	24,626	24,863

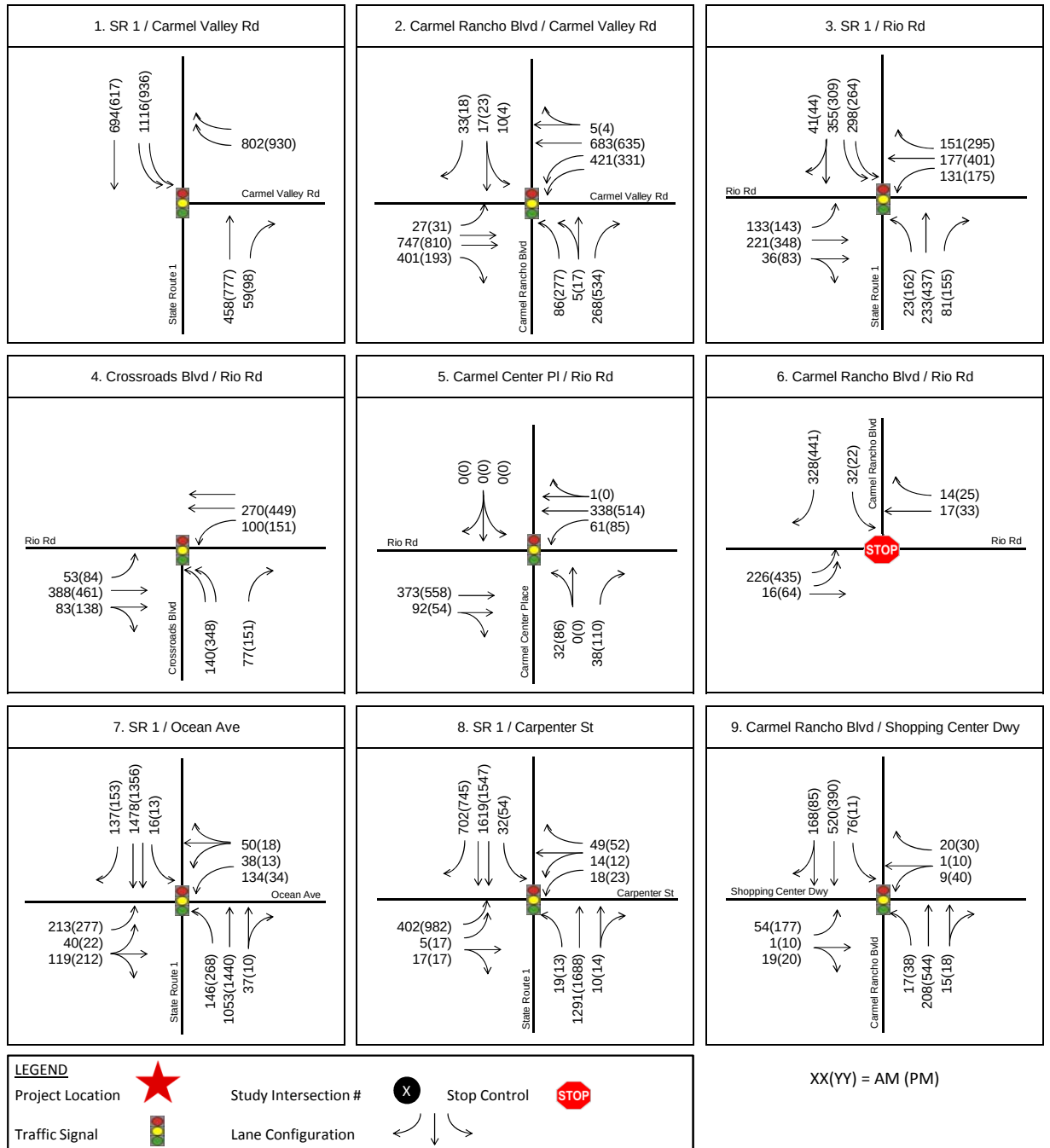
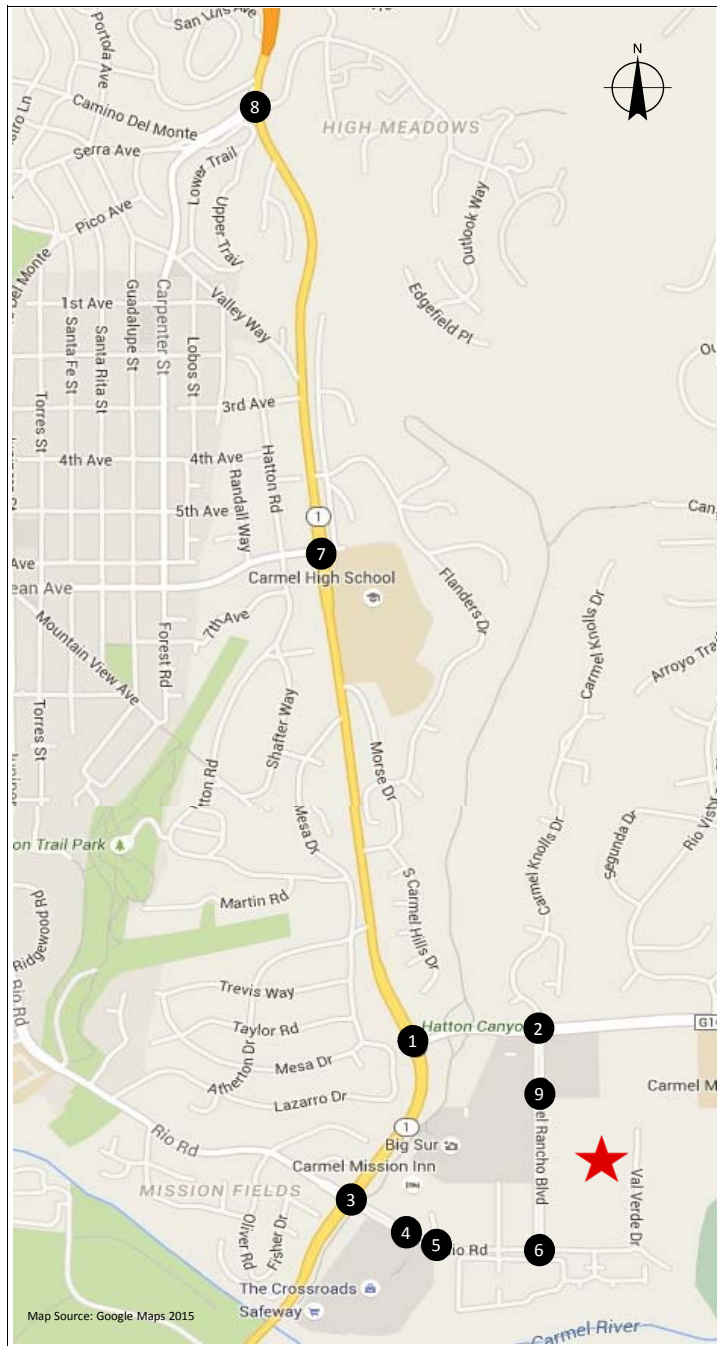
Notes:

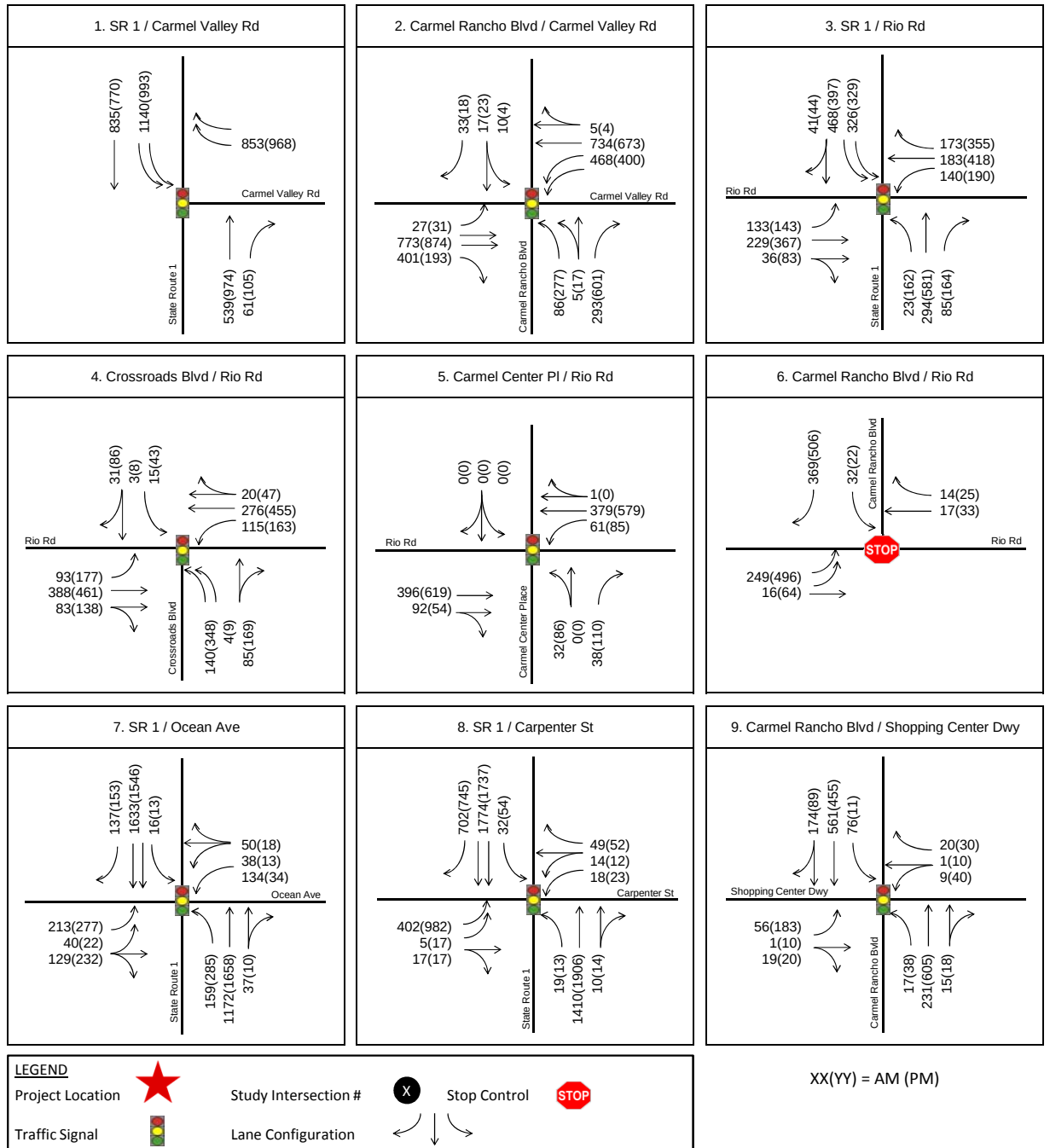
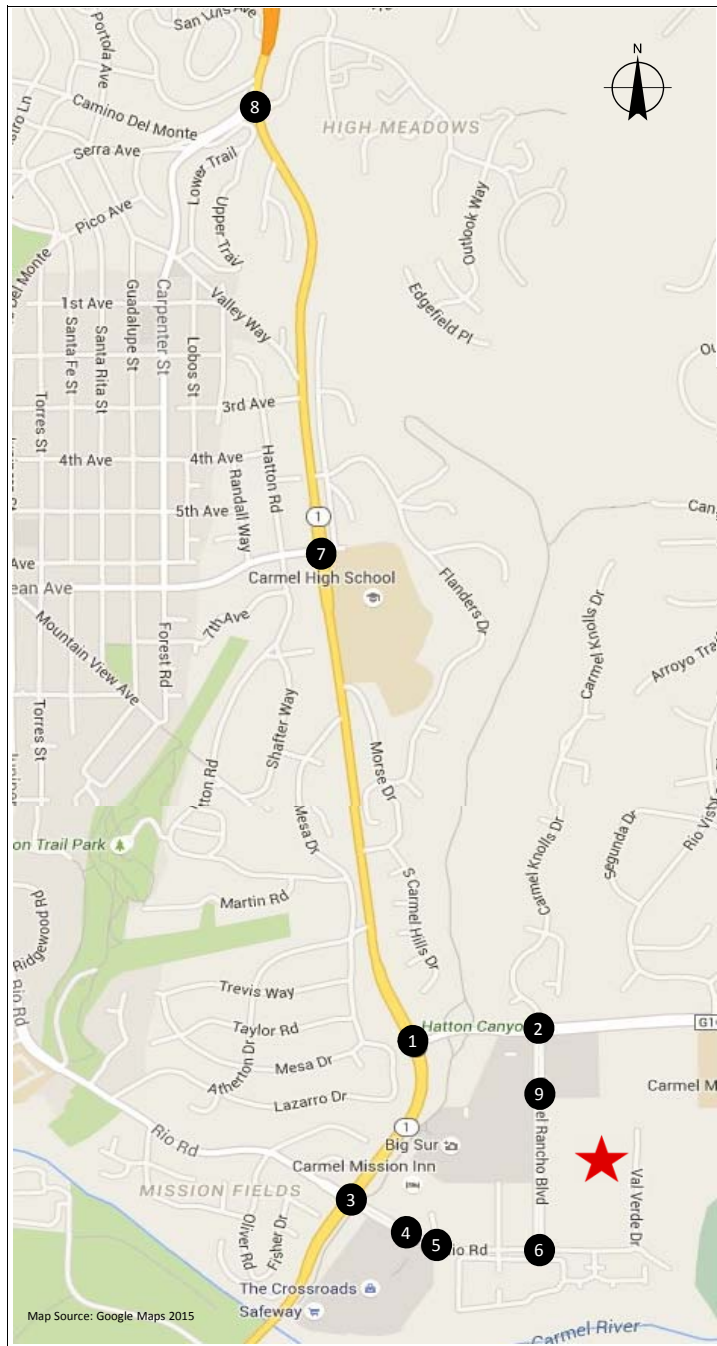
1. ADT highlighted in red indicates ADT exceeds ADT threshold.
2. ADT highlighted in yellow indicates ADT exceeds Carmel Valley Master Plan (CVMP) ADT Threshold and is a project impact.
3. Bold type indicates unmitigated impact.

Exhibit 23
Project Alternative 1 Scenarios
Road Segment ADT's
Segments 6 - 10









N-S Street	E-W Street	Existing Lane Configuration ^{1,2}	Existing Intersection Control	LOS Standard Jurisdiction	Existing Conditions		Existing Plus Project Alt 2 Conditions		Background Conditions		Background Plus Project Alt 2 Conditions		Cumulative Conditions		Cumulative Plus Project Alt 2 Conditions	
					AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.	AM Pk Hr.	PM Pk Hr.
					Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)	Delay LOS (sec)
1	SR 1	Carmel Valley Road NB 1-T, 1-R SB 2-L, 1-T WB 2-R <i>With RTP Improvements</i>	Signal	C/D Caltrans	11.3 B	18.1 B	11.3 B	18.1 B	11.9 B	21.0 C	11.9 B	21.1 C	14.1 B	43.5 D	14.1 B	43.7 D
															9.5 A	18.2 B
2	Carmel Rancho Blvd	Carmel Valley Road NB 1-L, 1-L/T, 1-R SB 1-L/T, 1-R EB 1-L, 2-T, 1-R WB 2-L, 1-T, 1-T/R	Signal	C CVMP	16.9 B	19.3 B	16.9 B	19.3 B	18.4 B	20.2 C	18.4 B	20.2 C	22.0 C	22.6 C	22.1 C	22.6 C
3	SR 1	Rio Road NB 1-L, 1-T, 1-R SB 2-L, 1-T/R EB 1-L, 1-T, 1-T/R WB 1-L, 1-T, 1-R <i>With RTP Improvements</i>	Signal	C/D Caltrans	22.6 C	37.9 D	22.6 C	37.9 D	22.8 C	38.6 D	22.8 C	38.6 D	26.7 C	54.0 D	26.7 C	54.1 D
															24.1 C	40.6 D
4	Crossroads Blvd	Rio Road NB 2-L, 1-T/R EB 1-L, 1-T, 1-T/R WB 1-L, 2-T	Signal	C CVMP	9.9 A	12.0 B	9.9 A	12.0 B	10.2 B	12.5 B	10.2 B	12.5 B	20.2 C	32.9 C	20.1 C	32.8 C
5	Carmel Center Place	Rio Road NB 1-L/T, 1-R SB 1-L/T/R EB 1-T, 1-T/R WB 1-L, 1-T, 1-T/R	Signal	C CVMP	9.3 A	6.0 A	9.3 A	6.0 A	9.1 A	5.9 A	9.1 A	5.9 A	6.1 A	7.8 A	6.0 A	7.8 A
6	Carmel Rancho Blvd	Rio Road SB 1-L, 1-R EB 2-L, 1-T WB 1-T, 1-R	Two-Way Stop	C CVMP	10.2 B 7.7 A 15.2 C	10.7 B 8.1 A 19.8 C	10.2 B 7.7 A 15.3 C	10.7 B 8.1 A 19.8 C	10.4 B 7.8 A 15.9 C	10.9 B 8.1 A 20.8 C	10.4 B 7.8 A 16.0 C	10.9 B 8.1 A 20.7 C	10.9 B 7.8 A 17.7 C	11.7 B 8.3 A 23.5 C	10.9 B 7.8 A 17.7 C	11.7 B 8.3 A 23.1 C
7	SR 1	Ocean Avenue NB 1-L, 1-T, 1-T/R SB 1-L, 2-T, 1-R EB 1-L, 1-L/T/R WB 1-L, 1-L/T/R	Signal	C/D Caltrans	43.6 D	37.1 D	43.7 D	37.2 D	49.8 D	43.1 D	49.9 D	43.3 D	71.4 E	67.5 E	71.5 E	67.7 E
8	SR 1	Carpenter Street NB 1-L, 1-T, 1-T/R SB 1-L, 2-T, 1-R EB 2-L, 1-T/R WB 1-L, 1-L/T, 1-R <i>With NB RT Lane</i>	Signal	C/D Caltrans	23.8 C	47.1 D	23.8 C	47.3 D	25.0 C	52.4 D	25.1 C	52.5 D	32.3 C	77.2 E	32.4 C	77.4 E
							23.7 C	46.1 D			24.9 C	49.9 D			30.3 C	67.5 E
9	Carmel Rancho Blvd	Shopping Center Dwy NB 1-L, 1-T, 1-T/R SB 1-L, 1-T, 1-T/R EB 1-L, 1-T/R WB 1-L/T, 1-R	Signal	C CVMP	4.0 A	5.5 A	4.0 A	5.6 A	4.0 A	5.6 A	4.0 A	5.6 A	4.0 A	5.8 A	4.0 A	5.8 A

Notes:

- 1 L, T, R = Left, Through, Right
- 2 NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound
- 3 Level of service highlighted in red indicates that LOS exceeds the LOS standard.
- 4 Yellow highlight indicates project impact.
- 5 Bold type indicates unmitigated impact.

Seg #	Road Segment	Existing AM vs Existing + Project Alt 2 AM		Existing PM vs Existing + Project Alt 2 PM		Background AM vs Background + Project Alt 2 AM		Background PM vs Background + Project Alt 2 PM		Cumulative AM vs Cumulative + Project Alt 2 AM		Cumulative PM vs Cumulative + Project Alt 2 PM	
		Existing AM	Exist+Proj AM	Existing PM	Exis+Proj PM	Background AM	Back+Proj AM	Background PM	Back+Proj PM	Cumulative AM	Cum+Proj AM	Cumulative PM	Cum+Proj PM
		Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS
NB Carmel Rancho Blvd													
12	From Rio Rd to Shopping Center Dwy	27.3	A	27.3	A	24.9	B	24.9	B	27.3	A	24.8	B
11	From Shopping Center Dwy to Carmel Valley Rd	9.5	D	9.5	D	8.9	E	8.9	E	9.2	D	8.6	E
Total		17.5	C	17.5	C	16.2	C	16.2	C	15.8	C	15.8	C
SB Carmel Rancho Blvd													
		Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	18.3	C	18.3	C	16.8	C	16.8	C	18.2	C	16.7	C
12	From Shopping Center Dwy to Rio Rd	22.9	B	22.9	B	22.6	B	22.6	B	22.5	B	22.5	B
Total		21.3	B	21.3	B	20.5	B	20.5	B	21.2	B	20.4	B
EB Rio Rd													
		Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	17.3	C	17.3	C	17.3	C	17.3	C	17.3	C	17.3	C
13	From SR 1 to Crossroads Blvd	12.9	D	12.9	D	11.7	D	11.7	D	12.6	D	11.7	D
14	From Crossroads Blvd to Carmel Center Pl	12.2	D	12.2	D	11.0	D	11.0	D	10.9	D	10.9	D
15	From Carmel Center Pl to Carmel Rancho Blvd	16.1	C	16.1	C	17.1	C	17.1	C	17.1	C	17.1	C
Total		15.8	C	15.8	C	15.7	C	15.7	C	15.6	C	15.6	C
WB Rio Rd													
		Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	20.3	B	20.3	B	19.6	B	19.6	B	20.3	B	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	9.6	D	9.6	D	8.3	E	8.3	E	9.6	D	8.4	E
13	From Crossroads Blvd to SR 1	7.3	E	7.3	E	7.2	E	7.2	E	7.3	E	7.2	E
5	From SR 1 to Atherton Dr	19.6	B	23.5	B	23.5	B	23.5	B	23.5	B	23.5	B
Total		15.1	C	16.3	C	15.9	C	15.9	C	16.3	C	16.3	C
NB SR 1		Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS
1	From Ocean Ave to Carpenter St	C	C	D	D	C	C	D	D	C	C	D	D
2	From Carmel Valley Rd to Ocean Ave	C	C	C	C	F	F	C	C	F	F	C	C
3	From Rio Rd to Carmel Valley Rd	F	F	F	F	F	F	F	F	F	F	F	F
4	From Ribera Rd to Rio Rd	B	B	B	B	B	B	B	B	B	B	B	B
SB SR 1		Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS	Arterial LOS
1	From Carpenter St to Ocean Ave	D	D	C	C	D	D	C	C	D	D	C	C
2	From Ocean Ave to Carmel Valley Rd	C	C	C	C	C	C	C	C	C	C	C	C
3	From Carmel Valley Rd to Rio Rd	C	C	E	E	C	C	E	E	C	C	E	E
4	From Rio Rd to Ribera Rd	B	B	B	B	B	B	B	B	B	B	B	B

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Text highlighted in yellow indicates potential project impact.

3. * = Traffic flow on this segment is controlled by closely spaced intersections that operate acceptably. Therefore, project does not have an impact.

4. SR 1 road segment levels of service are referenced from the *Rancho Cañada Draft Transportation Impact Study Report* prepared by Central Coast Transportation Consulting (CCTC, January 2015)

Carmel Valley Road				Existing Conditions	Existing Plus Project Alt 1 Conditions	Background Conditions	Background + Project Alt 1 Conditions	Cumulative Conditions	Cumulative + Project Alt 1 Conditions
Segment	From	To	CVMP ADT Threshold	ADT	ADT	ADT	ADT	ADT	ADT
6	Robinson Canyon Rd	Schulte Rd	15,499	14,611	14,671	15,847	15,907	17,107	17,167
7	Schulte Rd	Rancho San Carlos Rd	16,340	15,974	16,034	17,865	17,925	19,125	19,185
8	Rancho San Carlos Rd	Rio Rd	48,487	18,982	19,042	21,046	21,106	22,706	22,766
9	Rio Rd	Carmel Rancho Blvd	51,401	24,228	24,288	26,319	26,379	28,699	28,759
10	Carmel Rancho Blvd	SR 1	27,839	22,006	22,182	23,606	23,782	24,626	24,802

Notes:

1. ADT highlighted in red indicates ADT exceeds ADT threshold.
2. ADT highlighted in yellow indicates ADT exceeds Carmel Valley Master Plan (CVMP) ADT Threshold and is a project impact.
3. Bold type indicates unmitigated impact.

Exhibit 30
Project Alternative 2 Scenarios
Road Segment ADT's
Segments 6 - 10

Appendix A

LOS Descriptions for Signalized Intersections

APPENDIX A

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 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)

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

Appendix B

LOS Descriptions for Unsignalized Intersections

APPENDIX B

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)

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 C

LOS Descriptions for Road Segments – HCM Exhibits 14-4, 15-2, 15-3

Appendix C

HCM 2000 Exhibit 15-2 Urban Street LOS By Class

Urban Street Class	I	II	III	IV
Range of free-flow speeds (FFS)	55 to 45 mi/h	45 to 35 mi/h	35 to 30 mi/h	35 to 25 mi/h
Typical FFS	50 mi/h	40 mi/h	35 mi/h	30 mi/h
LOS	Average Travel Speed (mi/h)			
A	> 42	> 35	> 30	> 25
B	> 34–42	> 28–35	> 24–30	> 19–25
C	> 27–34	> 22–28	> 18–24	> 13–19
D	> 21–27	> 17–22	> 14–18	> 9–13
E	> 16–21	> 13–17	> 10–14	> 7–9
F	≤ 16	≤ 13	≤ 10	≤ 7

HCM 2010 Exhibit 14-4 Automobile LOS for Multilane Highways

LOS	FFS (mi/h)	Density (pc/mi/ln)
A	All	>0–11
B	All	>11–18
C	All	>18–26
D	All	>26–35
E	60	>35–40
	55	>35–41
	50	>35–43
	45	>35–45
F	Demand Exceeds Capacity	
	60	>40
	55	>41
	50	>43
	45	>45

HCM 2010 Exhibit 15-3 Automobile LOS for Two-Lane Highways

LOS	Class I Highways		Class II Highways	Class III Highways
	ATS (mi/h)	PTSF (%)	PTSF (%)	PFFS (%)
A	>55	≤35	≤40	>91.7
B	>50–55	>35–50	>40–55	>83.3–91.7
C	>45–50	>50–65	>55–70	>75.0–83.3
D	>40–45	>65–80	>70–85	>66.7–75.0
E	≤40	>80	>85	≤66.7

Appendix D

New Raw Counts and New vs. Previously Published Volumes – Comparison and Adjustments

Intersection Source and Date of Counts		AM Peak Hour												PM Peak Hour															
		NB			SB			EB			WB			Total	NB			SB			EB			WB			Total		
L	T	R	L	T	R	L	T	R	L	T	R	Total	L		T	R	L	T	R	L	T	R	L	T	R	Total			
1. SR 1 / Carmel Valley Rd Carmel Rio Rd Subdivision AM & PM Adjusted		1. SR 1 / Carmel Valley Rd														1. SR 1 / Carmel Valley Rd													
July 2015		0	388	46	900	628	0	0	0	0	0	0	715	2,677	0	733	83	771	582	0	0	0	0	0	773	2,942			
		0	457	54	1,059	739	0	0	0	0	0	0	842	3,151	0	776	88	816	616	0	0	0	0	0	818	3,114			
Volumes Used in Analysis		0	457	54	1,059	693	0	0	0	0	0	0	731	2,994	0	776	88	846	616	0	0	0	0	0	852	3,178			
Carmel Canine Sports Center Carmel Canine Sports Center Carmel Hill & River Bike Trail Val Verde Hexagon Study per DKS CVMP		November 2014 August 2014 March 2008 2003														November 2014 August 2014 March 2008 2003													
		0	302	99	997	519	0	0	0	0	0	0	846	2,763	0	716	69	802	611	0	0	0	0	0	836	3,034			
		0	429	82	1,066	526	0	0	0	0	0	0	1,048	3,151	0	717	73	834	512	0	0	0	0	0	978	3,114			
		0	459	77	1,082	509	0	0	0	0	0	0	1,005	3,132	0	618	49	918	509	0	0	0	0	0	943	3,037			
2. Carmel Rancho Blvd / Carmel Valley Rd Carmel Rio Rd Subdivision AM & PM Adjusted		2. Carmel Rancho Blvd / Carmel Valley Rd														2. Carmel Rancho Blvd / Carmel Valley Rd													
July 2015		86	4	197	8	13	33	21	609	308	302	612	4	2,197	250	15	461	4	21	16	28	644	174	272	505	1	2,391		
		112	5	257	10	17	43	27	794	401	394	798	5	2,863	276	17	509	4	23	18	31	711	192	300	558	1	2,640		
Volumes Used in Analysis		86	5	257	10	17	33	27	685	401	394	612	5	2,532	276	17	509	4	23	18	31	711	192	300	558	4	2,643		
Val Verde Hexagon Study per DKS CVMP		2003	114	7	207	5	18	30	31	789	315	430	913	4	2,863	372	9	500	4	15	8	31	640	280	271	507	4	2,641	
3. SR 1 / Rio Rd Carmel Rio Rd Subdivision AM: Adjusted, PM: Using July 2015 Counts		3. SR 1 / Rio Rd														3. SR 1 / Rio Rd													
July 2015		21	149	73	269	321	37	120	200	33	112	160	136	1,631	162	427	155	263	305	44	106	347	83	166	400	265	2,723		
		23	165	81	297	355	41	133	221	36	124	177	150	1,803	162	427	155	263	305	44	106	347	83	166	400	265	2,723		
Volumes Used in Analysis		23	228	81	297	355	41	133	221	36	124	177	150	1,866	162	427	155	263	309	44	143	347	83	166	400	294	2,793		
Carmel Hill & River Bike Trail Val Verde Hexagon Study per DKS CVMP		March 2008 2003														March 2008 2003													
		9	108	75	237	219	62	227	261	31	66	234	152	1,681	16	265	129	259	148	51	150	287	34	144	339	374	2,196		
		41	177	89	245	207	68	183	268	33	83	248	160	1,802	53	319	134	267	260	85	143	348	61	160	368	341	2,539		
4. Crossroads Blvd / Rio Rd Carmel Rio Rd Subdivision AM: Adjusted, PM: Using July 2015 Counts		4. Crossroads Blvd / Rio Rd														4. Crossroads Blvd / Rio Rd													
July 2015		133	0	65	0	0	50	335	79	82	223	0	967	348	0	133	0	0	0	84	374	138	137	395	0	1,609			
		140	0	69	0	0	53	353	83	86	235	0	1,019	348	0	133	0	0	0	84	374	138	137	395	0	1,609			
Volumes Used in Analysis		140	0	69	0	0	53	387	83	86	262	0	1,080	348	0	133	0	0	0	84	459	138	137	438	0	1,737			
Val Verde Hexagon Study per DKS CVMP		2005	94	0	40	0	0	72	357	49	48	360	0	1,020	244	0	116	0	0	0	0	379	105	120	438	0	1,402		
5. Carmel Center Pl / Rio Rd Carmel Rio Rd Subdivision AM: Adjusted, PM: Using July 2015 Counts		5. Carmel Center Pl / Rio Rd														5. Carmel Center Pl / Rio Rd													
July 2015		28	0	34	0	0	0	323	82	54	280	1	802	78	0	110	0	0	0	0	461	46	85	452	0	1,232			
		32	0	38	0	0	0	364	92	61	316	1	904	78	0	110	0	0	0	0	461	46	85	452	0	1,232			
Volumes Used in Analysis		32	0	38	0	0	0	364	92	61	316	1	904	86	0	110	0	0	0	0	538	54	85	489	0	1,362			
Val Verde Hexagon Study per DKS CVMP		2005	22	0	21	0	0	0	342	84	69	366	0	904	86	0	102	0	0	0	0	425	58	30	444	0	1,145		
6. Carmel Rancho Blvd / Rio Rd Carmel Rio Rd Subdivision AM & PM Adjusted		6. Carmel Rancho Blvd / Rio Rd														6. Carmel Rancho Blvd / Rio Rd													
July 2015		15	13	0	0	14	263	191	0	14	0	0	0	510	14	19	0	0	20	417	416	0	22	0	0	0	908		
		16	14	0	0	15	284	206	0	15	0	0	0	550	14	19	0	0	20	418	417	0	22	0	0	0	910		
Volumes Used in Analysis		16	14	0	0	31	307	218	0	15	0	0	0	601	31	23	0	0	20	418	417	0	62	0	0	0	971		
Val Verde Hexagon Study per DKS CVMP		2004	20	16	0	0	31	287	175	0	21	0	0	550	31	23	0	0	32	392	410	0	23	0	0	0	911		
7. SR 1 / Ocean Ave Carmel Rio Rd Subdivision AM: Using 11/06 Counts, PM: Partially Adjusted & 11/06 Counts		7. SR 1 / Ocean Ave														7. SR 1 / Ocean Ave													
July 2015		112	1018	6	5	1426	137	166	5	113	32	8	2	3,030	235	1248	3	12	1164	139	252	17	180	22	23	8	3,303		
		136	991	37	16	1,376	131	213	40	113	134	38	50	3,275	258	1371	10	13	1279	153	277	22	198	34	13	18	3,646		
Volumes Used in Analysis		136	991	37	16	1,426	137	213	40	113	134	38	50	3,331	258	1371	10	13	1279	153	277	22	198	34	13	18	3,646		
Carmel Hill & River Bike Trail Villas de Carmelo		March 2008 November 2006														March 2008 November 2006													
		123	1062	41	3	1362	159	201	34	83	91	31	15	3,205	147	1506	8	17	1159	171	286	13	147	61	13	15	3,543		
		136	991	37	16	1376	131	213	40	113	134	38	50	3,275	157	1513	10	5	1282	151	281	22	143	34	13	18	3,629		
8. SR 1 / Carpenter St Carmel Rio Rd Subdivision AM & PM Adjusted		8. SR 1 / Carpenter St														8. SR 1 / Carpenter St													
July 2015		18	1138	9	30	1567	650	372	5	16	17	13	45	3,880	12	1463	13	52	1405	712	982	16	16	22	11	50	4,754		
		19	1,229	10	32	1,693	702	402	5	17	18	14	49	4,190	13	1530	14	54	1470	745	1027	17	17	23	12	52	4,974		
Volumes Used in Analysis		19	1,229	10	32	1,567	702	402	5	17	18	14	49	4,064	13	1619	14	54	1470	745	982	17	17	23	12	52	5,018		
Villas de Carmelo		November 2006	38	1219	10	37	1496	730	498	11	34	29	26	63	4,191	35	1797	8	83	1437	726	779	13	31	10	14	40	4,973	
9. Carmel Rancho Blvd / Shopping Center Dwy Carmel Rio Rd Subdivision AM: 13% adj factor per Int #5, PM: Using 8/15 Counts		9. Carmel Rancho Blvd / Shopping Center Dwy														9. Carmel Rancho Blvd / Shopping Center Dwy													
August 2015		15	177	13	12	441	123	45	1	17	8	1	3	856	38	524	18	11	365	78	171	10	20	40	10	30	1,315		
1.13		17	200	15	14	498	139	51	1	19	9	1	3	967	38	524	18	11	365	78	171	10	20	40	10	30	1,315		
Volumes Used in Analysis		17	200	15	76	498	163	51	1	19	9	1	20	1,070	38	524	18	11	365	78	171	10	20	40	10	30	1,315		

- Notes:
1. "Adjusted" means new count (by movement) has been multiplied by the ratio of the highest available total entering volume and the new total entering volume to obtain adjusted volume.
 2. Highest "total entering intersection" volume highlighted in red.
 3. Lowest "total entering intersection" volume highlighted in yellow.
 4. "Volumes Used in Analysis" are the final volumes used after adjusting & balancing.

Appendix E

Intersection Level of Service Calculation Worksheets

HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Existing AM.syn

1/27/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	731	457	54	1059	693
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Flt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2760	1863	1509	3335	1759
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2760	1863	1509	3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	795	497	59	1151	753
RTOR Reduction (vph)	0	260	0	12	0	0
Lane Group Flow (vph)	0	535	497	47	1151	753
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases				2		
Actuated Green, G (s)		25.1	20.5	20.5	25.1	55.4
Effective Green, g (s)		25.1	20.5	20.5	25.1	55.4
Actuated g/C Ratio		0.45	0.37	0.37	0.45	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		1250	689	558	1510	1759
v/s Ratio Prot		0.19	c0.27		c0.35	0.43
v/s Ratio Perm				0.03		
v/c Ratio		0.43	0.72	0.08	0.76	0.43
Uniform Delay, d1		10.3	15.0	11.3	12.7	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.4	3.9	0.1	2.6	0.8
Delay (s)		10.7	18.9	11.4	15.3	0.8
Level of Service		B	B	B	B	A
Approach Delay (s)	10.7		18.1			9.5
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay		11.3			HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio		0.74				
Actuated Cycle Length (s)		55.4			Sum of lost time (s)	9.8
Intersection Capacity Utilization		62.4%			ICU Level of Service	B
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Existing AM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	685	401	394	612	5	86	5	257	10	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Flt	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00		1.00	0.97
Flt Protected	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Flt Permitted	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Satd. Flow (prot)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1560
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (perm)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1560
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	31	778	456	448	695	6	98	6	292	11	19	38
RTOR Reduction (vph)	0	0	291	0	1	0	0	0	243	0	0	37
Lane Group Flow (vph)	31	778	165	448	700	0	52	52	49	0	30	1
Confl. Peds. (#/hr)	2		1			1	1			1		2
Heavy Vehicles (%)	4%	7%	2%	1%	3%	0%	6%	0%	6%	30%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7		
Permitted Phases			2									7
Actuated Green, G (s)	1.8	20.2	20.2	9.3	27.8		4.3	4.3	9.3		1.5	1.5
Effective Green, g (s)	1.8	20.2	20.2	9.3	27.8		4.3	4.3	9.3		1.5	1.5
Actuated g/C Ratio	0.03	0.36	0.36	0.17	0.50		0.08	0.08	0.17		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	56	1223	566	578	1747		124	126	254		45	42
v/s Ratio Prot	0.02	c0.23		c0.13	0.20		c0.03	0.03	0.03		c0.02	
v/s Ratio Perm			0.11									0.00
v/c Ratio	0.55	0.64	0.29	0.78	0.40		0.42	0.41	0.19		0.67	0.02
Uniform Delay, d1	26.6	14.7	12.7	22.2	8.7		24.5	24.5	20.0		26.9	26.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.6	0.8	0.1	5.9	0.1		0.8	0.8	0.1		25.2	0.1
Delay (s)	33.1	15.5	12.8	28.1	8.8		25.3	25.3	20.1		52.1	26.5
Level of Service	C	B	B	C	A		C	C	C		D	C
Approach Delay (s)		14.9			16.3			21.5			37.8	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay		16.9									B	
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		55.7								20.4		
Intersection Capacity Utilization		52.3%								A		
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Existing AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	221	36	124	177	150	23	228	81	297	355	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1827	1863	1827	1820	1900
Adj Flow Rate, veh/h	145	240	39	135	192	163	25	248	88	323	386	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	2	4	4	4
Cap, veh/h	216	638	102	212	378	321	76	447	385	504	558	65
Arrive On Green	0.12	0.21	0.21	0.12	0.21	0.21	0.05	0.24	0.24	0.15	0.35	0.35
Sat Flow, veh/h	1774	3021	484	1774	1810	1534	1675	1827	1574	3375	1599	186
Grp Volume(v), veh/h	145	138	141	135	192	163	25	248	88	323	0	431
Grp Sat Flow(s),veh/h/ln	1774	1750	1755	1774	1810	1534	1675	1827	1574	1688	0	1785
Q Serve(g_s), s	4.7	4.0	4.1	4.3	5.6	5.6	0.9	7.1	2.7	5.4	0.0	12.4
Cycle Q Clear(g_c), s	4.7	4.0	4.1	4.3	5.6	5.6	0.9	7.1	2.7	5.4	0.0	12.4
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	216	370	371	212	378	321	76	447	385	504	0	623
V/C Ratio(X)	0.67	0.37	0.38	0.64	0.51	0.51	0.33	0.55	0.23	0.64	0.00	0.69
Avail Cap(c_a), veh/h	275	814	817	275	842	714	224	792	682	580	0	842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.2	20.2	20.3	25.2	21.0	21.0	27.7	19.8	18.1	24.0	0.0	16.8
Incr Delay (d2), s/veh	4.3	0.8	0.8	3.2	1.3	1.5	2.5	1.3	0.4	1.9	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.0	2.1	2.3	3.0	2.5	0.5	3.7	1.2	2.6	0.0	6.4
LnGrp Delay(d),s/veh	29.5	21.0	21.1	28.3	22.2	22.5	30.2	21.1	18.5	25.9	0.0	18.5
LnGrp LOS	C	C	C	C	C	C	C	C	B	C		B
Approach Vol, veh/h		424			490			361			754	
Approach Delay, s/veh		23.9			24.0			21.1			21.7	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.9	16.9	6.4	25.8	11.0	16.7	12.7	19.6				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	6.3	6.1	2.9	14.4	6.7	7.6	7.4	9.1				
Green Ext Time (p_c), s	0.1	4.2	0.0	4.2	0.1	4.1	0.3	4.6				

Intersection Summary

HCM 2010 Ctrl Delay 22.6
HCM 2010 LOS C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Existing AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	53	387	83	86	262	0	140	0	69	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1860	1900	1810	1792	0	1810	1696	1900			
Adj Flow Rate, veh/h	58	425	91	95	288	0	154	0	76			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	2	2	5	6	0	5	0	5			
Cap, veh/h	80	1759	374	118	2148	0	317	0	137			
Arrive On Green	0.04	0.61	0.61	0.14	1.00	0.00	0.09	0.00	0.09			
Sat Flow, veh/h	1810	2900	616	1723	3495	0	3343	0	1442			
Grp Volume(v), veh/h	58	258	258	95	288	0	154	0	76			
Grp Sat Flow(s),veh/h/ln	1810	1767	1749	1723	1703	0	1672	0	1442			
Q Serve(g_s), s	1.6	3.4	3.4	2.7	0.0	0.0	2.2	0.0	2.5			
Cycle Q Clear(g_c), s	1.6	3.4	3.4	2.7	0.0	0.0	2.2	0.0	2.5			
Prop In Lane	1.00		0.35	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	80	1071	1061	118	2148	0	317	0	137			
V/C Ratio(X)	0.72	0.24	0.24	0.80	0.13	0.00	0.49	0.00	0.56			
Avail Cap(c_a), veh/h	199	1071	1061	224	2148	0	1070	0	461			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.88	0.88	0.88	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.6	4.5	4.5	21.2	0.0	0.0	21.5	0.0	21.6			
Incr Delay (d2), s/veh	4.0	0.5	0.5	4.7	0.1	0.0	0.4	0.0	1.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.9	1.7	1.7	1.4	0.0	0.0	1.0	0.0	1.0			
LnGrp Delay(d),s/veh	27.6	5.0	5.0	26.0	0.1	0.0	21.9	0.0	22.9			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		574			383			230				
Approach Delay, s/veh		7.3			6.5			22.2				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.9	34.3			5.7	35.5		8.7				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			5.5	17.0		16.0				
Max Q Clear Time (g_c+I1), s	4.7	5.4			3.6	2.0		4.5				
Green Ext Time (p_c), s	0.0	2.8			0.0	3.3		0.4				

Intersection Summary

HCM 2010 Ctrl Delay 9.9
HCM 2010 LOS A

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Existing AM.syn
1/27/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	364	92	61	316	1	32	0	38	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1820	1900	1845	1845	1900	1900	1638	1712	1900	1900	1900
Adj Flow Rate, veh/h	0	439	111	73	381	1	39	0	46	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	3	3	3	0	0	11	0	0	0
Cap, veh/h	0	1816	455	91	2814	7	212	0	80	0	105	0
Arrive On Green	0.00	0.22	0.22	0.05	0.78	0.78	0.06	0.00	0.06	0.00	0.00	0.00
Sat Flow, veh/h	0	2830	687	1757	3586	9	1228	0	1444	0	1900	0
Grp Volume(v), veh/h	0	276	274	73	186	196	39	0	46	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1729	1697	1757	1753	1843	1228	0	1444	0	1900	0
Q Serve(g_s), s	0.0	6.6	6.7	2.1	1.3	1.3	1.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.6	6.7	2.1	1.3	1.3	1.5	0.0	1.6	0.0	0.0	0.0
Prop In Lane	0.00		0.40	1.00		0.01	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1146	1125	91	1375	1446	212	0	80	0	105	0
V/C Ratio(X)	0.00	0.24	0.24	0.80	0.14	0.14	0.18	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1146	1125	193	1375	1446	537	0	462	0	608	0
HCM Platoon Ratio	1.00	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.98	0.98	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.2	9.2	23.5	1.3	1.3	23.0	0.0	23.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	6.1	0.2	0.2	0.2	0.0	2.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.3	3.3	1.1	0.6	0.7	0.5	0.0	0.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	9.6	9.7	29.5	1.5	1.5	23.2	0.0	25.4	0.0	0.0	0.0
LnGrp LOS		A	A	C	A	A	C		C			
Approach Vol, veh/h		550			455			85			0	
Approach Delay, s/veh		9.7			6.0			24.4			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.1	37.1		6.8		43.2		6.8				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	5.5	17.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.1	8.7		0.0		3.3		3.6				
Green Ext Time (p_c), s	0.0	3.9		0.0		6.8		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			9.3									
HCM 2010 LOS			A									

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Existing AM.syn
1/27/2016

Intersection

Int Delay, s/veh 2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	218	0	15	0	1	0	16	14	0	0	31	307
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	1	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	92	80	92	92	92	80	80	92	92	80	80
Heavy Vehicles, %	7	0	0	2	2	2	0	7	0	0	0	2
Mvmt Flow	272	0	19	0	1	0	20	18	0	0	39	384

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	2	0	0	24	550	2	14	550	5
Stage 1	-	-	-	-	-	-	2	547	-	3	3	-
Stage 2	-	-	-	-	-	-	22	3	-	11	547	-
Critical Hdwy	4.17	-	-	-	-	-	7.1	6.57	-	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.57	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.5	4.063	-	3.5	4	3.318
Pot Cap-1 Maneuver	1587	-	-	-	-	-	993	436	-	1007	446	1078
Stage 1	-	-	-	-	-	-	-	-	-	1025	897	-
Stage 2	-	-	-	-	-	-	1002	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1584	-	-	-	-	-	572	360	-	-	368	1074
Mov Cap-2 Maneuver	-	-	-	-	-	-	372	1061	-	-	~ -783	-
Stage 1	-	-	-	-	-	-	-	-	-	847	896	-
Stage 2	-	-	-	-	-	-	615	882	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	7.2	0		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	372	-	1584	-	-	-	-	-	-	1074
HCM Lane V/C Ratio	0.054	-	0.172	-	-	-	-	-	-	0.357
HCM Control Delay (s)	15.2	-	7.7	-	-	0	-	-	-	10.2
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	0.6	-	-	-	-	-	-	1.6

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Existing AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	213	40	113	134	38	50	136	991	37	16	1426	137
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1869	1900	1900	1842	1900	1827	1839	1900	1357	1827	1845
Adj Flow Rate, veh/h	210	94	130	128	81	57	156	1139	43	18	1639	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	3	0	0	0	9	9	4	3	3	40	4	3
Cap, veh/h	288	114	158	151	82	58	163	1826	69	37	1620	732
Arrive On Green	0.16	0.16	0.16	0.08	0.08	0.08	0.09	0.53	0.53	0.03	0.47	0.00
Sat Flow, veh/h	1757	697	965	1810	977	688	1740	3432	130	1293	3471	1568
Grp Volume(v), veh/h	210	0	224	128	0	138	156	580	602	18	1639	0
Grp Sat Flow(s),veh/h/ln	1757	0	1662	1810	0	1665	1740	1747	1814	1293	1736	1568
Q Serve(g_s), s	10.0	0.0	11.5	6.2	0.0	7.3	7.9	20.6	20.6	1.2	41.3	0.0
Cycle Q Clear(g_c), s	10.0	0.0	11.5	6.2	0.0	7.3	7.9	20.6	20.6	1.2	41.3	0.0
Prop In Lane	1.00		0.58	1.00		0.41	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	288	0	272	151	0	139	163	930	965	37	1620	732
V/C Ratio(X)	0.73	0.00	0.82	0.85	0.00	0.99	0.96	0.62	0.62	0.49	1.01	0.00
Avail Cap(c_a), veh/h	318	0	300	151	0	139	163	930	965	107	1620	732
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.1	0.0	35.8	40.0	0.0	40.5	39.9	14.5	14.5	42.4	23.6	0.0
Incr Delay (d2), s/veh	7.9	0.0	16.0	34.4	0.0	73.5	57.3	1.7	1.6	9.9	25.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	6.5	4.5	0.0	6.2	6.4	10.3	10.6	0.5	25.3	0.0
LnGrp Delay(d),s/veh	43.1	0.0	51.7	74.3	0.0	114.0	97.2	16.2	16.1	52.3	48.9	0.0
LnGrp LOS	D		D	E		F	F	B	B	D	F	
Approach Vol, veh/h		434			266			1338			1657	
Approach Delay, s/veh		47.5			94.9			25.6			48.9	
Approach LOS		D			F			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		18.7	12.0	46.2		11.6	6.2	52.0				
Change Period (Y+Rc), s		* 4.2	3.7	4.9		4.2	3.7	4.9				
Max Green Setting (Gmax), s		* 16	8.3	41.3		7.4	7.3	42.3				
Max Q Clear Time (g_c+I1), s		13.5	9.9	43.3		9.3	3.2	22.6				
Green Ext Time (p_c), s		0.6	0.0	0.0		0.0	0.0	18.9				

Intersection Summary

HCM 2010 Ctrl Delay	43.6
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Existing AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1229	10	32	1567	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1429	12	37	1822	816
RTOR Reduction (vph)	0	17	0	0	54	0	0	0	0	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1441	0	37	1822	816
Confl. Peds. (#/hr)				1		1			1		1	
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6		4.5	70.1	117.7
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6		4.5	70.1	117.7
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59		0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	551	269		96	102	90	66	2088		67	2047	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.41		0.02	c0.53	
v/s Ratio Perm						0.00						c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.69		0.55	0.89	0.53
Uniform Delay, d1	48.0	41.7		52.8	52.8	52.4	55.1	16.6		55.6	20.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.4	0.1		1.6	1.5	0.3	3.0	1.2		9.5	5.7	1.3
Delay (s)	60.4	41.8		54.5	54.3	52.6	58.1	17.8		65.1	26.2	1.3
Level of Service	E	D		D	D	D	E	B		E	C	A
Approach Delay (s)		59.4			53.3		18.5				19.1	
Approach LOS		E			D		B				B	

Intersection Summary

HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	117.7	Sum of lost time (s)	17.9
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM 2010 Signalized Intersection Summary
9: Carmel Rancho Blvd & Shopping Center Dwy

Existing AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰	↱	↰	↱	↰	↱	↰
Volume (veh/h)	51	1	19	9	1	20	17	200	15	76	498	163
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1785	1863	1881	1848	1900	1827	1854	1900
Adj Flow Rate, veh/h	66	1	25	12	1	26	22	260	19	99	647	212
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	0	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	485	7	177	464	15	180	563	1637	119	835	1285	421
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	1392	62	1545	1084	134	1574	646	3320	241	1072	2606	853
Grp Volume(v), veh/h	66	0	26	13	0	26	22	137	142	99	437	422
Grp Sat Flow(s),veh/h/ln	1392	0	1607	1217	0	1574	646	1756	1805	1072	1761	1698
Q Serve(g_s), s	0.9	0.0	0.3	0.1	0.0	0.3	0.5	0.9	0.9	1.1	3.4	3.4
Cycle Q Clear(g_c), s	1.3	0.0	0.3	0.4	0.0	0.3	3.9	0.9	0.9	2.0	3.4	3.4
Prop In Lane	1.00		0.96	0.92		1.00	1.00		0.13	1.00		0.50
Lane Grp Cap(c), veh/h	485	0	184	479	0	180	563	866	890	835	868	837
V/C Ratio(X)	0.14	0.00	0.14	0.03	0.00	0.14	0.04	0.16	0.16	0.12	0.50	0.50
Avail Cap(c_a), veh/h	1691	0	1575	1644	0	1543	783	1463	1504	1200	1468	1415
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.8	0.0	8.1	8.2	0.0	8.1	4.8	2.8	2.8	3.4	3.5	3.5
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.1	0.0	0.1	0.1	0.4	0.4	0.3	1.6	1.6
LnGrp Delay(d),s/veh	8.8	0.0	8.3	8.2	0.0	8.3	4.8	2.9	2.9	3.4	3.7	3.7
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		92			39			301			958	
Approach Delay, s/veh		8.7			8.2			3.0			3.6	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		6.3		14.1		6.3		14.1				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		3.3		5.4		2.4		5.9				
Green Ext Time (p_c), s		0.2		4.1		0.2		4.0				

Intersection Summary												
HCM 2010 Ctrl Delay			4.0									
HCM 2010 LOS			A									

HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Existing PM.syn
1/27/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↰	↱	↰	↱	↰
Volume (vph)	0	852	776	88	846	616
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Fit		0.85	1.00	0.85	1.00	1.00
Fit Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2814	1863	1553	3467	1881
Fit Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2814	1863	1553	3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	906	826	94	900	655
RTOR Reduction (vph)	0	171	0	10	0	0
Lane Group Flow (vph)	0	735	826	84	900	655
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases				2		
Actuated Green, G (s)		20.3	31.1	31.1	20.3	61.2
Effective Green, g (s)		20.3	31.1	31.1	20.3	61.2
Actuated g/C Ratio		0.33	0.51	0.51	0.33	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		933	946	789	1150	1881
v/s Ratio Prot		c0.26	c0.44		0.26	0.35
v/s Ratio Perm				0.05		
v/c Ratio		0.79	0.87	0.11	0.78	0.35
Uniform Delay, d1		18.5	13.3	7.8	18.5	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.0	9.2	0.1	4.0	0.5
Delay (s)		23.5	22.5	7.9	22.4	0.5
Level of Service		C	C	A	C	A
Approach Delay (s)	23.5		21.0			13.2
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			18.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			61.2		Sum of lost time (s)	9.8
Intersection Capacity Utilization			78.8%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Existing PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	711	192	300	558	4	276	17	509	4	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Flt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (prot)	1805	3539	1615	3467	3571		1715	1729	1599		1887	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (perm)	1805	3539	1615	3467	3571		1715	1729	1599		1887	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	33	756	204	319	594	4	294	18	541	4	24	19
RTOR Reduction (vph)	0	0	138	0	1	0	0	0	458	0	0	19
Lane Group Flow (vph)	33	756	66	319	597	0	156	156	83	0	28	0
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	0%	1%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7		7
Permitted Phases			2									7
Actuated Green, G (s)	1.8	19.1	19.1	9.0	26.4		8.9	8.9	9.0		1.5	1.5
Effective Green, g (s)	1.8	19.1	19.1	9.0	26.4		8.9	8.9	9.0		1.5	1.5
Actuated g/C Ratio	0.03	0.32	0.32	0.15	0.45		0.15	0.15	0.15		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	55	1147	523	529	1600		259	261	244		48	39
v/s Ratio Prot	0.02	c0.21		c0.09	0.17		c0.09	0.09	0.05		c0.01	
v/s Ratio Perm			0.04									0.00
v/c Ratio	0.60	0.66	0.13	0.60	0.37		0.60	0.60	0.34		0.58	0.01
Uniform Delay, d1	28.2	17.1	14.0	23.3	10.8		23.3	23.3	22.3		28.4	28.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	11.2	1.1	0.0	1.3	0.1		2.7	2.4	0.3		11.1	0.0
Delay (s)	39.4	18.2	14.1	24.6	10.8		26.0	25.8	22.6		39.5	28.0
Level of Service	D	B	B	C	B		C	C	C		D	C
Approach Delay (s)		18.0			15.6			23.8			34.9	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		19.3							B			
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		58.9							20.4			
Intersection Capacity Utilization		66.7%							C			
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Existing PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	347	83	166	400	294	162	427	155	263	309	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1845	1863	1881	1884	1900
Adj Flow Rate, veh/h	146	354	85	169	408	300	165	436	158	268	315	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	1	2	1	3	2	1	1	1
Cap. veh/h	169	898	213	203	624	521	199	517	441	359	438	63
Arrive On Green	0.10	0.31	0.31	0.11	0.33	0.33	0.11	0.28	0.28	0.10	0.27	0.27
Sat Flow, veh/h	1774	2862	679	1792	1881	1571	1792	1845	1575	3476	1610	230
Grp Volume(V), veh/h	146	219	220	169	408	300	165	436	158	268	0	360
Grp Sat Flow(s),veh/h/ln	1774	1784	1758	1792	1881	1571	1792	1845	1575	1738	0	1840
Q Serve(g_s), s	7.1	8.4	8.6	8.0	16.1	13.7	7.9	19.4	7.0	6.5	0.0	15.4
Cycle Q Clear(g_c), s	7.1	8.4	8.6	8.0	16.1	13.7	7.9	19.4	7.0	6.5	0.0	15.4
Prop In Lane	1.00		0.39	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	169	559	551	203	624	521	199	517	441	359	0	501
V/C Ratio(X)	0.86	0.39	0.40	0.83	0.65	0.58	0.83	0.84	0.36	0.75	0.00	0.72
Avail Cap(c_a), veh/h	169	559	551	212	624	521	212	572	488	371	0	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.8	23.4	23.4	37.8	24.8	24.0	37.9	29.5	25.1	37.9	0.0	28.7
Incr Delay (d2), s/veh	34.1	0.5	0.6	22.9	5.3	4.6	22.1	10.6	0.6	7.8	0.0	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	4.2	4.2	5.3	9.3	6.6	5.1	11.3	3.1	3.5	0.0	8.4
LnGrp Delay(d),s/veh	72.9	23.9	24.0	60.6	30.1	28.6	60.0	40.1	25.7	45.8	0.0	33.0
LnGrp LOS	E	C	C	E	C	C	E	D	C	D		C
Approach Vol, veh/h		585			877		759				628	
Approach Delay, s/veh		36.2			35.5		41.4				38.5	
Approach LOS		D			D		D				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.6	31.5	13.4	28.6	12.0	33.1	12.7	29.3				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	10.0	10.6	9.9	17.4	9.1	18.1	8.5	21.4				
Green Ext Time (p_c), s	0.0	7.3	0.0	3.8	0.0	5.6	0.1	2.8				
Intersection Summary												
HCM 2010 Ctrl Delay				37.9								
HCM 2010 LOS				D								
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Existing PM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	84	459	138	137	438	0	348	0	133	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1867	1900	1881	1881	0	1881	1863	1900			
Adj Flow Rate, veh/h	85	464	139	138	442	0	352	0	134			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	0	2	2	1	1	0	1	0	1			
Cap, veh/h	108	1400	416	173	1989	0	534	0	243			
Arrive On Green	0.06	0.52	0.52	0.19	1.00	0.00	0.15	0.00	0.15			
Sat Flow, veh/h	1810	2694	801	1792	3668	0	3476	0	1583			
Grp Volume(v), veh/h	85	304	299	138	442	0	352	0	134			
Grp Sat Flow(s),veh/h/ln	1810	1774	1722	1792	1787	0	1738	0	1583			
Q Serve(g_s), s	2.3	5.0	5.0	3.7	0.0	0.0	4.8	0.0	3.9			
Cycle Q Clear(g_c), s	2.3	5.0	5.0	3.7	0.0	0.0	4.8	0.0	3.9			
Prop In Lane	1.00		0.47	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	108	921	895	173	1989	0	534	0	243			
V/C Ratio(X)	0.78	0.33	0.33	0.80	0.22	0.00	0.66	0.00	0.55			
Avail Cap(c_a), veh/h	235	921	895	233	1989	0	1112	0	507			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.87	0.99	0.99	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.2	7.0	7.0	19.7	0.0	0.0	19.9	0.0	19.6			
Incr Delay (d2), s/veh	4.0	0.8	0.9	9.1	0.3	0.0	0.5	0.0	0.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	2.6	2.5	2.2	0.1	0.0	2.3	0.0	1.8			
LnGrp Delay(d),s/veh	27.2	7.8	7.9	28.8	0.3	0.0	20.4	0.0	20.3			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h	688				580				486			
Approach Delay, s/veh	10.2				7.0				20.4			
Approach LOS	B				A				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	8.3	30.0			6.5	31.8		11.7				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			6.5	16.0		16.0				
Max Q Clear Time (g_c+I1), s	5.7	7.0			4.3	2.0		6.8				
Green Ext Time (p_c), s	0.0	3.4			0.0	4.3		0.9				
Intersection Summary												
HCM 2010 Ctrl Delay	12.0											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Existing PM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	538	54	85	489	0	86	0	110	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1881	1900	1900	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	555	56	88	504	0	89	0	113	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
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
Percent Heavy Veh, %	0	2	2	2	1	1	0	0	0	0	0	0
Cap, veh/h	0	1948	196	111	2619	0	297	0	173	0	204	0
Arrive On Green	0.00	1.00	1.00	0.06	0.73	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	0	3341	327	1774	3668	0	1422	0	1610	0	1900	0
Grp Volume(v), veh/h	0	302	309	88	504	0	89	0	113	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1805	1774	1787	0	1422	0	1610	0	1900	0
Q Serve(g_s), s	0.0	0.0	0.0	2.4	2.2	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.4	2.2	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Prop In Lane	0.00		0.18	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1062	1083	111	2619	0	297	0	173	0	204	0
V/C Ratio(X)	0.00	0.28	0.29	0.79	0.19	0.00	0.30	0.00	0.65	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1062	1083	231	2619	0	599	0	515	0	608	0
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.94	0.94	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	23.1	2.1	0.0	21.3	0.0	21.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.6	4.6	0.2	0.0	0.2	0.0	1.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	1.3	1.1	0.0	1.2	0.0	1.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.6	0.6	27.7	2.2	0.0	21.5	0.0	23.0	0.0	0.0	0.0
LnGrp LOS		A	A	C	A		C		C			
Approach Vol, veh/h	611				592				202			
Approach Delay, s/veh	0.6				6.0				22.3			
Approach LOS	A				A				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	34.0		9.4		40.6		9.4				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.4	2.0		0.0		4.2		5.4				
Green Ext Time (p_c), s	0.0	6.9		0.0		8.9		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay					6.0							
HCM 2010 LOS					A							

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Existing PM.syn
1/27/2016

Intersection												
Int Delay, s/veh		3.4										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	417	0	62	0	1	0	31	23	0	0	20	418
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	92	91	92	92	92	91	91	92	92	91	91
Heavy Vehicles, %	2	0	0	0	0	0	4	0	0	0	0	1
Mvmt Flow	458	0	68	0	1	0	34	25	0	0	22	459
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1	0	0	2	0	0	14	919	2	16	919	1
Stage 1	-	-	-	-	-	-	2	918	-	1	1	-
Stage 2	-	-	-	-	-	-	12	1	-	15	918	-
Critical Hdwy	4.12	-	-	-	-	-	7.14	6.5	-	7.1	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.536	4	-	3.5	4	3.309
Pot Cap-1 Maneuver	1622	-	-	-	-	-	997	273	-	1004	273	1087
Stage 1	-	-	-	-	-	-	-	-	-	1027	899	-
Stage 2	-	-	-	-	-	-	1003	899	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	-	-	-	548	196	-	-	196	1087
Mov Cap-2 Maneuver	-	-	-	-	-	-	277	-739	-	-	-71	-
Stage 1	-	-	-	-	-	-	-	-	-	737	899	-
Stage 2	-	-	-	-	-	-	565	899	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	277	-	1622	-	-	-	-	-	-	1087		
HCM Lane V/C Ratio	0.123	-	0.283	-	-	-	-	-	-	0.423		
HCM Control Delay (s)	19.8	-	8.1	-	-	0	-	-	-	10.7		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.4	-	1.2	-	-	-	-	-	-	2.1		

Notes
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Existing PM.syn
1/27/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	277	22	198	34	13	18	258	1371	10	13	1279	153
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1869	1900	1863	1763	1900	1900	1845	1900	1900	1881	1881
Adj Flow Rate, veh/h	262	66	208	34	16	19	272	1443	11	14	1346	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
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
Percent Heavy Veh, %	2	7	7	2	5	5	0	3	3	0	1	1
Cap, veh/h	333	73	232	115	46	55	293	1897	14	42	1405	629
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.16	0.53	0.53	0.02	0.39	0.00
Sat Flow, veh/h	1774	392	1234	1774	717	852	1810	3566	27	1810	3574	1599
Grp Volume(v), veh/h	262	0	274	34	0	35	272	709	745	14	1346	0
Grp Sat Flow(s),veh/h/ln	1774	0	1626	1774	0	1569	1810	1753	1840	1810	1787	1599
Q Serve(g_s), s	12.4	0.0	14.5	1.6	0.0	1.9	13.1	28.1	28.1	0.7	32.4	0.0
Cycle Q Clear(g_c), s	12.4	0.0	14.5	1.6	0.0	1.9	13.1	28.1	28.1	0.7	32.4	0.0
Prop In Lane	1.00		0.76	1.00		0.54	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	333	0	305	115	0	102	293	933	979	42	1405	629
V/C Ratio(X)	0.79	0.00	0.90	0.30	0.00	0.34	0.93	0.76	0.76	0.34	0.96	0.00
Avail Cap(c_a), veh/h	334	0	306	141	0	124	293	933	979	150	1421	636
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.2	0.0	35.0	39.4	0.0	39.5	36.5	16.2	16.2	42.5	26.1	0.0
Incr Delay (d2), s/veh	12.1	0.0	27.6	2.0	0.0	2.8	34.1	4.1	3.9	4.6	15.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	0.0	8.9	0.9	0.0	0.9	9.3	14.5	15.1	0.4	18.8	0.0
LnGrp Delay(d),s/veh	46.3	0.0	62.6	41.4	0.0	42.3	70.6	20.3	20.2	47.1	41.2	0.0
LnGrp LOS	D		E	D		D	E	C	C	D	D	
Approach Vol, veh/h	536			69			1726			1360		
Approach Delay, s/veh	54.6			41.9			28.2			41.3		
Approach LOS	D			D			C			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4			6	7	8				
Phs Duration (G+Y+Rc), s	20.8	18.0	39.6			9.9	5.7	51.9				
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9				
Max Green Setting (Gmax), s	* 17	14.3	35.1			7.0	7.3	42.1				
Max Q Clear Time (g_c+I1), s	16.5	15.1	34.4			3.9	2.7	30.1				
Green Ext Time (p_c), s	0.0	0.0	0.3			0.1	0.0	11.6				

Intersection Summary

HCM 2010 Ctrl Delay
HCM 2010 LOS

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Existing PM.syn

1/27/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17		23	12	52	13	1619	14	54	1470	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Flt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1686	15	56	1531	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	1	0	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1700	0	56	1531	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.4		6.2	71.0	141.2
Effective Green, g (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.4		6.2	71.0	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48		0.04	0.50	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	1038	521		85	87	80	39	1686		79	1797	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.48		0.03	0.43	
v/s Ratio Perm						0.00						c0.49
v/c Ratio	0.99	0.04		0.21	0.21	0.03	0.36	1.01		0.71	0.85	0.49
Uniform Delay, d1	48.9	34.8		64.5	64.4	63.9	68.1	36.9		66.6	30.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1		2.1	2.0	0.3	5.6	24.0		25.1	4.5	1.1
Delay (s)	73.3	34.9		66.6	66.5	64.2	73.6	60.9		91.7	35.1	1.1
Level of Service	E	C		E	E	E	E	E		F	D	A
Approach Delay (s)		72.0			65.1			61.0			25.2	
Approach LOS		E			E			E			C	
Intersection Summary												
HCM 2000 Control Delay	47.1			HCM 2000 Level of Service			D					
HCM 2000 Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	141.2			Sum of lost time (s)			17.9					
Intersection Capacity Utilization	91.3%			ICU Level of Service			F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

9: Carmel Rancho Blvd & Shopping Center Dwy

Existing PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Volume (veh/h)	171	10	20	40	10	30	38	524	18	11	365	78
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99	0.99	0.99	0.99	0.99	1.00	0.99	1.00	0.99	1.00	0.99	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1887	1900	1900	1800	1863	1881	1846	1900	1827	1851	1900
Adj Flow Rate, veh/h	184	11	22	43	11	32	41	563	19	12	392	84
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
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
Percent Heavy Veh, %	2	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	628	141	282	541	105	396	592	1359	46	542	1131	240
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1346	558	1116	1006	418	1568	919	3462	117	810	2883	612
Grp Volume(V), veh/h	184	0	33	54	0	32	41	285	297	12	238	238
Grp Sat Flow(s), veh/h/ln	1346	0	1675	1423	0	1568	919	1754	1825	810	1758	1736
Q Serve(g_s), s	2.7	0.0	0.3	0.0	0.0	0.4	0.7	2.7	2.7	0.2	2.1	2.2
Cycle Q Clear(g_c), s	3.3	0.0	0.3	0.5	0.0	0.4	2.9	2.7	2.7	2.9	2.1	2.2
Prop In Lane	1.00		0.67	0.80		1.00	1.00		0.06	1.00		0.35
Lane Grp Cap(c), veh/h	628	0	423	646	0	396	592	688	716	542	690	681
V/C Ratio(X)	0.29	0.00	0.08	0.08	0.00	0.08	0.07	0.41	0.41	0.02	0.34	0.35
Avail Cap(c_a), veh/h	1484	0	1487	1528	0	1393	925	1324	1377	836	1327	1310
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.8	0.0	6.4	6.5	0.0	6.4	5.8	5.0	5.0	6.0	4.8	4.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.2	0.3	0.0	0.2	0.2	1.3	1.3	0.1	1.0	1.0
LnGrp Delay(d), s/veh	7.8	0.0	6.4	6.5	0.0	6.5	5.9	5.1	5.1	6.0	4.9	4.9
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		217			86			623			488	
Approach Delay, s/veh		7.6			6.5			5.2			5.0	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.7		12.8		9.7		12.8				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		5.3		4.9		2.5		4.9				
Green Ext Time (p_c), s		0.6		3.6		0.6		3.6				
Intersection Summary												
HCM 2010 Ctrl Delay				5.5								
HCM 2010 LOS				A								

HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Existing + Proj AM.syn

1/27/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	733	462	54	1061	694
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2760	1863	1509	3335	1759
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2760	1863	1509	3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	797	502	59	1153	754
RTOR Reduction (vph)	0	256	0	12	0	0
Lane Group Flow (vph)	0	541	502	47	1153	754
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA	Perm	Prot	NA	Free
Protected Phases	3	2		3		
Permitted Phases			2			
Actuated Green, G (s)	25.2	20.7	20.7	25.2	55.7	
Effective Green, g (s)	25.2	20.7	20.7	25.2	55.7	
Actuated g/C Ratio	0.45	0.37	0.37	0.45	1.00	
Clearance Time (s)	4.9	4.9	4.9	4.9		
Vehicle Extension (s)	4.5	3.5	3.5	4.5		
Lane Grp Cap (vph)	1248	692	560	1508	1759	
v/s Ratio Prot	0.20	c0.27		c0.35	0.43	
v/s Ratio Perm			0.03			
v/c Ratio	0.43	0.73	0.08	0.76	0.43	
Uniform Delay, d1	10.4	15.1	11.4	12.8	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	3.9	0.1	2.7	0.8	
Delay (s)	10.8	19.0	11.4	15.4	0.8	
Level of Service	B	B	B	B	A	
Approach Delay (s)	10.8		18.2		9.6	
Approach LOS	B		B		A	
Intersection Summary						
HCM 2000 Control Delay		11.4		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.75				
Actuated Cycle Length (s)		55.7		Sum of lost time (s)	9.8	
Intersection Capacity Utilization		62.8%		ICU Level of Service	B	
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Existing + Proj AM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	685	403	395	612	5	88	5	259	10	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (prot)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1560
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (perm)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1560
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	31	778	458	449	695	6	100	6	294	11	19	38
RTOR Reduction (vph)	0	0	292	0	1	0	0	0	245	0	0	37
Lane Group Flow (vph)	31	778	166	449	700	0	53	53	49	0	30	1
Confl. Peds. (#/hr)	2		1			1	1			1		2
Heavy Vehicles (%)	4%	7%	2%	1%	3%	0%	6%	0%	6%	30%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7		
Permitted Phases			2									7
Actuated Green, G (s)	1.8	20.2	20.2	9.3	27.8		4.3	4.3	9.3		1.5	1.5
Effective Green, g (s)	1.8	20.2	20.2	9.3	27.8		4.3	4.3	9.3		1.5	1.5
Actuated g/C Ratio	0.03	0.36	0.36	0.17	0.50		0.08	0.08	0.17		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	56	1223	566	578	1747		124	126	254		45	42
v/s Ratio Prot	0.02	c0.23		c0.13	0.20		c0.03	0.03	0.03		c0.02	
v/s Ratio Perm			0.11									0.00
v/c Ratio	0.55	0.64	0.29	0.78	0.40		0.43	0.42	0.19		0.67	0.02
Uniform Delay, d1	26.6	14.7	12.7	22.2	8.7		24.5	24.5	20.0		26.9	26.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.6	0.8	0.1	5.9	0.1		0.9	0.8	0.1		25.2	0.1
Delay (s)	33.1	15.5	12.8	28.1	8.8		25.4	25.3	20.1		52.1	26.5
Level of Service	C	B	B	C	A		C	C	C		D	C
Approach Delay (s)		14.9			16.3			21.5			37.8	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay		17.0		HCM 2000 Level of Service	B							
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		55.7		Sum of lost time (s)	20.4							
Intersection Capacity Utilization		52.4%		ICU Level of Service	A							
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Existing + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱	↱	↰	↰	↰	↰	↰	↰	↰↱	↱	↱
Volume (veh/h)	133	222	36	126	179	155	23	228	82	298	355	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1827	1863	1827	1820	1900
Adj Flow Rate, veh/h	145	241	39	137	195	168	25	248	89	324	386	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	2	4	4	4
Cap, veh/h	215	646	103	212	384	325	76	446	384	502	556	65
Arrive On Green	0.12	0.21	0.21	0.12	0.21	0.21	0.05	0.24	0.24	0.15	0.35	0.35
Sat Flow, veh/h	1774	3023	482	1774	1810	1535	1675	1827	1574	3375	1599	186
Grp Volume(v), veh/h	145	138	142	137	195	168	25	248	89	324	0	431
Grp Sat Flow(s),veh/h/ln	1774	1750	1756	1774	1810	1535	1675	1827	1574	1688	0	1785
Q Serve(g_s), s	4.7	4.1	4.2	4.4	5.7	5.8	0.9	7.2	2.7	5.4	0.0	12.5
Cycle Q Clear(g_c), s	4.7	4.1	4.2	4.4	5.7	5.8	0.9	7.2	2.7	5.4	0.0	12.5
Prop In Lane	1.00		0.27	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	215	374	375	212	384	325	76	446	384	502	0	621
V/C Ratio(X)	0.68	0.37	0.38	0.65	0.51	0.52	0.33	0.56	0.23	0.65	0.00	0.69
Avail Cap(c_a), veh/h	274	810	813	274	838	711	222	788	679	577	0	838
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.3	20.2	20.3	25.3	21.0	21.0	27.9	19.9	18.2	24.1	0.0	16.9
Incr Delay (d2), s/veh	4.4	0.7	0.8	3.3	1.3	1.5	2.5	1.3	0.4	2.0	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.0	2.1	2.4	3.0	2.6	0.5	3.7	1.2	2.7	0.0	6.4
LnGrp Delay(d),s/veh	29.8	21.0	21.0	28.6	22.2	22.5	30.4	21.2	18.6	26.2	0.0	18.7
LnGrp LOS	C	C	C	C	C	C	C	C	B	C		B
Approach Vol, veh/h		425			500			362			755	
Approach Delay, s/veh		24.0			24.1			21.2			21.9	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.9	17.1	6.4	25.8	11.0	17.0	12.7	19.6				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	6.4	6.2	2.9	14.5	6.7	7.8	7.4	9.2				
Green Ext Time (p_c), s	0.1	4.3	0.0	4.2	0.1	4.2	0.3	4.6				

Intersection Summary

HCM 2010 Ctrl Delay 22.8
HCM 2010 LOS C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Existing + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱	↱	↰	↰	↰	↰	↰	↰	↰↱	↱	↱
Volume (veh/h)	53	390	83	87	271	0	140	0	69	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1860	1900	1810	1792	0	1810	1696	1900			
Adj Flow Rate, veh/h	58	429	91	96	298	0	154	0	76			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	2	2	5	6	0	5	0	5			
Cap, veh/h	80	1760	370	119	2148	0	317	0	137			
Arrive On Green	0.04	0.61	0.61	0.14	1.00	0.00	0.09	0.00	0.09			
Sat Flow, veh/h	1810	2905	611	1723	3495	0	3343	0	1442			
Grp Volume(v), veh/h	58	260	260	96	298	0	154	0	76			
Grp Sat Flow(s),veh/h/ln	1810	1767	1750	1723	1703	0	1672	0	1442			
Q Serve(g_s), s	1.6	3.4	3.4	2.7	0.0	0.0	2.2	0.0	2.5			
Cycle Q Clear(g_c), s	1.6	3.4	3.4	2.7	0.0	0.0	2.2	0.0	2.5			
Prop In Lane	1.00		0.35	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	80	1070	1060	119	2148	0	317	0	137			
V/C Ratio(X)	0.72	0.24	0.25	0.80	0.14	0.00	0.49	0.00	0.56			
Avail Cap(c_a), veh/h	199	1070	1060	224	2148	0	1070	0	461			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.88	0.88	0.88	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.6	4.6	4.6	21.2	0.0	0.0	21.5	0.0	21.6			
Incr Delay (d2), s/veh	4.0	0.5	0.5	4.7	0.1	0.0	0.4	0.0	1.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.9	1.8	1.8	1.4	0.0	0.0	1.0	0.0	1.0			
LnGrp Delay(d),s/veh	27.6	5.0	5.0	25.9	0.1	0.0	21.9	0.0	22.9			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		578			394			230				
Approach Delay, s/veh		7.3			6.4			22.2				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	7.0	34.3			5.7	35.5		8.7				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			5.5	17.0		16.0				
Max Q Clear Time (g_c+I1), s	4.7	5.4			3.6	2.0		4.5				
Green Ext Time (p_c), s	0.0	2.8			0.0	3.3		0.4				

Intersection Summary

HCM 2010 Ctrl Delay 9.9
HCM 2010 LOS A

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Existing + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (veh/h)	0	367	92	62	326	1	32	0	38	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1820	1900	1845	1845	1900	1900	1638	1712	1900	1900	1900
Adj Flow Rate, veh/h	0	442	111	75	393	1	39	0	46	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	3	3	3	0	0	11	0	0	0
Cap, veh/h	0	1814	452	94	2814	7	212	0	80	0	105	0
Arrive On Green	0.00	0.22	0.22	0.05	0.78	0.78	0.06	0.00	0.06	0.00	0.00	0.00
Sat Flow, veh/h	0	2834	684	1757	3587	9	1228	0	1444	0	1900	0
Grp Volume(v), veh/h	0	277	276	75	192	202	39	0	46	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1729	1698	1757	1753	1843	1228	0	1444	0	1900	0
Q Serve(g_s), s	0.0	6.6	6.7	2.1	1.3	1.3	1.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.6	6.7	2.1	1.3	1.3	1.5	0.0	1.6	0.0	0.0	0.0
Prop In Lane	0.00		0.40	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1143	1123	94	1375	1446	212	0	80	0	105	0
V/C Ratio(X)	0.00	0.24	0.25	0.80	0.14	0.14	0.18	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1143	1123	193	1375	1446	537	0	462	0	608	0
HCM Platoon Ratio	1.00	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.98	0.98	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.2	9.2	23.4	1.3	1.3	23.0	0.0	23.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	5.8	0.2	0.2	0.2	0.0	2.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.3	3.3	1.2	0.7	0.8	0.5	0.0	0.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	9.7	9.8	29.2	1.5	1.5	23.2	0.0	25.4	0.0	0.0	0.0
LnGrp LOS		A	A	C	A	A	C		C			
Approach Vol, veh/h		553			469			85			0	
Approach Delay, s/veh		9.7			5.9			24.4			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.2	37.1		6.8		43.2		6.8				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	5.5	17.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.1	8.7		0.0		3.3		3.6				
Green Ext Time (p_c), s	0.0	4.0		0.0		7.0		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			9.3									
HCM 2010 LOS			A									

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Existing + Proj AM.syn
1/27/2016

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	218	0	18	0	1	0	27	19	0	0	34	307
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	1	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	92	80	92	92	92	80	80	92	92	80	80
Heavy Vehicles, %	7	0	0	2	2	2	0	7	0	0	0	2
Mvmt Flow	272	0	22	0	1	0	34	24	0	0	42	384
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	2	0	0	26	550	2	17	550	5
Stage 1	-	-	-	-	-	-	2	547	-	3	3	-
Stage 2	-	-	-	-	-	-	24	3	-	14	547	-
Critical Hdwy	4.17	-	-	-	-	-	7.1	6.57	-	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.57	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.5	4.063	-	3.5	4	3.318
Pot Cap-1 Maneuver	1587	-	-	-	-	-	990	436	-	1003	446	1078
Stage 1	-	-	-	-	-	-	-	-	-	1025	897	-
Stage 2	-	-	-	-	-	-	999	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1584	-	-	-	-	-	572	360	-	-	368	1074
Mov Cap-2 Maneuver	-	-	-	-	-	-	370	1061	-	-	~ -783	-
Stage 1	-	-	-	-	-	-	-	-	-	847	896	-
Stage 2	-	-	-	-	-	-	611	882	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.2			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	370	-	1584	-	-	-	-	-	-	1074		
HCM Lane V/C Ratio	0.091	-	0.172	-	-	-	-	-	-	0.357		
HCM Control Delay (s)	15.7	-	7.7	-	-	0	-	-	-	10.2		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.3	-	0.6	-	-	-	-	-	-	1.6		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Existing + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (veh/h)	213	40	114	134	38	50	138	996	37	16	1428	137
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1869	1900	1900	1842	1900	1827	1839	1900	1357	1827	1845
Adj Flow Rate, veh/h	211	94	131	128	81	57	159	1145	43	18	1641	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	3	0	0	0	9	9	4	3	3	40	4	3
Cap, veh/h	288	114	159	151	82	57	163	1826	69	37	1619	731
Arrive On Green	0.16	0.16	0.16	0.08	0.08	0.08	0.09	0.53	0.53	0.03	0.47	0.00
Sat Flow, veh/h	1757	694	967	1810	977	688	1740	3433	129	1293	3471	1568
Grp Volume(v), veh/h	211	0	225	128	0	138	159	583	605	18	1641	0
Grp Sat Flow(s),veh/h/ln	1757	0	1661	1810	0	1665	1740	1748	1814	1293	1736	1568
Q Serve(g_s), s	10.1	0.0	11.6	6.2	0.0	7.3	8.1	20.7	20.8	1.2	41.3	0.0
Cycle Q Clear(g_c), s	10.1	0.0	11.6	6.2	0.0	7.3	8.1	20.7	20.8	1.2	41.3	0.0
Prop In Lane	1.00		0.58	1.00		0.41	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	288	0	273	151	0	139	163	930	965	37	1619	731
V/C Ratio(X)	0.73	0.00	0.82	0.85	0.00	0.99	0.97	0.63	0.63	0.49	1.01	0.00
Avail Cap(c_a), veh/h	317	0	300	151	0	139	163	930	965	107	1619	731
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.1	0.0	35.8	40.0	0.0	40.5	40.0	14.5	14.6	42.4	23.6	0.0
Incr Delay (d2), s/veh	8.0	0.0	16.2	34.4	0.0	73.7	62.7	1.7	1.7	9.9	25.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	6.5	4.5	0.0	6.2	6.7	10.3	10.7	0.5	25.4	0.0
LnGrp Delay(d),s/veh	43.2	0.0	52.0	74.5	0.0	114.2	102.8	16.3	16.2	52.3	49.4	0.0
LnGrp LOS	D		D	E		F	F	B	B	D	F	
Approach Vol, veh/h		436			266			1347			1659	
Approach Delay, s/veh		47.7			95.1			26.4			49.4	
Approach LOS		D			F			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		18.7	12.0	46.2		11.6	6.2	52.0				
Change Period (Y+Rc), s		* 4.2	3.7	4.9		4.2	3.7	4.9				
Max Green Setting (Gmax), s		* 16	8.3	41.3		7.4	7.3	42.3				
Max Q Clear Time (g_c+I1), s		13.6	10.1	43.3		9.3	3.2	22.8				
Green Ext Time (p_c), s		0.6	0.0	0.0		0.0	0.0	18.7				

Intersection Summary

HCM 2010 Ctrl Delay	44.1
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Existing + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	402	5	17	18	14	49	19	1234	10	32	1569	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1435	12	37	1824	816
RTOR Reduction (vph)	0	17	0	0	0	54	0	0	0	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1447	0	37	1824	816
Confl. Peds. (#/hr)				1		1			1		1	
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6		4.5	70.1	117.7
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6		4.5	70.1	117.7
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59		0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	551	269		96	102	90	66	2088		67	2047	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.41		0.02	c0.53	
v/s Ratio Perm						0.00						c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.69		0.55	0.89	0.53
Uniform Delay, d1	48.0	41.7		52.8	52.8	52.4	55.1	16.6		55.6	20.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.4	0.1		1.6	1.5	0.3	3.0	1.3		9.5	5.7	1.3
Delay (s)	60.4	41.8		54.5	54.3	52.6	58.1	17.9		65.1	26.2	1.3
Level of Service	E	D		D	D	D	E	B		E	C	A
Approach Delay (s)		59.4			53.3		18.5				19.2	
Approach LOS		E			D		B				B	

Intersection Summary

HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	117.7	Sum of lost time (s)	17.9
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM 2010 Signalized Intersection Summary
9: Carmel Rancho Blvd & Shopping Center Dwy

Existing + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰	↱	↰	↱	↰	↱	↰
Volume (veh/h)	51	1	19	9	1	20	18	204	15	76	501	163
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1785	1863	1881	1848	1900	1827	1854	1900
Adj Flow Rate, veh/h	66	1	25	12	1	26	23	265	19	99	651	212
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	0	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	484	7	177	462	16	180	562	1645	117	833	1292	420
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	1392	62	1545	1084	137	1574	644	3324	237	1067	2610	849
Grp Volume(v), veh/h	66	0	26	13	0	26	23	139	145	99	439	424
Grp Sat Flow(s),veh/h/ln	1392	0	1607	1221	0	1574	644	1756	1805	1067	1761	1699
Q Serve(g_s), s	0.9	0.0	0.3	0.1	0.0	0.3	0.5	0.9	0.9	1.2	3.4	3.4
Cycle Q Clear(g_c), s	1.3	0.0	0.3	0.4	0.0	0.3	4.0	0.9	0.9	2.1	3.4	3.4
Prop In Lane	1.00		0.96	0.92		1.00	1.00		0.13	1.00		0.50
Lane Grp Cap(c), veh/h	484	0	184	478	0	180	562	869	893	833	871	841
V/C Ratio(X)	0.14	0.00	0.14	0.03	0.00	0.14	0.04	0.16	0.16	0.12	0.50	0.50
Avail Cap(c_a), veh/h	1684	0	1569	1638	0	1537	778	1458	1499	1190	1462	1410
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.8	0.0	8.2	8.2	0.0	8.2	4.8	2.8	2.8	3.4	3.5	3.5
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.1	0.0	0.1	0.1	0.4	0.5	0.3	1.6	1.6
LnGrp Delay(d),s/veh	8.8	0.0	8.3	8.2	0.0	8.3	4.8	2.9	2.9	3.4	3.6	3.7
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		92			39			307			962	
Approach Delay, s/veh		8.7			8.3			3.0			3.6	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		6.3		14.1		6.3		14.1				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		3.3		5.4		2.4		6.0				
Green Ext Time (p_c), s		0.2		4.1		0.2		4.0				
Intersection Summary												
HCM 2010 Ctrl Delay			4.0									
HCM 2010 LOS			A									

HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Existing + Proj PM.syn
1/27/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↰	↱	↰	↱	↰
Volume (vph)	0	853	780	88	848	621
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Fit		0.85	1.00	0.85	1.00	1.00
Fit Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2814	1863	1553	3467	1881
Fit Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2814	1863	1553	3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	907	830	94	902	661
RTOR Reduction (vph)	0	170	0	10	0	0
Lane Group Flow (vph)	0	737	830	84	902	661
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases				2		
Actuated Green, G (s)		20.3	31.1	31.1	20.3	61.2
Effective Green, g (s)		20.3	31.1	31.1	20.3	61.2
Actuated g/C Ratio		0.33	0.51	0.51	0.33	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		933	946	789	1150	1881
v/s Ratio Prot		c0.26	c0.45		0.26	0.35
v/s Ratio Perm				0.05		
v/c Ratio		0.79	0.88	0.11	0.78	0.35
Uniform Delay, d1		18.5	13.4	7.8	18.5	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.1	9.4	0.1	4.0	0.5
Delay (s)		23.7	22.8	7.9	22.5	0.5
Level of Service		C	C	A	C	A
Approach Delay (s)	23.7		21.3			13.2
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			18.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			61.2		Sum of lost time (s)	9.8
Intersection Capacity Utilization			79.1%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Existing + Proj PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	711	194	303	558	4	277	17	511	4	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Flt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (prot)	1805	3539	1615	3467	3571		1715	1728	1599		1887	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (perm)	1805	3539	1615	3467	3571		1715	1728	1599		1887	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	33	756	206	322	594	4	295	18	544	4	24	19
RTOR Reduction (vph)	0	0	139	0	1	0	0	0	460	0	0	19
Lane Group Flow (vph)	33	756	67	322	597	0	156	157	84	0	28	0
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	0%	1%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7		7
Permitted Phases			2									7
Actuated Green, G (s)	1.8	19.1	19.1	9.1	26.5		8.9	8.9	9.1		1.5	1.5
Effective Green, g (s)	1.8	19.1	19.1	9.1	26.5		8.9	8.9	9.1		1.5	1.5
Actuated g/C Ratio	0.03	0.32	0.32	0.15	0.45		0.15	0.15	0.15		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	55	1145	522	534	1603		258	260	246		47	39
v/s Ratio Prot	0.02	c0.21		c0.09	0.17		c0.09	0.09	0.05		c0.01	
v/s Ratio Perm			0.04									0.00
v/c Ratio	0.60	0.66	0.13	0.60	0.37		0.60	0.60	0.34		0.60	0.01
Uniform Delay, d1	28.2	17.2	14.1	23.3	10.8		23.4	23.4	22.3		28.4	28.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	11.2	1.1	0.0	1.3	0.1		2.7	2.7	0.3		12.8	0.0
Delay (s)	39.4	18.3	14.1	24.6	10.8		26.1	26.1	22.6		41.2	28.1
Level of Service	D	B	B	C	B		C	C	C		D	C
Approach Delay (s)		18.1			15.6			23.9			35.9	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay		19.4										
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		59.0							20.4			
Intersection Capacity Utilization		66.8%							C			
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Existing + Proj PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	350	83	167	402	298	162	427	157	268	309	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1845	1863	1881	1884	1900
Adj Flow Rate, veh/h	146	357	85	170	410	304	165	436	160	273	315	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	1	2	1	3	2	1	1	1
Cap. veh/h	169	898	211	204	624	521	199	517	441	359	438	63
Arrive On Green	0.10	0.31	0.31	0.11	0.33	0.33	0.11	0.28	0.28	0.10	0.27	0.27
Sat Flow, veh/h	1774	2868	675	1792	1881	1571	1792	1845	1575	3476	1610	230
Grp Volume(V), veh/h	146	220	222	170	410	304	165	436	160	273	0	360
Grp Sat Flow(s),veh/h/ln	1774	1784	1759	1792	1881	1571	1792	1845	1575	1738	0	1840
Q Serve(g_s), s	7.1	8.4	8.6	8.1	16.2	14.0	7.9	19.4	7.1	6.7	0.0	15.4
Cycle Q Clear(g_c), s	7.1	8.4	8.6	8.1	16.2	14.0	7.9	19.4	7.1	6.7	0.0	15.4
Prop In Lane	1.00		0.38	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	169	558	551	204	624	521	199	517	441	359	0	501
V/C Ratio(X)	0.86	0.39	0.40	0.83	0.66	0.58	0.83	0.84	0.36	0.76	0.00	0.72
Avail Cap(c_a), veh/h	169	558	551	212	624	521	212	572	488	371	0	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.8	23.4	23.5	37.8	24.9	24.1	37.9	29.5	25.1	38.0	0.0	28.7
Incr Delay (d2), s/veh	34.1	0.5	0.6	23.1	5.3	4.7	22.1	10.6	0.6	8.7	0.0	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	4.2	4.3	5.3	9.4	6.7	5.1	11.3	3.1	3.6	0.0	8.4
LnGrp Delay(d),s/veh	72.9	24.0	24.1	60.8	30.2	28.8	60.0	40.1	25.7	46.7	0.0	33.0
LnGrp LOS	E	C	C	E	C	C	E	D	C	D		C
Approach Vol, veh/h		588			884		761				633	
Approach Delay, s/veh		36.2			35.6		41.4				38.9	
Approach LOS		D			D		D				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.6	31.5	13.4	28.6	12.0	33.1	12.7	29.3				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	10.1	10.6	9.9	17.4	9.1	18.2	8.7	21.4				
Green Ext Time (p_c), s	0.0	7.3	0.0	3.8	0.0	5.6	0.1	2.8				
Intersection Summary												
HCM 2010 Ctrl Delay				38.0								
HCM 2010 LOS				D								
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Existing + Proj PM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	84	469	138	137	445	0	348	0	134	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1867	1900	1881	1881	0	1881	1863	1900			
Adj Flow Rate, veh/h	85	474	139	138	449	0	352	0	135			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	0	2	2	1	1	0	1	0	1			
Cap, veh/h	108	1407	410	173	1989	0	534	0	243			
Arrive On Green	0.06	0.52	0.52	0.19	1.00	0.00	0.15	0.00	0.15			
Sat Flow, veh/h	1810	2709	789	1792	3668	0	3476	0	1583			
Grp Volume(v), veh/h	85	309	304	138	449	0	352	0	135			
Grp Sat Flow(s),veh/h/ln	1810	1774	1724	1792	1787	0	1738	0	1583			
Q Serve(g_s), s	2.3	5.1	5.1	3.7	0.0	0.0	4.8	0.0	3.9			
Cycle Q Clear(g_c), s	2.3	5.1	5.1	3.7	0.0	0.0	4.8	0.0	3.9			
Prop In Lane	1.00		0.46	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	108	921	896	173	1989	0	534	0	243			
V/C Ratio(X)	0.78	0.34	0.34	0.80	0.23	0.00	0.66	0.00	0.55			
Avail Cap(c_a), veh/h	235	921	896	233	1989	0	1112	0	507			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.87	0.99	0.99	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.2	7.0	7.0	19.7	0.0	0.0	19.9	0.0	19.6			
Incr Delay (d2), s/veh	4.0	0.9	0.9	9.1	0.3	0.0	0.5	0.0	0.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	2.6	2.7	2.2	0.1	0.0	2.3	0.0	1.8			
LnGrp Delay(d),s/veh	27.2	7.8	7.9	28.8	0.3	0.0	20.4	0.0	20.3			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		698			587			487				
Approach Delay, s/veh		10.2			7.0			20.4				
Approach LOS		B			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	8.3	30.0			6.5	31.8		11.7				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			6.5	16.0		16.0				
Max Q Clear Time (g_c+I1), s	5.7	7.1			4.3	2.0		6.8				
Green Ext Time (p_c), s	0.0	3.4			0.0	4.4		0.9				
Intersection Summary												
HCM 2010 Ctrl Delay			11.9									
HCM 2010 LOS			B									

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Existing + Proj PM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	549	54	85	496	0	86	0	111	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1881	1900	1900	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	566	56	88	511	0	89	0	114	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
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
Percent Heavy Veh, %	0	2	2	2	1	1	0	0	0	0	0	0
Cap, veh/h	0	1950	193	111	2617	0	297	0	174	0	205	0
Arrive On Green	0.00	1.00	1.00	0.06	0.73	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	0	3347	321	1774	3668	0	1422	0	1611	0	1900	0
Grp Volume(v), veh/h	0	307	315	88	511	0	89	0	114	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1806	1774	1787	0	1422	0	1611	0	1900	0
Q Serve(g_s), s	0.0	0.0	0.0	2.4	2.2	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.4	2.2	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Prop In Lane	0.00		0.18	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1060	1082	111	2617	0	297	0	174	0	205	0
V/C Ratio(X)	0.00	0.29	0.29	0.79	0.20	0.00	0.30	0.00	0.66	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1060	1082	231	2617	0	599	0	515	0	608	0
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.93	0.93	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	23.1	2.1	0.0	21.2	0.0	21.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.6	4.6	0.2	0.0	0.2	0.0	1.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	1.3	1.1	0.0	1.2	0.0	1.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.6	0.6	27.7	2.3	0.0	21.4	0.0	23.0	0.0	0.0	0.0
LnGrp LOS		A	A	C	A		C		C			
Approach Vol, veh/h		622			599			203			0	
Approach Delay, s/veh		0.6			6.0			22.3			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	34.0		9.4		40.6		9.4				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.4	2.0		0.0		4.2		5.4				
Green Ext Time (p_c), s	0.0	7.0		0.0		9.0		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			6.0									
HCM 2010 LOS			A									

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Existing + Proj PM.syn
1/27/2016

Intersection													
Int Delay, s/veh		3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Vol, veh/h	417	0	74	0	1	0	38	27	0	0	27	418	
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0	
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	91	92	91	92	92	92	91	91	92	92	91	91	
Heavy Vehicles, %	2	0	0	0	0	0	4	0	0	0	0	1	
Mvmt Flow	458	0	81	0	1	0	42	30	0	0	30	459	
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	1	0	0	2	0	0	18	919	2	18	919	1	
Stage 1	-	-	-	-	-	-	2	918	-	1	1	-	
Stage 2	-	-	-	-	-	-	16	1	-	17	918	-	
Critical Hdwy	4.12	-	-	-	-	-	7.14	6.5	-	7.1	6.5	6.21	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	-	-	-	
Follow-up Hdwy	2.218	-	-	-	-	-	3.536	4	-	3.5	4	3.309	
Pot Cap-1 Maneuver	1622	-	-	-	-	-	991	273	-	1001	273	1087	
Stage 1	-	-	-	-	-	-	-	-	-	1027	899	-	
Stage 2	-	-	-	-	-	-	998	899	-	-	-	-	
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	
Mov Cap-1 Maneuver	1622	-	-	-	-	-	579	196	-	-	196	1087	
Mov Cap-2 Maneuver	-	-	-	-	-	-	289	~ -739	-	-	~ -71	-	
Stage 1	-	-	-	-	-	-	-	-	-	737	899	-	
Stage 2	-	-	-	-	-	-	557	899	-	-	-	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	6.9			0									
HCM LOS													
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	289	-	1622	-	-	-	-	-	-	1087			
HCM Lane V/C Ratio	0.144	-	0.283	-	-	-	-	-	-	0.423			
HCM Control Delay (s)	19.5	-	8.1	-	-	0	-	-	-	10.7			
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B			
HCM 95th %tile Q(veh)	0.5	-	1.2	-	-	-	-	-	-	2.1			

Notes
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Existing + Proj PM.syn
1/27/2016

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (veh/h)	277	22	200	34	13	18	259	1375	10	13	1284	153	
Number	5	2	12	1	6	16	3	8	18	7	4	14	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00	0.98	1.00			0.96	1.00		0.99	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1863	1869	1900	1863	1763	1900	1900	1845	1900	1900	1881	1881	
Adj Flow Rate, veh/h	263	64	211	34	16	19	273	1447	11	14	1352	0	
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1	
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	
Percent Heavy Veh, %	2	7	7	2	5	5	0	3	3	0	1	1	
Cap, veh/h	333	71	234	115	46	55	293	1899	14	42	1408	630	
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.16	0.53	0.53	0.02	0.39	0.00	
Sat Flow, veh/h	1774	378	1246	1774	717	852	1810	3566	27	1810	3574	1599	
Grp Volume(V), veh/h	263	0	275	34	0	35	273	711	747	14	1352	0	
Grp Sat Flow(s),veh/h/ln	1774	0	1623	1774	0	1569	1810	1753	1840	1810	1787	1599	
Q Serve(g_s), s	12.5	0.0	14.7	1.6	0.0	1.9	13.2	28.2	28.3	0.7	32.6	0.0	
Cycle Q Clear(g_c), s	12.5	0.0	14.7	1.6	0.0	1.9	13.2	28.2	28.3	0.7	32.6	0.0	
Prop In Lane	1.00		0.77	1.00		0.54	1.00		0.01	1.00		1.00	
Lane Grp Cap(c), veh/h	333	0	305	115	0	101	293	933	980	42	1408	630	
V/C Ratio(X)	0.79	0.00	0.90	0.30	0.00	0.35	0.93	0.76	0.76	0.34	0.96	0.00	
Avail Cap(c_a), veh/h	333	0	305	140	0	124	293	933	980	149	1418	634	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	34.3	0.0	35.1	39.5	0.0	39.6	36.6	16.3	16.3	42.5	26.1	0.0	
Incr Delay (d2), s/veh	12.4	0.0	28.4	2.0	0.0	2.9	35.4	4.2	4.0	4.6	15.6	0.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	7.3	0.0	9.0	0.9	0.0	0.9	9.5	14.5	15.4	0.4	19.0	0.0	
LnGrp Delay(d),s/veh	46.7	0.0	63.6	41.5	0.0	42.4	72.0	20.4	20.3	47.2	41.7	0.0	
LnGrp LOS	D		E	D		D	E	C	C	D	D		
Approach Vol, veh/h	538			69			1731			1366			
Approach Delay, s/veh	55.3			42.0			28.5			41.8			
Approach LOS	E			D			C			D			
Timer	1	2	3	4	5	6	7	8					
Assigned Phs	2	3	4			6	7	8					
Phs Duration (G+Y+Rc), s	20.8	18.0	39.7			9.9	5.7	52.0					
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9					
Max Green Setting (Gmax), s	* 17	14.3	35.1			7.0	7.3	42.1					
Max Q Clear Time (g_c+I1), s	16.7	15.2	34.6			3.9	2.7	30.3					
Green Ext Time (p_c), s	0.0	0.0	0.2			0.1	0.0	11.5					

Intersection Summary												
HCM 2010 Ctrl Delay		37.5										
HCM 2010 LOS		D										

Notes
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Existing + Proj PM.syn

1/27/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 				 			 			 	
Volume (vph)	982	17	17	23	12	52	13	1623		54	1475	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Flt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1691	15	56	1536	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	1	0	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1705	0	56	1536	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.4		6.2	71.0	141.2
Effective Green, g (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.4		6.2	71.0	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48		0.04	0.50	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	1038	521		85	87	80	39	1686		79	1797	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.48		0.03	0.43	
v/s Ratio Perm						0.00						c0.49
v/c Ratio	0.99	0.04		0.21	0.21	0.03	0.36	1.01		0.71	0.85	0.49
Uniform Delay, d1	48.9	34.8		64.5	64.4	63.9	68.1	36.9		66.6	30.6	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1		2.1	2.0	0.3	5.6	24.8		25.1	4.6	1.1
Delay (s)	73.3	34.9		66.6	66.5	64.2	73.6	61.7		91.7	35.2	1.1
Level of Service	E	C		E	E	E	E	E		F	D	A
Approach Delay (s)		72.0			65.1			61.8			25.4	
Approach LOS		E			E			E			C	
Intersection Summary												
HCM 2000 Control Delay	47.4			HCM 2000 Level of Service				D				
HCM 2000 Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	141.2			Sum of lost time (s)				17.9				
Intersection Capacity Utilization	91.4%			ICU Level of Service				F				
Analysis Period (min)	15											
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

9: Carmel Rancho Blvd & Shopping Center Dwy

Existing + Proj PM.syn

1/27/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	171	10	22	40	10	30	39	527	18	11	370	78
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1887	1900	1900	1800	1863	1881	1846	1900	1827	1851	1900
Adj Flow Rate, veh/h	184	11	24	43	11	32	42	567	19	12	398	84
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
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
Percent Heavy Veh, %	2	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	627	133	289	539	105	396	589	1365	46	540	1139	238
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1346	525	1144	1005	416	1568	914	3463	116	807	2891	604
Grp Volume(v), veh/h	184	0	35	54	0	32	42	287	299	12	241	241
Grp Sat Flow(s),veh/h/ln	1346	0	1669	1421	0	1568	914	1754	1825	807	1758	1737
Q Serve(g_s), s	2.8	0.0	0.4	0.0	0.0	0.4	0.8	2.7	2.7	0.2	2.2	2.2
Cycle Q Clear(g_c), s	3.3	0.0	0.4	0.5	0.0	0.4	3.0	2.7	2.7	2.9	2.2	2.2
Prop In Lane	1.00		0.69	0.80		1.00	1.00		0.06	1.00		0.35
Lane Grp Cap(c), veh/h	627	0	422	645	0	396	589	691	719	540	693	685
V/C Ratio(X)	0.29	0.00	0.08	0.08	0.00	0.08	0.07	0.42	0.42	0.02	0.35	0.35
Avail Cap(c_a), veh/h	1475	0	1473	1517	0	1384	914	1316	1369	828	1319	1303
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.8	0.0	6.5	6.5	0.0	6.5	5.9	5.0	5.0	6.0	4.8	4.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.2	0.3	0.0	0.2	0.2	1.3	1.4	0.1	1.0	1.0
LnGrp Delay(d),s/veh	7.9	0.0	6.5	6.5	0.0	6.5	5.9	5.1	5.1	6.0	4.9	4.9
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h	219			86				628			494	
Approach Delay, s/veh	7.7			6.5				5.2			5.0	
Approach LOS	A			A				A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	9.7			12.9			9.7			12.9		
Change Period (Y+Rc), s	4.0			4.0			4.0			4.0		
Max Green Setting (Gmax), s	20.0			17.0			20.0			17.0		
Max Q Clear Time (g_c+I1), s	5.3			4.9			2.5			5.0		
Green Ext Time (p_c), s	0.6			3.6			0.6			3.6		
Intersection Summary												
HCM 2010 Ctrl Delay				5.6								
HCM 2010 LOS				A								

HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Back AM.syn

1/27/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↕	↕	↕
Volume (vph)	0	802	457	59	1116	693
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Flt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2760	1863	1509	3335	1759
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2760	1863	1509	3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	872	497	64	1213	753
RTOR Reduction (vph)	0	259	0	9	0	0
Lane Group Flow (vph)	0	613	497	55	1213	753
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA	Perm	Prot	NA	Free
Protected Phases	3	2		3		
Permitted Phases			2			
Actuated Green, G (s)	25.4	20.6	20.6	25.4	55.8	
Effective Green, g (s)	25.4	20.6	20.6	25.4	55.8	
Actuated g/C Ratio	0.46	0.37	0.37	0.46	1.00	
Clearance Time (s)	4.9	4.9	4.9	4.9		
Vehicle Extension (s)	4.5	3.5	3.5	4.5		
Lane Grp Cap (vph)	1256	687	557	1518	1759	
v/s Ratio Prot	0.22	c0.27		c0.36	0.43	
v/s Ratio Perm			0.04			
v/c Ratio	0.49	0.72	0.10	0.80	0.43	
Uniform Delay, d1	10.6	15.1	11.5	13.0	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	3.9	0.1	3.4	0.8	
Delay (s)	11.2	19.1	11.6	16.4	0.8	
Level of Service	B	B	B	B	A	
Approach Delay (s)	11.2		18.2		10.4	
Approach LOS	B		B		B	
Intersection Summary						
HCM 2000 Control Delay		11.9		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.76				
Actuated Cycle Length (s)		55.8		Sum of lost time (s)		9.8
Intersection Capacity Utilization		64.1%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Back AM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	27	747	401	420	683	5	86	5	268	10	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Flt	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00		1.00	0.97
Flt Protected	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Flt Permitted	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Satd. Flow (prot)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1559
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (perm)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1559
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	31	849	456	477	776	6	98	6	305	11	19	38
RTOR Reduction (vph)	0	0	278	0	0	0	0	0	257	0	0	37
Lane Group Flow (vph)	31	849	178	477	782	0	52	52	48	0	30	1
Confil. Peds. (#/hr)	2		1			1	1			1		2
Heavy Vehicles (%)	4%	7%	2%	1%	3%	0%	6%	0%	6%	30%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7		
Permitted Phases			2									7
Actuated Green, G (s)	1.8	22.6	22.6	9.2	30.1		4.3	4.3	9.2		1.5	1.5
Effective Green, g (s)	1.8	22.6	22.6	9.2	30.1		4.3	4.3	9.2		1.5	1.5
Actuated g/C Ratio	0.03	0.39	0.39	0.16	0.52		0.07	0.07	0.16		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	53	1314	609	549	1816		119	121	241		43	40
v/s Ratio Prot	0.02	c0.25		c0.14	0.22		c0.03	0.03	0.03		c0.02	
v/s Ratio Perm			0.11									0.00
v/c Ratio	0.58	0.65	0.29	0.87	0.43		0.44	0.43	0.20		0.70	0.02
Uniform Delay, d1	27.7	14.4	12.2	23.8	8.6		25.7	25.7	21.2		28.0	27.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.2	0.8	0.1	13.3	0.1		0.9	0.9	0.2		32.8	0.1
Delay (s)	37.9	15.3	12.3	37.1	8.7		26.6	26.6	21.4		60.9	27.6
Level of Service	D	B	B	D	A		C	C	C		E	C
Approach Delay (s)		14.8			19.5			22.7			42.3	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay		18.4		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio		0.68										
Actuated Cycle Length (s)		58.0		Sum of lost time (s)					20.4			
Intersection Capacity Utilization		54.7%		ICU Level of Service					A			
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Back AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	221	36	131	177	150	23	233	81	297	355	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1827	1863	1827	1820	1900
Adj Flow Rate, veh/h	145	240	39	142	192	163	25	253	88	323	386	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	2	4	4	4
Cap, veh/h	215	633	101	214	378	320	76	451	388	503	560	65
Arrive On Green	0.12	0.21	0.21	0.12	0.21	0.21	0.05	0.25	0.25	0.15	0.35	0.35
Sat Flow, veh/h	1774	3021	484	1774	1810	1534	1675	1827	1574	3375	1599	186
Grp Volume(v), veh/h	145	138	141	142	192	163	25	253	88	323	0	431
Grp Sat Flow(s),veh/h/ln	1774	1750	1755	1774	1810	1534	1675	1827	1574	1688	0	1785
Q Serve(g_s), s	4.7	4.1	4.2	4.6	5.7	5.7	0.9	7.3	2.7	5.4	0.0	12.4
Cycle Q Clear(g_c), s	4.7	4.1	4.2	4.6	5.7	5.7	0.9	7.3	2.7	5.4	0.0	12.4
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	215	366	368	214	378	320	76	451	388	503	0	625
V/C Ratio(X)	0.67	0.38	0.38	0.66	0.51	0.51	0.33	0.56	0.23	0.64	0.00	0.69
Avail Cap(c_a), veh/h	274	812	814	274	839	711	223	789	680	578	0	840
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.3	20.4	20.5	25.3	21.1	21.1	27.8	19.8	18.1	24.1	0.0	16.7
Incr Delay (d2), s/veh	4.4	0.8	0.8	4.0	1.3	1.5	2.5	1.3	0.4	2.0	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.0	2.1	2.5	3.0	2.5	0.5	3.8	1.2	2.6	0.0	6.4
LnGrp Delay(d),s/veh	29.7	21.2	21.2	29.2	22.3	22.6	30.3	21.1	18.4	26.1	0.0	18.5
LnGrp LOS	C	C	C	C	C	C	C	C	B	C		B
Approach Vol, veh/h		424			497			366			754	
Approach Delay, s/veh		24.1			24.4			21.1			21.7	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	16.8	6.4	26.0	11.0	16.8	12.7	19.8				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	6.6	6.2	2.9	14.4	6.7	7.7	7.4	9.3				
Green Ext Time (p_c), s	0.1	4.2	0.0	4.2	0.1	4.1	0.3	4.6				
Intersection Summary												
HCM 2010 Ctrl Delay			22.8									
HCM 2010 LOS			C									

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Back AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	53	387	83	100	269	0	140	0	77	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1860	1900	1810	1792	0	1810	1696	1900			
Adj Flow Rate, veh/h	58	425	91	110	296	0	154	0	85			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	2	2	5	6	0	5	0	5			
Cap, veh/h	80	1707	363	137	2126	0	340	0	146			
Arrive On Green	0.04	0.59	0.59	0.16	1.00	0.00	0.10	0.00	0.10			
Sat Flow, veh/h	1810	2900	616	1723	3495	0	3343	0	1442			
Grp Volume(v), veh/h	58	258	258	110	296	0	154	0	85			
Grp Sat Flow(s),veh/h/ln	1810	1767	1749	1723	1703	0	1672	0	1442			
Q Serve(g_s), s	1.6	3.5	3.6	3.1	0.0	0.0	2.2	0.0	2.8			
Cycle Q Clear(g_c), s	1.6	3.5	3.6	3.1	0.0	0.0	2.2	0.0	2.8			
Prop In Lane	1.00		0.35	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	80	1040	1030	137	2126	0	340	0	146			
V/C Ratio(X)	0.72	0.25	0.25	0.80	0.14	0.00	0.45	0.00	0.58			
Avail Cap(c_a), veh/h	199	1040	1030	224	2126	0	1070	0	461			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.88	0.88	0.88	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.6	4.9	5.0	20.6	0.0	0.0	21.2	0.0	21.4			
Incr Delay (d2), s/veh	4.0	0.5	0.5	4.0	0.1	0.0	0.4	0.0	1.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.9	1.8	1.8	1.6	0.0	0.0	1.0	0.0	1.2			
LnGrp Delay(d),s/veh	27.6	5.4	5.5	24.7	0.1	0.0	21.5	0.0	22.8			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		574			406			239				
Approach Delay, s/veh		7.7			6.8			22.0				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	7.5	33.4			5.7	35.2		9.1				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			5.5	17.0		16.0				
Max Q Clear Time (g_c+I1), s	5.1	5.6			3.6	2.0		4.8				
Green Ext Time (p_c), s	0.0	2.8			0.0	3.3		0.5				
Intersection Summary												
HCM 2010 Ctrl Delay			10.2									
HCM 2010 LOS			B									

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Back AM.syn
1/27/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	372	92	61	337	1	32	0	38	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1820	1900	1845	1845	1900	1638	1712	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	448	111	73	406	1	39	0	46	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	3	3	3	0	0	11	0	0	0
Cap, veh/h	0	1824	449	91	2814	7	212	0	80	0	105	0
Arrive On Green	0.00	0.22	0.22	0.05	0.78	0.78	0.06	0.00	0.06	0.00	0.00	0.00
Sat Flow, veh/h	0	2843	677	1757	3587	9	1228	0	1444	0	1900	0
Grp Volume(v), veh/h	0	280	279	73	198	209	39	0	46	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1729	1699	1757	1753	1843	1228	0	1444	0	1900	0
Q Serve(g_s), s	0.0	6.7	6.8	2.1	1.4	1.4	1.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.7	6.8	2.1	1.4	1.4	1.5	0.0	1.6	0.0	0.0	0.0
Prop In Lane	0.00		0.40	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1146	1126	91	1375	1446	212	0	80	0	105	0
V/C Ratio(X)	0.00	0.24	0.25	0.80	0.14	0.14	0.18	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1146	1126	193	1375	1446	537	0	462	0	608	0
HCM Platoon Ratio	1.00	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.98	0.98	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.2	9.2	23.5	1.3	1.3	23.0	0.0	23.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	6.1	0.2	0.2	0.2	0.0	2.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.4	3.3	1.1	0.7	0.8	0.5	0.0	0.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	9.7	9.7	29.5	1.5	1.5	23.2	0.0	25.4	0.0	0.0	0.0
LnGrp LOS		A	A	C	A	A	C		C			
Approach Vol, veh/h		559			480			85			0	
Approach Delay, s/veh		9.7			5.8			24.4			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.1	37.1		6.8		43.2		6.8				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	5.5	17.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.1	8.8		0.0		3.4		3.6				
Green Ext Time (p_c), s	0.0	4.0		0.0		7.2		0.1				

Intersection Summary												
HCM 2010 Ctrl Delay			9.1									
HCM 2010 LOS			A									

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Back AM.syn
1/27/2016

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	226	0	15	0	1	0	16	14	0	0	31	328
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	1	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	92	80	92	92	92	80	80	92	92	80	80
Heavy Vehicles, %	7	0	0	2	2	2	0	7	0	0	0	2
Mvmt Flow	282	0	19	0	1	0	20	18	0	0	39	410

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	2	0	0	24	570	2	14	570	5
Stage 1	-	-	-	-	-	-	2	567	-	3	3	-
Stage 2	-	-	-	-	-	-	22	3	-	11	567	-
Critical Hdwy	4.17	-	-	-	-	-	7.1	6.57	-	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.57	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.5	4.063	-	3.5	4	3.318
Pot Cap-1 Maneuver	1587	-	-	-	-	-	993	425	-	1007	434	1078
Stage 1	-	-	-	-	-	-	-	-	-	1025	897	-
Stage 2	-	-	-	-	-	-	1002	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1584	-	-	-	-	-	552	348	-	-	355	1074
Mov Cap-2 Maneuver	-	-	-	-	-	-	350	1134	-	-	-626	-
Stage 1	-	-	-	-	-	-	-	-	-	840	896	-
Stage 2	-	-	-	-	-	-	592	882	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	7.3	0		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	350	-	1584	-	-	-	-	-	-	1074
HCM Lane V/C Ratio	0.057	-	0.178	-	-	-	-	-	-	0.382
HCM Control Delay (s)	15.9	-	7.8	-	-	0	-	-	-	10.4
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	0.6	-	-	-	-	-	-	1.8

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Summary 7: SR 1 & Ocean Ave

Back AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	213	40	119	134	38	50	146	1052	37	16	1477	137
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.97	1.00	0.94	1.00	0.98	1.00	0.98	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1869	1900	1900	1842	1900	1827	1840	1900	1357	1827	1845
Adj Flow Rate, veh/h	214	89	137	128	81	57	168	1209	43	18	1698	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	3	0	0	0	9	9	4	3	3	40	4	3
Cap, veh/h	290	107	165	151	82	57	163	1829	65	37	1618	731
Arrive On Green	0.16	0.16	0.16	0.08	0.08	0.08	0.09	0.53	0.53	0.03	0.47	0.00
Sat Flow, veh/h	1757	651	1003	1810	977	688	1740	3441	122	1293	3471	1568
Grp Volume(v), veh/h	214	0	226	128	0	138	168	614	638	18	1698	0
Grp Sat Flow(s),veh/h/ln	1757	0	1654	1810	0	1665	1740	1748	1816	1293	1736	1568
Q Serve(g_s), s	10.3	0.0	11.7	6.2	0.0	7.3	8.3	22.5	22.5	1.2	41.3	0.0
Cycle Q Clear(g_c), s	10.3	0.0	11.7	6.2	0.0	7.3	8.3	22.5	22.5	1.2	41.3	0.0
Prop In Lane	1.00	0.61	1.00	1.00	0.41	1.00	0.07	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	290	0	273	151	0	139	163	929	965	37	1618	731
V/C Ratio(X)	0.74	0.00	0.83	0.85	0.00	0.99	1.03	0.66	0.66	0.49	1.05	0.00
Avail Cap(c_a), veh/h	317	0	299	151	0	139	163	929	965	106	1618	731
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.2	0.0	35.8	40.1	0.0	40.6	40.2	15.0	15.0	42.4	23.7	0.0
Incr Delay (d2), s/veh	8.5	0.0	16.8	34.6	0.0	74.0	78.9	2.1	2.1	9.9	36.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	6.6	4.5	0.0	6.2	7.5	11.3	11.7	0.5	27.8	0.0
LnGrp Delay(d),s/veh	43.7	0.0	52.5	74.7	0.0	114.6	119.3	17.1	17.1	52.3	60.3	0.0
LnGrp LOS	D		D	E		F	F	B	B	D	F	
Approach Vol, veh/h	440			266			1420			1716		
Approach Delay, s/veh	48.2			95.4			29.2			60.2		
Approach LOS	D			F			C			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4			6	7	8				
Phs Duration (G+Y+Rc), s	18.8	12.0	46.2			11.6	6.2	52.0				
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9				
Max Green Setting (Gmax), s	* 16	8.3	41.3			7.4	7.3	42.3				
Max Q Clear Time (g_c+I1), s	13.7	10.3	43.3			9.3	3.2	24.5				
Green Ext Time (p_c), s	0.6	0.0	0.0			0.0	0.0	17.2				

Intersection Summary

HCM 2010 Ctrl Delay 49.8
HCM 2010 LOS D

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis 8: SR 1 & Carpenter St

Back AM.syn
1/27/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1290	10	32	1618	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1500	12	37	1881	816
RTOR Reduction (vph)	0	17	0	0	0	54	0	0	0	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1512	0	37	1881	816
Confl. Peds. (#/hr)				1		1			1		1	
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59		0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	550	269		96	102	90	66	2089		67	2048	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.43		0.02	c0.55	
v/s Ratio Perm						0.00						c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.72		0.55	0.92	0.53
Uniform Delay, d1	48.1	41.7		52.9	52.9	52.4	55.2	17.2		55.7	21.2	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.6	0.1		1.6	1.5	0.3	3.0	1.6		9.5	7.5	1.3
Delay (s)	60.6	41.8		54.5	54.4	52.7	58.2	18.7		65.2	28.7	1.3
Level of Service	E	D		D	D	D	E	B		E	C	A
Approach Delay (s)	59.6			53.4			19.3			21.0		
Approach LOS	E			D			B			C		
Intersection Summary												
HCM 2000 Control Delay	25.0			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	117.8			Sum of lost time (s)			17.9					
Intersection Capacity Utilization	70.8%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary
9: Carmel Rancho Blvd & Shopping Center Dwy

Back AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰	↱	↰	↱	↰	↱	↰
Volume (veh/h)	54	1	19	9	1	20	17	208	15	76	519	168
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1785	1863	1881	1848	1900	1827	1853	1900
Adj Flow Rate, veh/h	70	1	25	12	1	26	22	270	19	99	674	218
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	0	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	486	7	179	459	21	182	550	1663	116	829	1306	422
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.50	0.50	0.50	0.50	0.50	0.50
Sat Flow, veh/h	1392	62	1545	1086	178	1573	626	3329	233	1062	2615	845
Grp Volume(v), veh/h	70	0	26	13	0	26	22	142	147	99	454	438
Grp Sat Flow(s),veh/h/ln	1392	0	1606	1264	0	1573	626	1756	1806	1062	1761	1699
Q Serve(g_s), s	1.0	0.0	0.3	0.0	0.0	0.3	0.5	0.9	0.9	1.2	3.6	3.6
Cycle Q Clear(g_c), s	1.3	0.0	0.3	0.3	0.0	0.3	4.1	0.9	0.9	2.1	3.6	3.6
Prop In Lane	1.00		0.96	0.92		1.00	1.00		0.13	1.00		0.50
Lane Grp Cap(c), veh/h	486	0	186	479	0	182	550	877	902	829	880	849
V/C Ratio(X)	0.14	0.00	0.14	0.03	0.00	0.14	0.04	0.16	0.16	0.12	0.52	0.52
Avail Cap(c_a), veh/h	1662	0	1544	1616	0	1512	749	1434	1475	1167	1439	1388
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.9	0.0	8.3	8.2	0.0	8.3	4.9	2.8	2.8	3.4	3.5	3.5
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.1	0.0	0.1	0.1	0.4	0.5	0.3	1.7	1.6
LnGrp Delay(d),s/veh	8.9	0.0	8.4	8.2	0.0	8.4	4.9	2.9	2.9	3.4	3.7	3.7
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		96			39			311			991	
Approach Delay, s/veh		8.8			8.3			3.0			3.7	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		6.4		14.4		6.4		14.4				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		3.3		5.6		2.3		6.1				
Green Ext Time (p_c), s		0.2		4.2		0.2		4.1				

Intersection Summary												
HCM 2010 Ctrl Delay			4.0									
HCM 2010 LOS			A									

HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Back PM.syn
1/27/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↰	↱	↰	↱	↰
Volume (vph)	0	929	776	98	935	616
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Fit		0.85	1.00	0.85	1.00	1.00
Fit Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2814	1863	1553	3467	1881
Fit Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2814	1863	1553	3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	988	826	104	995	655
RTOR Reduction (vph)	0	171	0	6	0	0
Lane Group Flow (vph)	0	817	826	98	995	655
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases				2		
Actuated Green, G (s)		20.3	31.1	31.1	20.3	61.2
Effective Green, g (s)		20.3	31.1	31.1	20.3	61.2
Actuated g/C Ratio		0.33	0.51	0.51	0.33	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		933	946	789	1150	1881
v/s Ratio Prot		c0.29	c0.44		0.29	0.35
v/s Ratio Perm				0.06		
v/c Ratio		0.88	0.87	0.12	0.87	0.35
Uniform Delay, d1		19.3	13.3	7.9	19.2	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		9.8	9.2	0.1	7.4	0.5
Delay (s)		29.0	22.5	8.0	26.6	0.5
Level of Service		C	C	A	C	A
Approach Delay (s)	29.0		20.8			16.3
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			21.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			61.2		Sum of lost time (s)	9.8
Intersection Capacity Utilization			81.5%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Back PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	810	192	330	635	4	276	17	533	4	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (prot)	1805	3539	1615	3467	3571		1715	1729	1599		1887	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (perm)	1805	3539	1615	3467	3571		1715	1729	1599		1887	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	33	862	204	351	676	4	294	18	567	4	24	19
RTOR Reduction (vph)	0	0	132	0	1	0	0	0	485	0	0	19
Lane Group Flow (vph)	33	862	72	351	679	0	156	156	82	0	28	0
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	0%	1%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.9	21.8	21.8	9.0	29.0		9.1	9.1	9.0		1.6	1.6
Effective Green, g (s)	1.9	21.8	21.8	9.0	29.0		9.1	9.1	9.0		1.6	1.6
Actuated g/C Ratio	0.03	0.35	0.35	0.15	0.47		0.15	0.15	0.15		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	55	1246	568	504	1673		252	254	232		48	40
v/s Ratio Prot	0.02	c0.24		c0.10	0.19		c0.09	0.09	0.05		c0.01	
v/s Ratio Perm			0.04									0.00
v/c Ratio	0.60	0.69	0.13	0.70	0.41		0.62	0.61	0.36		0.58	0.01
Uniform Delay, d1	29.6	17.2	13.6	25.2	10.8		24.8	24.8	23.8		29.8	29.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	11.2	1.4	0.0	3.4	0.1		3.2	3.1	0.3		11.1	0.0
Delay (s)	40.8	18.5	13.6	28.5	10.9		27.9	27.8	24.2		40.9	29.4
Level of Service	D	B	B	C	B		C	C	C		D	C
Approach Delay (s)		18.3			16.9			25.5			36.3	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay		20.2										
HCM 2000 Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		61.9							20.4			
Intersection Capacity Utilization		70.9%							C			
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Back PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	347	83	175	400	294	162	437	155	263	309	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1845	1863	1881	1884	1900
Adj Flow Rate, veh/h	146	354	85	179	408	300	165	446	158	268	315	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	1	2	1	3	2	1	1	1
Cap. veh/h	168	881	209	211	622	519	199	522	446	357	442	63
Arrive On Green	0.09	0.31	0.31	0.12	0.33	0.33	0.11	0.28	0.28	0.10	0.27	0.27
Sat Flow, veh/h	1774	2862	679	1792	1881	1571	1792	1845	1575	3476	1610	230
Grp Volume(V), veh/h	146	219	220	179	408	300	165	446	158	268	0	360
Grp Sat Flow(s),veh/h/ln	1774	1784	1758	1792	1881	1571	1792	1845	1575	1738	0	1840
Q Serve(g_s), s	7.1	8.5	8.7	8.6	16.2	13.8	7.9	20.0	7.0	6.6	0.0	15.4
Cycle Q Clear(g_c), s	7.1	8.5	8.7	8.6	16.2	13.8	7.9	20.0	7.0	6.6	0.0	15.4
Prop In Lane	1.00		0.39	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	168	549	541	211	622	519	199	522	446	357	0	505
V/C Ratio(X)	0.87	0.40	0.41	0.85	0.66	0.58	0.83	0.85	0.35	0.75	0.00	0.71
Avail Cap(c_a), veh/h	168	549	541	211	622	519	211	570	486	370	0	547
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.0	23.9	23.9	37.8	25.0	24.2	38.0	29.6	25.0	38.1	0.0	28.6
Incr Delay (d2), s/veh	34.8	0.6	0.6	26.2	5.3	4.6	22.3	11.7	0.6	8.0	0.0	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	4.2	4.3	5.8	9.3	6.6	5.1	11.9	3.1	3.5	0.0	8.4
LnGrp Delay(d),s/veh	73.8	24.4	24.5	64.0	30.4	28.8	60.3	41.3	25.6	46.2	0.0	32.8
LnGrp LOS	E	C	C	E	C	C	E	D	C	D		C
Approach Vol, veh/h		585			887		769				628	
Approach Delay, s/veh		36.8			36.6		42.2				38.5	
Approach LOS		D			D		D				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	31.1	13.4	28.9	12.0	33.1	12.7	29.6				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	10.6	10.7	9.9	17.4	9.1	18.2	8.6	22.0				
Green Ext Time (p_c), s	0.0	7.2	0.0	3.9	0.0	5.6	0.1	2.6				
Intersection Summary												
HCM 2010 Ctrl Delay				38.6								
HCM 2010 LOS				D								
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Back PM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	84	459	138	151	447	0	348	0	151	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1867	1900	1881	1881	0	1881	1863	1900			
Adj Flow Rate, veh/h	85	464	139	153	452	0	352	0	153			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	0	2	2	1	1	0	1	0	1			
Cap, veh/h	108	1370	407	191	1985	0	538	0	245			
Arrive On Green	0.06	0.51	0.51	0.21	1.00	0.00	0.15	0.00	0.15			
Sat Flow, veh/h	1810	2694	801	1792	3668	0	3476	0	1583			
Grp Volume(v), veh/h	85	304	299	153	452	0	352	0	153			
Grp Sat Flow(s),veh/h/ln	1810	1774	1722	1792	1787	0	1738	0	1583			
Q Serve(g_s), s	2.3	5.1	5.2	4.1	0.0	0.0	4.8	0.0	4.5			
Cycle Q Clear(g_c), s	2.3	5.1	5.2	4.1	0.0	0.0	4.8	0.0	4.5			
Prop In Lane	1.00		0.47	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	108	902	876	191	1985	0	538	0	245			
V/C Ratio(X)	0.78	0.34	0.34	0.80	0.23	0.00	0.65	0.00	0.62			
Avail Cap(c_a), veh/h	235	902	876	233	1985	0	1112	0	507			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.87	0.99	0.99	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.2	7.3	7.3	19.2	0.0	0.0	19.9	0.0	19.8			
Incr Delay (d2), s/veh	4.0	0.9	0.9	12.2	0.3	0.0	0.5	0.0	1.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	2.7	2.6	2.6	0.1	0.0	2.3	0.0	2.0			
LnGrp Delay(d),s/veh	27.2	8.2	8.2	31.3	0.3	0.0	20.4	0.0	20.7			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h	688				605				505			
Approach Delay, s/veh	10.5				8.1				20.5			
Approach LOS	B				A				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	8.8	29.4			6.5	31.8		11.7				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			6.5	16.0		16.0				
Max Q Clear Time (g_c+I1), s	6.1	7.2			4.3	2.0		6.8				
Green Ext Time (p_c), s	0.0	3.4			0.0	4.3		1.0				
Intersection Summary												
HCM 2010 Ctrl Delay	12.5											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Back PM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	556	54	85	512	0	86	0	110	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1881	1900	1900	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	573	56	88	528	0	89	0	113	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
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
Percent Heavy Veh, %	0	2	2	2	1	1	0	0	0	0	0	0
Cap, veh/h	0	1955	191	111	2619	0	297	0	173	0	204	0
Arrive On Green	0.00	1.00	1.00	0.06	0.73	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	0	3352	318	1774	3668	0	1422	0	1610	0	1900	0
Grp Volume(v), veh/h	0	311	318	88	528	0	89	0	113	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1807	1774	1787	0	1422	0	1610	0	1900	0
Q Serve(g_s), s	0.0	0.0	0.0	2.4	2.3	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.4	2.3	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Prop In Lane	0.00		0.18	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1062	1084	111	2619	0	297	0	173	0	204	0
V/C Ratio(X)	0.00	0.29	0.29	0.79	0.20	0.00	0.30	0.00	0.65	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1062	1084	231	2619	0	599	0	515	0	608	0
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.94	0.94	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	23.1	2.1	0.0	21.3	0.0	21.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.6	4.6	0.2	0.0	0.2	0.0	1.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	1.3	1.2	0.0	1.2	0.0	1.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.7	0.6	27.7	2.3	0.0	21.5	0.0	23.0	0.0	0.0	0.0
LnGrp LOS		A	A	C	A		C		C			
Approach Vol, veh/h	629				616				202			
Approach Delay, s/veh	0.6				5.9				22.3			
Approach LOS	A				A				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	34.0		9.4		40.6		9.4				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.4	2.0		0.0		4.3		5.4				
Green Ext Time (p_c), s	0.0	7.2		0.0		9.3		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay					5.9							
HCM 2010 LOS					A							

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Back PM.syn
1/27/2016

Intersection													
Int Delay, s/veh		3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Vol, veh/h	435	0	62	0	1	0	31	23	0	0	20	441	
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0	
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	91	92	91	92	92	92	91	91	92	92	91	91	
Heavy Vehicles, %	2	0	0	0	0	0	4	0	0	0	0	1	
Mvmt Flow	478	0	68	0	1	0	34	25	0	0	22	485	
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	1	0	0	2	0	0	14	959	2	16	959	1	
Stage 1	-	-	-	-	-	-	2	958	-	1	1	-	
Stage 2	-	-	-	-	-	-	12	1	-	15	958	-	
Critical Hdwy	4.12	-	-	-	-	-	7.14	6.5	-	7.1	6.5	6.21	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	-	-	-	
Follow-up Hdwy	2.218	-	-	-	-	-	3.536	4	-	3.5	4	3.309	
Pot Cap-1 Maneuver	1622	-	-	-	-	-	997	259	-	1004	259	1087	
Stage 1	-	-	-	-	-	-	-	-	-	1027	899	-	
Stage 2	-	-	-	-	-	-	1003	899	-	-	-	-	
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	
Mov Cap-1 Maneuver	1622	-	-	-	-	-	540	182	-	-	182	1087	
Mov Cap-2 Maneuver	-	-	-	-	-	-	262	~ -547	-	-	~ -58	-	
Stage 1	-	-	-	-	-	-	-	-	-	724	899	-	
Stage 2	-	-	-	-	-	-	542	899	-	-	-	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	7.1			0									
HCM LOS													
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	262	-	1622	-	-	-	-	-	-	1087			
HCM Lane V/C Ratio	0.13	-	0.295	-	-	-	-	-	-	0.446			
HCM Control Delay (s)	20.8	-	8.1	-	-	0	-	-	-	10.9			
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B			
HCM 95th %tile Q(veh)	0.4	-	1.2	-	-	-	-	-	-	2.3			

Notes
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Back PM.syn
1/27/2016

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (veh/h)	277	22	211	34	13	18	267	1439	10	13	1355	153	
Number	5	2	12	1	6	16	3	8	18	7	4	14	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00	0.98	1.00			0.96	1.00		0.99	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1863	1870	1900	1863	1763	1900	1900	1845	1900	1900	1881	1881	
Adj Flow Rate, veh/h	268	56	222	34	16	19	281	1515	11	14	1426	0	
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1	
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	
Percent Heavy Veh, %	2	7	7	2	5	5	0	3	3	0	1	1	
Cap, veh/h	332	61	241	114	46	55	292	1904	14	42	1414	633	
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.16	0.53	0.53	0.02	0.40	0.00	
Sat Flow, veh/h	1774	325	1290	1774	717	852	1810	3567	26	1810	3574	1599	
Grp Volume(V), veh/h	268	0	278	34	0	35	281	744	782	14	1426	0	
Grp Sat Flow(s),veh/h/ln	1774	0	1615	1774	0	1569	1810	1753	1840	1810	1787	1599	
Q Serve(g_s), s	12.8	0.0	15.0	1.6	0.0	1.9	13.7	30.5	30.6	0.7	35.1	0.0	
Cycle Q Clear(g_c), s	12.8	0.0	15.0	1.6	0.0	1.9	13.7	30.5	30.6	0.7	35.1	0.0	
Prop In Lane	1.00		0.80	1.00		0.54	1.00		0.01	1.00		1.00	
Lane Grp Cap(c), veh/h	332	0	302	114	0	101	292	936	982	42	1414	633	
V/C Ratio(X)	0.81	0.00	0.92	0.30	0.00	0.35	0.96	0.80	0.80	0.34	1.01	0.00	
Avail Cap(c_a), veh/h	332	0	302	140	0	124	292	936	982	149	1414	633	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	34.5	0.0	35.4	39.6	0.0	39.7	37.0	16.8	16.8	42.7	26.8	0.0	
Incr Delay (d2), s/veh	14.0	0.0	32.0	2.0	0.0	2.9	42.7	5.3	5.0	4.7	26.0	0.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	7.5	0.0	9.4	0.9	0.0	0.9	10.2	16.0	16.8	0.4	22.2	0.0	
LnGrp Delay(d),s/veh	48.5	0.0	67.4	41.6	0.0	42.6	79.6	22.0	21.8	47.3	52.8	0.0	
LnGrp LOS	D		E	D		D	E	C	C	D	F		
Approach Vol, veh/h	546			69			1807			1440			
Approach Delay, s/veh	58.1			42.1			30.9			52.8			
Approach LOS	E			D			C			D			
Timer	1	2	3	4	5	6	7	8					
Assigned Phs	2	3	4			6	7	8					
Phs Duration (G+Y+Rc), s	20.8	18.0	40.0			9.9	5.7	52.3					
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9					
Max Green Setting (Gmax), s	* 17	14.3	35.1			7.0	7.3	42.1					
Max Q Clear Time (g_c+I1), s	17.0	15.7	37.1			3.9	2.7	32.6					
Green Ext Time (p_c), s	0.0	0.0	0.0			0.1	0.0	9.4					

Intersection Summary												
HCM 2010 Ctrl Delay		43.1										
HCM 2010 LOS		D										

Notes
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Back PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Volume (vph)	982	17	17	23	12	52	13	1687	14	54	1546	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Flt Protected	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1757	15	56	1610	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	1	0	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1771	0	56	1610	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Effective Green, g (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48		0.04	0.50	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	1038	521		85	87	80	39	1684		80	1797	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.50		0.03	0.45	
v/s Ratio Perm						0.00						c0.49
v/c Ratio	0.99	0.04		0.21	0.21	0.03	0.36	1.05		0.70	0.90	0.49
Uniform Delay, d1	48.9	34.8		64.5	64.4	63.9	68.1	36.9		66.5	31.8	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1		2.1	2.0	0.3	5.6	37.0		23.4	6.7	1.1
Delay (s)	73.3	34.9		66.6	66.5	64.2	73.6	74.0		90.0	38.5	1.1
Level of Service	E	C		E	E	E	E	E		F	D	A
Approach Delay (s)		72.0			65.1			74.0			27.8	
Approach LOS		E			E			E			C	
Intersection Summary												
HCM 2000 Control Delay		52.4							D			
HCM 2000 Volume to Capacity ratio		1.00										
Actuated Cycle Length (s)		141.2						17.9				
Intersection Capacity Utilization		93.2%						F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

9: Carmel Rancho Blvd & Shopping Center Dwy

Back PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Volume (veh/h)	177	10	20	40	10	30	38	542	18	11	388	85
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99	0.99	0.99		0.99	1.00		0.99	1.00		0.99	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1887	1900	1900	1800	1863	1881	1846	1900	1827	1851	1900
Adj Flow Rate, veh/h	190	11	22	43	11	32	41	583	19	12	417	91
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
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
Percent Heavy Veh, %	2	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	624	143	286	538	106	402	574	1382	45	531	1145	248
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1347	558	1117	1010	412	1568	893	3466	113	796	2872	621
Grp Volume(V), veh/h	190	0	33	54	0	32	41	295	307	12	254	254
Grp Sat Flow(s), veh/h/ln	1347	0	1675	1422	0	1568	893	1754	1825	796	1759	1734
Q Serve(g_s), s	2.9	0.0	0.3	0.0	0.0	0.4	0.8	2.8	2.8	0.3	2.4	2.4
Cycle Q Clear(g_c), s	3.5	0.0	0.3	0.5	0.0	0.4	3.2	2.8	2.8	3.1	2.4	2.4
Prop In Lane	1.00		0.67	0.80		1.00	1.00		0.06	1.00		0.36
Lane Grp Cap(c), veh/h	624	0	429	643	0	402	574	699	728	531	701	691
V/C Ratio(X)	0.30	0.00	0.08	0.08	0.00	0.08	0.07	0.42	0.42	0.02	0.36	0.37
Avail Cap(c_a), veh/h	1441	0	1445	1484	0	1353	873	1286	1339	797	1290	1272
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.9	0.0	6.5	6.6	0.0	6.5	6.0	5.0	5.0	6.2	4.9	4.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.2	0.3	0.0	0.2	0.2	1.3	1.4	0.1	1.2	1.2
LnGrp Delay(d), s/veh	8.0	0.0	6.6	6.6	0.0	6.6	6.0	5.2	5.2	6.2	5.0	5.0
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		223			86			643			520	
Approach Delay, s/veh		7.8			6.6			5.2			5.0	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.9		13.2		9.9		13.2				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		5.5		5.1		2.5		5.2				
Green Ext Time (p_c), s		0.6		3.7		0.6		3.7				
Intersection Summary												
HCM 2010 Ctrl Delay				5.6								
HCM 2010 LOS				A								

HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Back + Proj AM.syn

1/27/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↕	↕	↕
Volume (vph)	0	804	462	59	1118	694
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2760	1863	1509	3335	1759
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2760	1863	1509	3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	874	502	64	1215	754
RTOR Reduction (vph)	0	255	0	9	0	0
Lane Group Flow (vph)	0	619	502	55	1215	754
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA	Perm	Prot	NA	Free
Protected Phases	3	2		3		
Permitted Phases			2			
Actuated Green, G (s)	25.4	20.7	20.7	25.4	55.9	
Effective Green, g (s)	25.4	20.7	20.7	25.4	55.9	
Actuated g/C Ratio	0.45	0.37	0.37	0.45	1.00	
Clearance Time (s)	4.9	4.9	4.9	4.9		
Vehicle Extension (s)	4.5	3.5	3.5	4.5		
Lane Grp Cap (vph)	1254	689	558	1515	1759	
v/s Ratio Prot	0.22	c0.27		c0.36	0.43	
v/s Ratio Perm			0.04			
v/c Ratio	0.49	0.73	0.10	0.80	0.43	
Uniform Delay, d1	10.7	15.2	11.5	13.1	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	4.0	0.1	3.5	0.8	
Delay (s)	11.3	19.2	11.6	16.6	0.8	
Level of Service	B	B	B	B	A	
Approach Delay (s)	11.3		18.3		10.5	
Approach LOS	B		B		B	
Intersection Summary						
HCM 2000 Control Delay		12.0		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.77				
Actuated Cycle Length (s)		55.9		Sum of lost time (s)		9.8
Intersection Capacity Utilization		64.4%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Back + Proj AM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
Volume (vph)	27	747	403	421	683	5	88	5	270	10	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (prot)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1559
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (perm)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1559
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	31	849	458	478	776	6	100	6	307	11	19	38
RTOR Reduction (vph)	0	0	280	0	0	0	0	0	258	0	0	37
Lane Group Flow (vph)	31	849	178	478	782	0	53	53	49	0	30	1
Confl. Peds. (#/hr)	2		1				1			1		2
Heavy Vehicles (%)	4%	7%	2%	1%	3%	0%	6%	0%	6%	30%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7		
Permitted Phases			2									7
Actuated Green, G (s)	1.8	22.6	22.6	9.2	30.1		4.3	4.3	9.2		1.5	1.5
Effective Green, g (s)	1.8	22.6	22.6	9.2	30.1		4.3	4.3	9.2		1.5	1.5
Actuated g/C Ratio	0.03	0.39	0.39	0.16	0.52		0.07	0.07	0.16		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	53	1314	609	549	1816		119	121	241		43	40
v/s Ratio Prot	0.02	c0.25		c0.14	0.22		c0.03	0.03	0.03		c0.02	
v/s Ratio Perm			0.11									0.00
v/c Ratio	0.58	0.65	0.29	0.87	0.43		0.45	0.44	0.20		0.70	0.02
Uniform Delay, d1	27.7	14.4	12.2	23.8	8.6		25.7	25.7	21.2		28.0	27.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.2	0.8	0.1	13.7	0.1		1.0	0.9	0.2		32.8	0.1
Delay (s)	37.9	15.3	12.3	37.5	8.7		26.7	26.6	21.4		60.9	27.6
Level of Service	D	B	B	D	A		C	C	C		E	C
Approach Delay (s)		14.8			19.6			22.7			42.3	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay		18.4		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio		0.68										
Actuated Cycle Length (s)		58.0		Sum of lost time (s)					20.4			
Intersection Capacity Utilization		54.8%		ICU Level of Service					A			
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Back + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	222	36	133	179	155	23	233	82	298	355	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1827	1863	1827	1820	1900
Adj Flow Rate, veh/h	145	241	39	145	195	168	25	253	89	324	386	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	2	4	4	4
Cap, veh/h	214	640	102	214	383	325	76	450	388	500	558	65
Arrive On Green	0.12	0.21	0.21	0.12	0.21	0.21	0.05	0.25	0.25	0.15	0.35	0.35
Sat Flow, veh/h	1774	3023	482	1774	1810	1535	1675	1827	1574	3375	1599	186
Grp Volume(v), veh/h	145	138	142	145	195	168	25	253	89	324	0	431
Grp Sat Flow(s),veh/h/ln	1774	1750	1756	1774	1810	1535	1675	1827	1574	1688	0	1785
Q Serve(g_s), s	4.7	4.1	4.2	4.7	5.8	5.9	0.9	7.3	2.7	5.5	0.0	12.5
Cycle Q Clear(g_c), s	4.7	4.1	4.2	4.7	5.8	5.9	0.9	7.3	2.7	5.5	0.0	12.5
Prop In Lane	1.00		0.27	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	214	371	372	214	383	325	76	450	388	500	0	623
V/C Ratio(X)	0.68	0.37	0.38	0.68	0.51	0.52	0.33	0.56	0.23	0.65	0.00	0.69
Avail Cap(c_a), veh/h	273	808	810	273	835	708	222	786	677	575	0	836
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.4	20.4	20.4	25.4	21.1	21.1	28.0	19.9	18.2	24.3	0.0	16.9
Incr Delay (d2), s/veh	4.5	0.8	0.8	4.5	1.3	1.5	2.5	1.3	0.4	2.1	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.0	2.1	2.6	3.0	2.6	0.5	3.8	1.2	2.7	0.0	6.4
LnGrp Delay(d),s/veh	30.0	21.1	21.2	30.0	22.3	22.6	30.4	21.3	18.6	26.3	0.0	18.7
LnGrp LOS	C	C	C	C	C	C	C	C	B	C		B
Approach Vol, veh/h		425			508			367			755	
Approach Delay, s/veh		24.2			24.6			21.2			22.0	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	17.0	6.4	26.0	11.0	17.0	12.7	19.8				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	6.7	6.2	2.9	14.5	6.7	7.9	7.5	9.3				
Green Ext Time (p_c), s	0.1	4.3	0.0	4.2	0.1	4.2	0.3	4.6				

Intersection Summary

HCM 2010 Ctrl Delay 22.9
HCM 2010 LOS C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2010 Signalized Intersection Summary

4: Crossroads Blvd & Rio Rd

Back + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	53	390	83	101	278	0	140	0	77	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1860	1900	1810	1792	0	1810	1696	1900			
Adj Flow Rate, veh/h	58	429	91	111	305	0	154	0	85			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	2	2	5	6	0	5	0	5			
Cap, veh/h	80	1708	360	138	2126	0	340	0	146			
Arrive On Green	0.04	0.59	0.59	0.16	1.00	0.00	0.10	0.00	0.10			
Sat Flow, veh/h	1810	2905	611	1723	3495	0	3343	0	1442			
Grp Volume(v), veh/h	58	260	260	111	305	0	154	0	85			
Grp Sat Flow(s),veh/h/ln	1810	1767	1750	1723	1703	0	1672	0	1442			
Q Serve(g_s), s	1.6	3.5	3.6	3.1	0.0	0.0	2.2	0.0	2.8			
Cycle Q Clear(g_c), s	1.6	3.5	3.6	3.1	0.0	0.0	2.2	0.0	2.8			
Prop In Lane	1.00		0.35	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	80	1039	1029	138	2126	0	340	0	146			
V/C Ratio(X)	0.72	0.25	0.25	0.80	0.14	0.00	0.45	0.00	0.58			
Avail Cap(c_a), veh/h	199	1039	1029	224	2126	0	1070	0	461			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.88	0.88	0.88	0.99	0.99	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.6	5.0	5.0	20.6	0.0	0.0	21.2	0.0	21.4			
Incr Delay (d2), s/veh	4.0	0.5	0.5	4.0	0.1	0.0	0.4	0.0	1.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.9	1.8	1.9	1.6	0.0	0.0	1.0	0.0	1.2			
LnGrp Delay(d),s/veh	27.6	5.5	5.5	24.6	0.1	0.0	21.5	0.0	22.8			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		578			416			239				
Approach Delay, s/veh		7.7			6.7			22.0				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	7.5	33.4			5.7	35.2		9.1				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			5.5	17.0		16.0				
Max Q Clear Time (g_c+I1), s	5.1	5.6			3.6	2.0		4.8				
Green Ext Time (p_c), s	0.0	2.9			0.0	3.4		0.5				

Intersection Summary

HCM 2010 Ctrl Delay 10.1
HCM 2010 LOS B

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Back + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (veh/h)	0	375	92	62	347	1	32	0	38	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1820	1900	1845	1845	1900	1638	1712	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	452	111	75	418	1	39	0	46	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	3	3	3	0	0	11	0	0	0
Cap, veh/h	0	1823	444	94	2814	7	212	0	80	0	105	0
Arrive On Green	0.00	0.22	0.22	0.05	0.78	0.78	0.06	0.00	0.06	0.00	0.00	0.00
Sat Flow, veh/h	0	2848	672	1757	3587	9	1228	0	1444	0	1900	0
Grp Volume(v), veh/h	0	282	281	75	204	215	39	0	46	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1729	1700	1757	1753	1843	1228	0	1444	0	1900	0
Q Serve(g_s), s	0.0	6.7	6.8	2.1	1.4	1.4	1.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.7	6.8	2.1	1.4	1.4	1.5	0.0	1.6	0.0	0.0	0.0
Prop In Lane	0.00		0.40	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1143	1124	94	1375	1446	212	0	80	0	105	0
V/C Ratio(X)	0.00	0.25	0.25	0.80	0.15	0.15	0.18	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1143	1124	193	1375	1446	537	0	462	0	608	0
HCM Platoon Ratio	1.00	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.98	0.98	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.3	9.3	23.4	1.3	1.3	23.0	0.0	23.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	5.8	0.2	0.2	0.2	0.0	2.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.4	3.4	1.2	0.8	0.8	0.5	0.0	0.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	9.8	9.8	29.2	1.5	1.5	23.2	0.0	25.4	0.0	0.0	0.0
LnGrp LOS		A	A	C	A	A	C		C			
Approach Vol, veh/h		563			494			85			0	
Approach Delay, s/veh		9.8			5.7			24.4			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.2	37.1		6.8		43.2		6.8				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	5.5	17.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.1	8.8		0.0		3.4		3.6				
Green Ext Time (p_c), s	0.0	4.1		0.0		7.4		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			9.1									
HCM 2010 LOS			A									

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Back + Proj AM.syn
1/27/2016

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	226	0	18	0	1	0	27	19	0	0	34	328
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	1	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	92	80	92	92	92	80	80	92	92	80	80
Heavy Vehicles, %	7	0	0	2	2	2	0	7	0	0	0	2
Mvmt Flow	282	0	22	0	1	0	34	24	0	0	42	410
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	2	0	0	26	570	2	17	570	5
Stage 1	-	-	-	-	-	-	2	567	-	3	3	-
Stage 2	-	-	-	-	-	-	24	3	-	14	567	-
Critical Hdwy	4.17	-	-	-	-	-	7.1	6.57	-	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.57	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.5	4.063	-	3.5	4	3.318
Pot Cap-1 Maneuver	1587	-	-	-	-	-	990	425	-	1003	434	1078
Stage 1	-	-	-	-	-	-	-	-	-	1025	897	-
Stage 2	-	-	-	-	-	-	999	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1584	-	-	-	-	-	553	348	-	-	355	1074
Mov Cap-2 Maneuver	-	-	-	-	-	-	348	1134	-	-	-626	-
Stage 1	-	-	-	-	-	-	-	-	-	840	896	-
Stage 2	-	-	-	-	-	-	587	882	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.2			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	348	-	1584	-	-	-	-	-	-	1074		
HCM Lane V/C Ratio	0.097	-	0.178	-	-	-	-	-	-	0.382		
HCM Control Delay (s)	16.5	-	7.8	-	-	0	-	-	-	10.4		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.3	-	0.6	-	-	-	-	-	-	1.8		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 2010 Signalized Intersection Summary

7: SR 1 & Ocean Ave

Back + Proj AM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	213	40	120	134	38	50	148	1057	37	16	1479	137
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1869	1900	1900	1842	1900	1827	1840	1900	1357	1827	1845
Adj Flow Rate, veh/h	214	89	138	128	81	57	170	1215	43	18	1700	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	3	0	0	0	9	9	4	3	3	40	4	3
Cap, veh/h	290	107	166	151	82	57	163	1828	65	37	1617	730
Arrive On Green	0.17	0.17	0.17	0.08	0.08	0.08	0.09	0.53	0.53	0.03	0.47	0.00
Sat Flow, veh/h	1757	648	1005	1810	977	688	1740	3442	122	1293	3471	1568
Grp Volume(v), veh/h	214	0	227	128	0	138	170	617	18	1700	0	0
Grp Sat Flow(s),veh/h/ln	1757	0	1654	1810	0	1665	1740	1748	1816	1293	1736	1568
Q Serve(g_s), s	10.3	0.0	11.8	6.2	0.0	7.3	8.3	22.7	22.7	1.2	41.3	0.0
Cycle Q Clear(g_c), s	10.3	0.0	11.8	6.2	0.0	7.3	8.3	22.7	22.7	1.2	41.3	0.0
Prop In Lane	1.00		0.61	1.00		0.41	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	290	0	273	151	0	139	163	928	964	37	1617	730
V/C Ratio(X)	0.74	0.00	0.83	0.85	0.00	0.99	1.04	0.66	0.66	0.49	1.05	0.00
Avail Cap(c_a), veh/h	317	0	298	151	0	139	163	928	964	106	1617	730
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.2	0.0	35.8	40.1	0.0	40.6	40.2	15.1	15.1	42.4	23.7	0.0
Incr Delay (d2), s/veh	8.4	0.0	17.0	34.7	0.0	74.2	82.5	2.2	2.1	9.9	37.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	6.7	4.5	0.0	6.2	7.7	11.4	11.8	0.5	27.9	0.0
LnGrp Delay(d),s/veh	43.6	0.0	52.8	74.8	0.0	114.8	122.8	17.2	17.2	52.4	60.9	0.0
LnGrp LOS	D		D	E		F	F	B	B	D	F	
Approach Vol, veh/h		441			266			1428			1718	
Approach Delay, s/veh		48.3			95.5			29.8			60.8	
Approach LOS		D			F			C			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		18.9	12.0	46.2		11.6	6.2	52.0				
Change Period (Y+Rc), s		* 4.2	3.7	4.9		4.2	3.7	4.9				
Max Green Setting (Gmax), s		* 16	8.3	41.3		7.4	7.3	42.3				
Max Q Clear Time (g_c+I1), s		13.8	10.3	43.3		9.3	3.2	24.7				
Green Ext Time (p_c), s		0.6	0.0	0.0		0.0	0.0	17.1				

Intersection Summary

HCM 2010 Ctrl Delay

HCM 2010 LOS

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Back + Proj AM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1295	10	32	1620	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1506	12	37	1884	816
RTOR Reduction (vph)	0	17	0	0	0	54	0	0	0	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1518	0	37	1884	816
Confl. Peds. (#/hr)				1		1			1		1	
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59		0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	550	269		96	102	90	66	2089		67	2048	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.43		0.02	c0.55	
v/s Ratio Perm						0.00						c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.73		0.55	0.92	0.53
Uniform Delay, d1	48.1	41.7		52.9	52.9	52.4	55.2	17.2		55.7	21.3	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.6	0.1		1.6	1.5	0.3	3.0	1.6		9.5	7.6	1.3
Delay (s)	60.6	41.8		54.5	54.4	52.7	58.2	18.8		65.2	28.9	1.3
Level of Service	E	D		D	D	D	E	B		E	C	A
Approach Delay (s)		59.6			53.4			19.4			21.1	
Approach LOS		E			D			B			C	
Intersection Summary												
HCM 2000 Control Delay		25.1										
HCM 2000 Volume to Capacity ratio		0.91										
Actuated Cycle Length (s)		117.8								17.9		
Intersection Capacity Utilization		70.8%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary
9: Carmel Rancho Blvd & Shopping Center Dwy

Back + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰	↱	↰	↱	↰	↱	↰
Volume (veh/h)	54	1	19	9	1	20	18	212	15	76	522	168
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1785	1863	1881	1848	1900	1827	1853	1900
Adj Flow Rate, veh/h	70	1	25	12	1	26	23	275	19	99	678	218
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	0	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	484	7	179	457	21	182	549	1671	115	827	1313	422
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.50	0.50	0.50	0.50	0.50	0.50
Sat Flow, veh/h	1392	62	1545	1086	182	1573	624	3333	229	1057	2619	842
Grp Volume(v), veh/h	70	0	26	13	0	26	23	144	150	99	456	440
Grp Sat Flow(s),veh/h/ln	1392	0	1606	1267	0	1573	624	1756	1807	1057	1761	1700
Q Serve(g_s), s	1.0	0.0	0.3	0.0	0.0	0.3	0.5	0.9	0.9	1.2	3.6	3.6
Cycle Q Clear(g_c), s	1.3	0.0	0.3	0.3	0.0	0.3	4.2	0.9	0.9	2.1	3.6	3.6
Prop In Lane	1.00		0.96	0.92		1.00	1.00		0.13	1.00		0.50
Lane Grp Cap(c), veh/h	484	0	186	478	0	182	549	880	906	827	883	852
V/C Ratio(X)	0.14	0.00	0.14	0.03	0.00	0.14	0.04	0.16	0.17	0.12	0.52	0.52
Avail Cap(c_a), veh/h	1656	0	1538	1610	0	1506	744	1429	1470	1157	1433	1383
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.9	0.0	8.3	8.2	0.0	8.3	4.9	2.8	2.8	3.4	3.5	3.5
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.1	0.0	0.1	0.1	0.4	0.5	0.3	1.7	1.6
LnGrp Delay(d),s/veh	9.0	0.0	8.4	8.2	0.0	8.4	4.9	2.9	2.9	3.4	3.7	3.7
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		96			39			317			995	
Approach Delay, s/veh		8.8			8.4			3.0			3.7	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		6.4		14.5		6.4		14.5				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		3.3		5.6		2.3		6.2				
Green Ext Time (p_c), s		0.2		4.2		0.2		4.1				

Intersection Summary												
HCM 2010 Ctrl Delay			4.0									
HCM 2010 LOS			A									

HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Back + Proj PM.syn
1/27/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↰↱	↰	↰	↰↱	↰
Volume (vph)	0	930	780	98	937	621
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Fit		0.85	1.00	0.85	1.00	1.00
Fit Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2814	1863	1553	3467	1881
Fit Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2814	1863	1553	3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	989	830	104	997	661
RTOR Reduction (vph)	0	170	0	6	0	0
Lane Group Flow (vph)	0	819	830	98	997	661
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases				2		
Actuated Green, G (s)		20.3	31.1	31.1	20.3	61.2
Effective Green, g (s)		20.3	31.1	31.1	20.3	61.2
Actuated g/C Ratio		0.33	0.51	0.51	0.33	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		933	946	789	1150	1881
v/s Ratio Prot		c0.29	c0.45		0.29	0.35
v/s Ratio Perm				0.06		
v/c Ratio		0.88	0.88	0.12	0.87	0.35
Uniform Delay, d1		19.3	13.4	7.9	19.2	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		9.9	9.4	0.1	7.5	0.5
Delay (s)		29.2	22.8	8.0	26.7	0.5
Level of Service		C	C	A	C	A
Approach Delay (s)	29.2		21.1			16.3
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			21.1		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.88			
Actuated Cycle Length (s)			61.2		Sum of lost time (s)	9.8
Intersection Capacity Utilization			81.8%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Back + Proj PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰		↰	↰	↰		↰	↰
Volume (vph)	31	810	194	333	635	4	277	17	535	4	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Flt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (prot)	1805	3539	1615	3467	3571		1715	1728	1599		1887	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (perm)	1805	3539	1615	3467	3571		1715	1728	1599		1887	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	33	862	206	354	676	4	295	18	569	4	24	19
RTOR Reduction (vph)	0	0	133	0	1	0	0	0	486	0	0	19
Lane Group Flow (vph)	33	862	73	354	679	0	156	157	83	0	28	0
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	0%	1%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.9	21.8	21.8	9.0	29.0		9.1	9.1	9.0		1.6	1.6
Effective Green, g (s)	1.9	21.8	21.8	9.0	29.0		9.1	9.1	9.0		1.6	1.6
Actuated g/C Ratio	0.03	0.35	0.35	0.15	0.47		0.15	0.15	0.15		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	55	1246	568	504	1673		252	254	232		48	40
v/s Ratio Prot	0.02	c0.24		c0.10	0.19		c0.09	0.09	0.05		c0.01	
v/s Ratio Perm			0.04									0.00
v/c Ratio	0.60	0.69	0.13	0.70	0.41		0.62	0.62	0.36		0.58	0.01
Uniform Delay, d1	29.6	17.2	13.6	25.2	10.8		24.8	24.8	23.8		29.8	29.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	11.2	1.4	0.0	3.6	0.1		3.2	3.1	0.3		11.1	0.0
Delay (s)	40.8	18.5	13.6	28.8	10.9		27.9	27.9	24.2		40.9	29.4
Level of Service	D	B	B	C	B		C	C	C		D	C
Approach Delay (s)		18.3			17.0			25.5			36.3	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay		20.2										
HCM 2000 Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		61.9							20.4			
Intersection Capacity Utilization		71.0%							C			
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Back + Proj PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (veh/h)	143	350	83	176	402	298	162	437	157	268	309	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1845	1863	1881	1884	1900
Adj Flow Rate, veh/h	146	357	85	180	410	304	165	446	160	273	315	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	1	2	1	3	2	1	1	1
Cap. veh/h	168	882	208	211	622	519	199	522	446	357	442	63
Arrive On Green	0.09	0.31	0.31	0.12	0.33	0.33	0.11	0.28	0.28	0.10	0.27	0.27
Sat Flow, veh/h	1774	2868	675	1792	1881	1571	1792	1845	1575	3476	1610	230
Grp Volume(V), veh/h	146	220	222	180	410	304	165	446	160	273	0	360
Grp Sat Flow(s),veh/h/ln	1774	1784	1759	1792	1881	1571	1792	1845	1575	1738	0	1840
Q Serve(g_s), s	7.1	8.5	8.7	8.6	16.3	14.0	7.9	20.0	7.1	6.7	0.0	15.4
Cycle Q Clear(g_c), s	7.1	8.5	8.7	8.6	16.3	14.0	7.9	20.0	7.1	6.7	0.0	15.4
Prop In Lane	1.00		0.38	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	168	549	541	211	622	519	199	522	446	357	0	505
V/C Ratio(X)	0.87	0.40	0.41	0.85	0.66	0.59	0.83	0.85	0.36	0.76	0.00	0.71
Avail Cap(c_a), veh/h	168	549	541	211	622	519	211	570	486	370	0	547
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.0	23.9	24.0	37.8	25.0	24.3	38.0	29.6	25.0	38.2	0.0	28.6
Incr Delay (d2), s/veh	34.8	0.6	0.6	27.0	5.4	4.8	22.3	11.7	0.6	8.9	0.0	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	4.3	4.3	5.8	9.4	6.7	5.1	11.9	3.1	3.7	0.0	8.4
LnGrp Delay(d),s/veh	73.8	24.5	24.6	64.8	30.5	29.1	60.3	41.3	25.6	47.1	0.0	32.8
LnGrp LOS	E	C	C	E	C	C	E	D	C	D		C
Approach Vol, veh/h		588			894		771				633	
Approach Delay, s/veh		36.8			36.9		42.1				39.0	
Approach LOS		D			D		D				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	31.1	13.4	28.9	12.0	33.1	12.7	29.6				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	10.6	10.7	9.9	17.4	9.1	18.3	8.7	22.0				
Green Ext Time (p_c), s	0.0	7.3	0.0	3.9	0.0	5.6	0.1	2.6				
Intersection Summary												
HCM 2010 Ctrl Delay				38.7								
HCM 2010 LOS				D								
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Back + Proj PM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	84	469	138	151	454	0	348	0	152	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1867	1900	1881	1881	0	1881	1863	1900			
Adj Flow Rate, veh/h	85	474	139	153	459	0	352	0	154			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	0	2	2	1	1	0	1	0	1			
Cap, veh/h	108	1377	401	191	1984	0	538	0	245			
Arrive On Green	0.06	0.51	0.51	0.21	1.00	0.00	0.15	0.00	0.15			
Sat Flow, veh/h	1810	2709	789	1792	3668	0	3476	0	1583			
Grp Volume(v), veh/h	85	309	304	153	459	0	352	0	154			
Grp Sat Flow(s),veh/h/ln	1810	1774	1724	1792	1787	0	1738	0	1583			
Q Serve(g_s), s	2.3	5.2	5.3	4.1	0.0	0.0	4.8	0.0	4.6			
Cycle Q Clear(g_c), s	2.3	5.2	5.3	4.1	0.0	0.0	4.8	0.0	4.6			
Prop In Lane	1.00		0.46	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	108	902	877	191	1984	0	538	0	245			
V/C Ratio(X)	0.78	0.34	0.35	0.80	0.23	0.00	0.65	0.00	0.63			
Avail Cap(c_a), veh/h	235	902	877	233	1984	0	1112	0	507			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.86	0.86	0.86	0.99	0.99	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.2	7.3	7.3	19.2	0.0	0.0	19.9	0.0	19.8			
Incr Delay (d2), s/veh	4.0	0.9	0.9	12.1	0.3	0.0	0.5	0.0	1.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	2.7	2.7	2.6	0.1	0.0	2.3	0.0	2.0			
LnGrp Delay(d),s/veh	27.2	8.2	8.3	31.3	0.3	0.0	20.4	0.0	20.8			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		698			612			506				
Approach Delay, s/veh		10.5			8.0			20.5				
Approach LOS		B			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	8.8	29.4			6.5	31.8		11.7				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			6.5	16.0		16.0				
Max Q Clear Time (g_c+I1), s	6.1	7.3			4.3	2.0		6.8				
Green Ext Time (p_c), s	0.0	3.4			0.0	4.4		1.0				
Intersection Summary												
HCM 2010 Ctrl Delay			12.5									
HCM 2010 LOS			B									

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Back + Proj PM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	567	54	85	519	0	86	0	111	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1881	1900	1900	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	585	56	88	535	0	89	0	114	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
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
Percent Heavy Veh, %	0	2	2	2	1	1	0	0	0	0	0	0
Cap, veh/h	0	1957	187	111	2617	0	297	0	174	0	205	0
Arrive On Green	0.00	1.00	1.00	0.06	0.73	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	0	3358	312	1774	3668	0	1422	0	1611	0	1900	0
Grp Volume(v), veh/h	0	317	324	88	535	0	89	0	114	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1808	1774	1787	0	1422	0	1611	0	1900	0
Q Serve(g_s), s	0.0	0.0	0.0	2.4	2.4	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.4	2.4	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Prop In Lane	0.00		0.17	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1060	1083	111	2617	0	297	0	174	0	205	0
V/C Ratio(X)	0.00	0.30	0.30	0.79	0.20	0.00	0.30	0.00	0.66	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1060	1083	231	2617	0	599	0	515	0	608	0
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.93	0.93	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	23.1	2.1	0.0	21.2	0.0	21.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.7	4.6	0.2	0.0	0.2	0.0	1.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	1.3	1.2	0.0	1.2	0.0	1.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.7	0.7	27.7	2.3	0.0	21.4	0.0	23.0	0.0	0.0	0.0
LnGrp LOS		A	A	C	A		C		C			
Approach Vol, veh/h		641			623			203			0	
Approach Delay, s/veh		0.7			5.9			22.3			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	34.0		9.4		40.6		9.4				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.4	2.0		0.0		4.4		5.4				
Green Ext Time (p_c), s	0.0	7.3		0.0		9.4		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay				5.9								
HCM 2010 LOS				A								

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Back + Proj PM.syn
1/27/2016

Intersection												
Int Delay, s/veh 3.4												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	435	0	74	0	1	0	38	27	0	0	27	441
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	92	91	92	92	92	91	91	92	92	91	91
Heavy Vehicles, %	2	0	0	0	0	0	4	0	0	0	0	1
Mvmt Flow	478	0	81	0	1	0	42	30	0	0	30	485
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1	0	0	2	0	0	18	959	2	18	959	1
Stage 1	-	-	-	-	-	-	2	958	-	1	1	-
Stage 2	-	-	-	-	-	-	16	1	-	17	958	-
Critical Hdwy	4.12	-	-	-	-	-	7.14	6.5	-	7.1	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.536	4	-	3.5	4	3.309
Pot Cap-1 Maneuver	1622	-	-	-	-	-	991	259	-	1001	259	1087
Stage 1	-	-	-	-	-	-	-	-	-	1027	899	-
Stage 2	-	-	-	-	-	-	998	899	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	-	-	-	576	182	-	-	182	1087
Mov Cap-2 Maneuver	-	-	-	-	-	-	276	-547	-	-	-58	-
Stage 1	-	-	-	-	-	-	-	-	-	724	899	-
Stage 2	-	-	-	-	-	-	535	899	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	276	-	1622	-	-	-	-	-	-	1087		
HCM Lane V/C Ratio	0.151	-	0.295	-	-	-	-	-	-	0.446		
HCM Control Delay (s)	20.4	-	8.1	-	-	0	-	-	-	10.9		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.5	-	1.2	-	-	-	-	-	-	2.3		

Notes
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Back + Proj PM.syn
1/27/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	277	22	213	34	13	18	268	1443	10	13	1360	153
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1870	1900	1863	1763	1900	1900	1845	1900	1900	1881	1881
Adj Flow Rate, veh/h	270	54	224	34	16	19	282	1519	11	14	1432	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
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
Percent Heavy Veh, %	2	7	7	2	5	5	0	3	3	0	1	1
Cap, veh/h	332	59	243	114	46	55	292	1904	14	42	1414	633
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.16	0.53	0.53	0.02	0.40	0.00
Sat Flow, veh/h	1774	313	1300	1774	717	852	1810	3567	26	1810	3574	1599
Grp Volume(v), veh/h	270	0	278	34	0	35	282	746	784	14	1432	0
Grp Sat Flow(s),veh/h/ln	1774	0	1613	1774	0	1569	1810	1753	1840	1810	1787	1599
Q Serve(g_s), s	12.9	0.0	15.0	1.6	0.0	1.9	13.7	30.7	30.7	0.7	35.1	0.0
Cycle Q Clear(g_c), s	12.9	0.0	15.0	1.6	0.0	1.9	13.7	30.7	30.7	0.7	35.1	0.0
Prop In Lane	1.00		0.81	1.00		0.54	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	332	0	302	114	0	101	292	936	982	42	1414	633
V/C Ratio(X)	0.81	0.00	0.92	0.30	0.00	0.35	0.97	0.80	0.80	0.34	1.01	0.00
Avail Cap(c_a), veh/h	332	0	302	140	0	124	292	936	982	149	1414	633
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.6	0.0	35.4	39.6	0.0	39.7	37.0	16.8	16.8	42.7	26.8	0.0
Incr Delay (d2), s/veh	14.6	0.0	32.2	2.0	0.0	2.9	43.6	5.3	5.1	4.7	27.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	9.4	0.9	0.0	0.9	10.3	16.1	16.9	0.4	22.4	0.0
LnGrp Delay(d),s/veh	49.2	0.0	67.6	41.6	0.0	42.6	80.5	22.1	21.9	47.3	53.9	0.0
LnGrp LOS	D		E	D		D	F	C	C	D	F	
Approach Vol, veh/h	548			69			1812			1446		
Approach Delay, s/veh	58.5			42.1			31.1			53.9		
Approach LOS	E			D			C			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4			6	7	8				
Phs Duration (G+Y+Rc), s	20.8	18.0	40.0			9.9	5.7	52.3				
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9				
Max Green Setting (Gmax), s	* 17	14.3	35.1			7.0	7.3	42.1				
Max Q Clear Time (g_c+I1), s	17.0	15.7	37.1			3.9	2.7	32.7				
Green Ext Time (p_c), s	0.0	0.0	0.0			0.1	0.0	9.2				

Intersection Summary												
HCM 2010 Ctrl Delay 43.7												
HCM 2010 LOS D												

Notes
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Back + Proj PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1691	14	54	1551	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Flt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1761	15	56	1616	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	1	0	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1775	0	56	1616	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Effective Green, g (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48		0.04	0.50	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	1038	521		85	87	80	39	1684		80	1797	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.50		0.03	0.45	
v/s Ratio Perm						0.00						c0.49
v/c Ratio	0.99	0.04		0.21	0.21	0.03	0.36	1.05		0.70	0.90	0.49
Uniform Delay, d1	48.9	34.8		64.5	64.4	63.9	68.1	36.9		66.5	31.9	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1		2.1	2.0	0.3	5.6	37.8		23.4	6.9	1.1
Delay (s)	73.3	34.9		66.6	66.5	64.2	73.6	74.8		90.0	38.7	1.1
Level of Service	E	C		E	E	E	E	E		F	D	A
Approach Delay (s)		72.0			65.1			74.8			28.0	
Approach LOS		E			E			E			C	
Intersection Summary												
HCM 2000 Control Delay		52.8							D			
HCM 2000 Volume to Capacity ratio		1.00										
Actuated Cycle Length (s)		141.2						17.9				
Intersection Capacity Utilization		93.3%						F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

9: Carmel Rancho Blvd & Shopping Center Dwy

Back + Proj PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	177	10	22	40	10	30	39	545	18	11	393	85
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99	0.99	0.99		0.99	1.00		0.99	1.00		0.99	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1887	1900	1900	1800	1863	1881	1846	1900	1827	1851	1900
Adj Flow Rate, veh/h	190	11	24	43	11	32	42	586	19	12	423	91
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
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
Percent Heavy Veh, %	2	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	623	135	294	536	105	402	572	1388	45	530	1153	246
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1347	525	1145	1009	411	1569	888	3467	112	793	2880	614
Grp Volume(V), veh/h	190	0	35	54	0	32	42	296	309	12	257	257
Grp Sat Flow(s), veh/h/ln	1347	0	1669	1420	0	1569	888	1754	1825	793	1758	1735
Q Serve(g_s), s	2.9	0.0	0.4	0.0	0.0	0.4	0.8	2.8	2.8	0.3	2.4	2.4
Cycle Q Clear(g_c), s	3.5	0.0	0.4	0.5	0.0	0.4	3.2	2.8	2.8	3.1	2.4	2.4
Prop In Lane	1.00		0.69	0.80		1.00	1.00		0.06	1.00		0.35
Lane Grp Cap(c), veh/h	623	0	428	642	0	402	572	702	731	530	704	695
V/C Ratio(X)	0.31	0.00	0.08	0.08	0.00	0.08	0.07	0.42	0.42	0.02	0.36	0.37
Avail Cap(c_a), veh/h	1432	0	1432	1474	0	1345	864	1279	1331	790	1282	1265
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.0	0.0	6.6	6.6	0.0	6.6	6.1	5.0	5.0	6.2	4.9	4.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.2	0.3	0.0	0.2	0.2	1.3	1.4	0.1	1.2	1.2
LnGrp Delay(d), s/veh	8.1	0.0	6.6	6.7	0.0	6.6	6.1	5.2	5.2	6.2	5.0	5.0
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		225			86			647			526	
Approach Delay, s/veh		7.9			6.6			5.3			5.1	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.0		13.3		10.0		13.3				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		5.5		5.1		2.5		5.2				
Green Ext Time (p_c), s		0.6		3.8		0.6		3.7				
Intersection Summary												
HCM 2010 Ctrl Delay					5.7							
HCM 2010 LOS					A							

HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Cum AM.syn

1/27/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	853	538	61	1140	834
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Flt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2760	1863	1509	3335	1759
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2760	1863	1509	3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	927	585	66	1239	907
RTOR Reduction (vph)	0	208	0	8	0	0
Lane Group Flow (vph)	0	719	585	58	1239	907
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA	Perm	Prot	NA	Free
Protected Phases	3	2		3		
Permitted Phases			2			
Actuated Green, G (s)	25.4	23.4	23.4	25.4	58.6	
Effective Green, g (s)	25.4	23.4	23.4	25.4	58.6	
Actuated g/C Ratio	0.43	0.40	0.40	0.43	1.00	
Clearance Time (s)	4.9	4.9	4.9	4.9		
Vehicle Extension (s)	4.5	3.5	3.5	4.5		
Lane Grp Cap (vph)	1196	743	602	1445	1759	
v/s Ratio Prot	0.26	c0.31		c0.37	0.52	
v/s Ratio Perm			0.04			
v/c Ratio	0.60	0.79	0.10	0.86	0.52	
Uniform Delay, d1	12.7	15.4	11.0	15.0	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	5.7	0.1	5.6	1.1	
Delay (s)	13.8	21.1	11.1	20.6	1.1	
Level of Service	B	C	B	C	A	
Approach Delay (s)	13.8		20.1		12.4	
Approach LOS	B		C		B	
Intersection Summary						
HCM 2000 Control Delay		14.1		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.82				
Actuated Cycle Length (s)		58.6		Sum of lost time (s)		9.8
Intersection Capacity Utilization		69.0%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Cum AM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	773	401	467	734	5	86	5	293	10	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Flt	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00		1.00	0.96
Flt Protected	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Flt Permitted	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Satd. Flow (prot)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1558
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (perm)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1558
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	31	878	456	531	834	6	98	6	333	11	19	38
RTOR Reduction (vph)	0	0	275	0	0	0	0	0	281	0	0	37
Lane Group Flow (vph)	31	878	181	531	840	0	52	52	52	0	30	1
Confl. Peds. (#/hr)	2		1			1	1			1		2
Heavy Vehicles (%)	4%	7%	2%	1%	3%	0%	6%	0%	6%	30%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7		
Permitted Phases			2									7
Actuated Green, G (s)	1.8	23.4	23.4	9.2	30.9		4.3	4.3	9.2		1.5	1.5
Effective Green, g (s)	1.8	23.4	23.4	9.2	30.9		4.3	4.3	9.2		1.5	1.5
Actuated g/C Ratio	0.03	0.40	0.40	0.16	0.53		0.07	0.07	0.16		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	53	1342	622	542	1839		118	120	238		42	39
v/s Ratio Prot	0.02	c0.26		c0.15	0.24		c0.03	0.03	0.03		c0.02	
v/s Ratio Perm			0.12									0.00
v/c Ratio	0.58	0.65	0.29	0.98	0.46		0.44	0.43	0.22		0.71	0.02
Uniform Delay, d1	28.1	14.4	12.1	24.7	8.7		26.1	26.1	21.7		28.4	27.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.2	0.9	0.1	32.9	0.1		1.0	0.9	0.2		38.0	0.1
Delay (s)	38.3	15.3	12.2	57.6	8.8		27.1	27.0	21.8		66.5	28.0
Level of Service	D	B	B	E	A		C	C	C		E	C
Approach Delay (s)		14.8			27.7			23.1			45.0	
Approach LOS		B			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			22.0		HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			58.8		Sum of lost time (s)				20.4			
Intersection Capacity Utilization			56.7%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Cum AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	229	36	140	183	172	23	294	85	325	468	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1827	1863	1827	1821	1900
Adj Flow Rate, veh/h	145	249	39	152	199	187	25	320	92	353	509	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	2	4	4	4
Cap, veh/h	202	654	101	204	391	332	75	510	440	465	614	54
Arrive On Green	0.11	0.22	0.22	0.11	0.22	0.22	0.04	0.28	0.28	0.14	0.37	0.37
Sat Flow, veh/h	1774	3038	470	1774	1810	1535	1675	1827	1575	3375	1649	146
Grp Volume(v), veh/h	145	142	146	152	199	187	25	320	92	353	0	554
Grp Sat Flow(s),veh/h/ln	1774	1750	1758	1774	1810	1535	1675	1827	1575	1688	0	1794
Q Serve(g_s), s	5.1	4.5	4.6	5.4	6.3	7.1	0.9	10.0	2.9	6.6	0.0	18.3
Cycle Q Clear(g_c), s	5.1	4.5	4.6	5.4	6.3	7.1	0.9	10.0	2.9	6.6	0.0	18.3
Prop In Lane	1.00	0.27	1.00		1.00	1.00		1.00	1.00		0.08	
Lane Grp Cap(c), veh/h	202	377	378	204	391	332	75	510	440	465	0	668
V/C Ratio(X)	0.72	0.38	0.39	0.75	0.51	0.56	0.33	0.63	0.21	0.76	0.00	0.83
Avail Cap(c_a), veh/h	253	749	752	253	774	657	205	728	628	533	0	778
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.9	21.9	21.9	27.9	22.5	22.8	30.2	20.5	18.0	27.1	0.0	18.6
Incr Delay (d2), s/veh	7.1	0.8	0.8	9.0	1.2	1.8	2.6	1.5	0.3	5.5	0.0	6.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.2	2.3	3.2	3.3	3.1	0.5	5.2	1.3	3.4	0.0	10.2
LnGrp Delay(d),s/veh	35.0	22.6	22.7	37.0	23.7	24.6	32.8	22.1	18.3	32.5	0.0	25.5
LnGrp LOS	D	C	C	D	C	C	C	C	B	C	C	C
Approach Vol, veh/h	433				538				437			
Approach Delay, s/veh	26.8				27.8				21.9			
Approach LOS	C				C				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.2	18.2	6.6	29.2	11.1	18.3	12.7	23.1				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	7.4	6.6	2.9	20.3	7.1	9.1	8.6	12.0				
Green Ext Time (p_c), s	0.1	4.5	0.0	3.8	0.1	4.3	0.2	5.5				

Intersection Summary

HCM 2010 Ctrl Delay
HCM 2010 LOS

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Cum AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	93	387	83	115	275	20	140	4	85	15	3	31
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1860	1900	1810	1799	1900	1810	1704	1900	1900	1900	1900
Adj Flow Rate, veh/h	102	425	91	126	302	22	154	4	93	16	3	34
Adj No. of Lanes	1	2	0	1	2	0	2	1	0	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	0	2	2	5	6	6	5	0	0	0	0	0
Cap, veh/h	131	1617	343	158	1864	135	252	11	261	174	7	81
Arrive On Green	0.07	0.56	0.56	0.09	0.58	0.58	0.08	0.19	0.19	0.05	0.05	0.05
Sat Flow, veh/h	1810	2900	616	1723	3233	234	3343	60	1397	1319	133	1502
Grp Volume(v), veh/h	102	258	258	126	159	165	154	0	97	16	0	37
Grp Sat Flow(s),veh/h/ln	1810	1767	1749	1723	1709	1757	1672	0	1457	1319	0	1635
Q Serve(g_s), s	3.9	5.3	5.4	5.0	3.0	3.1	3.1	0.0	4.1	0.8	0.0	1.5
Cycle Q Clear(g_c), s	3.9	5.3	5.4	5.0	3.0	3.1	3.1	0.0	4.1	0.8	0.0	1.5
Prop In Lane	1.00	0.35	1.00		0.13	1.00		0.96	1.00		0.92	
Lane Grp Cap(c), veh/h	131	985	975	158	986	1014	252	0	272	174	0	88
V/C Ratio(X)	0.78	0.26	0.26	0.80	0.16	0.16	0.61	0.00	0.36	0.09	0.00	0.42
Avail Cap(c_a), veh/h	142	985	975	160	986	1014	764	0	333	404	0	374
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	0.85	0.99	0.99	0.99	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.9	8.0	8.0	31.2	6.9	6.9	31.4	0.0	24.8	31.7	0.0	32.0
Incr Delay (d2), s/veh	16.8	0.5	0.6	22.0	0.3	0.3	0.9	0.0	0.3	0.2	0.0	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.7	2.7	3.3	1.5	1.6	1.5	0.0	1.6	0.3	0.0	0.8
LnGrp Delay(d),s/veh	48.7	8.6	8.6	53.1	7.3	7.3	32.3	0.0	25.1	31.9	0.0	35.2
LnGrp LOS	D	A	A	D	A	A	C		C	C		D
Approach Vol, veh/h	618				450				251			
Approach Delay, s/veh	15.2				20.1				29.5			
Approach LOS	B				C				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	43.0	9.3	7.8	8.6	44.4		17.1				
Change Period (Y+Rc), s	3.5	4.0	4.0	4.0	3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0	16.0	16.0	5.5	17.0		16.0				
Max Q Clear Time (g_c+I1), s	7.0	7.4	5.1	3.5	5.9	5.1		6.1				
Green Ext Time (p_c), s	0.0	2.5	0.2	0.4	0.0	3.0		0.4				

Intersection Summary

HCM 2010 Ctrl Delay
HCM 2010 LOS

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Cum AM.syn
1/27/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	395	92	61	378	1	32	0	38	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1820	1900	1845	1845	1900	1900	1638	1712	1900	1900	1900
Adj Flow Rate, veh/h	0	476	111	73	455	1	39	0	46	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	3	3	3	0	0	11	0	0	0
Cap, veh/h	0	1848	428	91	2815	6	212	0	80	0	105	0
Arrive On Green	0.00	0.66	0.66	0.05	0.78	0.78	0.06	0.00	0.06	0.00	0.00	0.00
Sat Flow, veh/h	0	2879	646	1757	3588	8	1228	0	1444	0	1900	0
Grp Volume(v), veh/h	0	294	293	73	222	234	39	0	46	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1729	1705	1757	1753	1843	1228	0	1444	0	1900	0
Q Serve(g_s), s	0.0	3.5	3.5	2.1	1.6	1.6	1.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	3.5	3.5	2.1	1.6	1.6	1.5	0.0	1.6	0.0	0.0	0.0
Prop In Lane	0.00		0.38	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1146	1130	91	1375	1446	212	0	80	0	105	0
V/C Ratio(X)	0.00	0.26	0.26	0.80	0.16	0.16	0.18	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1146	1130	193	1375	1446	537	0	462	0	608	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.97	0.97	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	3.4	3.4	23.5	1.3	1.3	23.0	0.0	23.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	6.1	0.3	0.2	0.2	0.0	2.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.8	1.8	1.1	0.8	0.9	0.5	0.0	0.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	3.9	4.0	29.5	1.6	1.6	23.2	0.0	25.4	0.0	0.0	0.0
LnGrp LOS		A	A	C	A	A	C		C			
Approach Vol, veh/h		587			529			85			0	
Approach Delay, s/veh		4.0			5.4			24.4			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.1	37.1		6.8		43.2		6.8				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	5.5	17.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.1	5.5		0.0		3.6		3.6				
Green Ext Time (p_c), s	0.0	5.5		0.0		7.9		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			6.1									
HCM 2010 LOS			A									

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Cum AM.syn
1/27/2016

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	249	0	15	0	1	0	16	14	0	0	31	369
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	1	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	92	80	92	92	92	80	80	92	92	80	80
Heavy Vehicles, %	7	0	0	2	2	2	0	7	0	0	0	2
Mvmt Flow	311	0	19	0	1	0	20	18	0	0	39	461
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	2	0	0	24	628	2	14	628	5
Stage 1	-	-	-	-	-	-	2	625	-	3	3	-
Stage 2	-	-	-	-	-	-	22	3	-	11	625	-
Critical Hdwy	4.17	-	-	-	-	-	7.1	6.57	-	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.57	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.5	4.063	-	3.5	4	3.318
Pot Cap-1 Maneuver	1587	-	-	-	-	-	993	393	-	1007	402	1078
Stage 1	-	-	-	-	-	-	-	-	-	1025	897	-
Stage 2	-	-	-	-	-	-	1002	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1584	-	-	-	-	-	515	315	-	-	322	1074
Mov Cap-2 Maneuver	-	-	-	-	-	-	304	1518	-	-	~ -380	-
Stage 1	-	-	-	-	-	-	-	-	-	822	896	-
Stage 2	-	-	-	-	-	-	546	882	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.4			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	304	-	1584	-	-	-	-	-	-	1074		
HCM Lane V/C Ratio	0.066	-	0.196	-	-	-	-	-	-	0.429		
HCM Control Delay (s)	17.7	-	7.8	-	-	0	-	-	-	10.9		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.2	-	0.7	-	-	-	-	-	-	2.2		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 2010 Signalized Intersection Summary 7: SR 1 & Ocean Ave

Cum AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (veh/h)	213	40	129	134	38	50	159	1171	37	16	1632	137
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.97	1.00	0.97	1.00	0.94	1.00	0.98	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1868	1900	1900	1842	1900	1827	1840	1900	1357	1827	1845
Adj Flow Rate, veh/h	220	82	148	128	81	57	183	1346	43	18	1876	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	3	0	0	0	9	9	4	3	3	40	4	3
Cap, veh/h	293	98	177	151	81	57	163	1832	58	37	1614	729
Arrive On Green	0.17	0.17	0.17	0.08	0.08	0.08	0.09	0.53	0.53	0.03	0.46	0.00
Sat Flow, veh/h	1757	586	1057	1810	977	688	1740	3456	110	1293	3471	1568
Grp Volume(v), veh/h	220	0	230	128	0	138	183	680	709	18	1876	0
Grp Sat Flow(s),veh/h/ln	1757	0	1643	1810	0	1665	1740	1748	1818	1293	1736	1568
Q Serve(g_s), s	10.6	0.0	12.0	6.2	0.0	7.4	8.3	26.6	26.7	1.2	41.3	0.0
Cycle Q Clear(g_c), s	10.6	0.0	12.0	6.2	0.0	7.4	8.3	26.6	26.7	1.2	41.3	0.0
Prop In Lane	1.00	0.64	1.00	0.00	0.41	1.00	0.06	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	293	0	274	151	0	139	163	927	964	37	1614	729
V/C Ratio(X)	0.75	0.00	0.84	0.85	0.00	1.00	1.13	0.73	0.74	0.49	1.16	0.00
Avail Cap(c_a), veh/h	316	0	296	151	0	139	163	927	964	106	1614	729
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.2	0.0	35.8	40.2	0.0	40.7	40.3	16.1	16.1	42.5	23.8	0.0
Incr Delay (d2), s/veh	9.3	0.0	18.2	35.1	0.0	74.9	108.4	3.5	3.4	9.9	80.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	0.0	6.8	4.6	0.0	6.2	8.8	13.5	14.1	0.5	37.5	0.0
LnGrp Delay(d),s/veh	44.6	0.0	54.1	75.3	0.0	115.6	148.6	19.5	19.4	52.5	104.2	0.0
LnGrp LOS	D	D	E	F	F	B	B	D	D	F	F	D
Approach Vol, veh/h	450			266			1572			1894		
Approach Delay, s/veh	49.4			96.2			34.5			103.7		
Approach LOS	D			F			C			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		3		4		6		7		8	
Phs Duration (G+Y+Rc), s	19.0		12.0		46.2		11.6		6.2		52.0	
Change Period (Y+Rc), s	* 4.2		3.7		4.9		4.2		3.7		4.9	
Max Green Setting (Gmax), s	* 16		8.3		41.3		7.4		7.3		42.3	
Max Q Clear Time (g_c+I1), s	14.0		10.3		43.3		9.4		3.2		28.7	
Green Ext Time (p_c), s	0.5		0.0		0.0		0.0		0.0		13.4	

Intersection Summary

HCM 2010 Ctrl Delay	71.4
HCM 2010 LOS	E

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis 8: SR 1 & Carpenter St

Cum AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	402	5	17	18	14	49	19	1409	10	32	1773	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3532		1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3532		1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1638	12	37	2062	816
RTOR Reduction (vph)	0	17	0	0	54	0	0	0	0	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1650	0	37	2062	816
Confl. Peds. (#/hr)				1		1			1		1	
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59		0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	550	269		96	102	90	66	2089		67	2048	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.47		0.02	c0.60	
v/s Ratio Perm						0.00						c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.79		0.55	1.01	0.53
Uniform Delay, d1	48.1	41.7		52.9	52.9	52.4	55.2	18.4		55.7	23.8	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.6	0.1		1.6	1.5	0.3	3.0	2.4		9.5	21.6	1.3
Delay (s)	60.6	41.8		54.5	54.4	52.7	58.2	20.8		65.2	45.4	1.3
Level of Service	E	D		D	D	D	E	C		E	D	A
Approach Delay (s)	59.6			53.4			21.3			33.3		
Approach LOS	E			D			C			C		

Intersection Summary

HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	117.8	Sum of lost time (s)	17.9
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM 2010 Signalized Intersection Summary
9: Carmel Rancho Blvd & Shopping Center Dwy

Cum AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰		↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (veh/h)	56	1	19	9	1	20	17	231	15	76	560	174
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1785	1863	1881	1848	1900	1827	1853	1900
Adj Flow Rate, veh/h	73	1	25	12	1	26	22	300	19	99	727	226
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	0	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	476	7	179	448	24	183	528	1718	108	814	1354	421
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.51	0.51	0.51	0.51	0.51	0.51
Sat Flow, veh/h	1392	62	1545	1086	205	1573	592	3354	211	1034	2643	821
Grp Volume(v), veh/h	73	0	26	13	0	26	22	156	163	99	484	469
Grp Sat Flow(s),veh/h/ln	1392	0	1606	1291	0	1573	592	1755	1810	1034	1761	1703
Q Serve(g_s), s	1.1	0.0	0.3	0.0	0.0	0.3	0.6	1.0	1.0	1.2	4.0	4.0
Cycle Q Clear(g_c), s	1.4	0.0	0.3	0.3	0.0	0.3	4.5	1.0	1.0	2.3	4.0	4.0
Prop In Lane	1.00		0.96	0.92		1.00	1.00		0.12	1.00		0.48
Lane Grp Cap(c), veh/h	476	0	187	471	0	183	528	899	927	814	902	873
V/C Ratio(X)	0.15	0.00	0.14	0.03	0.00	0.14	0.04	0.17	0.18	0.12	0.54	0.54
Avail Cap(c_a), veh/h	1607	0	1492	1564	0	1461	692	1386	1428	1100	1390	1345
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	0.0	8.6	8.5	0.0	8.6	5.1	2.8	2.8	3.4	3.5	3.5
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.1	0.0	0.1	0.1	0.5	0.5	0.3	1.9	1.9
LnGrp Delay(d),s/veh	9.2	0.0	8.7	8.5	0.0	8.7	5.1	2.8	2.8	3.4	3.7	3.7
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		99			39			341			1052	
Approach Delay, s/veh		9.1			8.6			3.0			3.7	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		6.5		15.0		6.5		15.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		3.4		6.0		2.3		6.5				
Green Ext Time (p_c), s		0.2		4.5		0.2		4.4				
Intersection Summary												
HCM 2010 Ctrl Delay			4.0									
HCM 2010 LOS			A									

HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Cum PM.syn
1/27/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↰	↰	↰	↰	↰
Volume (vph)	0	967	973	105	992	769
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Fit		0.85	1.00	0.85	1.00	1.00
Fit Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2814	1863	1553	3467	1881
Fit Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2814	1863	1553	3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1029	1035	112	1055	818
RTOR Reduction (vph)	0	104	0	5	0	0
Lane Group Flow (vph)	0	925	1035	107	1055	818
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases				2		
Actuated Green, G (s)		20.1	35.1	35.1	20.1	65.0
Effective Green, g (s)		20.1	35.1	35.1	20.1	65.0
Actuated g/C Ratio		0.31	0.54	0.54	0.31	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		870	1006	838	1072	1881
v/s Ratio Prot		c0.33	c0.56		0.30	0.43
v/s Ratio Perm				0.07		
v/c Ratio		1.06	1.03	0.13	0.98	0.43
Uniform Delay, d1		22.4	14.9	7.4	22.3	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		48.9	36.0	0.1	23.6	0.7
Delay (s)		71.3	50.9	7.5	45.9	0.7
Level of Service		E	D	A	D	A
Approach Delay (s)	71.3		46.7			26.2
Approach LOS	E		D			C
Intersection Summary						
HCM 2000 Control Delay		43.5		HCM 2000 Level of Service		D
HCM 2000 Volume to Capacity ratio		1.04				
Actuated Cycle Length (s)		65.0		Sum of lost time (s)		9.8
Intersection Capacity Utilization		93.2%		ICU Level of Service		F
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Cum PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	874	192	399	673	4	276	17	600	4	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (prot)	1805	3539	1615	3467	3571		1715	1729	1599		1887	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (perm)	1805	3539	1615	3467	3571		1715	1729	1599		1887	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	33	930	204	424	716	4	294	18	638	4	24	19
RTOR Reduction (vph)	0	0	120	0	1	0	0	0	536	0	0	19
Lane Group Flow (vph)	33	930	84	424	719	0	156	156	102	0	28	0
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	0%	1%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.9	23.9	23.9	9.0	31.1		9.2	9.2	9.0		1.6	1.6
Effective Green, g (s)	1.9	23.9	23.9	9.0	31.1		9.2	9.2	9.0		1.6	1.6
Actuated g/C Ratio	0.03	0.37	0.37	0.14	0.49		0.14	0.14	0.14		0.02	0.02
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	53	1319	602	486	1732		246	248	224		47	38
v/s Ratio Prot	0.02	c0.26		c0.12	0.20		c0.09	0.09	0.06		c0.01	
v/s Ratio Perm			0.05									0.00
v/c Ratio	0.62	0.71	0.14	0.87	0.42		0.63	0.63	0.45		0.60	0.01
Uniform Delay, d1	30.7	17.1	13.3	27.0	10.6		25.9	25.8	25.3		30.9	30.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	15.2	1.4	0.0	15.3	0.1		3.9	3.6	0.5		12.8	0.0
Delay (s)	46.0	18.5	13.3	42.3	10.7		29.8	29.4	25.8		43.7	30.5
Level of Service	D	B	B	D	B		C	C	C		D	C
Approach Delay (s)		18.4			22.4			27.1			38.4	
Approach LOS		B			C			C			D	
Intersection Summary												
HCM 2000 Control Delay		22.6										
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		64.1							20.4			
Intersection Capacity Utilization		76.8%							D			
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Cum PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	366	83	190	417	354	162	581	164	328	397	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1845	1863	1881	1883	1900
Adj Flow Rate, veh/h	146	373	85	194	426	361	165	593	167	335	405	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	1	2	1	3	2	1	1	1
Cap. veh/h	164	865	195	205	604	504	198	553	473	359	487	54
Arrive On Green	0.09	0.30	0.30	0.11	0.32	0.32	0.11	0.30	0.30	0.10	0.29	0.29
Sat Flow, veh/h	1774	2894	652	1792	1881	1571	1792	1845	1575	3476	1664	185
Grp Volume(V), veh/h	146	228	230	194	426	361	165	593	167	335	0	450
Grp Sat Flow(s),veh/h/ln	1774	1784	1763	1792	1881	1571	1792	1845	1575	1738	0	1849
Q Serve(g_s), s	7.3	9.3	9.5	9.7	17.9	18.2	8.1	27.0	7.5	8.6	0.0	20.5
Cycle Q Clear(g_c), s	7.3	9.3	9.5	9.7	17.9	18.2	8.1	27.0	7.5	8.6	0.0	20.5
Prop In Lane	1.00		0.37	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	164	533	527	205	604	504	198	553	473	359	0	541
V/C Ratio(X)	0.89	0.43	0.44	0.95	0.71	0.72	0.83	1.07	0.35	0.93	0.00	0.83
Avail Cap(c_a), veh/h	164	533	527	205	604	504	205	553	473	359	0	541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.4	25.4	25.4	39.6	26.8	26.9	39.2	31.5	24.7	40.0	0.0	29.8
Incr Delay (d2), s/veh	41.0	0.7	0.7	47.6	6.8	8.4	23.7	58.9	0.5	30.8	0.0	10.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	4.7	4.7	7.5	10.4	9.0	5.3	22.7	3.3	5.7	0.0	12.0
LnGrp Delay(d),s/veh	81.5	26.0	26.1	87.2	33.6	35.4	62.9	90.4	25.2	70.8	0.0	40.6
LnGrp LOS	F	C	C	F	C	D	E	F	C	E		D
Approach Vol, veh/h		604			981			925			785	
Approach Delay, s/veh		39.5			44.8			73.7			53.5	
Approach LOS		D			D			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	31.1	13.7	31.2	12.0	33.1	13.0	31.9				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	11.7	11.5	10.1	22.5	9.3	20.2	10.6	29.0				
Green Ext Time (p_c), s	0.0	7.6	0.0	2.3	0.0	5.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay				54.0								
HCM 2010 LOS				D								
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Cum PM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	177	459	138	163	453	47	348	9	169	43	8	86
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1867	1900	1881	1883	1900	1881	1865	1900	1900	1900	1900
Adj Flow Rate, veh/h	179	464	139	165	458	47	352	9	171	43	8	87
Adj No. of Lanes	1	2	0	1	2	0	2	1	0	1	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	0	2	2	1	1	1	1	0	0	0	0	0
Cap, veh/h	168	1231	366	166	1497	153	461	23	434	221	13	142
Arrive On Green	0.09	0.46	0.46	0.09	0.46	0.46	0.13	0.29	0.29	0.10	0.10	0.10
Sat Flow, veh/h	1810	2694	801	1792	3276	335	3476	80	1517	1223	136	1481
Grp Volume(v), veh/h	179	304	299	165	249	256	352	0	180	43	0	95
Grp Sat Flow(s),veh/h/ln	1810	1774	1721	1792	1789	1822	1738	0	1597	1223	0	1617
Q Serve(g_s), s	6.5	7.9	8.0	6.4	6.2	6.2	6.8	0.0	6.4	2.3	0.0	3.9
Cycle Q Clear(g_c), s	6.5	7.9	8.0	6.4	6.2	6.2	6.8	0.0	6.4	2.3	0.0	3.9
Prop In Lane	1.00		0.47	1.00		0.18	1.00		0.95	1.00		0.92
Lane Grp Cap(c), veh/h	168	810	787	166	817	833	461	0	457	221	0	156
V/C Ratio(X)	1.07	0.38	0.38	0.99	0.30	0.31	0.76	0.00	0.39	0.19	0.00	0.61
Avail Cap(c_a), veh/h	168	810	787	166	817	833	794	0	457	382	0	370
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.79	0.79	0.98	0.98	0.98	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.8	12.5	12.5	31.7	12.0	12.0	29.3	0.0	20.1	29.6	0.0	30.4
Incr Delay (d2), s/veh	79.9	1.0	1.1	66.6	0.9	0.9	1.0	0.0	0.2	0.4	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	4.0	4.0	6.2	3.3	3.3	3.3	0.0	2.8	0.8	0.0	1.9
LnGrp Delay(d),s/veh	111.6	13.5	13.6	98.3	12.9	12.9	30.3	0.0	20.3	30.1	0.0	34.2
LnGrp LOS	F	B	B	F	B	B	C		C	C		C
Approach Vol, veh/h	782				670				532			
Approach Delay, s/veh	36.0				34.0				26.9			
Approach LOS	D				C				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	36.0	13.3	10.7	10.0	36.0		24.0				
Change Period (Y+Rc), s	3.5	4.0	4.0	4.0	3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0	16.0	16.0	6.5	16.0		16.0				
Max Q Clear Time (g_c+I1), s	8.4	10.0	8.8	5.9	8.5	8.2		8.4				
Green Ext Time (p_c), s	0.0	2.6	0.4	0.5	0.0	3.1		0.9				
Intersection Summary												
HCM 2010 Ctrl Delay	32.9											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

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1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	617	54	85	577	0	86	0	110	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1881	1900	1900	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	636	56	88	595	0	89	0	113	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
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
Percent Heavy Veh, %	0	2	2	2	1	1	0	0	0	0	0	0
Cap, veh/h	0	1975	174	111	2619	0	297	0	173	0	204	0
Arrive On Green	0.00	0.60	0.60	0.06	0.73	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	0	3385	289	1774	3668	0	1422	0	1610	0	1900	0
Grp Volume(v), veh/h	0	342	350	88	595	0	89	0	113	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1812	1774	1787	0	1422	0	1610	0	1900	0
Q Serve(g_s), s	0.0	4.8	4.8	2.4	2.7	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	4.8	4.8	2.4	2.7	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Prop In Lane	0.00		0.16	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1062	1087	111	2619	0	297	0	173	0	204	0
V/C Ratio(X)	0.00	0.32	0.32	0.79	0.23	0.00	0.30	0.00	0.65	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1062	1087	231	2619	0	599	0	515	0	608	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.88	0.88	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.0	5.0	23.1	2.1	0.0	21.3	0.0	21.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.7	4.6	0.2	0.0	0.2	0.0	1.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.5	2.5	1.3	1.3	0.0	1.2	0.0	1.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	5.7	5.7	27.7	2.3	0.0	21.5	0.0	23.0	0.0	0.0	0.0
LnGrp LOS		A	A	C	A		C		C			
Approach Vol, veh/h	692				683				202			
Approach Delay, s/veh	5.7				5.6				22.3			
Approach LOS	A				A				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	34.0		9.4		40.6		9.4				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.4	6.8		0.0		4.7		5.4				
Green Ext Time (p_c), s	0.0	5.9		0.0		10.4		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay					7.8							
HCM 2010 LOS					A							

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

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1/27/2016

Intersection													
Int Delay, s/veh		3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Vol, veh/h	496	0	62	0	1	0	31	23	0	0	20	506	
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0	
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	91	92	91	92	92	92	91	91	92	92	91	91	
Heavy Vehicles, %	2	0	0	0	0	0	4	0	0	0	0	1	
Mvmt Flow	545	0	68	0	1	0	34	25	0	0	22	556	
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	1	0	0	2	0	0	14	1093	2	16	1093	1	
Stage 1	-	-	-	-	-	-	2	1092	-	1	1	-	
Stage 2	-	-	-	-	-	-	12	1	-	15	1092	-	
Critical Hdwy	4.12	-	-	-	-	-	7.14	6.5	-	7.1	6.5	6.21	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	-	-	-	
Follow-up Hdwy	2.218	-	-	-	-	-	3.536	4	-	3.5	4	3.309	
Pot Cap-1 Maneuver	1622	-	-	-	-	-	997	216	-	1004	216	1087	
Stage 1	-	-	-	-	-	-	-	-	-	1027	899	-	
Stage 2	-	-	-	-	-	-	1003	899	-	-	-	-	
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	
Mov Cap-1 Maneuver	1622	-	-	-	-	-	531	143	-	-	143	1087	
Mov Cap-2 Maneuver	-	-	-	-	-	-	228	-283	-	-	-32	-	
Stage 1	-	-	-	-	-	-	-	-	-	682	899	-	
Stage 2	-	-	-	-	-	-	478	899	-	-	-	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	7.4			0									
HCM LOS													
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	228	-	1622	-	-	-	-	-	-	1087			
HCM Lane V/C Ratio	0.149	-	0.336	-	-	-	-	-	-	0.512			
HCM Control Delay (s)	23.5	-	8.3	-	-	0	-	-	-	11.7			
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B			
HCM 95th %tile Q(veh)	0.5	-	1.5	-	-	-	-	-	-	3			

Notes
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

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1/27/2016

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (veh/h)	277	22	231	34	13	18	284	1657	10	13	1545	153	
Number	5	2	12	1	6	16	3	8	18	7	4	14	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.99	1.00	1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1863	1871	1900	1863	1763	1900	1900	1845	1900	1900	1881	1881	
Adj Flow Rate, veh/h	279	41	243	34	16	19	299	1744	11	14	1626	0	
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1	
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	
Percent Heavy Veh, %	2	7	7	2	5	5	0	3	3	0	1	1	
Cap, veh/h	332	43	256	114	46	55	292	1906	12	42	1414	633	
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.16	0.53	0.53	0.02	0.40	0.00	
Sat Flow, veh/h	1774	231	1369	1774	717	852	1810	3571	23	1810	3574	1599	
Grp Volume(V), veh/h	279	0	284	34	0	35	299	855	900	14	1626	0	
Grp Sat Flow(s),veh/h/ln	1774	0	1600	1774	0	1569	1810	1753	1841	1810	1787	1599	
Q Serve(g_s), s	13.5	0.0	15.6	1.6	0.0	1.9	14.3	39.4	39.5	0.7	35.1	0.0	
Cycle Q Clear(g_c), s	13.5	0.0	15.6	1.6	0.0	1.9	14.3	39.4	39.5	0.7	35.1	0.0	
Prop In Lane	1.00	0.86	1.00	0.54	1.00	0.01	1.00	1.00	1.00	1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	332	0	299	114	0	101	292	936	983	42	1414	633	
V/C Ratio(X)	0.84	0.00	0.95	0.30	0.00	0.35	1.03	0.91	0.92	0.34	1.15	0.00	
Avail Cap(c_a), veh/h	332	0	299	140	0	124	292	936	983	149	1414	633	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	34.8	0.0	35.6	39.6	0.0	39.7	37.2	18.8	18.9	42.7	26.8	0.0	
Incr Delay (d2), s/veh	17.6	0.0	38.5	2.0	0.0	2.9	59.3	13.5	13.2	4.7	76.1	0.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	8.2	0.0	10.1	0.9	0.0	0.9	11.9	22.3	23.6	0.4	32.0	0.0	
LnGrp Delay(d),s/veh	52.3	0.0	74.1	41.6	0.0	42.6	96.6	32.4	32.0	47.3	102.9	0.0	
LnGrp LOS	D		E	D		D	F	C	C	D	F		
Approach Vol, veh/h	563			69			2054			1640			
Approach Delay, s/veh	63.3			42.1			41.6			102.4			
Approach LOS	E			D			D			F			
Timer	1	2	3	4	5	6	7	8					
Assigned Phs	2	3	4			6	7	8					
Phs Duration (G+Y+Rc), s	20.8	18.0	40.0			9.9	5.7	52.3					
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9					
Max Green Setting (Gmax), s	* 17	14.3	35.1			7.0	7.3	42.1					
Max Q Clear Time (g_c+I1), s	17.6	16.3	37.1			3.9	2.7	41.5					
Green Ext Time (p_c), s	0.0	0.0	0.0			0.1	0.0	0.6					

Intersection Summary												
HCM 2010 Ctrl Delay		67.5										
HCM 2010 LOS		E										

Notes
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

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1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Volume (vph)	982	17	17	23	12	52	13	1905	14	54	1736	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Flt Protected	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3535		1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3535		1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1984	15	56	1808	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	1	0	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1998	0	56	1808	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Effective Green, g (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48		0.04	0.50	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	1038	521		85	87	80	39	1684		80	1797	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.57		0.03	0.51	
v/s Ratio Perm						0.00						c0.49
v/c Ratio	0.99	0.04		0.21	0.21	0.03	0.36	1.19		0.70	1.01	0.49
Uniform Delay, d1	48.9	34.8		64.5	64.4	63.9	68.1	36.9		66.5	35.1	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1		2.1	2.0	0.3	5.6	90.4		23.4	22.7	1.1
Delay (s)	73.3	34.9		66.6	66.5	64.2	73.6	127.3		90.0	57.8	1.1
Level of Service	E	C		E	E	E	E	F		F	E	A
Approach Delay (s)		72.0			65.1			126.9			41.8	
Approach LOS		E			E			F			D	
Intersection Summary												
HCM 2000 Control Delay		77.2							E			
HCM 2000 Volume to Capacity ratio		1.07										
Actuated Cycle Length (s)		141.2						17.9				
Intersection Capacity Utilization		99.2%						F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

9: Carmel Rancho Blvd & Shopping Center Dwy

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1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Volume (veh/h)	183	10	20	40	10	30	38	603	18	11	453	89
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99	0.99	0.99	0.99	0.99	1.00	0.99	1.00	0.99	1.00	0.99	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1887	1900	1900	1800	1863	1881	1846	1900	1827	1851	1900
Adj Flow Rate, veh/h	197	11	22	43	11	32	41	648	19	12	487	96
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
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
Percent Heavy Veh, %	2	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	610	145	290	527	105	407	541	1445	42	503	1215	238
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1347	558	1117	1016	403	1569	833	3479	102	749	2927	574
Grp Volume(V), veh/h	197	0	33	54	0	32	41	327	340	12	291	292
Grp Sat Flow(S), veh/h/ln	1347	0	1675	1419	0	1569	833	1754	1827	749	1758	1743
Q Serve(g_s), s	3.2	0.0	0.4	0.1	0.0	0.4	0.9	3.3	3.3	0.3	2.9	2.9
Cycle Q Clear(g_c), s	3.8	0.0	0.4	0.6	0.0	0.4	3.8	3.3	3.3	3.6	2.9	2.9
Prop In Lane	1.00		0.67	0.80		1.00	1.00		0.06	1.00		0.33
Lane Grp Cap(c), veh/h	610	0	435	631	0	407	541	728	759	503	730	724
V/C Ratio(X)	0.32	0.00	0.08	0.09	0.00	0.08	0.08	0.45	0.45	0.02	0.40	0.40
Avail Cap(c_a), veh/h	1355	0	1361	1398	0	1275	770	1212	1262	710	1215	1204
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.4	0.0	6.9	7.0	0.0	6.9	6.4	5.2	5.2	6.5	5.0	5.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.1	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.2	0.3	0.0	0.2	0.2	1.6	1.6	0.1	1.4	1.4
LnGrp Delay(d), s/veh	8.5	0.0	6.9	7.0	0.0	6.9	6.4	5.3	5.3	6.5	5.2	5.2
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		230			86			708			595	
Approach Delay, s/veh		8.3			7.0			5.4			5.2	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.4		14.2		10.4		14.2				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		5.8		5.6		2.6		5.8				
Green Ext Time (p_c), s		0.6		4.2		0.6		4.1				
Intersection Summary												
HCM 2010 Ctrl Delay				5.8								
HCM 2010 LOS				A								

HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Cum + Proj AM.syn

1/27/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	855	543	61	1142	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2760	1863	1509	3335	1759
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2760	1863	1509	3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	929	590	66	1241	908
RTOR Reduction (vph)	0	205	0	8	0	0
Lane Group Flow (vph)	0	724	590	58	1241	908
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA	Perm	Prot	NA	Free
Protected Phases	3	2		3		
Permitted Phases			2			
Actuated Green, G (s)	25.4	23.5	23.5	25.4	58.7	
Effective Green, g (s)	25.4	23.5	23.5	25.4	58.7	
Actuated g/C Ratio	0.43	0.40	0.40	0.43	1.00	
Clearance Time (s)	4.9	4.9	4.9	4.9		
Vehicle Extension (s)	4.5	3.5	3.5	4.5		
Lane Grp Cap (vph)	1194	745	604	1443	1759	
v/s Ratio Prot	0.26	c0.32		c0.37	0.52	
v/s Ratio Perm			0.04			
v/c Ratio	0.61	0.79	0.10	0.86	0.52	
Uniform Delay, d1	12.8	15.5	11.0	15.0	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	5.9	0.1	5.8	1.1	
Delay (s)	14.0	21.4	11.1	20.9	1.1	
Level of Service	B	C	B	C	A	
Approach Delay (s)	14.0		20.3		12.5	
Approach LOS	B		C		B	
Intersection Summary						
HCM 2000 Control Delay		14.3		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.83				
Actuated Cycle Length (s)		58.7		Sum of lost time (s)		9.8
Intersection Capacity Utilization		69.3%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Cum + Proj AM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	773	403	468	734	5	88	5	295	10	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00		1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (prot)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1558
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (perm)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1558
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	31	878	458	532	834	6	100	6	335	11	19	38
RTOR Reduction (vph)	0	0	276	0	0	0	0	0	283	0	0	37
Lane Group Flow (vph)	31	878	182	532	840	0	53	53	52	0	30	1
Confl. Peds. (#/hr)	2		1			1	1			1		2
Heavy Vehicles (%)	4%	7%	2%	1%	3%	0%	6%	0%	6%	30%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7		
Permitted Phases			2									7
Actuated Green, G (s)	1.8	23.4	23.4	9.2	30.9		4.4	4.4	9.2		1.5	1.5
Effective Green, g (s)	1.8	23.4	23.4	9.2	30.9		4.4	4.4	9.2		1.5	1.5
Actuated g/C Ratio	0.03	0.40	0.40	0.16	0.52		0.07	0.07	0.16		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	53	1340	620	541	1836		120	122	238		42	39
v/s Ratio Prot	0.02	c0.26		c0.15	0.24		c0.03	0.03	0.03		c0.02	
v/s Ratio Perm			0.12									0.00
v/c Ratio	0.58	0.66	0.29	0.98	0.46		0.44	0.43	0.22		0.71	0.02
Uniform Delay, d1	28.2	14.5	12.1	24.8	8.8		26.1	26.1	21.7		28.5	28.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.2	0.9	0.1	34.1	0.1		0.9	0.9	0.2		38.0	0.1
Delay (s)	38.3	15.4	12.2	58.9	8.8		27.0	27.0	21.9		66.5	28.1
Level of Service	D	B	B	E	A		C	C	C		E	C
Approach Delay (s)		14.8			28.2			23.1			45.0	
Approach LOS		B			C			C			D	
Intersection Summary												
HCM 2000 Control Delay		22.2		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio		0.71										
Actuated Cycle Length (s)		58.9		Sum of lost time (s)				20.4				
Intersection Capacity Utilization		56.8%		ICU Level of Service				B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Cum + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	230	36	142	185	177	23	294	86	326	468	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1827	1863	1827	1821	1900
Adj Flow Rate, veh/h	145	250	39	154	201	192	25	320	93	354	509	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	2	1	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	2	4	4	4
Cap, veh/h	201	662	102	203	396	336	75	510	439	463	612	54
Arrive On Green	0.11	0.22	0.22	0.11	0.22	0.22	0.04	0.28	0.28	0.14	0.37	0.37
Sat Flow, veh/h	1774	3040	468	1774	1810	1535	1675	1827	1575	3375	1649	146
Grp Volume(v), veh/h	145	143	146	154	201	192	25	320	93	354	0	554
Grp Sat Flow(s),veh/h/ln	1774	1750	1758	1774	1810	1535	1675	1827	1575	1688	0	1794
Q Serve(g_s), s	5.2	4.5	4.7	5.5	6.4	7.3	0.9	10.0	3.0	6.6	0.0	18.4
Cycle Q Clear(g_c), s	5.2	4.5	4.7	5.5	6.4	7.3	0.9	10.0	3.0	6.6	0.0	18.4
Prop In Lane	1.00		0.27	1.00		1.00	1.00		1.00	1.00		0.08
Lane Grp Cap(c), veh/h	201	381	383	203	396	336	75	510	439	463	0	667
V/C Ratio(X)	0.72	0.37	0.38	0.76	0.51	0.57	0.33	0.63	0.21	0.77	0.00	0.83
Avail Cap(c_a), veh/h	252	745	748	252	770	653	204	724	624	530	0	774
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.1	21.8	21.9	28.1	22.5	22.9	30.4	20.7	18.1	27.3	0.0	18.7
Incr Delay (d2), s/veh	7.3	0.7	0.8	9.9	1.2	1.8	2.6	1.5	0.3	5.8	0.0	7.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.3	2.3	3.3	3.3	3.3	0.5	5.3	1.3	3.5	0.0	10.4
LnGrp Delay(d),s/veh	35.4	22.6	22.6	38.1	23.7	24.7	33.0	22.2	18.4	33.0	0.0	25.8
LnGrp LOS	D	C	C	D	C	C	C	C	B	C	C	C
Approach Vol, veh/h		434			547			438			908	
Approach Delay, s/veh		26.9			28.1			22.0			28.6	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.2	18.5	6.6	29.3	11.1	18.6	12.7	23.2				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	7.5	6.7	2.9	20.4	7.2	9.3	8.6	12.0				
Green Ext Time (p_c), s	0.1	4.5	0.0	3.8	0.1	4.3	0.2	5.5				

Intersection Summary

HCM 2010 Ctrl Delay 26.9
HCM 2010 LOS C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Cum + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	93	390	83	116	284	20	140	4	85	15	3	31
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1860	1900	1810	1799	1900	1810	1704	1900	1900	1900	1900
Adj Flow Rate, veh/h	102	429	91	127	312	22	154	4	93	16	3	34
Adj No. of Lanes	1	2	0	1	2	0	2	1	0	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	0	2	2	5	6	6	5	0	0	0	0	0
Cap, veh/h	131	1618	341	159	1869	131	252	11	261	174	7	81
Arrive On Green	0.07	0.56	0.56	0.09	0.58	0.58	0.08	0.19	0.19	0.05	0.05	0.05
Sat Flow, veh/h	1810	2905	611	1723	3240	227	3343	60	1397	1319	133	1502
Grp Volume(v), veh/h	102	260	260	127	164	170	154	0	97	16	0	37
Grp Sat Flow(s),veh/h/ln	1810	1767	1750	1723	1709	1758	1672	0	1457	1319	0	1635
Q Serve(g_s), s	3.9	5.3	5.4	5.1	3.1	3.2	3.1	0.0	4.1	0.8	0.0	1.5
Cycle Q Clear(g_c), s	3.9	5.3	5.4	5.1	3.1	3.2	3.1	0.0	4.1	0.8	0.0	1.5
Prop In Lane	1.00		0.35	1.00		0.13	1.00		0.96	1.00		0.92
Lane Grp Cap(c), veh/h	131	984	974	159	986	1014	252	0	272	174	0	88
V/C Ratio(X)	0.78	0.26	0.27	0.80	0.17	0.17	0.61	0.00	0.36	0.09	0.00	0.42
Avail Cap(c_a), veh/h	142	984	974	160	986	1014	764	0	333	404	0	374
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	0.85	0.99	0.99	0.99	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.9	8.1	8.1	31.1	6.9	6.9	31.4	0.0	24.8	31.7	0.0	32.0
Incr Delay (d2), s/veh	16.8	0.6	0.6	22.2	0.4	0.4	0.9	0.0	0.3	0.2	0.0	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.7	2.8	3.4	1.6	1.6	1.5	0.0	1.6	0.3	0.0	0.8
LnGrp Delay(d),s/veh	48.7	8.6	8.6	53.4	7.3	7.3	32.3	0.0	25.1	31.9	0.0	35.2
LnGrp LOS	D	A	A	D	A	A	C		C	C		D
Approach Vol, veh/h		622			461			251			53	
Approach Delay, s/veh		15.2			20.0			29.5			34.2	
Approach LOS		B			B			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	43.0	9.3	7.8	8.6	44.4		17.1				
Change Period (Y+Rc), s	3.5	4.0	4.0	4.0	3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0	16.0	16.0	5.5	17.0		16.0				
Max Q Clear Time (g_c+I1), s	7.1	7.4	5.1	3.5	5.9	5.2		6.1				
Green Ext Time (p_c), s	0.0	2.5	0.2	0.4	0.0	3.0		0.4				

Intersection Summary

HCM 2010 Ctrl Delay 20.1
HCM 2010 LOS C

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Cum + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔	↔		↔	
Volume (veh/h)	0	398	92	62	388	1	32	0	38	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1820	1900	1845	1845	1900	1900	1638	1712	1900	1900	1900
Adj Flow Rate, veh/h	0	480	111	75	467	1	39	0	46	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	3	3	3	0	0	11	0	0	0
Cap, veh/h	0	1847	425	94	2815	6	212	0	80	0	105	0
Arrive On Green	0.00	0.66	0.66	0.05	0.78	0.78	0.06	0.00	0.06	0.00	0.00	0.00
Sat Flow, veh/h	0	2884	642	1757	3588	8	1228	0	1444	0	1900	0
Grp Volume(v), veh/h	0	296	295	75	228	240	39	0	46	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1729	1706	1757	1753	1843	1228	0	1444	0	1900	0
Q Serve(g_s), s	0.0	3.5	3.5	2.1	1.6	1.6	1.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	3.5	3.5	2.1	1.6	1.6	1.5	0.0	1.6	0.0	0.0	0.0
Prop In Lane	0.00		0.38	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1144	1128	94	1375	1446	212	0	80	0	105	0
V/C Ratio(X)	0.00	0.26	0.26	0.80	0.17	0.17	0.18	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1144	1128	193	1375	1446	537	0	462	0	608	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.97	0.97	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	3.5	3.5	23.4	1.3	1.3	23.0	0.0	23.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	5.8	0.3	0.2	0.2	0.0	2.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.8	1.8	1.2	0.9	0.9	0.5	0.0	0.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	4.0	4.0	29.2	1.6	1.6	23.2	0.0	25.4	0.0	0.0	0.0
LnGrp LOS		A	A	C	A	A	C		C			
Approach Vol, veh/h		591			543			85			0	
Approach Delay, s/veh		4.0			5.4			24.4			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.2	37.1		6.8		43.2		6.8				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	5.5	17.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.1	5.5		0.0		3.6		3.6				
Green Ext Time (p_c), s	0.0	5.6		0.0		8.1		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			6.1									
HCM 2010 LOS			A									

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Cum + Proj AM.syn
1/27/2016

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	249	0	18	0	1	0	27	19	0	0	34	369
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	1	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	92	80	92	92	92	80	80	92	92	80	80
Heavy Vehicles, %	7	0	0	2	2	2	0	7	0	0	0	2
Mvmt Flow	311	0	22	0	1	0	34	24	0	0	42	461
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	2	0	0	26	628	2	17	628	5
Stage 1	-	-	-	-	-	-	2	625	-	3	3	-
Stage 2	-	-	-	-	-	-	24	3	-	14	625	-
Critical Hdwy	4.17	-	-	-	-	-	7.1	6.57	-	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.57	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.5	4.063	-	3.5	4	3.318
Pot Cap-1 Maneuver	1587	-	-	-	-	-	990	393	-	1003	402	1078
Stage 1	-	-	-	-	-	-	-	-	-	1025	897	-
Stage 2	-	-	-	-	-	-	999	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1584	-	-	-	-	-	517	315	-	-	322	1074
Mov Cap-2 Maneuver	-	-	-	-	-	-	304	1518	-	-	~ -380	-
Stage 1	-	-	-	-	-	-	-	-	-	822	896	-
Stage 2	-	-	-	-	-	-	542	882	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.3			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	304	-	1584	-	-	-	-	-	-	1074		
HCM Lane V/C Ratio	0.111	-	0.196	-	-	-	-	-	-	0.429		
HCM Control Delay (s)	18.3	-	7.8	-	-	0	-	-	-	10.9		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.4	-	0.7	-	-	-	-	-	-	2.2		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Cum + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (veh/h)	213	40	130	134	38	50	161	1176	37	16	1634	137
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1868	1900	1900	1842	1900	1827	1840	1900	1357	1827	1845
Adj Flow Rate, veh/h	220	81	149	128	81	57	185	1352	43	18	1878	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	3	0	0	0	9	9	4	3	3	40	4	3
Cap, veh/h	294	97	178	151	81	57	163	1832	58	37	1614	729
Arrive On Green	0.17	0.17	0.17	0.08	0.08	0.08	0.09	0.53	0.53	0.03	0.46	0.00
Sat Flow, veh/h	1757	578	1063	1810	977	688	1740	3457	110	1293	3471	1568
Grp Volume(v), veh/h	220	0	230	128	0	138	185	683	712	18	1878	0
Grp Sat Flow(s),veh/h/ln	1757	0	1641	1810	0	1665	1740	1748	1819	1293	1736	1568
Q Serve(g_s), s	10.6	0.0	12.1	6.2	0.0	7.4	8.3	26.8	26.9	1.2	41.3	0.0
Cycle Q Clear(g_c), s	10.6	0.0	12.1	6.2	0.0	7.4	8.3	26.8	26.9	1.2	41.3	0.0
Prop In Lane	1.00		0.65	1.00		0.41	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	294	0	274	151	0	139	163	927	964	37	1614	729
V/C Ratio(X)	0.75	0.00	0.84	0.85	0.00	1.00	1.14	0.74	0.74	0.49	1.16	0.00
Avail Cap(c_a), veh/h	316	0	296	151	0	139	163	927	964	106	1614	729
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.2	0.0	35.8	40.2	0.0	40.7	40.3	16.1	16.1	42.5	23.8	0.0
Incr Delay (d2), s/veh	9.3	0.0	18.3	35.1	0.0	75.0	112.6	3.5	3.4	9.9	81.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	0.0	6.8	4.6	0.0	6.2	9.0	13.6	14.4	0.5	37.6	0.0
LnGrp Delay(d),s/veh	44.5	0.0	54.1	75.3	0.0	115.7	152.8	19.6	19.6	52.5	104.7	0.0
LnGrp LOS	D		D	E		F	F	B	B	D	F	
Approach Vol, veh/h		450			266			1580			1896	
Approach Delay, s/veh		49.4			96.2			35.2			104.2	
Approach LOS		D			F			D			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.0	12.0	46.2		11.6	6.2	52.0				
Change Period (Y+Rc), s		* 4.2	3.7	4.9		4.2	3.7	4.9				
Max Green Setting (Gmax), s		* 16	8.3	41.3		7.4	7.3	42.3				
Max Q Clear Time (g_c+I1), s		14.1	10.3	43.3		9.4	3.2	28.9				
Green Ext Time (p_c), s		0.5	0.0	0.0		0.0	0.0	13.3				

Intersection Summary

HCM 2010 Ctrl Delay 71.8
HCM 2010 LOS E

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Cum + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	402	5	17	18	14	49	19	1414	10	32	1775	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3532		1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3532		1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1644	12	37	2064	816
RTOR Reduction (vph)	0	17	0	0	54	0	0	0	0	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1656	0	37	2064	816
Confl. Peds. (#/hr)				1		1			1			
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59		0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	550	269		96	102	90	66	2089		67	2048	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.47		0.02	c0.60	
v/s Ratio Perm						0.00						c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.79		0.55	1.01	0.53
Uniform Delay, d1	48.1	41.7		52.9	52.9	52.4	55.2	18.5		55.7	23.8	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.6	0.1		1.6	1.5	0.3	3.0	2.5		9.5	21.8	1.3
Delay (s)	60.6	41.8		54.5	54.4	52.7	58.2	21.0		65.2	45.6	1.3
Level of Service	E	D		D	D	D	E	C		E	D	A
Approach Delay (s)		59.6			53.4		21.4				33.5	
Approach LOS		E			D		C				C	

Intersection Summary

HCM 2000 Control Delay 32.4
HCM 2000 Volume to Capacity ratio 0.97
Actuated Cycle Length (s) 117.8
Intersection Capacity Utilization 75.1%
Analysis Period (min) 15
c Critical Lane Group

HCM 2000 Level of Service C
Sum of lost time (s) 17.9
ICU Level of Service D

HCM 2010 Signalized Intersection Summary
9: Carmel Rancho Blvd & Shopping Center Dwy

Cum + Proj AM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰	↱	↰	↱	↰	↱	↰
Volume (veh/h)	56	1	19	9	1	20	18	235	15	76	563	174
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1785	1863	1881	1848	1900	1827	1853	1900
Adj Flow Rate, veh/h	73	1	25	12	1	26	23	305	19	99	731	226
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	0	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	474	7	179	446	24	182	527	1725	107	812	1360	420
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.51	0.51	0.51	0.51	0.51	0.51
Sat Flow, veh/h	1392	62	1545	1086	204	1573	589	3357	208	1029	2646	818
Grp Volume(v), veh/h	73	0	26	13	0	26	23	159	165	99	486	471
Grp Sat Flow(s),veh/h/ln	1392	0	1606	1290	0	1573	589	1755	1810	1029	1761	1704
Q Serve(g_s), s	1.1	0.0	0.3	0.0	0.0	0.3	0.6	1.0	1.1	1.2	4.0	4.0
Cycle Q Clear(g_c), s	1.4	0.0	0.3	0.3	0.0	0.3	4.6	1.0	1.1	2.3	4.0	4.0
Prop In Lane	1.00		0.96	0.92		1.00	1.00		0.11	1.00		0.48
Lane Grp Cap(c), veh/h	474	0	186	470	0	182	527	902	930	812	905	876
V/C Ratio(X)	0.15	0.00	0.14	0.03	0.00	0.14	0.04	0.18	0.18	0.12	0.54	0.54
Avail Cap(c_a), veh/h	1601	0	1486	1558	0	1455	687	1380	1423	1092	1384	1340
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	0.0	8.6	8.5	0.0	8.6	5.1	2.8	2.8	3.4	3.5	3.5
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.1	0.0	0.1	0.1	0.5	0.5	0.3	1.9	1.9
LnGrp Delay(d),s/veh	9.3	0.0	8.7	8.5	0.0	8.7	5.1	2.8	2.8	3.4	3.7	3.7
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		99			39			347			1056	
Approach Delay, s/veh		9.1			8.7			3.0			3.7	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		6.5		15.1		6.5		15.1				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		3.4		6.0		2.3		6.6				
Green Ext Time (p_c), s		0.2		4.5		0.2		4.4				
Intersection Summary												
HCM 2010 Ctrl Delay			4.0									
HCM 2010 LOS			A									

HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Cum + Proj PM.syn
1/27/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↰↱	↰	↰	↰↱	↰
Volume (vph)	0	968	977	105	994	774
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Fit		0.85	1.00	0.85	1.00	1.00
Fit Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2814	1863	1553	3467	1881
Fit Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2814	1863	1553	3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1030	1039	112	1057	823
RTOR Reduction (vph)	0	103	0	5	0	0
Lane Group Flow (vph)	0	927	1039	107	1057	823
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases				2		
Actuated Green, G (s)		20.1	35.1	35.1	20.1	65.0
Effective Green, g (s)		20.1	35.1	35.1	20.1	65.0
Actuated g/C Ratio		0.31	0.54	0.54	0.31	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		870	1006	838	1072	1881
v/s Ratio Prot		c0.33	c0.56		0.30	0.44
v/s Ratio Perm				0.07		
v/c Ratio		1.07	1.03	0.13	0.99	0.44
Uniform Delay, d1		22.4	14.9	7.4	22.3	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		49.5	37.1	0.1	24.0	0.7
Delay (s)		72.0	52.1	7.5	46.3	0.7
Level of Service		E	D	A	D	A
Approach Delay (s)	72.0		47.8			26.4
Approach LOS	E		D			C
Intersection Summary						
HCM 2000 Control Delay			44.0		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.04			
Actuated Cycle Length (s)			65.0		Sum of lost time (s)	9.8
Intersection Capacity Utilization			93.5%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Cum + Proj PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	874	194	402	673	4	277	17	602	4	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (prot)	1805	3539	1615	3467	3571		1715	1728	1599		1887	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (perm)	1805	3539	1615	3467	3571		1715	1728	1599		1887	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	33	930	206	428	716	4	295	18	640	4	24	19
RTOR Reduction (vph)	0	0	122	0	1	0	0	0	536	0	0	19
Lane Group Flow (vph)	33	930	84	428	719	0	156	157	104	0	28	0
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	0%	1%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7		7
Permitted Phases			2									7
Actuated Green, G (s)	1.9	23.9	23.9	9.0	31.1		9.2	9.2	9.0		1.6	1.6
Effective Green, g (s)	1.9	23.9	23.9	9.0	31.1		9.2	9.2	9.0		1.6	1.6
Actuated g/C Ratio	0.03	0.37	0.37	0.14	0.49		0.14	0.14	0.14		0.02	0.02
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	53	1319	602	486	1732		246	248	224		47	38
v/s Ratio Prot	0.02	c0.26		c0.12	0.20		c0.09	0.09	0.06		c0.01	
v/s Ratio Perm			0.05									0.00
v/c Ratio	0.62	0.71	0.14	0.88	0.42		0.63	0.63	0.46		0.60	0.01
Uniform Delay, d1	30.7	17.1	13.3	27.0	10.6		25.9	25.9	25.3		30.9	30.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	15.2	1.4	0.0	16.4	0.1		3.9	3.8	0.6		12.8	0.0
Delay (s)	46.0	18.5	13.3	43.4	10.7		29.8	29.7	25.9		43.7	30.5
Level of Service	D	B	B	D	B		C	C	C		D	C
Approach Delay (s)		18.4			22.9			27.1			38.4	
Approach LOS		B			C			C			D	
Intersection Summary												
HCM 2000 Control Delay		22.7										
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		64.1							20.4			
Intersection Capacity Utilization		76.9%							D			
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Cum + Proj PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	369	83	191	419	358	162	581	166	333	397	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1845	1863	1881	1883	1900
Adj Flow Rate, veh/h	146	377	85	195	428	365	165	593	169	340	405	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	1	2	1	3	2	1	1	1
Cap, veh/h	164	867	193	205	604	504	198	553	473	359	487	54
Arrive On Green	0.09	0.30	0.30	0.11	0.32	0.32	0.11	0.30	0.30	0.10	0.29	0.29
Sat Flow, veh/h	1774	2900	647	1792	1881	1571	1792	1845	1575	3476	1664	185
Grp Volume(V), veh/h	146	230	232	195	428	365	165	593	169	340	0	450
Grp Sat Flow(s),veh/h/ln	1774	1784	1764	1792	1881	1571	1792	1845	1575	1738	0	1849
Q Serve(g_s), s	7.3	9.4	9.5	9.7	18.0	18.5	8.1	27.0	7.6	8.8	0.0	20.5
Cycle Q Clear(g_c), s	7.3	9.4	9.5	9.7	18.0	18.5	8.1	27.0	7.6	8.8	0.0	20.5
Prop In Lane	1.00	0.37	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.0	0.10
Lane Grp Cap(c), veh/h	164	533	527	205	604	504	198	553	473	359	0	541
V/C Ratio(X)	0.89	0.43	0.44	0.95	0.71	0.72	0.83	1.07	0.36	0.95	0.00	0.83
Avail Cap(c_a), veh/h	164	533	527	205	604	504	205	553	473	359	0	541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.4	25.4	25.5	39.6	26.8	27.0	39.2	31.5	24.7	40.1	0.0	29.8
Incr Delay (d2), s/veh	41.0	0.7	0.7	48.9	6.9	8.7	23.7	58.9	0.6	33.8	0.0	10.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	4.7	4.7	7.6	10.4	9.2	5.3	22.7	3.4	5.9	0.0	12.0
LnGrp Delay(d),s/veh	81.5	26.1	26.2	88.5	33.7	35.7	62.9	90.4	25.3	73.9	0.0	40.6
LnGrp LOS	F	C	C	F	C	D	E	F	C	E		D
Approach Vol, veh/h		608			988			927			790	
Approach Delay, s/veh		39.4			45.3			73.6			54.9	
Approach LOS		D			D			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	31.1	13.7	31.2	12.0	33.1	13.0	31.9				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	11.7	11.5	10.1	22.5	9.3	20.5	10.8	29.0				
Green Ext Time (p_c), s	0.0	7.6	0.0	2.3	0.0	5.0	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay				54.4								
HCM 2010 LOS				D								
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Cum + Proj PM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	177	469	138	163	460	47	348	9	170	43	8	86
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1867	1900	1881	1883	1900	1881	1865	1900	1900	1900	1900
Adj Flow Rate, veh/h	179	474	139	165	465	47	352	9	172	43	8	87
Adj No. of Lanes	1	2	0	1	2	0	2	1	0	1	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	0	2	2	1	1	1	1	0	0	0	0	0
Cap, veh/h	168	1238	360	166	1499	151	461	23	434	220	13	142
Arrive On Green	0.09	0.46	0.46	0.09	0.46	0.46	0.13	0.29	0.29	0.10	0.10	0.10
Sat Flow, veh/h	1810	2708	789	1792	3281	330	3476	79	1517	1222	136	1481
Grp Volume(v), veh/h	179	309	304	165	253	259	352	0	181	43	0	95
Grp Sat Flow(s),veh/h/ln	1810	1774	1724	1792	1789	1823	1738	0	1597	1222	0	1617
Q Serve(g_s), s	6.5	8.0	8.1	6.4	6.3	6.3	6.8	0.0	6.4	2.3	0.0	3.9
Cycle Q Clear(g_c), s	6.5	8.0	8.1	6.4	6.3	6.3	6.8	0.0	6.4	2.3	0.0	3.9
Prop In Lane	1.00		0.46	1.00		0.18	1.00		0.95	1.00		0.92
Lane Grp Cap(c), veh/h	168	810	788	166	817	833	461	0	457	220	0	156
V/C Ratio(X)	1.07	0.38	0.39	0.99	0.31	0.31	0.76	0.00	0.40	0.20	0.00	0.61
Avail Cap(c_a), veh/h	168	810	788	166	817	833	794	0	457	382	0	370
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	0.78	0.98	0.98	0.98	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.8	12.5	12.5	31.7	12.0	12.0	29.3	0.0	20.1	29.6	0.0	30.4
Incr Delay (d2), s/veh	79.6	1.1	1.1	66.5	1.0	1.0	1.0	0.0	0.2	0.4	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	4.1	4.1	6.2	3.3	3.4	3.3	0.0	2.8	0.8	0.0	1.9
LnGrp Delay(d),s/veh	111.3	13.6	13.6	98.3	13.0	13.0	30.3	0.0	20.3	30.1	0.0	34.2
LnGrp LOS	F	B	B	F	B	B	C		C	C		C
Approach Vol, veh/h		792			677			533			138	
Approach Delay, s/veh		35.7			33.8			26.9			32.9	
Approach LOS		D			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	36.0	13.3	10.7	10.0	36.0		24.0				
Change Period (Y+Rc), s	3.5	4.0	4.0	4.0	3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0	16.0	16.0	6.5	16.0		16.0				
Max Q Clear Time (g_c+I1), s	8.4	10.1	8.8	5.9	8.5	8.3		8.4				
Green Ext Time (p_c), s	0.0	2.6	0.4	0.5	0.0	3.2		0.9				
Intersection Summary												
HCM 2010 Ctrl Delay			32.7									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Cum + Proj PM.syn
1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	628	54	85	584	0	86	0	111	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1881	1900	1900	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	647	56	88	602	0	89	0	114	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
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
Percent Heavy Veh, %	0	2	2	2	1	1	0	0	0	0	0	0
Cap, veh/h	0	1976	171	111	2617	0	297	0	174	0	205	0
Arrive On Green	0.00	0.60	0.60	0.06	0.73	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	0	3390	285	1774	3668	0	1422	0	1611	0	1900	0
Grp Volume(v), veh/h	0	347	356	88	602	0	89	0	114	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1812	1774	1787	0	1422	0	1611	0	1900	0
Q Serve(g_s), s	0.0	4.9	4.9	2.4	2.7	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	4.9	4.9	2.4	2.7	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Prop In Lane	0.00		0.16	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1060	1086	111	2617	0	297	0	174	0	205	0
V/C Ratio(X)	0.00	0.33	0.33	0.79	0.23	0.00	0.30	0.00	0.66	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1060	1086	231	2617	0	599	0	515	0	608	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.88	0.88	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.0	5.0	23.1	2.2	0.0	21.2	0.0	21.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.7	4.6	0.2	0.0	0.2	0.0	1.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.5	2.6	1.3	1.3	0.0	1.2	0.0	1.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	5.7	5.7	27.7	2.4	0.0	21.4	0.0	23.0	0.0	0.0	0.0
LnGrp LOS		A	A	C	A		C		C			
Approach Vol, veh/h		703			690			203			0	
Approach Delay, s/veh		5.7			5.6			22.3			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	34.0		9.4		40.6		9.4				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.4	6.9		0.0		4.7		5.4				
Green Ext Time (p_c), s	0.0	5.9		0.0		10.5		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			7.8									
HCM 2010 LOS			A									

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Cum + Proj PM.syn
1/27/2016

Intersection												
Int Delay, s/veh		3.6										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	496	0	74	0	1	0	38	27	0	0	27	506
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	92	91	92	92	92	91	91	92	92	91	91
Heavy Vehicles, %	2	0	0	0	0	0	4	0	0	0	0	1
Mvmt Flow	545	0	81	0	1	0	42	30	0	0	30	556
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1	0	0	2	0	0	18	1093	2	18	1093	1
Stage 1	-	-	-	-	-	-	2	1092	-	1	1	-
Stage 2	-	-	-	-	-	-	16	1	-	17	1092	-
Critical Hdwy	4.12	-	-	-	-	-	7.14	6.5	-	7.1	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.536	4	-	3.5	4	3.309
Pot Cap-1 Maneuver	1622	-	-	-	-	-	991	216	-	1001	216	1087
Stage 1	-	-	-	-	-	-	-	-	-	1027	899	-
Stage 2	-	-	-	-	-	-	998	899	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	-	-	-	585	143	-	-	143	1087
Mov Cap-2 Maneuver	-	-	-	-	-	-	251	~ -283	-	-	~ -32	-
Stage 1	-	-	-	-	-	-	-	-	-	682	899	-
Stage 2	-	-	-	-	-	-	471	899	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.3			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	251	-	1622	-	-	-	-	-	-	1087		
HCM Lane V/C Ratio	0.166	-	0.336	-	-	-	-	-	-	0.512		
HCM Control Delay (s)	22.2	-	8.3	-	-	0	-	-	-	11.7		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.6	-	1.5	-	-	-	-	-	-	3		

Notes
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Cum + Proj PM.syn
1/27/2016

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Volume (veh/h)	277	22	233	34	13	18	285	1661	10	13	1550	153			
Number	5	2	12	1	6	16	3	8	18	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1871	1900	1863	1763	1900	1900	1845	1900	1900	1881	1881			
Adj Flow Rate, veh/h	280	40	245	34	16	19	300	1748	11	14	1632	0			
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1			
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			
Percent Heavy Veh, %	2	7	7	2	5	5	0	3	3	0	1	1			
Cap, veh/h	332	42	257	114	46	55	292	1906	12	42	1414	633			
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.16	0.53	0.53	0.02	0.40	0.00			
Sat Flow, veh/h	1774	224	1375	1774	717	852	1810	3571	22	1810	3574	1599			
Grp Volume(v), veh/h	280	0	285	34	0	35	300	857	902	14	1632	0			
Grp Sat Flow(s),veh/h/ln	1774	0	1599	1774	0	1569	1810	1753	1841	1810	1787	1599			
Q Serve(g_s), s	13.5	0.0	15.6	1.6	0.0	1.9	14.3	39.6	39.7	0.7	35.1	0.0			
Cycle Q Clear(g_c), s	13.5	0.0	15.6	1.6	0.0	1.9	14.3	39.6	39.7	0.7	35.1	0.0			
Prop In Lane	1.00		0.86	1.00		0.54	1.00		0.01	1.00		1.00			
Lane Grp Cap(c), veh/h	332	0	299	114	0	101	292	936	983	42	1414	633			
V/C Ratio(X)	0.84	0.00	0.95	0.30	0.00	0.35	1.03	0.92	0.92	0.34	1.15	0.00			
Avail Cap(c_a), veh/h	332	0	299	140	0	124	292	936	983	149	1414	633			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	34.8	0.0	35.7	39.6	0.0	39.7	37.2	18.9	18.9	42.7	26.8	0.0			
Incr Delay (d2), s/veh	17.9	0.0	39.4	2.0	0.0	2.9	60.3	13.8	13.4	4.7	77.9	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.3	0.0	10.2	0.9	0.0	0.9	11.9	22.6	23.7	0.4	32.4	0.0			
LnGrp Delay(d),s/veh	52.7	0.0	75.1	41.6	0.0	42.6	97.5	32.7	32.3	47.3	104.7	0.0			
LnGrp LOS	D		E	D		D	F	C	C	D	F				
Approach Vol, veh/h	565			69			2059			1646					
Approach Delay, s/veh	64.0			42.1			42.0			104.2					
Approach LOS	E			D			D			F					
Timer	1	2	3	4	5	6	7	8							
Assigned Phs	2	3	4			6	7	8							
Phs Duration (G+Y+Rc), s	20.8	18.0	40.0			9.9	5.7	52.3							
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9							
Max Green Setting (Gmax), s	* 17	14.3	35.1			7.0	7.3	42.1							
Max Q Clear Time (g_c+I1), s	17.6	16.3	37.1			3.9	2.7	41.7							
Green Ext Time (p_c), s	0.0	0.0	0.0			0.1	0.0	0.4							

Intersection Summary												
HCM 2010 Ctrl Delay		68.4										
HCM 2010 LOS		E										

Notes
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Cum + Proj PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Volume (vph)	982	17	17	23	12	52	13	1909	14	54	1741	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Flt Protected	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3535		1805	3574	1583
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3535		1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1989	15	56	1814	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	1	0	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	2003	0	56	1814	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Effective Green, g (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48		0.04	0.50	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	1038	521		85	87	80	39	1684		80	1797	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.57		0.03	0.51	
v/s Ratio Perm						0.00						c0.49
v/c Ratio	0.99	0.04		0.21	0.21	0.03	0.36	1.19		0.70	1.01	0.49
Uniform Delay, d1	48.9	34.8		64.5	64.4	63.9	68.1	36.9		66.5	35.1	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1		2.1	2.0	0.3	5.6	91.6		23.4	23.6	1.1
Delay (s)	73.3	34.9		66.6	66.5	64.2	73.6	128.6		90.0	58.7	1.1
Level of Service	E	C		E	E	E	E	F		F	E	A
Approach Delay (s)		72.0			65.1			128.2			42.4	
Approach LOS		E			E			F			D	
Intersection Summary												
HCM 2000 Control Delay		77.9							E			
HCM 2000 Volume to Capacity ratio		1.08										
Actuated Cycle Length (s)		141.2						17.9				
Intersection Capacity Utilization		99.3%						F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

9: Carmel Rancho Blvd & Shopping Center Dwy

Cum + Proj PM.syn

1/27/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Volume (veh/h)	183	10	22	40	10	30	39	606	18	11	458	89
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99	0.99	0.99	0.99	0.99	1.00	0.99	1.00	0.99	1.00	0.99	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1887	1900	1900	1800	1863	1881	1846	1900	1827	1851	1900
Adj Flow Rate, veh/h	197	11	24	43	11	32	42	652	19	12	492	96
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
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
Percent Heavy Veh, %	2	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	609	136	298	525	105	408	538	1450	42	502	1222	237
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1347	525	1145	1015	402	1569	830	3480	101	747	2933	569
Grp Volume(V), veh/h	197	0	35	54	0	32	42	328	343	12	294	294
Grp Sat Flow(S), veh/h/ln	1347	0	1669	1417	0	1569	830	1754	1827	747	1758	1744
Q Serve(g_s), s	3.2	0.0	0.4	0.1	0.0	0.4	0.9	3.3	3.3	0.3	2.9	2.9
Cycle Q Clear(g_c), s	3.8	0.0	0.4	0.6	0.0	0.4	3.9	3.3	3.3	3.6	2.9	2.9
Prop In Lane	1.00		0.69	0.80		1.00	1.00		0.06	1.00		0.33
Lane Grp Cap(c), veh/h	609	0	434	630	0	408	538	731	761	502	732	726
V/C Ratio(X)	0.32	0.00	0.08	0.09	0.00	0.08	0.08	0.45	0.45	0.02	0.40	0.40
Avail Cap(c_a), veh/h	1348	0	1350	1389	0	1268	763	1205	1256	704	1208	1198
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.4	0.0	6.9	7.0	0.0	6.9	6.4	5.2	5.2	6.5	5.1	5.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.0	0.1	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.2	0.3	0.0	0.2	0.2	1.6	1.7	0.1	1.4	1.4
LnGrp Delay(d), s/veh	8.6	0.0	6.9	7.0	0.0	6.9	6.4	5.3	5.3	6.5	5.2	5.2
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		232			86			713			600	
Approach Delay, s/veh		8.3			7.0			5.4			5.2	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.4		14.3		10.4		14.3				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		5.8		5.6		2.6		5.9				
Green Ext Time (p_c), s		0.6		4.2		0.6		4.1				
Intersection Summary												
HCM 2010 Ctrl Delay				5.8								
HCM 2010 LOS				A								

HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Existing + Proj AM-Miti.syn
1/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰	↰↱	↰	↰↱		↰↱	↰	↰
Volume (veh/h)	133	222	36	126	179	155	23	228	82	298	355	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1836	1900	1827	1827	1759
Adj Flow Rate, veh/h	145	241	39	137	195	168	25	248	89	324	386	45
Adj No. of Lanes	1	2	0	1	1	2	1	2	0	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	4	4	4	8
Cap, veh/h	220	658	105	217	391	583	77	565	197	519	605	491
Arrive On Green	0.12	0.22	0.22	0.12	0.22	0.22	0.05	0.22	0.22	0.15	0.33	0.33
Sat Flow, veh/h	1774	3023	483	1774	1810	2701	1675	2532	885	3375	1827	1484
Grp Volume(v), veh/h	145	138	142	137	195	168	25	169	168	324	386	45
Grp Sat Flow(s),veh/h/ln	1774	1750	1756	1774	1810	1351	1675	1744	1673	1688	1827	1484
Q Serve(g_s), s	4.5	3.9	4.0	4.3	5.5	3.0	0.8	4.8	5.1	5.2	10.4	1.2
Cycle Q Clear(g_c), s	4.5	3.9	4.0	4.3	5.5	3.0	0.8	4.8	5.1	5.2	10.4	1.2
Prop In Lane	1.00		0.27	1.00		1.00	1.00		0.53	1.00		1.00
Lane Grp Cap(c), veh/h	220	381	382	217	391	583	77	389	373	519	605	491
V/C Ratio(X)	0.66	0.36	0.37	0.63	0.50	0.29	0.33	0.43	0.45	0.62	0.64	0.09
Avail Cap(c_a), veh/h	283	838	841	283	867	1294	230	779	747	597	887	721
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.3	19.4	19.4	24.3	20.1	19.1	26.9	19.5	19.6	23.1	16.5	13.4
Incr Delay (d2), s/veh	3.6	0.7	0.7	3.0	1.2	0.3	2.4	0.9	1.0	1.6	1.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	2.0	2.0	2.3	2.9	1.1	0.4	2.4	2.4	2.5	5.5	0.5
LnGrp Delay(d),s/veh	27.9	20.1	20.1	27.3	21.3	19.4	29.4	20.4	20.6	24.7	17.9	13.5
LnGrp LOS	C	C	C	C	C	B	C	C	C	C	B	B
Approach Vol, veh/h		425			500			362			755	
Approach Delay, s/veh		22.8			22.3			21.1			20.6	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.8	16.9	6.4	24.2	10.9	16.8	12.7	17.9				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	6.3	6.0	2.8	12.4	6.5	7.5	7.2	7.1				
Green Ext Time (p_c), s	0.1	4.4	0.0	4.5	0.1	4.3	0.3	4.8				

Intersection Summary												
HCM 2010 Ctrl Delay			21.5									
HCM 2010 LOS			C									

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Existing + Proj AM-Miti.syn
1/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰		↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	402	5	17	18	14	49	19	1234	10	32	1569	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1435	12	37	1824	816
RTOR Reduction (vph)	0	17	0	0	0	54	0	0	5	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1435	7	37	1824	816
Confl. Peds. (#/hr)				1		1			1		1	
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6	69.6	4.5	70.1	117.7
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6	69.6	4.5	70.1	117.7
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59	0.59	0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	551	269		96	102	90	66	2092	824	67	2047	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.41		0.02	c0.53	
v/s Ratio Perm						0.00			0.01			c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.69	0.01	0.55	0.89	0.53
Uniform Delay, d1	48.0	41.7		52.8	52.8	52.4	55.1	16.5	9.9	55.6	20.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.4	0.1		1.6	1.5	0.3	3.0	1.2	0.0	9.5	5.7	1.3
Delay (s)	60.4	41.8		54.5	54.3	52.6	58.1	17.8	9.9	65.1	26.2	1.3
Level of Service	E	D		D	D	D	E	B	A	E	C	A
Approach Delay (s)		59.4			53.3			18.3			19.2	
Approach LOS		E			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	117.7	Sum of lost time (s)	17.9
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Existing + Proj PM-Miti.syn
1/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (veh/h)	143	350	83	167	402	298	162	427	157	268	309	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1849	1900	1881	1881	1900
Adj Flow Rate, veh/h	146	357	85	170	410	304	165	436	160	273	315	45
Adj No. of Lanes	1	2	0	1	1	2	1	2	0	2	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	1	2	1	3	3	1	1	0
Cap, veh/h	177	950	223	206	652	959	201	626	228	374	459	390
Arrive On Green	0.10	0.33	0.33	0.11	0.35	0.35	0.11	0.25	0.25	0.11	0.24	0.24
Sat Flow, veh/h	1774	2868	675	1792	1881	2767	1792	2522	917	3476	1881	1598
Grp Volume(v), veh/h	146	220	222	170	410	304	165	303	293	273	315	45
Grp Sat Flow(s),veh/h/ln	1774	1784	1759	1792	1881	1383	1792	1757	1681	1738	1881	1598
Q Serve(g_s), s	6.7	7.9	8.0	7.7	15.2	6.7	7.5	13.0	13.3	6.3	12.7	1.8
Cycle Q Clear(g_c), s	6.7	7.9	8.0	7.7	15.2	6.7	7.5	13.0	13.3	6.3	12.7	1.8
Prop In Lane	1.00		0.38	1.00		1.00	1.00		0.55	1.00		1.00
Lane Grp Cap(c), veh/h	177	591	582	206	652	959	201	436	418	374	459	390
V/C Ratio(X)	0.83	0.37	0.38	0.83	0.63	0.32	0.82	0.69	0.70	0.73	0.69	0.12
Avail Cap(c_a), veh/h	177	591	582	221	652	959	221	569	544	388	586	498
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.8	21.3	21.3	36.1	22.8	20.0	36.2	28.5	28.5	36.0	28.6	24.5
Incr Delay (d2), s/veh	26.5	0.5	0.5	20.9	4.6	0.9	20.0	2.8	3.2	6.6	2.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	3.9	4.0	5.0	8.7	2.7	4.8	6.6	6.5	3.4	6.9	0.8
LnGrp Delay(d),s/veh	63.3	21.8	21.8	57.0	27.3	20.9	56.2	31.3	31.7	42.6	31.3	24.7
LnGrp LOS	E	C	C	E	C	C	E	C	C	D	C	C
Approach Vol, veh/h		588			884			761			633	
Approach Delay, s/veh		32.1			30.8			36.9			35.7	
Approach LOS		C			C			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.3	31.8	13.0	25.3	12.0	33.1	12.7	25.6				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	9.7	10.0	9.5	14.7	8.7	17.2	8.3	15.3				
Green Ext Time (p_c), s	0.0	7.6	0.0	4.7	0.0	6.1	0.1	4.8				

Intersection Summary												
HCM 2010 Ctrl Delay			33.8									
HCM 2010 LOS			C									

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Existing + Proj PM-Miti.syn
1/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	982	17	17	23	12	52	13	1623	14	54	1475	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Fit	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Fit Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1691	15	56	1536	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	0	8	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1691	7	56	1536	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	2%	3%	0%	1%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	42.3	42.3		7.0	7.0	7.0	3.1	67.8	67.8	6.2	71.4	141.2
Effective Green, g (s)	42.3	42.3		7.0	7.0	7.0	3.1	67.8	67.8	6.2	71.4	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48	0.48	0.04	0.51	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	1028	516		85	87	80	39	1699	752	79	1807	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.48		0.03	0.43	
v/s Ratio Perm						0.00			0.00			c0.49
v/c Ratio	1.00	0.05		0.21	0.21	0.03	0.36	1.00	0.01	0.71	0.85	0.49
Uniform Delay, d1	49.3	35.1		64.5	64.4	63.9	68.1	36.5	19.2	66.6	30.3	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.8	0.1		2.1	2.0	0.3	5.6	20.6	0.0	25.1	4.4	1.1
Delay (s)	76.1	35.2		66.6	66.5	64.2	73.6	57.2	19.2	91.7	34.7	1.1
Level of Service	E	D		E	E	E	E	E	B	F	C	A
Approach Delay (s)		74.7			65.1			57.0			25.0	
Approach LOS		E			E			E			C	
Intersection Summary												
HCM 2000 Control Delay		46.3										
HCM 2000 Volume to Capacity ratio		0.97										
Actuated Cycle Length (s)		141.2								17.9		
Intersection Capacity Utilization		91.0%								E		
Analysis Period (min)		15										
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Back + Proj AM-Miti.syn
1/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↱	↰↱	↰	↰↱		↰↱	↱	↰
Volume (veh/h)	133	222	36	133	179	155	23	233	82	298	355	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1836	1900	1827	1827	1759
Adj Flow Rate, veh/h	145	241	39	145	195	168	25	253	89	324	386	45
Adj No. of Lanes	1	2	0	1	1	2	1	2	0	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	4	4	4	8
Cap, veh/h	220	652	104	220	390	583	77	571	196	518	606	493
Arrive On Green	0.12	0.22	0.22	0.12	0.22	0.22	0.05	0.22	0.22	0.15	0.33	0.33
Sat Flow, veh/h	1774	3023	482	1774	1810	2701	1675	2546	873	3375	1827	1484
Grp Volume(v), veh/h	145	138	142	145	195	168	25	171	171	324	386	45
Grp Sat Flow(s),veh/h/ln	1774	1750	1756	1774	1810	1351	1675	1744	1675	1688	1827	1484
Q Serve(g_s), s	4.6	3.9	4.0	4.6	5.5	3.0	0.8	4.9	5.1	5.2	10.4	1.2
Cycle Q Clear(g_c), s	4.6	3.9	4.0	4.6	5.5	3.0	0.8	4.9	5.1	5.2	10.4	1.2
Prop In Lane	1.00		0.27	1.00		1.00	1.00		0.52	1.00		1.00
Lane Grp Cap(c), veh/h	220	377	379	220	390	583	77	391	376	518	606	493
V/C Ratio(X)	0.66	0.37	0.37	0.66	0.50	0.29	0.33	0.44	0.45	0.63	0.64	0.09
Avail Cap(c_a), veh/h	283	806	809	313	865	1291	230	777	746	596	886	720
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.4	19.5	19.5	24.4	20.1	19.1	27.0	19.5	19.6	23.1	16.5	13.4
Incr Delay (d2), s/veh	3.7	0.7	0.7	3.3	1.2	0.3	2.4	0.9	1.0	1.6	1.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	2.0	2.0	2.4	2.9	1.1	0.4	2.5	2.5	2.5	5.5	0.5
LnGrp Delay(d),s/veh	28.0	20.2	20.3	27.7	21.3	19.5	29.4	20.4	20.6	24.8	17.9	13.5
LnGrp LOS	C	C	C	C	C	B	C	C	C	C	B	B
Approach Vol, veh/h		425			508			367			755	
Approach Delay, s/veh		22.9			22.5			21.1			20.6	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.9	16.8	6.4	24.3	10.9	16.8	12.7	18.0				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	6.6	6.0	2.8	12.4	6.6	7.5	7.2	7.1				
Green Ext Time (p_c), s	0.1	4.4	0.0	4.5	0.1	4.3	0.3	4.8				

Intersection Summary												
HCM 2010 Ctrl Delay		21.6										
HCM 2010 LOS		C										

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Back + Proj AM-Miti.syn
1/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰		↰	↱	↰	↰	↱	↰	↰	↱	↰
Volume (vph)	402	5	17	18	14	49	19	1295	10	32	1620	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1506	12	37	1884	816
RTOR Reduction (vph)	0	17	0	0	0	54	0	0	5	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1506	7	37	1884	816
Confl. Peds. (#/hr)				1		1			1		1	
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	18.4	18.4		6.9	6.9	6.9	4.6	70.6	70.6	4.5	71.0	118.3
Effective Green, g (s)	18.4	18.4		6.9	6.9	6.9	4.6	70.6	70.6	4.5	71.0	118.3
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.60	0.60	0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	533	261		97	103	91	67	2112	832	67	2063	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.43		0.02	c0.55	
v/s Ratio Perm						0.00			0.01			c0.53
v/c Ratio	0.88	0.03		0.19	0.18	0.04	0.33	0.71	0.01	0.55	0.91	0.53
Uniform Delay, d1	48.8	42.4		53.0	53.0	52.6	55.3	16.7	9.7	55.9	20.9	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.7	0.1		1.6	1.5	0.3	2.9	1.4	0.0	9.5	7.1	1.3
Delay (s)	64.6	42.5		54.6	54.5	52.8	58.2	18.2	9.7	65.4	28.0	1.3
Level of Service	E	D		D	D	D	E	B	A	E	C	A
Approach Delay (s)		63.4			53.5			18.7			20.5	
Approach LOS		E			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	118.3	Sum of lost time (s)	17.9
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Back + Proj PM-Miti.syn
1/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (veh/h)	143	350	83	176	402	298	162	437	157	268	309	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1849	1900	1881	1881	1900
Adj Flow Rate, veh/h	146	357	85	180	410	304	165	446	160	273	315	45
Adj No. of Lanes	1	2	0	1	1	2	1	2	0	2	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	1	2	1	3	3	1	1	0
Cap, veh/h	176	931	219	216	650	956	200	635	226	373	463	393
Arrive On Green	0.10	0.32	0.32	0.12	0.35	0.35	0.11	0.25	0.25	0.11	0.25	0.25
Sat Flow, veh/h	1774	2868	675	1792	1881	2767	1792	2538	903	3476	1881	1599
Grp Volume(v), veh/h	146	220	222	180	410	304	165	308	298	273	315	45
Grp Sat Flow(s),veh/h/ln	1774	1784	1759	1792	1881	1383	1792	1757	1684	1738	1881	1599
Q Serve(g_s), s	6.8	8.0	8.1	8.2	15.2	6.8	7.5	13.3	13.5	6.4	12.7	1.8
Cycle Q Clear(g_c), s	6.8	8.0	8.1	8.2	15.2	6.8	7.5	13.3	13.5	6.4	12.7	1.8
Prop In Lane	1.00		0.38	1.00		1.00	1.00		0.54	1.00		1.00
Lane Grp Cap(c), veh/h	176	579	571	216	650	956	200	440	422	373	463	393
V/C Ratio(X)	0.83	0.38	0.39	0.83	0.63	0.32	0.82	0.70	0.71	0.73	0.68	0.11
Avail Cap(c_a), veh/h	176	579	571	221	650	956	221	567	544	387	585	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.0	21.8	21.8	36.0	22.9	20.1	36.3	28.5	28.6	36.1	28.6	24.5
Incr Delay (d2), s/veh	26.9	0.5	0.5	22.9	4.6	0.9	20.1	3.0	3.4	6.7	2.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	4.0	4.0	5.4	8.7	2.7	4.8	6.8	6.6	3.4	6.9	0.8
LnGrp Delay(d),s/veh	63.9	22.3	22.3	58.9	27.5	21.0	56.5	31.5	31.9	42.8	31.2	24.6
LnGrp LOS	E	C	C	E	C	C	E	C	C	D	C	C
Approach Vol, veh/h		588			894			771			633	
Approach Delay, s/veh		32.6			31.6			37.0			35.7	
Approach LOS		C			C			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.8	31.3	13.1	25.5	12.0	33.1	12.7	25.8				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	10.2	10.1	9.5	14.7	8.8	17.2	8.4	15.5				
Green Ext Time (p_c), s	0.0	7.5	0.0	4.7	0.0	6.0	0.1	4.8				

Intersection Summary

HCM 2010 Ctrl Delay	34.2
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Back + Proj PM-Miti.syn
1/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	982	17	17	23	12	52	13	1691	14	54	1551	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Fit	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Fit Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1761	15	56	1616	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	0	8	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1761	7	56	1616	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	2%	3%	0%	1%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	41.3	41.3		7.0	7.0	7.0	3.1	68.8	68.8	6.2	72.4	141.2
Effective Green, g (s)	41.3	41.3		7.0	7.0	7.0	3.1	68.8	68.8	6.2	72.4	141.2
Actuated g/C Ratio	0.29	0.29		0.05	0.05	0.05	0.02	0.49	0.49	0.04	0.51	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	1004	503		85	87	80	39	1724	764	79	1832	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.50		0.03	0.45	
v/s Ratio Perm						0.00			0.00			c0.49
v/c Ratio	1.02	0.05		0.21	0.21	0.03	0.36	1.02	0.01	0.71	0.88	0.49
Uniform Delay, d1	49.9	35.8		64.5	64.4	63.9	68.1	36.2	18.6	66.6	30.6	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.2	0.1		2.1	2.0	0.3	5.6	27.3	0.0	25.1	5.8	1.1
Delay (s)	83.2	35.9		66.6	66.5	64.2	73.6	63.5	18.7	91.7	36.4	1.1
Level of Service	F	D		E	E	E	E	E	B	F	D	A
Approach Delay (s)		81.6			65.1			63.2			26.5	
Approach LOS		F			E			E			C	
Intersection Summary												
HCM 2000 Control Delay		50.1										
HCM 2000 Volume to Capacity ratio		1.00										
Actuated Cycle Length (s)		141.2								17.9		
Intersection Capacity Utilization		92.8%								F		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Cum + Proj AM-Miti.syn

1/28/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↔↔	↕↕		↕↕	↕↕
Volume (vph)	0	855	543	61	1142	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9	4.0
Lane Util. Factor		0.88	0.95		0.97	1.00
Frt		0.85	0.98		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		2760	3469		3335	1759
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		2760	3469		3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	929	590	66	1241	908
RTOR Reduction (vph)	0	183	9	0	0	0
Lane Group Flow (vph)	0	746	647	0	1241	908
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type		Over	NA		Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases						
Actuated Green, G (s)		25.2	15.9		25.2	50.9
Effective Green, g (s)		25.2	15.9		25.2	50.9
Actuated g/C Ratio		0.50	0.31		0.50	1.00
Clearance Time (s)		4.9	4.9		4.9	
Vehicle Extension (s)		4.5	3.5		4.5	
Lane Grp Cap (vph)		1366	1083		1651	1759
v/s Ratio Prot		0.27	0.19		c0.37	0.52
v/s Ratio Perm						
v/c Ratio		0.55	0.60		0.75	0.52
Uniform Delay, d1		8.9	14.8		10.3	0.0
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.7	0.9		2.2	1.1
Delay (s)		9.6	15.7		12.6	1.1
Level of Service		A	B		B	A
Approach Delay (s)	9.6		15.7			7.7
Approach LOS	A		B			A
Intersection Summary						
HCM 2000 Control Delay		9.6		HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio		0.72				
Actuated Cycle Length (s)		50.9		Sum of lost time (s)	9.8	
Intersection Capacity Utilization		57.7%		ICU Level of Service	B	
Analysis Period (min)		15				
c Critical Lane Group						

HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Cum + Proj AM-Miti.syn

1/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕		↔	↕	↕↕	↔	↕↕		↕↕	↕	↔
Volume (veh/h)	133	230	36	142	185	177	23	294	86	326	468	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1835	1900	1827	1827	1759
Adj Flow Rate, veh/h	145	250	39	154	201	192	25	320	93	354	509	45
Adj No. of Lanes	1	2	0	1	1	2	1	2	0	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	4	4	4	8
Cap, veh/h	209	647	100	211	388	579	75	698	199	484	657	534
Arrive On Green	0.12	0.21	0.21	0.12	0.21	0.21	0.05	0.26	0.26	0.14	0.36	0.36
Sat Flow, veh/h	1774	3040	468	1774	1810	2701	1675	2674	764	3375	1827	1485
Grp Volume(V), veh/h	145	143	146	154	201	192	25	207	206	354	509	45
Grp Sat Flow(s),veh/h/ln	1774	1750	1758	1774	1810	1351	1675	1743	1695	1688	1827	1485
Q Serve(g_s), s	4.9	4.4	4.5	5.2	6.1	3.8	0.9	6.2	6.4	6.3	15.5	1.3
Cycle Q Clear(g_c), s	4.9	4.4	4.5	5.2	6.1	3.8	0.9	6.2	6.4	6.3	15.5	1.3
Prop In Lane	1.00	0.27	1.00		1.00	1.00	1.00	0.45	1.00		1.00	
Lane Grp Cap(c), veh/h	209	373	374	211	388	579	75	455	442	484	657	534
V/C Ratio(X)	0.70	0.38	0.39	0.73	0.52	0.33	0.33	0.45	0.47	0.73	0.78	0.08
Avail Cap(c_a), veh/h	264	780	784	264	807	1204	214	724	704	555	826	671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	21.1	21.1	26.6	21.7	20.8	29.0	19.4	19.5	25.6	17.8	13.2
Incr Delay (d2), s/veh	5.6	0.8	0.8	7.5	1.3	0.4	2.5	0.9	0.9	4.2	3.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	2.2	2.2	3.0	3.2	1.4	0.5	3.1	3.1	3.2	8.5	0.5
LnGrp Delay(d),s/veh	32.1	21.9	22.0	34.1	23.0	21.2	31.5	20.3	20.4	29.9	21.7	13.3
LnGrp LOS	C	C	C	C	C	C	C	C	C	C	C	B
Approach Vol, veh/h		434			547			438			908	
Approach Delay, s/veh		25.3			25.5			21.0			24.5	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.2	17.5	6.5	27.4	11.1	17.6	12.7	21.2				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	7.2	6.5	2.9	17.5	6.9	8.1	8.3	8.4				
Green Ext Time (p_c), s	0.1	4.7	0.0	4.7	0.1	4.5	0.3	6.1				
Intersection Summary												
HCM 2010 Ctrl Delay			24.2									
HCM 2010 LOS			C									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Cum + Proj AM-Miti.syn

1/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱	↰	↱	↱	↰	↱	↱
Volume (vph)	402	5	17	18	14	49	19	1414	10	32	1775	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1644	12	37	2064	816
RTOR Reduction (vph)	0	17	0	0	0	54	0	0	5	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1644	7	37	2064	816
Confl. Peds. (#/hr)				1		1			1		1	
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	17.2	17.2		6.9	6.9	6.9	4.6	71.7	71.7	4.5	72.1	118.2
Effective Green, g (s)	17.2	17.2		6.9	6.9	6.9	4.6	71.7	71.7	4.5	72.1	118.2
Actuated g/C Ratio	0.15	0.15		0.06	0.06	0.06	0.04	0.61	0.61	0.04	0.61	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	499	244		97	104	91	67	2146	846	67	2097	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.46		0.02	c0.60	
v/s Ratio Perm						0.00			0.01			c0.53
v/c Ratio	0.94	0.04		0.19	0.18	0.04	0.33	0.77	0.01	0.55	0.98	0.53
Uniform Delay, d1	50.0	43.4		53.0	53.0	52.5	55.3	17.1	9.2	55.9	22.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.6	0.1		1.6	1.5	0.3	2.9	2.0	0.0	9.5	16.1	1.3
Delay (s)	75.5	43.5		54.6	54.4	52.8	58.2	19.1	9.2	65.4	38.6	1.3
Level of Service	E	D		D	D	D	E	B	A	E	D	A
Approach Delay (s)		73.8			53.5			19.5			28.5	
Approach LOS		E			D			B			C	

Intersection Summary												
HCM 2000 Control Delay		30.4		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio		0.97										
Actuated Cycle Length (s)		118.2				Sum of lost time (s)		17.9				
Intersection Capacity Utilization		75.1%				ICU Level of Service		D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Cum + Proj PM-Miti.syn

1/28/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↰	↱		↰	↱
Volume (vph)	0	968	977	105	994	774
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9	4.0
Lane Util. Factor		0.88	0.95		0.97	1.00
Flt		0.85	0.99		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		2814	3481		3467	1881
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		2814	3481		3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1030	1039	112	1057	823
RTOR Reduction (vph)	0	95	5	0	0	0
Lane Group Flow (vph)	0	935	1146	0	1057	823
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA		Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases						
Actuated Green, G (s)		20.3	26.8		20.3	56.9
Effective Green, g (s)		20.3	26.8		20.3	56.9
Actuated g/C Ratio		0.36	0.47		0.36	1.00
Clearance Time (s)		4.9	4.9		4.9	
Vehicle Extension (s)		4.5	3.5		4.5	
Lane Grp Cap (vph)		1003	1639		1236	1881
v/s Ratio Prot		c0.33	c0.33		0.30	0.44
v/s Ratio Perm						
v/c Ratio		0.93	0.70		0.86	0.44
Uniform Delay, d1		17.6	11.9		16.9	0.0
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		15.1	1.4		6.4	0.7
Delay (s)		32.7	13.2		23.4	0.7
Level of Service		C	B		C	A
Approach Delay (s)	32.7		13.2			13.5
Approach LOS	C		B			B
Intersection Summary						
HCM 2000 Control Delay		18.3		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.80				
Actuated Cycle Length (s)		56.9		Sum of lost time (s)		9.8
Intersection Capacity Utilization		72.4%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

HCM 2010 Signalized Intersection Summary 3: SR 1 & Rio Rd

Cum + Proj PM-Miti.syn
1/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (veh/h)	143	369	83	191	419	358	162	581	166	333	397	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1849	1900	1881	1881	1900
Adj Flow Rate, veh/h	146	377	85	195	428	365	165	593	169	340	405	45
Adj No. of Lanes	1	2	0	1	1	2	1	2	0	2	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	1	2	1	3	3	1	1	0
Cap, veh/h	169	894	199	211	623	916	199	751	213	370	515	438
Arrive On Green	0.10	0.31	0.31	0.12	0.33	0.33	0.11	0.28	0.28	0.11	0.27	0.27
Sat Flow, veh/h	1774	2900	647	1792	1881	2766	1792	2698	767	3476	1881	1600
Grp Volume(v), veh/h	146	230	232	195	428	365	165	386	376	340	405	45
Grp Sat Flow(s),veh/h/ln	1774	1784	1764	1792	1881	1383	1792	1756	1708	1738	1881	1600
Q Serve(g_s), s	7.1	9.0	9.1	9.4	17.2	8.9	7.9	17.7	17.8	8.5	17.4	1.8
Cycle Q Clear(g_c), s	7.1	9.0	9.1	9.4	17.2	8.9	7.9	17.7	17.8	8.5	17.4	1.8
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	169	550	543	211	623	916	199	489	475	370	515	438
V/C Ratio(X)	0.87	0.42	0.43	0.92	0.69	0.40	0.83	0.79	0.79	0.92	0.79	0.10
Avail Cap(c_a), veh/h	169	550	543	211	623	916	211	543	528	370	560	477
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.9	24.0	24.1	38.1	25.3	22.5	38.0	29.1	29.2	38.6	29.3	23.7
Incr Delay (d2), s/veh	34.5	0.6	0.6	40.9	6.1	1.3	22.2	7.3	7.6	27.3	7.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	4.5	4.5	7.1	10.0	3.5	5.1	9.6	9.4	5.5	10.0	0.8
LnGrp Delay(d),s/veh	73.5	24.6	24.7	79.0	31.4	23.8	60.2	36.4	36.8	65.9	36.4	23.8
LnGrp LOS	E	C	C	E	C	C	E	D	D	E	D	C
Approach Vol, veh/h		608			988			927			790	
Approach Delay, s/veh		36.4			38.0			40.8			48.4	
Approach LOS		D			D			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	31.1	13.4	28.8	12.0	33.1	13.0	29.2				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+H1), s	11.4	11.1	9.9	19.4	9.1	19.2	10.5	19.8				
Green Ext Time (p_c), s	0.0	7.8	0.0	4.0	0.0	5.7	0.0	4.3				

Intersection Summary												
HCM 2010 Ctrl Delay			41.0									
HCM 2010 LOS			D									

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis 8: SR 1 & Carpenter St

Cum + Proj PM-Miti.syn
1/28/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	982	17	17	23	12	52	13	1909	14	54	1741	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Flt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1989	15	56	1814	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	0	7	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1989	8	56	1814	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	2%	3%	0%	1%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	39.2	39.2		7.0	7.0	7.0	3.1	70.8	70.8	6.2	74.4	141.1
Effective Green, g (s)	39.2	39.2		7.0	7.0	7.0	3.1	70.8	70.8	6.2	74.4	141.1
Actuated g/C Ratio	0.28	0.28		0.05	0.05	0.05	0.02	0.50	0.50	0.04	0.53	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	953	478		85	88	80	39	1775	786	79	1884	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.56		0.03	0.51	
v/s Ratio Perm						0.00			0.00			c0.49
v/c Ratio	1.07	0.05		0.21	0.20	0.03	0.36	1.12	0.01	0.71	0.96	0.49
Uniform Delay, d1	50.9	37.3		64.4	64.4	63.8	68.0	35.1	17.6	66.6	32.0	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	51.0	0.1		2.1	2.0	0.3	5.6	62.4	0.0	25.1	13.3	1.1
Delay (s)	101.9	37.4		66.5	66.4	64.1	73.6	97.6	17.6	91.7	45.3	1.1
Level of Service	F	D		E	E	E	E	F	B	F	D	A
Approach Delay (s)		99.7			65.1			96.8			33.3	
Approach LOS		F			E			F			C	
Intersection Summary												
HCM 2000 Control Delay		67.9										
HCM 2000 Volume to Capacity ratio		1.07										
Actuated Cycle Length (s)		141.1								17.9		
Intersection Capacity Utilization		98.9%								F		
Analysis Period (min)		15										
c Critical Lane Group												

Appendix F

Road Segment Level of Service Calculation Worksheets

Arterial Level of Service

Existing AM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	28.0	43.6	0.12	9.5	D
Total		IV		47.9	31.2	79.1	0.38	17.5	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.6	22.7	0.12	18.3	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.2	42.5	0.27	22.9	B
Total		IV		51.4	13.8	65.2	0.39	21.3	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	6.6	31.6	0.11	12.9	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	1.3	12.3	0.04	12.2	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.7	37.8	0.17	16.1	C
Total				132.2	39.5	171.7	0.76	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.2	32.3	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	4.6	15.6	0.04	9.6	D
13	From Crossroads Blvd to SR 1	IV	25	25.0	30.8	55.8	0.11	7.3	E
5	From SR 1 to Atherton Dr	IV	25	79.2	0.0	79.2	0.43	19.6	B
Total				145.3	37.6	182.9	0.77	15.1	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Existing + Project AM

Existing + Project AM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	28.0	43.6	0.12	9.5	D	28.0	43.6	0.12	9.5	D
Total		IV		47.9	31.2	79.1	0.38	17.5	C	31.2	79.1	0.38	17.5	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.6	22.7	0.12	18.3	C	3.6	22.7	0.12	18.3	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.2	42.5	0.27	22.9	B	10.2	42.5	0.27	22.9	B
Total		IV		51.4	13.8	65.2	0.39	21.3	B	13.8	65.2	0.39	21.3	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.8	89.9	0.43	17.3	C	22.9	89.0	0.43	17.5	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	6.7	31.7	0.11	12.9	D	6.7	31.7	0.11	12.9	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	1.3	12.3	0.04	12.2	D	1.3	12.3	0.04	12.2	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.7	37.8	0.17	16.1	C	7.7	37.8	0.17	16.1	C
Total				132.2	39.5	171.7	0.76	15.8	C	38.6	170.8	0.76	15.9	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.2	32.3	0.18	20.3	B	2.2	32.3	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	4.6	15.6	0.04	9.6	D	4.6	15.6	0.04	9.6	D
13	From Crossroads Blvd to SR 1	IV	25	25.0	30.8	55.8	0.11	7.3	E	29.5	54.5	0.11	7.5	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				132.2	37.6	169.8	0.77	16.3	C	36.3	168.5	0.77	16.4	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Existing PM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.6	38.9	0.27	24.9	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	30.9	46.5	0.12	8.9	E
Total		IV		47.9	37.5	85.4	0.38	16.2	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	5.7	24.8	0.12	16.8	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.7	43.0	0.27	22.6	B
Total		IV		51.4	16.4	67.8	0.39	20.5	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.7	89.8	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	9.9	34.9	0.11	11.7	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	2.6	13.6	0.04	11.0	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.1	37.7	0.18	17.1	C
Total				131.7	44.3	176.0	0.77	15.7	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.3	32.9	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	7.0	18.0	0.04	8.3	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.5	56.5	0.11	7.2	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				131.7	41.8	173.5	0.77	15.9	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Existing + Project PM

Existing + Project PM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.6	38.9	0.27	24.9	B	6.6	38.9	0.27	24.9	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	31.0	46.6	0.12	8.9	E	31.0	46.6	0.12	8.9	E
Total		IV		47.9	37.6	85.5	0.38	16.2	C	37.6	85.5	0.38	16.2	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	5.7	24.8	0.12	16.8	C	5.7	24.8	0.12	16.8	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.7	43.0	0.27	22.6	B	10.7	43.0	0.27	22.6	B
Total		IV		51.4	16.4	67.8	0.39	20.5	B	16.4	67.8	0.39	20.5	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.8	89.9	0.43	17.3	C	22.0	88.1	0.43	17.6	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	10.0	35.0	0.11	11.7	D	10.0	35.0	0.11	11.7	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	2.6	13.6	0.04	11.0	D	2.6	13.6	0.04	11.0	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.1	37.7	0.18	17.1	C	8.1	37.7	0.18	17.1	C
Total				131.7	44.5	176.2	0.77	15.7	C	42.7	174.4	0.77	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.3	32.9	0.18	19.6	B	3.3	32.9	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	7.0	18.0	0.04	8.3	E	7.0	18.0	0.04	8.3	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.6	56.6	0.11	7.2	E	28.8	53.8	0.11	7.6	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				131.7	41.9	173.6	0.77	15.9	C	39.1	170.8	0.77	16.1	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Background AM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	29.5	45.1	0.12	9.2	D
Total		IV		47.9	32.7	80.6	0.38	17.2	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.7	22.8	0.12	18.2	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.4	42.7	0.27	22.8	B
Total		IV		51.4	14.1	65.5	0.39	21.2	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	7.4	32.4	0.11	12.6	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	1.4	12.4	0.04	12.1	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.8	37.9	0.17	16.0	C
Total				132.2	40.5	172.7	0.76	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.2	32.3	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	4.6	15.6	0.04	9.6	D
13	From Crossroads Blvd to SR 1	IV	25	25.0	30.8	55.8	0.11	7.3	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				132.2	37.6	169.8	0.77	16.3	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Background + Project AM

Background + Project AM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	29.6	45.2	0.12	9.2	D	29.6	45.2	0.12	9.2	D
Total		IV		47.9	32.8	80.7	0.38	17.2	C	32.8	80.7	0.38	17.2	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.8	22.9	0.12	18.2	C	3.8	22.9	0.12	18.2	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.4	42.7	0.27	22.8	B	10.4	42.7	0.27	22.8	B
Total		IV		51.4	14.2	65.6	0.39	21.2	B	14.2	65.6	0.39	21.2	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C	23.7	89.8	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	7.4	32.4	0.11	12.6	D	7.4	32.4	0.11	12.6	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	1.4	12.4	0.04	12.1	D	1.4	12.4	0.04	12.1	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.8	37.9	0.17	16.0	C	7.8	37.9	0.17	16.0	C
Total				132.2	40.5	172.7	0.76	15.8	C	40.3	172.5	0.76	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.2	32.3	0.18	20.3	B	2.2	32.3	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	4.6	15.6	0.04	9.6	D	4.6	15.6	0.04	9.6	D
13	From Crossroads Blvd to SR 1	IV	25	25.0	30.9	55.9	0.11	7.3	E	29.6	54.6	0.11	7.5	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				132.2	37.7	169.9	0.77	16.3	C	36.4	168.6	0.77	16.4	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Background PM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.7	39.0	0.27	24.8	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	33.0	48.6	0.12	8.6	E
Total		IV		47.9	39.7	87.6	0.38	15.8	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	5.8	24.9	0.12	16.7	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.9	43.2	0.27	22.5	B
Total		IV		51.4	16.7	68.1	0.39	20.4	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	10.1	35.1	0.11	11.7	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	2.7	13.7	0.04	10.9	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.1	37.7	0.18	17.1	C
Total				131.7	44.8	176.5	0.77	15.6	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.3	32.9	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	6.9	17.9	0.04	8.4	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.7	56.7	0.11	7.2	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				131.7	41.9	173.6	0.77	15.9	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Background + Project PM

Background + Project PM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.8	39.1	0.27	24.8	B	6.8	39.1	0.27	24.8	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	33.1	48.7	0.12	8.5	E	33.1	48.7	0.12	8.5	E
Total		IV		47.9	39.9	87.8	0.38	15.8	C	39.9	87.8	0.38	15.8	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	5.9	25.0	0.12	16.6	C	5.9	25.0	0.12	16.6	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.9	43.2	0.27	22.5	B	10.9	43.2	0.27	22.5	B
Total		IV		51.4	16.8	68.2	0.39	20.4	B	16.8	68.2	0.39	20.4	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C	22.1	88.2	0.43	17.6	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	10.2	35.2	0.11	11.6	D	10.2	35.2	0.11	11.6	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	2.8	13.8	0.04	10.9	D	2.8	13.8	0.04	10.9	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.1	37.7	0.18	17.1	C	8.1	37.7	0.18	17.1	C
Total				131.7	45.0	176.7	0.77	15.6	C	43.2	174.9	0.77	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.3	32.9	0.18	19.6	B	3.3	32.9	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	7.0	18.0	0.04	8.3	E	7.0	18.0	0.04	8.3	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.8	56.8	0.11	7.2	E	28.9	53.9	0.11	7.6	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				131.7	42.1	173.8	0.77	15.9	C	39.2	170.9	0.77	16.1	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Cumulative AM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.3	35.6	0.27	27.2	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	29.9	45.5	0.12	9.1	D
Total		IV		47.9	33.2	81.1	0.38	17.1	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.9	23.0	0.12	18.1	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.9	43.2	0.27	22.5	B
Total		IV		51.4	14.8	66.2	0.39	21.0	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	24.7	90.8	0.43	17.1	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	12.5	37.5	0.11	10.9	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	5.9	16.9	0.04	8.9	E
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.8	37.9	0.17	16.0	C
Total				132.2	50.9	183.1	0.76	14.9	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.3	32.4	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	11.1	22.1	0.04	6.8	F
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.7	56.7	0.11	7.2	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				132.2	45.1	177.3	0.77	15.6	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Cumulative Plus Project AM

Cumulative Plus Project AM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	30.0	45.6	0.12	9.1	D	30.0	45.6	0.12	9.1	D
Total		IV		47.9	33.2	81.1	0.38	17.1	C	33.2	81.1	0.38	17.1	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.9	23.0	0.12	18.1	C	3.9	23.0	0.12	18.1	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.9	43.2	0.27	22.5	B	10.9	43.2	0.27	22.5	B
Total		IV		51.4	14.8	66.2	0.39	21.0	B	14.8	66.2	0.39	21.0	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	24.7	90.8	0.43	17.1	C	23.9	90.0	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	12.6	37.6	0.11	10.9	D	11.3	36.3	0.11	11.3	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	5.9	16.9	0.04	8.9	E	5.9	16.9	0.04	8.9	E
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.8	37.9	0.17	16.0	C	7.8	37.9	0.17	16.0	C
Total				132.2	51.0	183.2	0.76	14.8	C	48.9	181.1	0.76	15.0	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.3	32.4	0.18	20.3	B	2.3	32.4	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	11.2	22.2	0.04	6.8	F	10.0	21.0	0.04	7.1	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.7	56.7	0.11	7.2	E	30.7	55.7	0.11	7.3	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				132.2	45.2	177.4	0.77	15.6	C	43.0	175.2	0.77	15.8	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Cumulative PM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	7.0	39.3	0.27	24.6	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	34.7	50.3	0.12	8.3	E
Total		IV		47.9	41.7	89.6	0.38	15.4	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	6.2	25.3	0.12	16.4	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	11.7	44.0	0.27	22.1	B
Total		IV		51.4	17.9	69.3	0.39	20.0	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	25.1	91.2	0.43	17.0	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	19.5	44.5	0.11	9.2	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	8.2	19.2	0.04	7.8	E
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.3	37.9	0.18	17.0	C
Total				131.7	61.1	192.8	0.77	14.3	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.4	33.0	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	20.3	31.3	0.04	4.8	F
13	From Crossroads Blvd to SR 1	IV	25	25.0	34.3	59.3	0.11	6.9	F
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				131.7	58.0	189.7	0.77	14.6	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Cumulative Plus Project PM

Cumulative Plus Project PM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.9	39.2	0.27	24.7	B	6.9	39.2	0.27	24.7	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	34.9	50.5	0.12	8.2	E	34.9	50.5	0.12	8.2	E
Total		IV		47.9	41.8	89.7	0.38	15.4	C	41.8	89.7	0.38	15.4	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	6.1	25.2	0.12	16.5	C	6.1	25.2	0.12	16.5	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	11.7	44.0	0.27	22.1	B	11.7	44.0	0.27	22.1	B
Total		IV		51.4	17.8	69.2	0.39	20.1	B	17.8	69.2	0.39	20.1	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	25.2	91.3	0.43	17.0	C	24.1	90.2	0.43	17.2	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	19.8	44.8	0.11	9.1	D	18.9	43.9	0.11	9.3	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	8.3	19.3	0.04	7.8	E	8.3	19.3	0.04	7.8	E
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.3	37.9	0.18	17.0	C	8.3	37.9	0.18	17.0	C
Total				131.7	61.6	193.3	0.77	14.3	C	59.6	191.3	0.77	14.4	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.4	33.0	0.18	19.6	B	3.4	33.0	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	20.4	31.4	0.04	4.8	F	19.5	30.5	0.04	4.9	F
13	From Crossroads Blvd to SR 1	IV	25	25.0	34.5	59.5	0.11	6.9	F	32.5	57.5	0.11	7.1	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				131.7	58.3	190.0	0.77	14.5	C	55.4	187.1	0.77	14.8	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Appendix G

Approved Projects Trip Generation

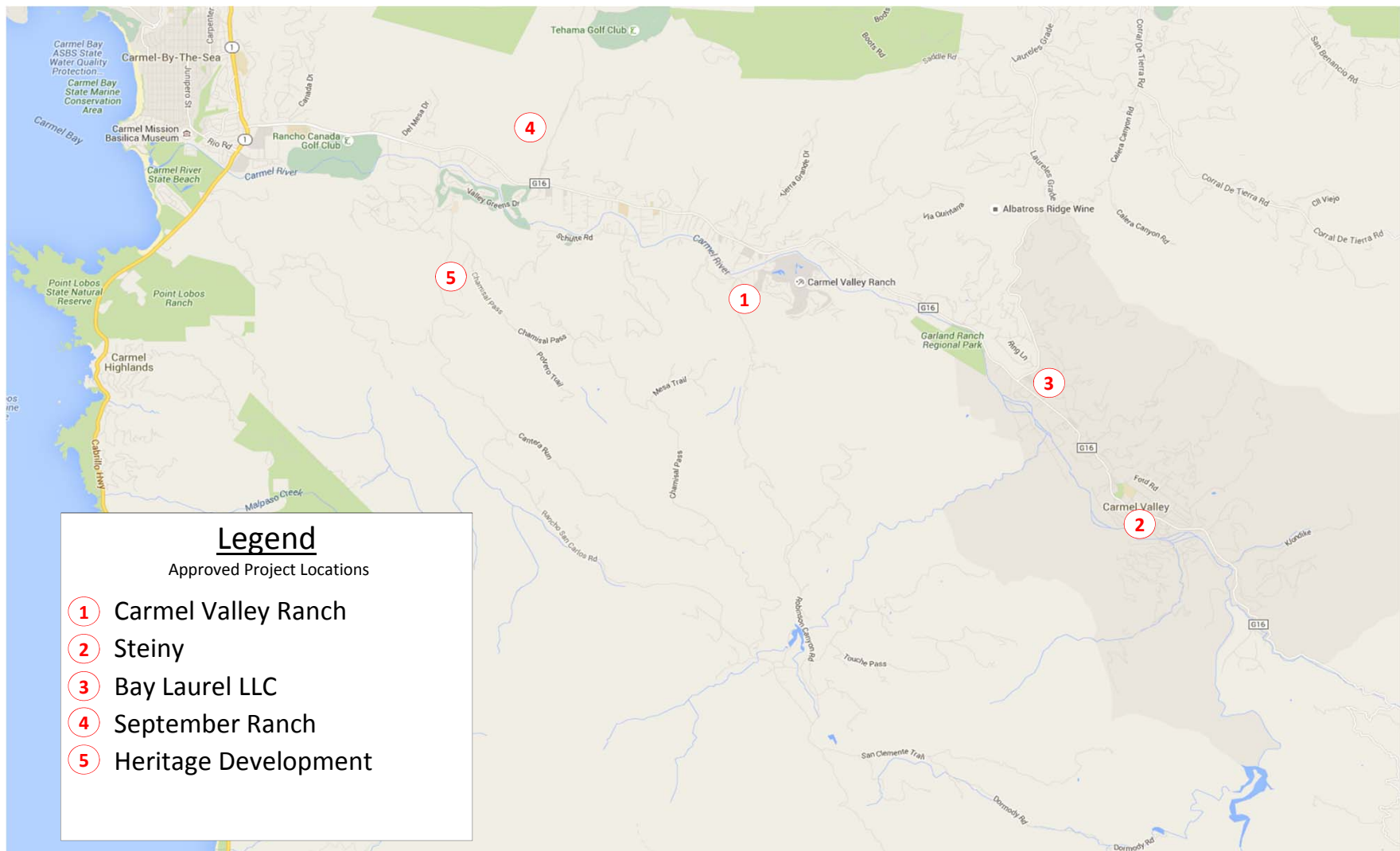
TRIP GENERATION FOR APPROVED PROJECTS											
PROJECT		DAILY TRIP RATE	DAILY TRIPS	AM PEAK HOUR				PM PEAK HOUR			
				PEAK HOUR VOL.	(% OF DAILY)	IN	OUT	PEAK HOUR VOL.	(% OF DAILY)	IN	OUT
1. Carmel Valley Ranch	47 units	8.92	419	17	(4%)	12	5	23	(5%)	10	13
2. Steiny	-										
Comercial Retail	15,500 S.F.	0.04	687	42	(6%)	18	24	78	(11%)	44	34
Apartments	16 units	6.65	106	8	(8%)	2	6	10	(9%)	2	8
3. Bay Laurel LLC ²	16 rooms	8.92	143	11	(8%)	6	5	11	(8%)	5	6
4. September Ranch	-										
Residential lots	95 units	9.52	904	71	(8%)	18	53	95	(11%)	60	35
Equestrian center ³	50 stables	2.21	111	7	(6%)	5	2	14	(13%)	7	7
5. Heritage Development	3 units	9.52	29	2	(7%)	0	2	3	(11%)	2	1
TOTAL APPROVED PROJECTS			2,399	158	(7%)	61	97	234	(10%)	130	104

Notes:

1. Traffic volumes are based on trip generation rates quoted by the Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, 2012, unless otherwise noted.
2. *Bernardus Lodge Expansion Traffic Impact Analysis*, Higgins Associates, September 15, 2008.
3. *Monterey Downs and Monterey Horse Park and Central Coast Veterans Cemetary Specific Plan* RBF Consulting, March 2015.

Appendix H

Approved Projects Location Map



Map Source: Google Maps, 2015

Appendix I

Cumulative Projects Trip Generation

TRIP GENERATION FOR CUMULATIVE PROJECTS

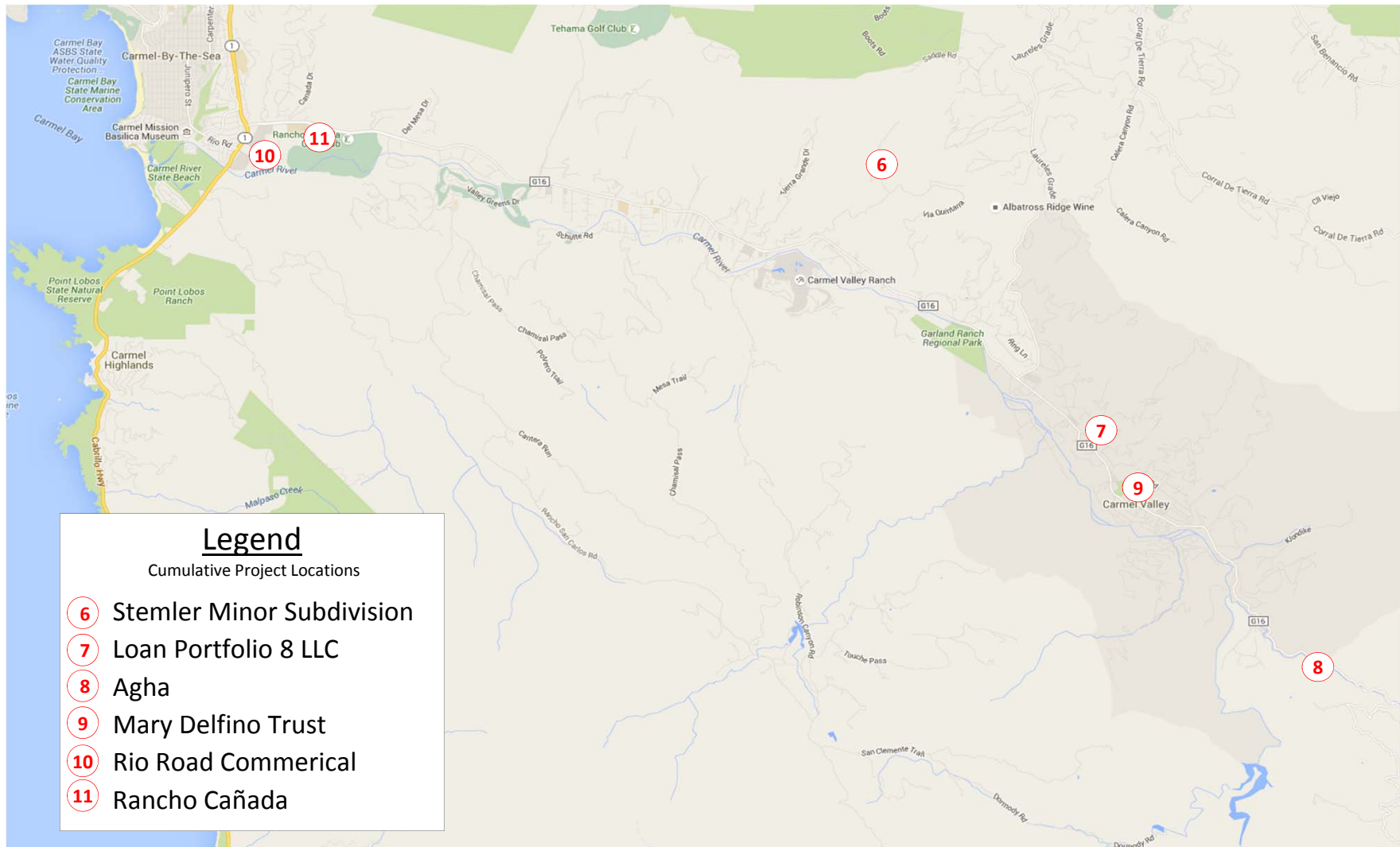
0.10224		DAILY TRIP RATE DAILY TRIPS		AM PEAK HOUR				PM PEAK HOUR			
				PEAK HOUR VOL.	(% OF DAILY)	IN	OUT	PEAK HOUR VOL.	(% OF DAILY)	IN	OUT
PROJECT	SIZE										
6. Stemler Minor Subdivision	2 units	9.52	19	2	(11%)	0	2	2	(11%)	2	0
7. Loan Portfolio 8 LLC	-										
Demolition of exisiting hotel/spa	-22 units	8.92	-196	-8	(4%)	-6	-2	-11	(6%)	-5	-6
Development of resort hotel	60 units	8.92	535	22	(4%)	16	6	29	(5%)	12	17
8. Agha	20 lots	9.52	190	15	(8%)	4	11	20	(11%)	13	7
9. Mary Delfino Trust	-										
Single Family Lots	18 units	9.52	171	14	(8%)	4	10	18	(11%)	11	7
Multi-Family Lots	6 units	6.65	40	3	(8%)	1	2	4	(10%)	1	3
10. Rio Road Commercial											
Grocery Store	30,000 S.F.	0.10	3,067	102	(3%)	63	39	284	(9%)	145	139
Retail	14,500 S.F.	0.04	643	39	(6%)	17	22	73	(11%)	41	32
11. Rancho Cañada	130 lots	9.52	1,238	98	(8%)	25	73	130	(11%)	82	48
TOTAL CUMULATIVE PROJECTS			5,707	287	5%	124	163	549	10%	302	247

Notes:

1. Traffic volumes are based on trip generation rates quoted by the Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, 2012, unless otherwise noted.

Appendix J

Cumulative Projects Location Map



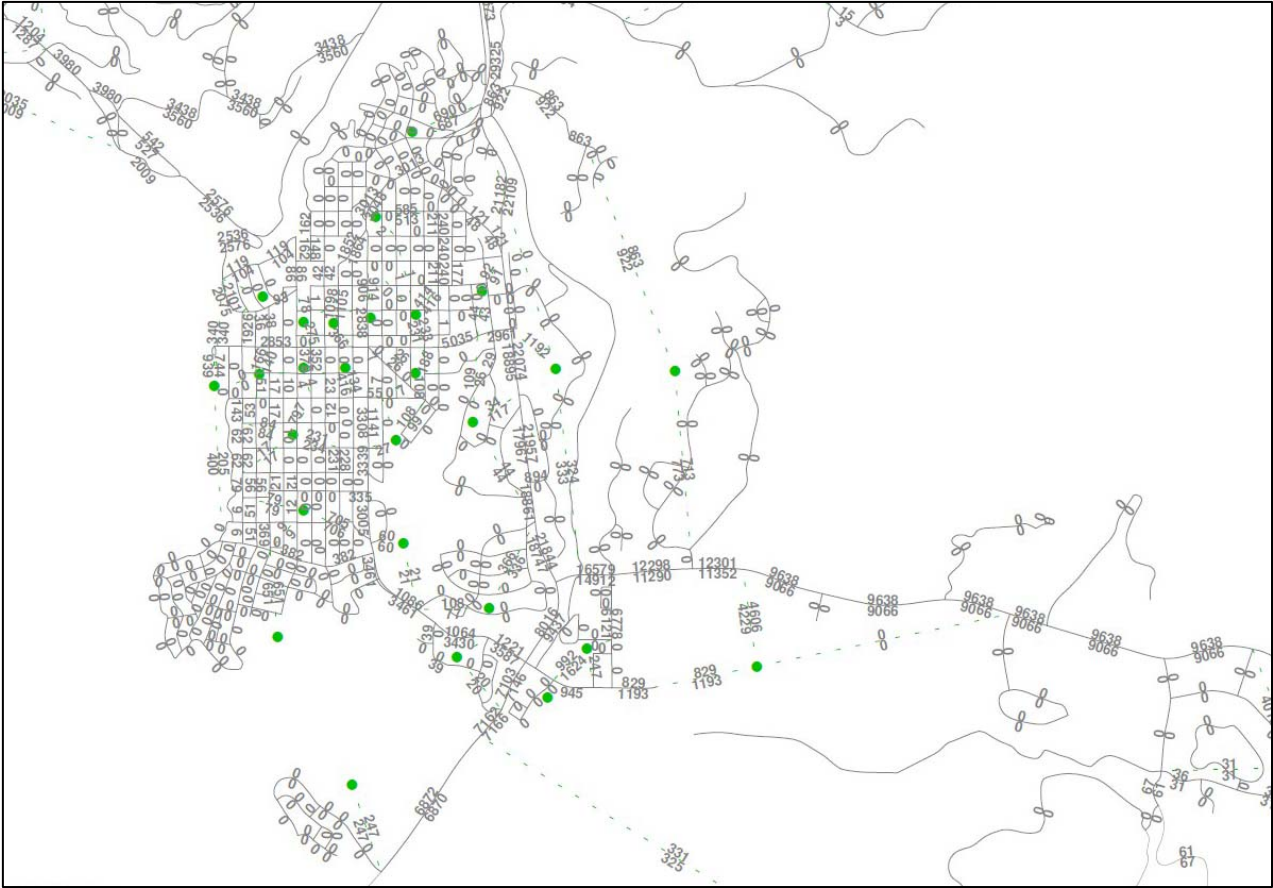
Map Source: Google Maps, 2015

Appendix K

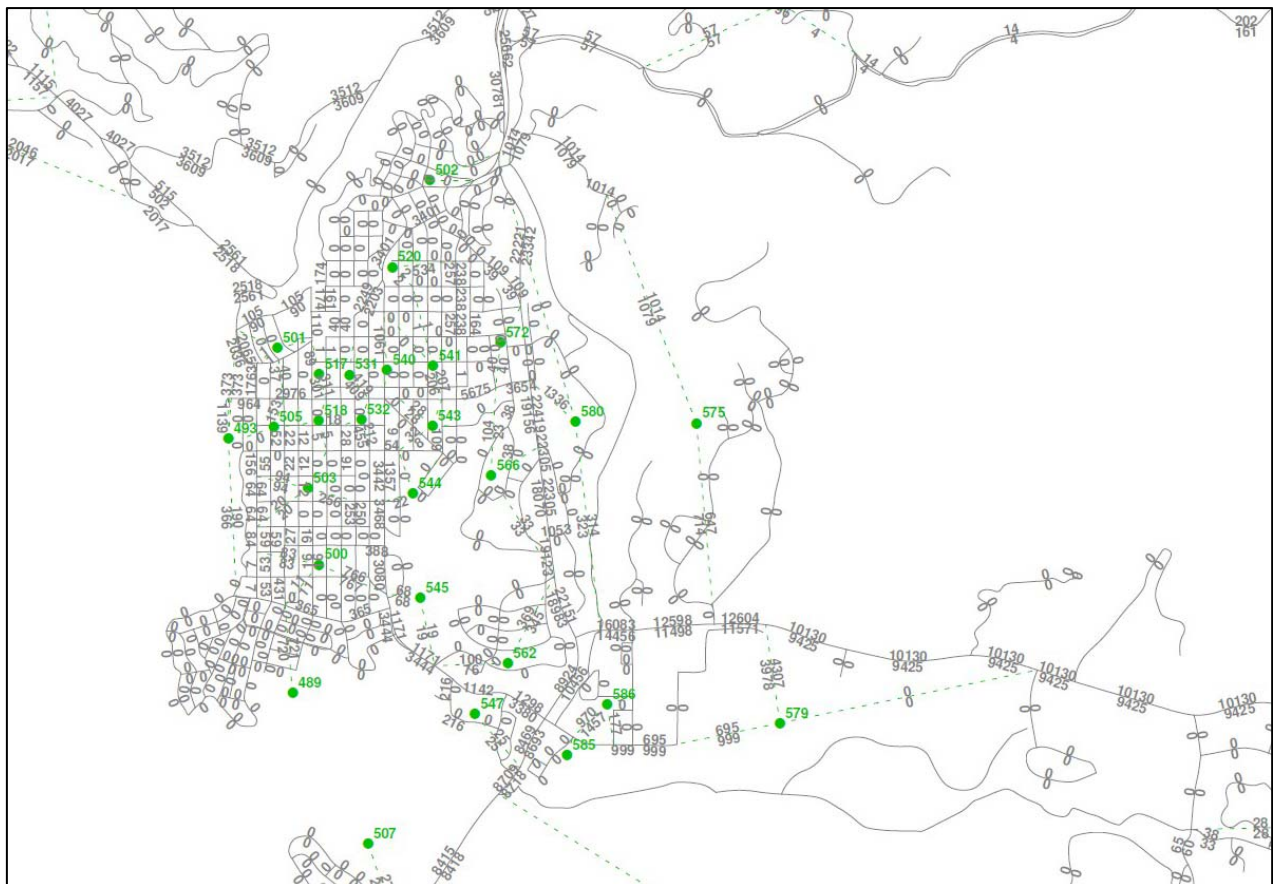
AMBAG Model Plots

Appendix K

AMBAG 2014 Daily Traffic Volumes Model Plot



AMBAG 2035 Daily Traffic Volumes Model Plot



Appendix L

Project Alternative Scenarios Intersection LOS Calculations

HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Existing + Proj Alt 1 AM.syn

3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	733	458	54	1059	694
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2760	1863	1509	3335	1759
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2760	1863	1509	3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	797	498	59	1151	754
RTOR Reduction (vph)	0	259	0	12	0	0
Lane Group Flow (vph)	0	538	498	47	1151	754
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA	Perm	Prot	NA	
Protected Phases	3	2		3	Free	
Permitted Phases			2			
Actuated Green, G (s)		25.1	20.6	20.6	25.1	55.5
Effective Green, g (s)		25.1	20.6	20.6	25.1	55.5
Actuated g/C Ratio		0.45	0.37	0.37	0.45	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)	1248	691	560	1508	1759	
v/s Ratio Prot	0.19	c0.27		c0.35	0.43	
v/s Ratio Perm			0.03			
v/c Ratio	0.43	0.72	0.08	0.76	0.43	
Uniform Delay, d1	10.3	15.0	11.3	12.7	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	3.8	0.1	2.6	0.8	
Delay (s)	10.8	18.8	11.4	15.4	0.8	
Level of Service		B	B	B	A	
Approach Delay (s)	10.8		18.0		9.6	
Approach LOS	B		B		A	
Intersection Summary						
HCM 2000 Control Delay		11.3		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.74				
Actuated Cycle Length (s)		55.5		Sum of lost time (s)	9.8	
Intersection Capacity Utilization		62.5%		ICU Level of Service	B	
Analysis Period (min)		15				
c Critical Lane Group						

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HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Existing + Proj Alt 1 AM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	685	401	395	612	5	86	5	258	10	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (prot)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1560
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (perm)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1560
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	31	778	456	449	695	6	98	6	293	11	19	38
RTOR Reduction (vph)	0	0	291	0	1	0	0	0	244	0	0	37
Lane Group Flow (vph)	31	778	165	449	700	0	52	52	49	0	30	1
Confl. Peds. (#/hr)	2		1				1			1		2
Heavy Vehicles (%)	4%	7%	2%	1%	3%	0%	6%	0%	6%	30%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.8	20.2	20.2	9.3	27.8		4.3	4.3	9.3		1.5	1.5
Effective Green, g (s)	1.8	20.2	20.2	9.3	27.8		4.3	4.3	9.3		1.5	1.5
Actuated g/C Ratio	0.03	0.36	0.36	0.17	0.50		0.08	0.08	0.17		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	56	1223	566	578	1747		124	126	254		45	42
v/s Ratio Prot	0.02	c0.23		c0.13	0.20		c0.03	0.03	0.03		c0.02	
v/s Ratio Perm			0.11									0.00
v/c Ratio	0.55	0.64	0.29	0.78	0.40		0.42	0.41	0.19		0.67	0.02
Uniform Delay, d1	26.6	14.7	12.7	22.2	8.7		24.5	24.5	20.0		26.9	26.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.6	0.8	0.1	5.9	0.1		0.8	0.8	0.1		25.2	0.1
Delay (s)	33.1	15.5	12.8	28.1	8.8		25.3	25.3	20.1		52.1	26.5
Level of Service	C	B	B	C	A		C	C	C		D	C
Approach Delay (s)		14.9			16.3			21.5			37.8	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			16.9		HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			55.7		Sum of lost time (s)				20.4			
Intersection Capacity Utilization			52.3%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

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HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Existing + Proj Alt 1 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	221	36	124	177	151	23	228	81	298	355	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1827	1863	1827	1820	1900
Adj Flow Rate, veh/h	145	240	39	135	192	164	25	248	88	324	386	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	2	4	4	4
Cap, veh/h	215	640	103	212	379	322	76	447	385	504	557	65
Arrive On Green	0.12	0.21	0.21	0.12	0.21	0.21	0.05	0.24	0.24	0.15	0.35	0.35
Sat Flow, veh/h	1774	3021	484	1774	1810	1534	1675	1827	1574	3375	1599	186
Grp Volume(v), veh/h	145	138	141	135	192	164	25	248	88	324	0	431
Grp Sat Flow(s),veh/h/ln	1774	1750	1755	1774	1810	1534	1675	1827	1574	1688	0	1785
Q Serve(g_s), s	4.7	4.0	4.1	4.4	5.6	5.7	0.9	7.1	2.7	5.4	0.0	12.4
Cycle Q Clear(g_c), s	4.7	4.0	4.1	4.4	5.6	5.7	0.9	7.1	2.7	5.4	0.0	12.4
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	215	371	372	212	379	322	76	447	385	504	0	622
V/C Ratio(X)	0.67	0.37	0.38	0.64	0.51	0.51	0.33	0.55	0.23	0.64	0.00	0.69
Avail Cap(c_a), veh/h	275	814	816	275	841	713	223	791	682	579	0	842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.2	20.2	20.3	25.2	21.0	21.0	27.8	19.8	18.1	24.0	0.0	16.8
Incr Delay (d2), s/veh	4.3	0.7	0.8	3.2	1.3	1.5	2.5	1.3	0.4	2.0	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.0	2.1	2.3	3.0	2.5	0.5	3.7	1.2	2.7	0.0	6.4
LnGrp Delay(d),s/veh	29.6	21.0	21.0	28.4	22.2	22.5	30.2	21.1	18.5	26.0	0.0	18.6
LnGrp LOS	C	C	C	C	C	C	C	C	B	C		B
Approach Vol, veh/h		424			491			361			755	
Approach Delay, s/veh		23.9			24.0			21.1			21.8	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.9	16.9	6.4	25.8	11.0	16.8	12.7	19.6				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	6.4	6.1	2.9	14.4	6.7	7.7	7.4	9.1				
Green Ext Time (p_c), s	0.1	4.3	0.0	4.2	0.1	4.2	0.3	4.6				

Intersection Summary

HCM 2010 Ctrl Delay 22.6
HCM 2010 LOS C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Existing + Proj Alt 1 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	53	388	83	86	263	0	140	0	69	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1860	1900	1810	1792	0	1810	1696	1900			
Adj Flow Rate, veh/h	58	426	91	95	289	0	154	0	76			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	2	2	5	6	0	5	0	5			
Cap, veh/h	80	1759	373	118	2148	0	317	0	137			
Arrive On Green	0.04	0.61	0.61	0.14	1.00	0.00	0.09	0.00	0.09			
Sat Flow, veh/h	1810	2901	615	1723	3495	0	3343	0	1442			
Grp Volume(v), veh/h	58	258	259	95	289	0	154	0	76			
Grp Sat Flow(s),veh/h/ln	1810	1767	1749	1723	1703	0	1672	0	1442			
Q Serve(g_s), s	1.6	3.4	3.4	2.7	0.0	0.0	2.2	0.0	2.5			
Cycle Q Clear(g_c), s	1.6	3.4	3.4	2.7	0.0	0.0	2.2	0.0	2.5			
Prop In Lane	1.00		0.35	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	80	1071	1061	118	2148	0	317	0	137			
V/C Ratio(X)	0.72	0.24	0.24	0.80	0.13	0.00	0.49	0.00	0.56			
Avail Cap(c_a), veh/h	199	1071	1061	224	2148	0	1070	0	461			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.88	0.88	0.88	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.6	4.5	4.5	21.2	0.0	0.0	21.5	0.0	21.6			
Incr Delay (d2), s/veh	4.0	0.5	0.5	4.7	0.1	0.0	0.4	0.0	1.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.9	1.7	1.7	1.4	0.0	0.0	1.0	0.0	1.0			
LnGrp Delay(d),s/veh	27.6	5.0	5.0	26.0	0.1	0.0	21.9	0.0	22.9			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		575			384			230				
Approach Delay, s/veh		7.3			6.5			22.2				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.9	34.3			5.7	35.5		8.7				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			5.5	17.0		16.0				
Max Q Clear Time (g_c+I1), s	4.7	5.4			3.6	2.0		4.5				
Green Ext Time (p_c), s	0.0	2.8			0.0	3.3		0.4				

Intersection Summary

HCM 2010 Ctrl Delay 9.9
HCM 2010 LOS A

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Existing + Proj Alt 1 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	365	92	61	317	1	32	0	38	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1820	1900	1845	1845	1900	1900	1638	1712	1900	1900	1900
Adj Flow Rate, veh/h	0	440	111	73	382	1	39	0	46	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	3	3	3	0	0	11	0	0	0
Cap, veh/h	0	1817	455	91	2814	7	212	0	80	0	105	0
Arrive On Green	0.00	0.22	0.22	0.05	0.78	0.78	0.06	0.00	0.06	0.00	0.00	0.00
Sat Flow, veh/h	0	2832	686	1757	3586	9	1228	0	1444	0	1900	0
Grp Volume(v), veh/h	0	276	275	73	187	196	39	0	46	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1729	1698	1757	1753	1843	1228	0	1444	0	1900	0
Q Serve(g, s), s	0.0	6.6	6.7	2.1	1.3	1.3	1.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.6	6.7	2.1	1.3	1.3	1.5	0.0	1.6	0.0	0.0	0.0
Prop In Lane	0.00		0.40	1.00		0.01	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1146	1125	91	1375	1446	212	0	80	0	105	0
V/C Ratio(X)	0.00	0.24	0.24	0.80	0.14	0.14	0.18	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1146	1125	193	1375	1446	537	0	462	0	608	0
HCM Platoon Ratio	1.00	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.98	0.98	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.2	9.2	23.5	1.3	1.3	23.0	0.0	23.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	6.1	0.2	0.2	0.2	0.0	2.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.3	3.3	1.1	0.6	0.7	0.5	0.0	0.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	9.6	9.7	29.5	1.5	1.5	23.2	0.0	25.4	0.0	0.0	0.0
LnGrp LOS	A	A	C	A	A	C	C		C			
Approach Vol, veh/h		551			456			85			0	
Approach Delay, s/veh		9.7			6.0			24.4			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.1	37.1		6.8		43.2		6.8				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	5.5	17.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.1	8.7		0.0		3.3		3.6				
Green Ext Time (p_c), s	0.0	3.9		0.0		6.8		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			9.3									
HCM 2010 LOS			A									

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HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Existing + Proj Alt 1 AM.syn
3/14/2016

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	218	0	16	0	1	0	17	15	0	0	32	307
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	1	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	92	80	92	92	92	80	80	92	92	80	80
Heavy Vehicles, %	7	0	0	2	2	2	0	7	0	0	0	2
Mvmt Flow	272	0	20	0	1	0	21	19	0	0	40	384
Major/Minor												
	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	2	0	0	25	550	2	14	550	5
Stage 1	-	-	-	-	-	-	2	547	-	3	3	-
Stage 2	-	-	-	-	-	-	23	3	-	11	547	-
Critical Hdwy	4.17	-	-	-	-	-	7.1	6.57	-	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.57	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.5	4.063	-	3.5	4	3.318
Pot Cap-1 Maneuver	1587	-	-	-	-	-	991	436	-	1007	446	1078
Stage 1	-	-	-	-	-	-	-	-	-	1025	897	-
Stage 2	-	-	-	-	-	-	1000	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1584	-	-	-	-	-	571	360	-	-	368	1074
Mov Cap-2 Maneuver	-	-	-	-	-	-	371	1061	-	-	783	-
Stage 1	-	-	-	-	-	-	-	-	-	847	896	-
Stage 2	-	-	-	-	-	-	613	882	-	-	-	-
Approach												
	EB			WB			NB			SB		
HCM Control Delay, s	7.2			0								
HCM LOS												
Minor Lane/Major Mvmt												
	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	371	-	1584	-	-	-	-	-	-	1074		
HCM Lane V/C Ratio	0.057	-	0.172	-	-	-	-	-	-	0.357		
HCM Control Delay (s)	15.3	-	7.7	-	-	0	-	-	-	10.2		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.2	-	0.6	-	-	-	-	-	-	1.6		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Existing + Proj Alt 1 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	213	40	113	134	38	50	136	992	37	16	1427	137
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1869	1900	1900	1842	1900	1827	1839	1900	1357	1827	1845
Adj Flow Rate, veh/h	210	94	130	128	81	57	156	1140	43	18	1640	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh. %	3	0	0	0	9	9	4	3	3	40	4	3
Cap, veh/h	288	114	158	151	82	58	163	1827	69	37	1620	732
Arrive On Green	0.16	0.16	0.16	0.08	0.08	0.08	0.09	0.53	0.53	0.03	0.47	0.00
Sat Flow, veh/h	1757	697	965	1810	977	688	1740	3432	129	1293	3471	1568
Grp Volume(v), veh/h	210	0	224	128	0	138	156	580	603	18	1640	0
Grp Sat Flow(s),veh/h/ln	1757	0	1662	1810	0	1665	1740	1747	1814	1293	1736	1568
Q Serve(g, s), s	10.0	0.0	11.5	6.2	0.0	7.3	7.9	20.6	20.6	1.2	41.3	0.0
Cycle Q Clear(g_c), s	10.0	0.0	11.5	6.2	0.0	7.3	7.9	20.6	20.6	1.2	41.3	0.0
Prop In Lane	1.00		0.58	1.00		0.41	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	288	0	272	151	0	139	163	930	965	37	1620	732
V/C Ratio(X)	0.73	0.00	0.82	0.85	0.00	0.99	0.96	0.62	0.62	0.49	1.01	0.00
Avail Cap(c_a), veh/h	318	0	300	151	0	139	163	930	965	107	1620	732
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.1	0.0	35.8	40.0	0.0	40.5	39.9	14.5	14.5	42.4	23.6	0.0
Incr Delay (d2), s/veh	7.9	0.0	16.0	34.4	0.0	73.5	57.3	1.7	1.6	9.9	25.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	6.5	4.5	0.0	6.2	6.4	10.3	10.6	0.5	25.3	0.0
LnGrp Delay(d),s/veh	43.1	0.0	51.7	74.3	0.0	114.0	97.2	16.2	16.1	52.3	49.0	0.0
LnGrp LOS	D		D	E		F	F	B	B	D	F	
Approach Vol, veh/h		434			266			1339			1658	
Approach Delay, s/veh		47.5			94.9			25.6			49.1	
Approach LOS		D			F			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		18.7	12.0	46.2		11.6	6.2	52.0				
Change Period (Y+Rc), s		* 4.2	3.7	4.9		4.2	3.7	4.9				
Max Green Setting (Gmax), s		* 16	8.3	41.3		7.4	7.3	42.3				
Max Q Clear Time (g_c+I1), s		13.5	9.9	43.3		9.3	3.2	22.6				
Green Ext Time (p_c), s		0.6	0.0	0.0		0.0	0.0	18.9				
Intersection Summary												
HCM 2010 Ctrl Delay			43.7									
HCM 2010 LOS			D									

Notes
User approved volume balancing among the lanes for turning movement.

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Existing + Proj Alt 1 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1230	10	32	1568	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1430	12	37	1823	816
RTOR Reduction (vph)	0	17	0	0	54	0	0	0	0	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1442	0	37	1823	816
Confl. Peds. (#/hr)				1		1			1			
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6		4.5	70.1	117.7
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6		4.5	70.1	117.7
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59		0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	551	269		96	102	90	66	2088		67	2047	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.41		0.02	c0.53	
v/s Ratio Perm						0.00						c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.69		0.55	0.89	0.53
Uniform Delay, d1	48.0	41.7		52.8	52.8	52.4	55.1	16.6		55.6	20.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.4	0.1		1.6	1.5	0.3	3.0	1.3		9.5	5.7	1.3
Delay (s)	60.4	41.8		54.5	54.3	52.6	58.1	17.9		65.1	26.2	1.3
Level of Service	E	D		D	D	D	E	B		E	C	A
Approach Delay (s)		59.4			53.3		18.5				19.1	
Approach LOS		E			D		B				B	
Intersection Summary												
HCM 2000 Control Delay			23.8									
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			117.7							17.9		
Intersection Capacity Utilization			69.4%									
Analysis Period (min)			15									
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
9: Carmel Rancho Blvd & Shopping Center Dwy

Existing + Proj Alt 1 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	51	1	19	9	1	20	17	201	15	76	499	163
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1785	1863	1881	1848	1900	1827	1854	1900
Adj Flow Rate, veh/h	66	1	25	12	1	26	22	261	19	99	648	212
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	0	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	485	7	177	463	15	180	563	1638	119	835	1286	420
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	1392	62	1545	1084	134	1574	645	3320	240	1071	2607	852
Grp Volume(v), veh/h	66	0	26	13	0	26	22	137	143	99	438	422
Grp Sat Flow(s),veh/h/ln	1392	0	1607	1218	0	1574	645	1756	1805	1071	1761	1698
Q Serve(g, s), s	0.9	0.0	0.3	0.1	0.0	0.3	0.5	0.9	0.9	1.1	3.4	3.4
Cycle Q Clear(g_c), s	1.3	0.0	0.3	0.4	0.0	0.3	3.9	0.9	0.9	2.0	3.4	3.4
Prop In Lane	1.00		0.96	0.92		1.00	1.00		0.13	1.00		0.50
Lane Grp Cap(c), veh/h	485	0	184	479	0	180	563	866	891	835	869	838
V/C Ratio(X)	0.14	0.00	0.14	0.03	0.00	0.14	0.04	0.16	0.16	0.12	0.50	0.50
Avail Cap(c_a), veh/h	1690	0	1574	1643	0	1542	782	1463	1503	1198	1467	1414
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.8	0.0	8.1	8.2	0.0	8.1	4.8	2.8	2.8	3.4	3.5	3.5
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.1	0.0	0.1	0.1	0.4	0.4	0.3	1.6	1.6
LnGrp Delay(d),s/veh	8.8	0.0	8.3	8.2	0.0	8.3	4.8	2.9	2.9	3.4	3.7	3.7
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		92			39			302			959	
Approach Delay, s/veh		8.7			8.2			3.0			3.6	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		6.3		14.1		6.3		14.1				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		3.3		5.4		2.4		5.9				
Green Ext Time (p_c), s		0.2		4.1		0.2		4.0				
Intersection Summary												
HCM 2010 Ctrl Delay			4.0									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Existing + Proj Alt 1 PM.syn
3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	853	778	88	847	618
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2814	1863	1553	3467	1881
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2814	1863	1553	3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	907	828	94	901	657
RTOR Reduction (vph)	0	170	0	10	0	0
Lane Group Flow (vph)	0	737	828	84	901	657
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases				2		
Actuated Green, G (s)		20.3	31.1	31.1	20.3	61.2
Effective Green, g (s)		20.3	31.1	31.1	20.3	61.2
Actuated g/C Ratio		0.33	0.51	0.51	0.33	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		933	946	789	1150	1881
v/s Ratio Prot		c0.26	c0.44		0.26	0.35
v/s Ratio Perm				0.05		
v/c Ratio		0.79	0.88	0.11	0.78	0.35
Uniform Delay, d1		18.5	13.3	7.8	18.5	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.0	9.3	0.1	4.0	0.5
Delay (s)		23.5	22.6	7.9	22.4	0.5
Level of Service		C	C	A	C	A
Approach Delay (s)	23.5		21.1			13.2
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			18.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			61.2		Sum of lost time (s)	9.8
Intersection Capacity Utilization			79.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Existing + Proj Alt 1 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	711	193	301	558	4	277	17	510	4	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.99	1.00	
Satd. Flow (prot)	1805	3539	1615	3467	3571		1715	1728	1599	1887	1553	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.99	1.00	
Satd. Flow (perm)	1805	3539	1615	3467	3571		1715	1728	1599	1887	1553	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	33	756	205	320	594	4	295	18	543	4	24	19
RTOR Reduction (vph)	0	0	139	0	1	0	0	0	460	0	0	19
Lane Group Flow (vph)	33	756	66	320	597	0	156	157	83	0	28	0
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	0%	1%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.8	19.1	19.1	9.0	26.4		8.9	8.9	9.0	1.5	1.5	
Effective Green, g (s)	1.8	19.1	19.1	9.0	26.4		8.9	8.9	9.0	1.5	1.5	
Actuated g/C Ratio	0.03	0.32	0.32	0.15	0.45		0.15	0.15	0.15	0.03	0.03	
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6	5.0	5.0	
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	55	1147	523	529	1600		259	261	244	48	39	
v/s Ratio Prot	0.02	c0.21		c0.09	0.17		c0.09	0.09	0.05	c0.01		
v/s Ratio Perm			0.04								0.00	
v/c Ratio	0.60	0.66	0.13	0.60	0.37		0.60	0.60	0.34	0.58	0.01	
Uniform Delay, d1	28.2	17.1	14.0	23.3	10.8		23.3	23.3	22.3	28.4	28.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.2	1.1	0.0	1.3	0.1		2.7	2.7	0.3	11.1	0.0	
Delay (s)	39.4	18.2	14.1	24.6	10.8		26.0	26.0	22.6	39.5	28.0	
Level of Service	D	B	B	C	B		C	C	C	D	C	
Approach Delay (s)		18.0			15.6			23.9		34.9		
Approach LOS		B			B			C		C		

Intersection Summary

HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	58.9	Sum of lost time (s)	20.4
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Existing + Proj Alt 1 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	348	83	166	401	296	162	427	155	265	309	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1845	1863	1881	1884	1900
Adj Flow Rate, veh/h	146	355	85	169	409	302	165	436	158	270	315	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	1	2	1	3	2	1	1	1
Cap, veh/h	169	898	213	203	624	521	199	517	441	359	438	63
Arrive On Green	0.10	0.31	0.31	0.11	0.33	0.33	0.11	0.28	0.28	0.10	0.27	0.27
Sat Flow, veh/h	1774	2864	678	1792	1881	1571	1792	1845	1575	3476	1610	230
Grp Volume(v), veh/h	146	219	221	169	409	302	165	436	158	270	0	360
Grp Sat Flow(s),veh/h/ln	1774	1784	1758	1792	1881	1571	1792	1845	1575	1738	0	1840
Q Serve(g_s), s	7.1	8.4	8.6	8.0	16.2	13.8	7.9	19.4	7.0	6.6	0.0	15.4
Cycle Q Clear(g_c), s	7.1	8.4	8.6	8.0	16.2	13.8	7.9	19.4	7.0	6.6	0.0	15.4
Prop In Lane	1.00		0.39	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	169	559	551	203	624	521	199	517	441	359	0	501
V/C Ratio(X)	0.86	0.39	0.40	0.83	0.66	0.58	0.83	0.84	0.36	0.75	0.00	0.72
Avail Cap(c_a), veh/h	169	559	551	212	624	521	212	572	488	371	0	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.8	23.4	23.5	37.8	24.8	24.1	37.9	29.5	25.1	38.0	0.0	28.7
Incr Delay (d2), s/veh	34.1	0.5	0.6	22.9	5.3	4.6	22.1	10.6	0.6	8.2	0.0	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	4.2	4.3	5.3	9.3	6.6	5.1	11.3	3.1	3.6	0.0	8.4
LnGrp Delay(d),s/veh	72.9	23.9	24.0	60.6	30.1	28.7	60.0	40.1	25.7	46.1	0.0	33.0
LnGrp LOS	E	C	C	E	C	C	E	D	C	D		C
Approach Vol, veh/h		586			880			759			630	
Approach Delay, s/veh		36.2			35.5			41.4			38.6	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.6	31.5	13.4	28.6	12.0	33.1	12.7	29.3
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0
Max Q Clear Time (g_c+I1), s	10.0	10.6	9.9	17.4	9.1	18.2	8.6	21.4
Green Ext Time (p_c), s	0.0	7.3	0.0	3.8	0.0	5.6	0.1	2.8

Intersection Summary

HCM 2010 Ctrl Delay	37.9
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Existing + Proj Alt 1 PM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	84	462	138	137	441	0	348	0	133	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1867	1900	1881	1881	0	1881	1863	1900			
Adj Flow Rate, veh/h	85	467	139	138	445	0	352	0	134			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	0	2	2	1	1	0	1	0	1			
Cap, veh/h	108	1402	414	173	1989	0	534	0	243			
Arrive On Green	0.06	0.52	0.52	0.19	1.00	0.00	0.15	0.00	0.15			
Sat Flow, veh/h	1810	2699	797	1792	3668	0	3476	0	1583			
Grp Volume(v), veh/h	85	306	300	138	445	0	352	0	134			
Grp Sat Flow(s),veh/h/ln	1810	1774	1723	1792	1787	0	1738	0	1583			
Q Serve(g_s), s	2.3	5.0	5.1	3.7	0.0	0.0	4.8	0.0	3.9			
Cycle Q Clear(g_c), s	2.3	5.0	5.1	3.7	0.0	0.0	4.8	0.0	3.9			
Prop In Lane	1.00		0.46	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	108	921	895	173	1989	0	534	0	243			
V/C Ratio(X)	0.78	0.33	0.34	0.80	0.22	0.00	0.66	0.00	0.55			
Avail Cap(c_a), veh/h	235	921	895	233	1989	0	1112	0	507			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.87	0.99	0.99	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.2	7.0	7.0	19.7	0.0	0.0	19.9	0.0	19.6			
Incr Delay (d2), s/veh	4.0	0.8	0.9	9.1	0.3	0.0	0.5	0.0	0.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	2.6	2.6	2.2	0.1	0.0	2.3	0.0	1.8			
LnGrp Delay(d),s/veh	27.2	7.8	7.9	28.8	0.3	0.0	20.4	0.0	20.3			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		691			583			486				
Approach Delay, s/veh		10.2			7.0			20.4				
Approach LOS		B			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	8.3	30.0			6.5	31.8		11.7				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			6.5	16.0		16.0				
Max Q Clear Time (g_c+I1), s	5.7	7.1			4.3	2.0		6.8				
Green Ext Time (p_c), s	0.0	3.4			0.0	4.3		0.9				
Intersection Summary												
HCM 2010 Ctrl Delay			12.0									
HCM 2010 LOS			B									

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Existing + Proj Alt 1 PM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	541	54	85	492	0	86	0	110	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1881	1900	1900	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	558	56	88	507	0	89	0	113	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
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
Percent Heavy Veh, %	0	2	2	2	1	1	0	0	0	0	0	0
Cap, veh/h	0	1949	195	111	2619	0	297	0	173	0	204	0
Arrive On Green	0.00	1.00	1.00	0.06	0.73	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	0	3343	325	1774	3668	0	1422	0	1610	0	1900	0
Grp Volume(v), veh/h	0	303	311	88	507	0	89	0	113	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1805	1774	1787	0	1422	0	1610	0	1900	0
Q Serve(g_s), s	0.0	0.0	0.0	2.4	2.2	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.4	2.2	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Prop In Lane	0.00		0.18	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1062	1083	111	2619	0	297	0	173	0	204	0
V/C Ratio(X)	0.00	0.29	0.29	0.79	0.19	0.00	0.30	0.00	0.65	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1062	1083	231	2619	0	599	0	515	0	608	0
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.94	0.94	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	23.1	2.1	0.0	21.3	0.0	21.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.6	4.6	0.2	0.0	0.2	0.0	1.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	1.3	1.1	0.0	1.2	0.0	1.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.6	0.6	27.7	2.2	0.0	21.5	0.0	23.0	0.0	0.0	0.0
LnGrp LOS		A	A	C	A		C		C			
Approach Vol, veh/h		614			595			202			0	
Approach Delay, s/veh		0.6			6.0			22.3			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	34.0		9.4		40.6		9.4				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.4	2.0		0.0		4.2		5.4				
Green Ext Time (p_c), s	0.0	7.0		0.0		8.9		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			6.0									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Existing + Proj Alt 1 PM.syn
3/14/2016

Intersection												
Int Delay, s/veh		3.4										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	417	0	65	0	1	0	34	25	0	0	22	418
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	92	91	92	92	92	91	91	92	92	91	91
Heavy Vehicles, %	2	0	0	0	0	0	4	0	0	0	0	1
Mvmt Flow	458	0	71	0	1	0	37	27	0	0	24	459
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1	0	0	2	0	0	15	919	2	17	919	1
Stage 1	-	-	-	-	-	-	2	918	-	1	1	-
Stage 2	-	-	-	-	-	-	13	1	-	16	918	-
Critical Hdwy	4.12	-	-	-	-	-	7.14	6.5	-	7.1	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.536	4	-	3.5	4	3.309
Pot Cap-1 Maneuver	1622	-	-	-	-	-	996	273	-	1003	273	1087
Stage 1	-	-	-	-	-	-	-	-	-	1027	899	-
Stage 2	-	-	-	-	-	-	1002	899	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	-	-	-	557	196	-	-	196	1087
Mov Cap-2 Maneuver	-	-	-	-	-	-	280 ~	-739	-	-	~ 71	-
Stage 1	-	-	-	-	-	-	-	-	-	737	899	-
Stage 2	-	-	-	-	-	-	563	899	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	280	-	1622	-	-	-	-	-	-	1087		
HCM Lane V/C Ratio	0.133	-	0.283	-	-	-	-	-	-	0.423		
HCM Control Delay (s)	19.8	-	8.1	-	-	0	-	-	-	10.7		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.5	-	1.2	-	-	-	-	-	-	2.1		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Existing + Proj Alt 1 PM.syn
3/14/2016

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Volume (veh/h)	277	22	199	34	13	18	259	1373	10	13	1281	153												
Number	5	2	12	1	6	16	3	8	18	7	4	14												
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0												
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.99	1.00		1.00												
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00												
Adj Sat Flow, veh/h/ln	1863	1869	1900	1863	1763	1900	1900	1845	1900	1900	1881	1881												
Adj Flow Rate, veh/h	262	65	209	34	16	19	273	1445	11	14	1348	0												
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1												
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												
Percent Heavy Veh, %	2	7	7	2	5	5	0	3	3	0	1	1												
Cap, veh/h	333	72	232	115	46	55	293	1898	14	42	1406	629												
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.16	0.53	0.53	0.02	0.39	0.00												
Sat Flow, veh/h	1774	385	1239	1774	717	852	1810	3566	27	1810	3574	1599												
Grp Volume(v), veh/h	262	0	274	34	0	35	273	710	746	14	1348	0												
Grp Sat Flow(s),veh/h/ln	1774	0	1625	1774	0	1569	1810	1753	1840	1810	1787	1599												
Q Serve(g_s), s	12.4	0.0	14.6	1.6	0.0	1.9	13.2	28.1	28.2	0.7	32.4	0.0												
Cycle Q Clear(g_c), s	12.4	0.0	14.6	1.6	0.0	1.9	13.2	28.1	28.2	0.7	32.4	0.0												
Prop In Lane	1.00		0.76	1.00		0.54	1.00		0.01	1.00		1.00												
Lane Grp Cap(c), veh/h	333	0	305	115	0	101	293	933	979	42	1406	629												
V/C Ratio(X)	0.79	0.00	0.90	0.30	0.00	0.34	0.93	0.76	0.76	0.34	0.96	0.00												
Avail Cap(c_a), veh/h	333	0	305	141	0	124	293	933	979	150	1420	635												
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00												
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00												
Uniform Delay (d), s/veh	34.2	0.0	35.1	39.4	0.0	39.5	36.5	16.2	16.3	42.5	26.1	0.0												
Incr Delay (d2), s/veh	12.1	0.0	27.7	2.0	0.0	2.8	35.0	4.1	4.0	4.6	15.3	0.0												
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0												
%ile BackOfQ(50%),veh/ln	7.2	0.0	8.9	0.9	0.0	0.9	9.4	14.5	15.2	0.4	18.9	0.0												
LnGrp Delay(d),s/veh	46.3	0.0	62.8	41.4	0.0	42.4	71.6	20.4	20.2	47.1	41.4	0.0												
LnGrp LOS	D		E	D		D	E	C	C	D	D													
Approach Vol, veh/h	536			69			1729			1362														
Approach Delay, s/veh	54.7			41.9			28.4			41.4														
Approach LOS	D			D			C			D														
Timer	1	2	3	4	5	6	7	8																
Assigned Phs	2	3	4			6	7	8																
Phs Duration (G+Y+Rc), s	20.8	18.0	39.6			9.9	5.7	51.9																
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9																
Max Green Setting (Gmax), s	* 17	14.3	35.1			7.0	7.3	42.1																
Max Q Clear Time (g_c+I1), s	16.6	15.2	34.4			3.9	2.7	30.2																
Green Ext Time (p_c), s	0.0	0.0	0.3			0.1	0.0	11.6																
Intersection Summary																								
HCM 2010 Ctrl Delay	37.3																							
HCM 2010 LOS	D																							
Notes																								
User approved volume balancing among the lanes for turning movement.																								

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Existing + Proj Alt 1 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1621	14	54	1472	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1689	15	56	1533	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	1	0	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1703	0	56	1533	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.4		6.2	71.0	141.2
Effective Green, g (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.4		6.2	71.0	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48		0.04	0.50	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	1038	521		85	87	80	39	1686		79	1797	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.48		0.03	0.43	
v/s Ratio Perm						0.00						c0.49
v/c Ratio	0.99	0.04		0.21	0.21	0.03	0.36	1.01		0.71	0.85	0.49
Uniform Delay, d1	48.9	34.8		64.5	64.4	63.9	68.1	36.9		66.6	30.6	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1		2.1	2.0	0.3	5.6	24.5		25.1	4.6	1.1
Delay (s)	73.3	34.9		66.6	66.5	64.2	73.6	61.4		91.7	35.1	1.1
Level of Service	E	C		E	E	E	E	E		F	D	A
Approach Delay (s)		72.0			65.1			61.5			25.3	
Approach LOS		E			E			E			C	

Intersection Summary

HCM 2000 Control Delay	47.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	141.2	Sum of lost time (s)	17.9
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

9: Carmel Rancho Blvd & Shopping Center Dwy

Existing + Proj Alt 1 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	171	10	20	40	10	30	38	526	18	11	367	78
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1887	1900	1900	1800	1863	1881	1846	1900	1827	1851	1900
Adj Flow Rate, veh/h	184	11	22	43	11	32	41	566	19	12	395	84
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
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
Percent Heavy Veh. %	2	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	627	141	282	540	105	396	590	1362	46	541	1135	239
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1346	558	1116	1006	417	1568	917	3463	116	808	2887	608
Grp Volume(v), veh/h	184	0	33	54	0	32	41	286	299	12	239	240
Grp Sat Flow(s),veh/h/ln	1346	0	1675	1423	0	1568	917	1754	1825	808	1758	1736
Q Serve(g_s), s	2.8	0.0	0.3	0.0	0.0	0.4	0.7	2.7	2.7	0.2	2.2	2.2
Cycle Q Clear(g_c), s	3.3	0.0	0.3	0.5	0.0	0.4	2.9	2.7	2.7	2.9	2.2	2.2
Prop In Lane	1.00		0.67	0.80		1.00	1.00		0.06	1.00		0.35
Lane Grp Cap(c), veh/h	627	0	422	646	0	396	590	690	718	541	692	683
V/C Ratio(X)	0.29	0.00	0.08	0.08	0.00	0.08	0.07	0.42	0.42	0.02	0.35	0.35
Avail Cap(c_a), veh/h	1481	0	1484	1524	0	1390	920	1321	1374	832	1325	1308
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.8	0.0	6.4	6.5	0.0	6.4	5.9	5.0	5.0	6.0	4.8	4.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.2	0.3	0.0	0.2	0.2	1.3	1.4	0.1	1.0	1.0
LnGrp Delay(d),s/veh	7.9	0.0	6.5	6.5	0.0	6.5	5.9	5.1	5.1	6.0	4.9	4.9
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		217			86			626			491	
Approach Delay, s/veh		7.7			6.5			5.2			5.0	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		9.7		12.9		9.7		12.9
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0
Max Q Clear Time (g_c+I1), s		5.3		4.9		2.5		4.9
Green Ext Time (p_c), s		0.6		3.6		0.6		3.6

Intersection Summary

HCM 2010 Ctrl Delay	5.6
HCM 2010 LOS	A

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Back + Proj Alt 1 AM.syn

3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	804	458	59	1116	694
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2760	1863	1509	3335	1759
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2760	1863	1509	3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	874	498	64	1213	754
RTOR Reduction (vph)	0	258	0	9	0	0
Lane Group Flow (vph)	0	616	498	55	1213	754
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA	Perm	Prot	NA	
Protected Phases	3	2		3	Free	
Permitted Phases			2			
Actuated Green, G (s)		25.4	20.6	20.6	25.4	55.8
Effective Green, g (s)		25.4	20.6	20.6	25.4	55.8
Actuated g/C Ratio		0.46	0.37	0.37	0.46	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)	1256	687	557	1518	1759	
v/s Ratio Prot	0.22	c0.27		c0.36	0.43	
v/s Ratio Perm			0.04			
v/c Ratio	0.49	0.72	0.10	0.80	0.43	
Uniform Delay, d1	10.7	15.2	11.5	13.0	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	3.9	0.1	3.4	0.8	
Delay (s)	11.2	19.1	11.6	16.4	0.8	
Level of Service		B	B	B	A	
Approach Delay (s)	11.2		18.2		10.4	
Approach LOS	B		B		B	
Intersection Summary						
HCM 2000 Control Delay		11.9		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.77				
Actuated Cycle Length (s)		55.8		Sum of lost time (s)	9.8	
Intersection Capacity Utilization		64.1%		ICU Level of Service	C	
Analysis Period (min)		15				
c Critical Lane Group						

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Back + Proj Alt 1 AM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	747	401	421	683	5	86	5	269	10	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (prot)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1559
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (perm)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1559
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	31	849	456	478	776	6	98	6	306	11	19	38
RTOR Reduction (vph)	0	0	278	0	0	0	0	0	257	0	0	37
Lane Group Flow (vph)	31	849	178	478	782	0	52	52	49	0	30	1
Confl. Peds. (#/hr)	2		1			1	1			1		2
Heavy Vehicles (%)	4%	7%	2%	1%	3%	0%	6%	0%	6%	30%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.8	22.6	22.6	9.2	30.1		4.3	4.3	9.2		1.5	1.5
Effective Green, g (s)	1.8	22.6	22.6	9.2	30.1		4.3	4.3	9.2		1.5	1.5
Actuated g/C Ratio	0.03	0.39	0.39	0.16	0.52		0.07	0.07	0.16		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	53	1314	609	549	1816		119	121	241		43	40
v/s Ratio Prot	0.02	c0.25		c0.14	0.22		c0.03	0.03	0.03		c0.02	
v/s Ratio Perm			0.11									0.00
v/c Ratio	0.58	0.65	0.29	0.87	0.43		0.44	0.43	0.20		0.70	0.02
Uniform Delay, d1	27.7	14.4	12.2	23.8	8.6		25.7	25.7	21.2		28.0	27.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.2	0.8	0.1	13.7	0.1		0.9	0.9	0.2		32.8	0.1
Delay (s)	37.9	15.3	12.3	37.5	8.7		26.6	26.6	21.4		60.9	27.6
Level of Service	D	B	B	D	A		C	C	C		E	C
Approach Delay (s)		14.8			19.6			22.7			42.3	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			18.4		HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			58.0		Sum of lost time (s)				20.4			
Intersection Capacity Utilization			54.7%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Back + Proj Alt 1 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	221	36	131	177	151	23	233	81	298	355	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1827	1863	1827	1820	1900
Adj Flow Rate, veh/h	145	240	39	142	192	164	25	253	88	324	386	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	2	4	4	4
Cap, veh/h	215	634	102	214	379	321	76	451	388	502	560	65
Arrive On Green	0.12	0.21	0.21	0.12	0.21	0.21	0.05	0.25	0.25	0.15	0.35	0.35
Sat Flow, veh/h	1774	3021	484	1774	1810	1534	1675	1827	1574	3375	1599	186
Grp Volume(v), veh/h	145	138		141	142	192	164	25	253	88	324	0
Grp Sat Flow(s),veh/h/ln	1774	1750		1774	1810	1534	1675	1827	1574	1688	0	1785
Q Serve(g_s), s	4.7	4.1	4.2	4.6	5.7	5.7	0.9	7.3	2.7	5.4	0.0	12.5
Cycle Q Clear(g_c), s	4.7	4.1	4.2	4.6	5.7	5.7	0.9	7.3	2.7	5.4	0.0	12.5
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	215	367	368	214	379	321	76	451	388	502	0	625
V/C Ratio(X)	0.67	0.37	0.38	0.66	0.51	0.51	0.33	0.56	0.23	0.65	0.00	0.69
Avail Cap(c_a), veh/h	274	811	813	274	838	711	223	789	679	577	0	839
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.3	20.4	20.4	25.3	21.1	21.1	27.9	19.8	18.1	24.1	0.0	16.8
Incr Delay (d2), s/veh	4.4	0.8	0.8	4.0	1.3	1.5	2.5	1.3	0.4	2.0	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.0	2.1	2.5	3.0	2.5	0.5	3.8	1.2	2.7	0.0	6.4
LnGrp Delay(d),s/veh	29.7	21.2	21.2	29.3	22.3	22.6	30.3	21.2	18.4	26.1	0.0	18.5
LnGrp LOS	C	C	C	C	C	C	C	C	B	C		B
Approach Vol, veh/h		424			498			366			755	
Approach Delay, s/veh		24.1			24.4			21.1			21.8	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	16.8	6.4	26.0	11.0	16.8	12.7	19.8				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	6.6	6.2	2.9	14.5	6.7	7.7	7.4	9.3				
Green Ext Time (p_c), s	0.1	4.3	0.0	4.2	0.1	4.2	0.3	4.6				

Intersection Summary

HCM 2010 Ctrl Delay 22.8
HCM 2010 LOS C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Back + Proj Alt 1 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	53	388	83	100	270	0	140	0	77	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1860	1900	1810	1792	0	1810	1696	1900			
Adj Flow Rate, veh/h	58	426	91	110	297	0	154	0	85			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	2	2	5	6	0	5	0	5			
Cap, veh/h	80	1708	362	137	2126	0	340	0	146			
Arrive On Green	0.04	0.59	0.59	0.16	1.00	0.00	0.10	0.00	0.10			
Sat Flow, veh/h	1810	2901	615	1723	3495	0	3343	0	1442			
Grp Volume(v), veh/h	58	258	259	110	297	0	154	0	85			
Grp Sat Flow(s),veh/h/ln	1810	1767	1749	1723	1703	0	1672	0	1442			
Q Serve(g_s), s	1.6	3.5	3.6	3.1	0.0	0.0	2.2	0.0	2.8			
Cycle Q Clear(g_c), s	1.6	3.5	3.6	3.1	0.0	0.0	2.2	0.0	2.8			
Prop In Lane	1.00		0.35	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	80	1040	1030	137	2126	0	340	0	146			
V/C Ratio(X)	0.72	0.25	0.25	0.80	0.14	0.00	0.45	0.00	0.58			
Avail Cap(c_a), veh/h	199	1040	1030	224	2126	0	1070	0	461			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.87	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.6	5.0	5.0	20.6	0.0	0.0	21.2	0.0	21.4			
Incr Delay (d2), s/veh	4.0	0.5	0.5	4.0	0.1	0.0	0.4	0.0	1.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.9	1.8	1.9	1.6	0.0	0.0	1.0	0.0	1.2			
LnGrp Delay(d),s/veh	27.6	5.4	5.5	24.7	0.1	0.0	21.5	0.0	22.8			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		575			407			239				
Approach Delay, s/veh		7.7			6.8			22.0				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	7.5	33.4			5.7	35.2		9.1				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			5.5	17.0		16.0				
Max Q Clear Time (g_c+I1), s	5.1	5.6			3.6	2.0		4.8				
Green Ext Time (p_c), s	0.0	2.8			0.0	3.3		0.5				

Intersection Summary

HCM 2010 Ctrl Delay 10.2
HCM 2010 LOS B

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Back + Proj Alt 1 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	373	92	61	338	1	32	0	38	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1820	1900	1845	1845	1900	1900	1638	1712	1900	1900	1900
Adj Flow Rate, veh/h	0	449	111	73	407	1	39	0	46	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	3	3	3	0	0	11	0	0	0
Cap, veh/h	0	1825	448	91	2814	7	212	0	80	0	105	0
Arrive On Green	0.00	0.22	0.22	0.05	0.78	0.78	0.06	0.00	0.06	0.00	0.00	0.00
Sat Flow, veh/h	0	2844	676	1757	3587	9	1228	0	1444	0	1900	0
Grp Volume(v), veh/h	0	281	279	73	199	209	39	0	46	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1729	1700	1757	1753	1843	1228	0	1444	0	1900	0
Q Serve(g_s), s	0.0	6.7	6.8	2.1	1.4	1.4	1.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.7	6.8	2.1	1.4	1.4	1.5	0.0	1.6	0.0	0.0	0.0
Prop In Lane	0.00		0.40	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1146	1127	91	1375	1446	212	0	80	0	105	0
V/C Ratio(X)	0.00	0.24	0.25	0.80	0.14	0.14	0.18	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1146	1127	193	1375	1446	537	0	462	0	608	0
HCM Platoon Ratio	1.00	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.98	0.98	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.2	9.2	23.5	1.3	1.3	23.0	0.0	23.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	6.1	0.2	0.2	0.2	0.0	2.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.4	3.4	1.1	0.7	0.8	0.5	0.0	0.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	9.7	9.7	29.5	1.5	1.5	23.2	0.0	25.4	0.0	0.0	0.0
LnGrp LOS	A	A	C	A	A	C	C		C			
Approach Vol, veh/h		560			481			85			0	
Approach Delay, s/veh		9.7			5.8			24.4			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.1	37.1		6.8		43.2		6.8				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	5.5	17.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.1	8.8		0.0		3.4		3.6				
Green Ext Time (p_c), s	0.0	4.0		0.0		7.2		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			9.1									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Back + Proj Alt 1 AM.syn
3/14/2016

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	226	0	16	0	1	0	17	15	0	0	32	328
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	1	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	92	80	92	92	92	80	80	92	92	80	80
Heavy Vehicles, %	7	0	0	2	2	2	0	7	0	0	0	2
Mvmt Flow	282	0	20	0	1	0	21	19	0	0	40	410
Major/Minor												
	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	2	0	0	25	570	2	14	570	5
Stage 1	-	-	-	-	-	-	2	567	-	3	3	-
Stage 2	-	-	-	-	-	-	23	3	-	11	567	-
Critical Hdwy	4.17	-	-	-	-	-	7.1	6.57	-	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.57	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.5	4.063	-	3.5	4	3.318
Pot Cap-1 Maneuver	1587	-	-	-	-	-	991	425	-	1007	434	1078
Stage 1	-	-	-	-	-	-	-	-	-	1025	897	-
Stage 2	-	-	-	-	-	-	1000	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1584	-	-	-	-	-	552	348	-	-	355	1074
Mov Cap-2 Maneuver	-	-	-	-	-	-	349	1134	-	-	-626	-
Stage 1	-	-	-	-	-	-	-	-	-	840	896	-
Stage 2	-	-	-	-	-	-	590	882	-	-	-	-
Approach												
	EB			WB			NB			SB		
HCM Control Delay, s	7.3			0								
HCM LOS							-			-		
Minor Lane/Major Mvmt												
	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	349	-	1584	-	-	-	-	-	-	1074		
HCM Lane V/C Ratio	0.061	-	0.178	-	-	-	-	-	-	0.382		
HCM Control Delay (s)	16	-	7.8	-	-	0	-	-	-	10.4		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.2	-	0.6	-	-	-	-	-	-	1.8		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Back + Proj Alt 1 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	213	40	119	134	38	50	146	1053	37	16	1478	137
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1869	1900	1900	1842	1900	1827	1840	1900	1357	1827	1845
Adj Flow Rate, veh/h	214	89	137	128	81	57	168	1210	43	18	1699	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh. %	3	0	0	0	9	9	4	3	3	40	4	3
Cap, veh/h	290	107	165	151	82	57	163	1829	65	37	1618	731
Arrive On Green	0.16	0.16	0.16	0.08	0.08	0.08	0.09	0.53	0.53	0.03	0.47	0.00
Sat Flow, veh/h	1757	651	1003	1810	977	688	1740	3441	122	1293	3471	1568
Grp Volume(v), veh/h	214	0	226	128	0	138	168	614	639	18	1699	0
Grp Sat Flow(s),veh/h/ln	1757	0	1654	1810	0	1665	1740	1748	1816	1293	1736	1568
Q Serve(g, s), s	10.3	0.0	11.7	6.2	0.0	7.3	8.3	22.5	22.5	1.2	41.3	0.0
Cycle Q Clear(g_c), s	10.3	0.0	11.7	6.2	0.0	7.3	8.3	22.5	22.5	1.2	41.3	0.0
Prop In Lane	1.00		0.61	1.00		0.41	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	290	0	273	151	0	139	163	929	965	37	1618	731
V/C Ratio(X)	0.74	0.00	0.83	0.85	0.00	0.99	1.03	0.66	0.66	0.49	1.05	0.00
Avail Cap(c_a), veh/h	317	0	299	151	0	139	163	929	965	106	1618	731
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.2	0.0	35.8	40.1	0.0	40.6	40.2	15.0	15.0	42.4	23.7	0.0
Incr Delay (d2), s/veh	8.5	0.0	16.8	34.6	0.0	74.0	78.9	2.1	2.1	9.9	36.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	6.6	4.5	0.0	6.2	7.5	11.3	11.7	0.5	27.8	0.0
LnGrp Delay(d),s/veh	43.7	0.0	52.5	74.7	0.0	114.6	119.3	17.1	17.1	52.3	60.5	0.0
LnGrp LOS	D		D	E		F	F	B	B	D	F	
Approach Vol, veh/h		440			266			1421			1717	
Approach Delay, s/veh		48.2			95.4			29.2			60.4	
Approach LOS		D			F			C			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		18.8	12.0	46.2		11.6	6.2	52.0				
Change Period (Y+Rc), s		* 4.2	3.7	4.9		4.2	3.7	4.9				
Max Green Setting (Gmax), s		* 16	8.3	41.3		7.4	7.3	42.3				
Max Q Clear Time (g_c+I1), s		13.7	10.3	43.3		9.3	3.2	24.5				
Green Ext Time (p_c), s		0.6	0.0	0.0		0.0	0.0	17.2				
Intersection Summary												
HCM 2010 Ctrl Delay			49.9									
HCM 2010 LOS			D									

Notes
User approved volume balancing among the lanes for turning movement.

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Back + Proj Alt 1 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1291	10	32	1619	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1501	12	37	1883	816
RTOR Reduction (vph)	0	17	0	0	54	0	0	0	0	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1513	0	37	1883	816
Confl. Peds. (#/hr)				1		1			1			
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59		0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	550	269		96	102	90	66	2089		67	2048	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.43		0.02	c0.55	
v/s Ratio Perm						0.00						c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.72		0.55	0.92	0.53
Uniform Delay, d1	48.1	41.7		52.9	52.9	52.4	55.2	17.2		55.7	21.3	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.6	0.1		1.6	1.5	0.3	3.0	1.6		9.5	7.6	1.3
Delay (s)	60.6	41.8		54.5	54.4	52.7	58.2	18.7		65.2	28.8	1.3
Level of Service	E	D		D	D	D	E	B		E	C	A
Approach Delay (s)		59.6			53.4		19.3				21.1	
Approach LOS		E			D		B				C	
Intersection Summary												
HCM 2000 Control Delay			25.1									
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			117.8							17.9		
Intersection Capacity Utilization			70.8%									
Analysis Period (min)			15									
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
9: Carmel Rancho Blvd & Shopping Center Dwy

Back + Proj Alt 1 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	54	1	19	9	1	20	17	209	15	76	520	168
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1785	1863	1881	1848	1900	1827	1853	1900
Adj Flow Rate, veh/h	70	1	25	12	1	26	22	271	19	99	675	218
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	0	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	485	7	179	458	21	182	550	1664	116	829	1307	422
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.50	0.50	0.50	0.50	0.50	0.50
Sat Flow, veh/h	1392	62	1545	1086	179	1573	626	3330	232	1061	2616	844
Grp Volume(v), veh/h	70	0	26	13	0	26	22	142	148	99	454	439
Grp Sat Flow(s),veh/h/ln	1392	0	1606	1265	0	1573	626	1756	1806	1061	1761	1699
Q Serve(g, s), s	1.0	0.0	0.3	0.0	0.0	0.3	0.5	0.9	0.9	1.2	3.6	3.6
Cycle Q Clear(g_c), s	1.3	0.0	0.3	0.3	0.0	0.3	4.1	0.9	0.9	2.1	3.6	3.6
Prop In Lane	1.00		0.96	0.92		1.00	1.00		0.13	1.00		0.50
Lane Grp Cap(c), veh/h	485	0	186	479	0	182	550	878	903	829	880	849
V/C Ratio(X)	0.14	0.00	0.14	0.03	0.00	0.14	0.04	0.16	0.16	0.12	0.52	0.52
Avail Cap(c_a), veh/h	1661	0	1543	1615	0	1511	748	1434	1475	1165	1438	1388
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.9	0.0	8.3	8.2	0.0	8.3	4.9	2.8	2.8	3.4	3.5	3.5
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.1	0.0	0.1	0.1	0.4	0.5	0.3	1.7	1.6
LnGrp Delay(d),s/veh	8.9	0.0	8.4	8.2	0.0	8.4	4.9	2.9	2.9	3.4	3.7	3.7
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		96			39			312			992	
Approach Delay, s/veh		8.8			8.3			3.0			3.7	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		6.4		14.4		6.4		14.4				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		3.3		5.6		2.3		6.1				
Green Ext Time (p_c), s		0.2		4.2		0.2		4.1				
Intersection Summary												
HCM 2010 Ctrl Delay			4.0									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Back + Proj Alt 1 PM.syn
3/14/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	930	778	98	936	618
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2814	1863	1553	3467	1881
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2814	1863	1553	3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	989	828	104	996	657
RTOR Reduction (vph)	0	170	0	6	0	0
Lane Group Flow (vph)	0	819	828	98	996	657
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases				2		
Actuated Green, G (s)		20.3	31.1	31.1	20.3	61.2
Effective Green, g (s)		20.3	31.1	31.1	20.3	61.2
Actuated g/C Ratio		0.33	0.51	0.51	0.33	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		933	946	789	1150	1881
v/s Ratio Prot		c0.29	c0.44		0.29	0.35
v/s Ratio Perm				0.06		
v/c Ratio		0.88	0.88	0.12	0.87	0.35
Uniform Delay, d1		19.3	13.3	7.9	19.2	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		9.9	9.3	0.1	7.5	0.5
Delay (s)		29.2	22.6	8.0	26.7	0.5
Level of Service		C	C	A	C	A
Approach Delay (s)	29.2		21.0			16.3
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			21.1		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.88			
Actuated Cycle Length (s)			61.2		Sum of lost time (s)	9.8
Intersection Capacity Utilization			81.6%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

Back + Proj Alt 1 PM.syn

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	810	193	331	635	4	277	17	534	4	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.99	1.00	
Satd. Flow (prot)	1805	3539	1615	3467	3571		1715	1728	1599	1887	1553	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.99	1.00	
Satd. Flow (perm)	1805	3539	1615	3467	3571		1715	1728	1599	1887	1553	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	33	862	205	352	676	4	295	18	568	4	24	19
RTOR Reduction (vph)	0	0	133	0	1	0	0	0	485	0	0	19
Lane Group Flow (vph)	33	862	72	352	679	0	156	157	83	0	28	0
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	0%	1%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.9	21.8	21.8	9.0	29.0		9.1	9.1	9.0	1.6	1.6	
Effective Green, g (s)	1.9	21.8	21.8	9.0	29.0		9.1	9.1	9.0	1.6	1.6	
Actuated g/C Ratio	0.03	0.35	0.35	0.15	0.47		0.15	0.15	0.15	0.03	0.03	
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6	5.0	5.0	
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	55	1246	568	504	1673		252	254	232	48	40	
v/s Ratio Prot	0.02	c0.24		c0.10	0.19		c0.09	0.09	0.05	c0.01		
v/s Ratio Perm			0.04								0.00	
v/c Ratio	0.60	0.69	0.13	0.70	0.41		0.62	0.62	0.36	0.58	0.01	
Uniform Delay, d1	29.6	17.2	13.6	25.2	10.8		24.8	24.8	23.8	29.8	29.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.2	1.4	0.0	3.4	0.1		3.2	3.1	0.3	11.1	0.0	
Delay (s)	40.8	18.5	13.6	28.6	10.9		27.9	27.9	24.2	40.9	29.4	
Level of Service	D	B	B	C	B		C	C	C	D	C	
Approach Delay (s)		18.3			16.9			25.5		36.3		
Approach LOS		B			B			C		D		

Intersection Summary

HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	61.9	Sum of lost time (s)	20.4
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

Back + Proj Alt 1 PM.syn

3: SR 1 & Rio Rd

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	348	83	175	401	296	162	437	155	265	309	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1845	1863	1881	1884	1900
Adj Flow Rate, veh/h	146	355	85	179	409	302	165	446	158	270	315	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh. %	2	1	1	1	2	1	3	2	1	1	1	1
Cap, veh/h	168	881	209	211	622	519	199	522	446	357	442	63
Arrive On Green	0.09	0.31	0.31	0.12	0.33	0.33	0.11	0.28	0.28	0.10	0.27	0.27
Sat Flow, veh/h	1774	2864	678	1792	1881	1571	1792	1845	1575	3476	1610	230
Grp Volume(v), veh/h	146	219	221	179	409	302	165	446	158	270	0	360
Grp Sat Flow(s),veh/h/ln	1774	1784	1758	1792	1881	1571	1792	1845	1575	1738	0	1840
Q Serve(g_s), s	7.1	8.5	8.7	8.6	16.3	13.9	7.9	20.0	7.0	6.6	0.0	15.4
Cycle Q Clear(g_c), s	7.1	8.5	8.7	8.6	16.3	13.9	7.9	20.0	7.0	6.6	0.0	15.4
Prop In Lane	1.00		0.39	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	168	549	541	211	622	519	199	522	446	357	0	505
V/C Ratio(X)	0.87	0.40	0.41	0.85	0.66	0.58	0.83	0.85	0.35	0.76	0.00	0.71
Avail Cap(c_a), veh/h	168	549	541	211	622	519	211	570	486	370	0	547
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.0	23.9	24.0	37.8	25.0	24.2	38.0	29.6	25.0	38.1	0.0	28.6
Incr Delay (d2), s/veh	34.8	0.6	0.6	26.2	5.4	4.7	22.3	11.7	0.6	8.4	0.0	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	4.2	4.3	5.8	9.3	6.7	5.1	11.9	3.1	3.6	0.0	8.4
LnGrp Delay(d),s/veh	73.8	24.5	24.6	64.0	30.4	28.9	60.3	41.3	25.6	46.5	0.0	32.8
LnGrp LOS	E	C	C	E	C	C	E	D	C	D		C
Approach Vol, veh/h		586			890			769			630	
Approach Delay, s/veh		36.8			36.7			42.2			38.7	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	31.1	13.4	28.9	12.0	33.1	12.7	29.6
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0
Max Q Clear Time (g_c+I1), s	10.6	10.7	9.9	17.4	9.1	18.3	8.6	22.0
Green Ext Time (p_c), s	0.0	7.2	0.0	3.9	0.0	5.6	0.1	2.6

Intersection Summary

HCM 2010 Ctrl Delay	38.6
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Back + Proj Alt 1 PM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	84	462	138	151	450	0	348	0	151	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1867	1900	1881	1881	0	1881	1863	1900			
Adj Flow Rate, veh/h	85	467	139	153	455	0	352	0	153			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	0	2	2	1	1	0	1	0	1			
Cap, veh/h	108	1372	406	191	1985	0	538	0	245			
Arrive On Green	0.06	0.51	0.51	0.21	1.00	0.00	0.15	0.00	0.15			
Sat Flow, veh/h	1810	2699	797	1792	3668	0	3476	0	1583			
Grp Volume(v), veh/h	85	306	300	153	455	0	352	0	153			
Grp Sat Flow(s),veh/h/ln	1810	1774	1723	1792	1787	0	1738	0	1583			
Q Serve(g_s), s	2.3	5.1	5.2	4.1	0.0	0.0	4.8	0.0	4.5			
Cycle Q Clear(g_c), s	2.3	5.1	5.2	4.1	0.0	0.0	4.8	0.0	4.5			
Prop In Lane	1.00		0.46	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	108	902	876	191	1985	0	538	0	245			
V/C Ratio(X)	0.78	0.34	0.34	0.80	0.23	0.00	0.65	0.00	0.62			
Avail Cap(c_a), veh/h	235	902	876	233	1985	0	1112	0	507			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.87	0.99	0.99	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.2	7.3	7.3	19.2	0.0	0.0	19.9	0.0	19.8			
Incr Delay (d2), s/veh	4.0	0.9	0.9	12.1	0.3	0.0	0.5	0.0	1.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	2.7	2.6	2.6	0.1	0.0	2.3	0.0	2.0			
LnGrp Delay(d),s/veh	27.2	8.2	8.2	31.3	0.3	0.0	20.4	0.0	20.7			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		691			608			505				
Approach Delay, s/veh		10.5			8.1			20.5				
Approach LOS		B			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	8.8	29.4			6.5	31.8		11.7				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			6.5	16.0		16.0				
Max Q Clear Time (g_c+I1), s	6.1	7.2			4.3	2.0		6.8				
Green Ext Time (p_c), s	0.0	3.4			0.0	4.4		1.0				
Intersection Summary												
HCM 2010 Ctrl Delay			12.5									
HCM 2010 LOS			B									

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Back + Proj Alt 1 PM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	559	54	85	515	0	86	0	110	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1881	1900	1900	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	576	56	88	531	0	89	0	113	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
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
Percent Heavy Veh, %	0	2	2	2	1	1	0	0	0	0	0	0
Cap, veh/h	0	1956	190	111	2619	0	297	0	173	0	204	0
Arrive On Green	0.00	1.00	1.00	0.06	0.73	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	0	3353	316	1774	3668	0	1422	0	1610	0	1900	0
Grp Volume(v), veh/h	0	312	320	88	531	0	89	0	113	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1807	1774	1787	0	1422	0	1610	0	1900	0
Q Serve(g_s), s	0.0	0.0	0.0	2.4	2.3	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.4	2.3	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Prop In Lane	0.00		0.18	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1062	1084	111	2619	0	297	0	173	0	204	0
V/C Ratio(X)	0.00	0.29	0.30	0.79	0.20	0.00	0.30	0.00	0.65	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1062	1084	231	2619	0	599	0	515	0	608	0
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.93	0.93	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	23.1	2.1	0.0	21.3	0.0	21.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.6	4.6	0.2	0.0	0.2	0.0	1.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	1.3	1.2	0.0	1.2	0.0	1.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.7	0.6	27.7	2.3	0.0	21.5	0.0	23.0	0.0	0.0	0.0
LnGrp LOS		A	A	C	A		C		C			
Approach Vol, veh/h		632			619			202			0	
Approach Delay, s/veh		0.7			5.9			22.3			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	34.0		9.4		40.6		9.4				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.4	2.0		0.0		4.3		5.4				
Green Ext Time (p_c), s	0.0	7.3		0.0		9.3		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			5.9									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Back + Proj Alt 1 PM.syn
3/14/2016

Intersection												
Int Delay, s/veh		3.5										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	435	0	65	0	1	0	34	25	0	0	22	441
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	92	91	92	92	92	91	91	92	92	91	91
Heavy Vehicles, %	2	0	0	0	0	0	4	0	0	0	0	1
Mvmt Flow	478	0	71	0	1	0	37	27	0	0	24	485
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1	0	0	2	0	0	15	959	2	17	959	1
Stage 1	-	-	-	-	-	-	2	958	-	1	1	-
Stage 2	-	-	-	-	-	-	13	1	-	16	958	-
Critical Hdwy	4.12	-	-	-	-	-	7.14	6.5	-	7.1	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.536	4	-	3.5	4	3.309
Pot Cap-1 Maneuver	1622	-	-	-	-	-	996	259	-	1003	259	1087
Stage 1	-	-	-	-	-	-	-	-	-	1027	899	-
Stage 2	-	-	-	-	-	-	1002	899	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	-	-	-	551	182	-	-	182	1087
Mov Cap-2 Maneuver	-	-	-	-	-	-	266 ~	~547	-	-	~58	-
Stage 1	-	-	-	-	-	-	-	-	-	724	899	-
Stage 2	-	-	-	-	-	-	540	899	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.1			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	266	-	1622	-	-	-	-	-	-	1087		
HCM Lane V/C Ratio	0.14	-	0.295	-	-	-	-	-	-	0.446		
HCM Control Delay (s)	20.7	-	8.1	-	-	0	-	-	-	10.9		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.5	-	1.2	-	-	-	-	-	-	2.3		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Back + Proj Alt 1 PM.syn
3/14/2016

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Volume (veh/h)	277	22	212	34	13	18	268	1441	10	13	1357	153												
Number	5	2	12	1	6	16	3	8	18	7	4	14												
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0												
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.99	1.00		1.00												
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00												
Adj Sat Flow, veh/h/ln	1863	1870	1900	1863	1763	1900	1900	1845	1900	1900	1881	1881												
Adj Flow Rate, veh/h	269	55	223	34	16	19	282	1517	11	14	1428	0												
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1												
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												
Percent Heavy Veh, %	2	7	7	2	5	5	0	3	3	0	1	1												
Cap, veh/h	332	60	242	114	46	55	292	1904	14	42	1414	633												
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.16	0.53	0.53	0.02	0.40	0.00												
Sat Flow, veh/h	1774	319	1295	1774	717	852	1810	3567	26	1810	3574	1599												
Grp Volume(v), veh/h	269	0	278	34	0	35	282	745	783	14	1428	0												
Grp Sat Flow(s),veh/h/ln	1774	0	1614	1774	0	1569	1810	1753	1840	1810	1787	1599												
Q Serve(g_s), s	12.9	0.0	15.0	1.6	0.0	1.9	13.7	30.6	30.6	0.7	35.1	0.0												
Cycle Q Clear(g_c), s	12.9	0.0	15.0	1.6	0.0	1.9	13.7	30.6	30.6	0.7	35.1	0.0												
Prop In Lane	1.00		0.80	1.00		0.54	1.00		0.01	1.00		1.00												
Lane Grp Cap(c), veh/h	332	0	302	114	0	101	292	936	982	42	1414	633												
V/C Ratio(X)	0.81	0.00	0.92	0.30	0.00	0.35	0.97	0.80	0.80	0.34	1.01	0.00												
Avail Cap(c_a), veh/h	332	0	302	140	0	124	292	936	982	149	1414	633												
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00												
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00												
Uniform Delay (d), s/veh	34.6	0.0	35.4	39.6	0.0	39.7	37.0	16.8	16.8	42.7	26.8	0.0												
Incr Delay (d2), s/veh	14.3	0.0	32.1	2.0	0.0	2.9	43.6	5.3	5.1	4.7	26.4	0.0												
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0												
%ile BackOfQ(50%),veh/ln	7.6	0.0	9.4	0.9	0.0	0.9	10.3	16.1	16.8	0.4	22.3	0.0												
LnGrp Delay(d),s/veh	48.8	0.0	67.5	41.6	0.0	42.6	80.5	22.1	21.9	47.3	53.2	0.0												
LnGrp LOS	D		E	D		D	F	C	C	D	F													
Approach Vol, veh/h	547			69			1810			1442														
Approach Delay, s/veh	58.3			42.1			31.1			53.1														
Approach LOS	E			D			C			D														
Timer	1	2	3	4	5	6	7	8																
Assigned Phs	2	3	4			6	7	8																
Phs Duration (G+Y+Rc), s	20.8	18.0	40.0			9.9	5.7	52.3																
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9																
Max Green Setting (Gmax), s	* 17	14.3	35.1			7.0	7.3	42.1																
Max Q Clear Time (g_c+I1), s	17.0	15.7	37.1			3.9	2.7	32.6																
Green Ext Time (p_c), s	0.0	0.0	0.0			0.1	0.0	9.3																
Intersection Summary																								
HCM 2010 Ctrl Delay	43.4																							
HCM 2010 LOS	D																							
Notes																								
User approved volume balancing among the lanes for turning movement.																								

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Back + Proj Alt 1 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1689	14	54	1548	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1759	15	56	1612	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	1	0	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1773	0	56	1612	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Effective Green, g (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48		0.04	0.50	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	1038	521		85	87	80	39	1684		80	1797	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.50		0.03	0.45	
v/s Ratio Perm						0.00						c0.49
v/c Ratio	0.99	0.04		0.21	0.21	0.03	0.36	1.05		0.70	0.90	0.49
Uniform Delay, d1	48.9	34.8		64.5	64.4	63.9	68.1	36.9		66.5	31.8	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1		2.1	2.0	0.3	5.6	37.4		23.4	6.8	1.1
Delay (s)	73.3	34.9		66.6	66.5	64.2	73.6	74.4		90.0	38.6	1.1
Level of Service	E	C		E	E	E	E	E		F	D	A
Approach Delay (s)		72.0			65.1			74.4			27.8	
Approach LOS		E			E			E			C	

Intersection Summary

HCM 2000 Control Delay	52.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	141.2	Sum of lost time (s)	17.9
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

9: Carmel Rancho Blvd & Shopping Center Dwy

Back + Proj Alt 1 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	177	10	20	40	10	30	38	544	18	11	390	85
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1887	1900	1900	1800	1863	1881	1846	1900	1827	1851	1900
Adj Flow Rate, veh/h	190	11	22	43	11	32	41	585	19	12	419	91
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
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
Percent Heavy Veh. %	2	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	624	143	286	537	105	402	574	1384	45	530	1148	247
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1347	558	1117	1010	412	1568	891	3467	113	794	2874	619
Grp Volume(v), veh/h	190	0	33	54	0	32	41	296	308	12	255	255
Grp Sat Flow(s),veh/h/ln	1347	0	1675	1422	0	1568	891	1754	1825	794	1759	1735
Q Serve(g_s), s	2.9	0.0	0.3	0.0	0.0	0.4	0.8	2.8	2.8	0.3	2.4	2.4
Cycle Q Clear(g_c), s	3.5	0.0	0.3	0.5	0.0	0.4	3.2	2.8	2.8	3.1	2.4	2.4
Prop In Lane	1.00		0.67	0.80		1.00	1.00		0.06	1.00		0.36
Lane Grp Cap(c), veh/h	624	0	429	643	0	402	574	700	729	530	702	693
V/C Ratio(X)	0.30	0.00	0.08	0.08	0.00	0.08	0.07	0.42	0.42	0.02	0.36	0.37
Avail Cap(c_a), veh/h	1439	0	1443	1482	0	1351	870	1285	1337	795	1288	1270
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.0	0.0	6.6	6.6	0.0	6.6	6.0	5.0	5.0	6.2	4.9	4.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.2	0.3	0.0	0.2	0.2	1.3	1.4	0.1	1.2	1.2
LnGrp Delay(d),s/veh	8.1	0.0	6.6	6.6	0.0	6.6	6.1	5.2	5.2	6.2	5.0	5.0
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		223			86			645			522	
Approach Delay, s/veh		7.8			6.6			5.2			5.1	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		9.9		13.3		9.9		13.3
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0
Max Q Clear Time (g_c+I1), s		5.5		5.1		2.5		5.2
Green Ext Time (p_c), s		0.6		3.8		0.6		3.7

Intersection Summary

HCM 2010 Ctrl Delay	5.6
HCM 2010 LOS	A

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Cum + Proj Alt 1 AM.syn

3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	855	539	61	1140	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2760	1863	1509	3335	1759
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2760	1863	1509	3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	929	586	66	1239	908
RTOR Reduction (vph)	0	208	0	8	0	0
Lane Group Flow (vph)	0	721	586	58	1239	908
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA	Perm	Prot	NA	
Protected Phases	3	2		3	Free	
Permitted Phases			2			
Actuated Green, G (s)		25.4	23.4	23.4	25.4	58.6
Effective Green, g (s)		25.4	23.4	23.4	25.4	58.6
Actuated g/C Ratio		0.43	0.40	0.40	0.43	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)	1196	743	602	1445	1759	
v/s Ratio Prot	0.26	c0.31		c0.37	0.52	
v/s Ratio Perm			0.04			
v/c Ratio	0.60	0.79	0.10	0.86	0.52	
Uniform Delay, d1	12.7	15.4	11.0	15.0	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	5.7	0.1	5.6	1.1	
Delay (s)	13.9	21.2	11.1	20.6	1.1	
Level of Service		B	C	B	C	A
Approach Delay (s)	13.9		20.1		12.4	
Approach LOS	B		C		B	
Intersection Summary						
HCM 2000 Control Delay		14.1		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.82				
Actuated Cycle Length (s)		58.6		Sum of lost time (s)	9.8	
Intersection Capacity Utilization		69.1%		ICU Level of Service	C	
Analysis Period (min)		15				
c Critical Lane Group						

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Cum + Proj Alt 1 AM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	773	401	468	734	5	86	5	294	10	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00		1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (prot)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1558
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (perm)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1558
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	31	878	456	532	834	6	98	6	334	11	19	38
RTOR Reduction (vph)	0	0	275	0	0	0	0	0	282	0	0	37
Lane Group Flow (vph)	31	878	181	532	840	0	52	52	52	0	30	1
Confl. Peds. (#/hr)	2		1			1	1			1		2
Heavy Vehicles (%)	4%	7%	2%	1%	3%	0%	6%	0%	6%	30%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.8	23.4	23.4	9.2	30.9		4.3	4.3	9.2		1.5	1.5
Effective Green, g (s)	1.8	23.4	23.4	9.2	30.9		4.3	4.3	9.2		1.5	1.5
Actuated g/C Ratio	0.03	0.40	0.40	0.16	0.53		0.07	0.07	0.16		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	53	1342	622	542	1839		118	120	238		42	39
v/s Ratio Prot	0.02	c0.26		c0.15	0.24		c0.03	0.03	0.03		c0.02	
v/s Ratio Perm			0.12									0.00
v/c Ratio	0.58	0.65	0.29	0.98	0.46		0.44	0.43	0.22		0.71	0.02
Uniform Delay, d1	28.1	14.4	12.1	24.7	8.7		26.1	26.1	21.7		28.4	27.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.2	0.9	0.1	33.7	0.1		1.0	0.9	0.2		38.0	0.1
Delay (s)	38.3	15.3	12.2	58.4	8.8		27.1	27.0	21.8		66.5	28.0
Level of Service	D	B	B	E	A		C	C	C		E	C
Approach Delay (s)		14.8			28.0			23.1			45.0	
Approach LOS		B			C			C			D	
Intersection Summary												
HCM 2000 Control Delay		22.1		HCM 2000 Level of Service	C							
HCM 2000 Volume to Capacity ratio		0.71										
Actuated Cycle Length (s)		58.8		Sum of lost time (s)				20.4				
Intersection Capacity Utilization		56.7%		ICU Level of Service	B							
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Cum + Proj Alt 1 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	229	36	140	183	173	23	294	85	326	468	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1827	1863	1827	1821	1900
Adj Flow Rate, veh/h	145	249	39	152	199	188	25	320	92	354	509	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	2	4	4	4
Cap, veh/h	202	656	101	204	392	333	75	510	440	465	613	54
Arrive On Green	0.11	0.22	0.22	0.11	0.22	0.22	0.04	0.28	0.28	0.14	0.37	0.37
Sat Flow, veh/h	1774	3038	470	1774	1810	1535	1675	1827	1575	3375	1649	146
Grp Volume(v), veh/h	145	142	146	152	199	188	25	320	92	354	0	554
Grp Sat Flow(s),veh/h/ln	1774	1750	1758	1774	1810	1535	1675	1827	1575	1688	0	1794
Q Serve(g_s), s	5.2	4.5	4.6	5.4	6.3	7.1	0.9	10.0	2.9	6.6	0.0	18.3
Cycle Q Clear(g_c), s	5.2	4.5	4.6	5.4	6.3	7.1	0.9	10.0	2.9	6.6	0.0	18.3
Prop In Lane	1.00		0.27	1.00		1.00	1.00		1.00	1.00		0.08
Lane Grp Cap(c), veh/h	202	378	379	204	392	333	75	510	440	465	0	668
V/C Ratio(X)	0.72	0.38	0.38	0.75	0.51	0.56	0.33	0.63	0.21	0.76	0.00	0.83
Avail Cap(c_a), veh/h	253	748	751	253	773	656	205	728	627	533	0	778
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.9	21.9	21.9	28.0	22.5	22.8	30.2	20.6	18.0	27.1	0.0	18.6
Incr Delay (d2), s/veh	7.2	0.7	0.8	9.1	1.2	1.8	2.6	1.5	0.3	5.6	0.0	6.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.2	2.3	3.2	3.3	3.2	0.5	5.2	1.3	3.4	0.0	10.2
LnGrp Delay(d),s/veh	35.1	22.6	22.7	37.0	23.7	24.6	32.8	22.1	18.3	32.7	0.0	25.5
LnGrp LOS	D	C	C	D	C	C	C	C	B	C	C	C
Approach Vol, veh/h		433			539			437			908	
Approach Delay, s/veh		26.8			27.8			21.9			28.3	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.2	18.3	6.6	29.2	11.1	18.4	12.7	23.1				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	7.4	6.6	2.9	20.3	7.2	9.1	8.6	12.0				
Green Ext Time (p_c), s	0.1	4.5	0.0	3.8	0.1	4.3	0.2	5.5				

Intersection Summary

HCM 2010 Ctrl Delay 26.7
HCM 2010 LOS C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Cum + Proj Alt 1 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	93	388	83	115	276	20	140	4	85	15	3	31
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1860	1900	1810	1799	1900	1810	1704	1900	1900	1900	1900
Adj Flow Rate, veh/h	102	426	91	126	303	22	154	4	93	16	3	34
Adj No. of Lanes	1	2	0	1	2	0	2	1	0	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	0	2	2	5	6	6	5	0	0	0	0	0
Cap, veh/h	131	1618	343	158	1865	135	252	11	261	174	7	81
Arrive On Green	0.07	0.56	0.56	0.09	0.58	0.58	0.08	0.19	0.19	0.05	0.05	0.05
Sat Flow, veh/h	1810	2901	615	1723	3233	233	3343	60	1397	1319	133	1502
Grp Volume(v), veh/h	102	258	259	126	159	166	154	0	97	16	0	37
Grp Sat Flow(s),veh/h/ln	1810	1767	1749	1723	1709	1757	1672	0	1457	1319	0	1635
Q Serve(g_s), s	3.9	5.3	5.4	5.0	3.0	3.1	3.1	0.0	4.1	0.8	0.0	1.5
Cycle Q Clear(g_c), s	3.9	5.3	5.4	5.0	3.0	3.1	3.1	0.0	4.1	0.8	0.0	1.5
Prop In Lane	1.00		0.35	1.00		0.13	1.00		0.96	1.00		0.92
Lane Grp Cap(c), veh/h	131	985	975	158	986	1014	252	0	272	174	0	88
V/C Ratio(X)	0.78	0.26	0.27	0.80	0.16	0.16	0.61	0.00	0.36	0.09	0.00	0.42
Avail Cap(c_a), veh/h	142	985	975	160	986	1014	764	0	333	404	0	374
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	0.85	0.99	0.99	0.99	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.9	8.0	8.0	31.2	6.9	6.9	31.4	0.0	24.8	31.7	0.0	32.0
Incr Delay (d2), s/veh	16.8	0.5	0.6	22.0	0.3	0.3	0.9	0.0	0.3	0.2	0.0	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.7	2.7	3.3	1.5	1.6	1.5	0.0	1.6	0.3	0.0	0.8
LnGrp Delay(d),s/veh	48.7	8.6	8.6	53.1	7.3	7.3	32.3	0.0	25.1	31.9	0.0	35.2
LnGrp LOS	D	A	A	D	A	A	C		C	C		D
Approach Vol, veh/h		619			451			251			53	
Approach Delay, s/veh		15.2			20.1			29.5			34.2	
Approach LOS		B			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	43.0	9.3	7.8	8.6	44.4		17.1				
Change Period (Y+Rc), s	3.5	4.0	4.0	4.0	3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0	16.0	16.0	5.5	17.0		16.0				
Max Q Clear Time (g_c+I1), s	7.0	7.4	5.1	3.5	5.9	5.1		6.1				
Green Ext Time (p_c), s	0.0	2.5	0.2	0.4	0.0	3.0		0.4				

Intersection Summary

HCM 2010 Ctrl Delay 20.1
HCM 2010 LOS C

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HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Cum + Proj Alt 1 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	396	92	61	379	1	32	0	38	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1820	1900	1845	1845	1900	1900	1638	1712	1900	1900	1900
Adj Flow Rate, veh/h	0	477	111	73	457	1	39	0	46	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	3	3	3	0	0	11	0	0	0
Cap, veh/h	0	1849	428	91	2815	6	212	0	80	0	105	0
Arrive On Green	0.00	0.66	0.66	0.05	0.78	0.78	0.06	0.00	0.06	0.00	0.00	0.00
Sat Flow, veh/h	0	2880	645	1757	3588	8	1228	0	1444	0	1900	0
Grp Volume(v), veh/h	0	295	293	73	223	235	39	0	46	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1729	1705	1757	1753	1843	1228	0	1444	0	1900	0
Q Serve(g_s), s	0.0	3.5	3.5	2.1	1.6	1.6	1.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	3.5	3.5	2.1	1.6	1.6	1.5	0.0	1.6	0.0	0.0	0.0
Prop In Lane	0.00		0.38	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1146	1130	91	1375	1446	212	0	80	0	105	0
V/C Ratio(X)	0.00	0.26	0.26	0.80	0.16	0.16	0.18	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1146	1130	193	1375	1446	537	0	462	0	608	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.97	0.97	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	3.4	3.4	23.5	1.3	1.3	23.0	0.0	23.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	6.1	0.3	0.2	0.2	0.0	2.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.8	1.8	1.1	0.8	0.9	0.5	0.0	0.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	3.9	4.0	29.5	1.6	1.6	23.2	0.0	25.4	0.0	0.0	0.0
LnGrp LOS	A	A	C	A	A	C	C		C			
Approach Vol, veh/h		588			531			85			0	
Approach Delay, s/veh		4.0			5.4			24.4			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.1	37.1		6.8		43.2		6.8				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	5.5	17.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.1	5.5		0.0		3.6		3.6				
Green Ext Time (p_c), s	0.0	5.5		0.0		8.0		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			6.0									
HCM 2010 LOS			A									

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HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Cum + Proj Alt 1 AM.syn
3/14/2016

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	249	0	16	0	1	0	17	15	0	0	32	369
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	1	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	92	80	92	92	92	80	80	92	92	80	80
Heavy Vehicles, %	7	0	0	2	2	2	0	7	0	0	0	2
Mvmt Flow	311	0	20	0	1	0	21	19	0	0	40	461
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	2	0	0	25	628	2	14	628	5
Stage 1	-	-	-	-	-	-	2	625	-	3	3	-
Stage 2	-	-	-	-	-	-	23	3	-	11	625	-
Critical Hdwy	4.17	-	-	-	-	-	7.1	6.57	-	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.57	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.5	4.063	-	3.5	4	3.318
Pot Cap-1 Maneuver	1587	-	-	-	-	-	991	393	-	1007	402	1078
Stage 1	-	-	-	-	-	-	-	-	-	1025	897	-
Stage 2	-	-	-	-	-	-	1000	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1584	-	-	-	-	-	515	315	-	-	322	1074
Mov Cap-2 Maneuver	-	-	-	-	-	-	304	1518	-	-	380	-
Stage 1	-	-	-	-	-	-	-	-	-	822	896	-
Stage 2	-	-	-	-	-	-	544	882	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.4			0								
HCM LOS							-			-		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	304	-	1584	-	-	-	-	-	-	1074		
HCM Lane V/C Ratio	0.07	-	0.196	-	-	-	-	-	-	0.429		
HCM Control Delay (s)	17.7	-	7.8	-	-	0	-	-	-	10.9		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.2	-	0.7	-	-	-	-	-	-	2.2		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Cum + Proj Alt 1 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	213	40	129	134	38	50	159	1172	37	16	1633	137
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1868	1900	1900	1842	1900	1827	1840	1900	1357	1827	1845
Adj Flow Rate, veh/h	220	82	148	128	81	57	183	1347	43	18	1877	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh. %	3	0	0	0	9	9	4	3	3	40	4	3
Cap, veh/h	293	98	177	151	81	57	163	1832	58	37	1614	729
Arrive On Green	0.17	0.17	0.17	0.08	0.08	0.08	0.09	0.53	0.53	0.03	0.46	0.00
Sat Flow, veh/h	1757	586	1057	1810	977	688	1740	3456	110	1293	3471	1568
Grp Volume(v), veh/h	220	0	230	128	0	138	183	681	709	18	1877	0
Grp Sat Flow(s),veh/h/ln	1757	0	1643	1810	0	1665	1740	1748	1818	1293	1736	1568
Q Serve(g, s), s	10.6	0.0	12.0	6.2	0.0	7.4	8.3	26.6	26.7	1.2	41.3	0.0
Cycle Q Clear(g_c), s	10.6	0.0	12.0	6.2	0.0	7.4	8.3	26.6	26.7	1.2	41.3	0.0
Prop In Lane	1.00		0.64	1.00		0.41	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	293	0	274	151	0	139	163	927	964	37	1614	729
V/C Ratio(X)	0.75	0.00	0.84	0.85	0.00	1.00	1.13	0.73	0.74	0.49	1.16	0.00
Avail Cap(c_a), veh/h	316	0	296	151	0	139	163	927	964	106	1614	729
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.2	0.0	35.8	40.2	0.0	40.7	40.3	16.1	16.1	42.5	23.8	0.0
Incr Delay (d2), s/veh	9.3	0.0	18.2	35.1	0.0	74.9	108.4	3.5	3.4	9.9	80.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	0.0	6.8	4.6	0.0	6.2	8.8	13.6	14.1	0.5	37.6	0.0
LnGrp Delay(d),s/veh	44.6	0.0	54.1	75.3	0.0	115.6	148.6	19.5	19.5	52.5	104.4	0.0
LnGrp LOS	D		D	E		F	F	B	B	D	F	
Approach Vol, veh/h		450			266			1573			1895	
Approach Delay, s/veh		49.4			96.2			34.5			103.9	
Approach LOS		D			F			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.0	12.0	46.2		11.6	6.2	52.0				
Change Period (Y+Rc), s		* 4.2	3.7	4.9		4.2	3.7	4.9				
Max Green Setting (Gmax), s		* 16	8.3	41.3		7.4	7.3	42.3				
Max Q Clear Time (g_c+I1), s		14.0	10.3	43.3		9.4	3.2	28.7				
Green Ext Time (p_c), s		0.5	0.0	0.0		0.0	0.0	13.4				
Intersection Summary												
HCM 2010 Ctrl Delay			71.5									
HCM 2010 LOS			E									

Notes

User approved volume balancing among the lanes for turning movement.

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Cum + Proj Alt 1 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1410	10	32	1774	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3532		1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3532		1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1640	12	37	2063	816
RTOR Reduction (vph)	0	17	0	0	54	0	0	0	0	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1652	0	37	2063	816
Confl. Peds. (#/hr)				1		1			1			
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59		0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	550	269		96	102	90	66	2089		67	2048	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.47		0.02	c0.60	
v/s Ratio Perm						0.00						c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.79		0.55	1.01	0.53
Uniform Delay, d1	48.1	41.7		52.9	52.9	52.4	55.2	18.5		55.7	23.8	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.6	0.1		1.6	1.5	0.3	3.0	2.4		9.5	21.7	1.3
Delay (s)	60.6	41.8		54.5	54.4	52.7	58.2	20.9		65.2	45.5	1.3
Level of Service	E	D		D	D	D	E	C		E	D	A
Approach Delay (s)		59.6			53.4		21.4				33.4	
Approach LOS		E			D		C				C	
Intersection Summary												
HCM 2000 Control Delay			32.4									
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			117.8							17.9		
Intersection Capacity Utilization			75.1%									
Analysis Period (min)			15									
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
9: Carmel Rancho Blvd & Shopping Center Dwy

Cum + Proj Alt 1 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	56	1	19	9	1	20	17	232	15	76	561	174
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1785	1863	1881	1848	1900	1827	1853	1900
Adj Flow Rate, veh/h	73	1	25	12	1	26	22	301	19	99	729	226
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	0	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	475	7	179	447	24	183	527	1720	108	814	1356	420
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.51	0.51	0.51	0.51	0.51	0.51
Sat Flow, veh/h	1392	62	1545	1086	205	1573	591	3354	211	1033	2644	820
Grp Volume(v), veh/h	73	0	26	13	0	26	22	157	163	99	485	470
Grp Sat Flow(s),veh/h/ln	1392	0	1606	1291	0	1573	591	1755	1810	1033	1761	1704
Q Serve(g, s), s	1.1	0.0	0.3	0.0	0.0	0.3	0.6	1.0	1.0	1.2	4.0	4.0
Cycle Q Clear(g_c), s	1.4	0.0	0.3	0.3	0.0	0.3	4.6	1.0	1.0	2.3	4.0	4.0
Prop In Lane	1.00		0.96	0.92		1.00	1.00		0.12	1.00		0.48
Lane Grp Cap(c), veh/h	475	0	187	471	0	183	527	900	928	814	903	874
V/C Ratio(X)	0.15	0.00	0.14	0.03	0.00	0.14	0.04	0.17	0.18	0.12	0.54	0.54
Avail Cap(c_a), veh/h	1605	0	1490	1563	0	1459	690	1384	1427	1098	1388	1344
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	0.0	8.6	8.5	0.0	8.6	5.1	2.8	2.8	3.4	3.5	3.5
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.1	0.0	0.1	0.1	0.5	0.5	0.3	1.9	1.9
LnGrp Delay(d),s/veh	9.2	0.0	8.7	8.5	0.0	8.7	5.1	2.8	2.8	3.4	3.7	3.7
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		99			39			342			1054	
Approach Delay, s/veh		9.1			8.6			3.0			3.7	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		6.5		15.1		6.5		15.1				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		3.4		6.0		2.3		6.6				
Green Ext Time (p_c), s		0.2		4.5		0.2		4.4				
Intersection Summary												
HCM 2010 Ctrl Delay			4.0									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Cum + Proj Alt 1 PM.syn
3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	968	975	105	993	771
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2814	1863	1553	3467	1881
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2814	1863	1553	3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1030	1037	112	1056	820
RTOR Reduction (vph)	0	104	0	5	0	0
Lane Group Flow (vph)	0	926	1037	107	1056	820
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases			2			
Actuated Green, G (s)		20.1	35.1	35.1	20.1	65.0
Effective Green, g (s)		20.1	35.1	35.1	20.1	65.0
Actuated g/C Ratio		0.31	0.54	0.54	0.31	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		870	1006	838	1072	1881
v/s Ratio Prot		c0.33	c0.56		0.30	0.44
v/s Ratio Perm				0.07		
v/c Ratio		1.06	1.03	0.13	0.99	0.44
Uniform Delay, d1		22.4	14.9	7.4	22.3	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		49.3	36.6	0.1	23.8	0.7
Delay (s)		71.7	51.5	7.5	46.1	0.7
Level of Service		E	D	A	D	A
Approach Delay (s)	71.7		47.2			26.3
Approach LOS	E		D			C
Intersection Summary						
HCM 2000 Control Delay			43.8		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.04			
Actuated Cycle Length (s)			65.0		Sum of lost time (s)	9.8
Intersection Capacity Utilization			93.3%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Cum + Proj Alt 1 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰		↰	↰	↰		↰	↰
Volume (vph)	31	874	193	400	673	4	277	17	601	4	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (prot)	1805	3539	1615	3467	3571		1715	1728	1599		1887	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (perm)	1805	3539	1615	3467	3571		1715	1728	1599		1887	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	33	930	205	426	716	4	295	18	639	4	24	19
RTOR Reduction (vph)	0	0	121	0	1	0	0	0	536	0	0	19
Lane Group Flow (vph)	33	930	84	426	719	0	156	157	103	0	28	0
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	0%	1%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.9	23.9	23.9	9.0	31.1		9.2	9.2	9.0		1.6	1.6
Effective Green, g (s)	1.9	23.9	23.9	9.0	31.1		9.2	9.2	9.0		1.6	1.6
Actuated g/C Ratio	0.03	0.37	0.37	0.14	0.49		0.14	0.14	0.14		0.02	0.02
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	53	1319	602	486	1732		246	248	224		47	38
v/s Ratio Prot	0.02	c0.26		c0.12	0.20		c0.09	0.09	0.06		c0.01	
v/s Ratio Perm			0.05									0.00
v/c Ratio	0.62	0.71	0.14	0.88	0.42		0.63	0.63	0.46		0.60	0.01
Uniform Delay, d1	30.7	17.1	13.3	27.0	10.6		25.9	25.9	25.3		30.9	30.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	15.2	1.4	0.0	15.7	0.1		3.9	3.8	0.5		12.8	0.0
Delay (s)	46.0	18.5	13.3	42.7	10.7		29.8	29.7	25.9		43.7	30.5
Level of Service	D	B	B	D	B		C	C	C		D	C
Approach Delay (s)		18.4			22.6			27.1			38.4	
Approach LOS		B			C			C			D	
Intersection Summary												
HCM 2000 Control Delay		22.6			HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		64.1			Sum of lost time (s)			20.4				
Intersection Capacity Utilization		76.9%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Cum + Proj Alt 1 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (veh/h)	143	367	83	190	418	356	162	581	164	330	397	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1845	1863	1881	1883	1900
Adj Flow Rate, veh/h	146	374	85	194	427	363	165	593	167	337	405	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	2	1	3	2	1	1	1	1
Cap, veh/h	164	865	195	205	604	504	198	553	473	359	487	54
Arrive On Green	0.09	0.30	0.30	0.11	0.32	0.32	0.11	0.30	0.30	0.10	0.29	0.29
Sat Flow, veh/h	1774	2896	651	1792	1881	1571	1792	1845	1575	3476	1664	185
Grp Volume(v), veh/h	146	229	230	194	427	363	165	593	167	337	0	450
Grp Sat Flow(s),veh/h/ln	1774	1784	1763	1792	1881	1571	1792	1845	1575	1738	0	1849
Q Serve(g_s), s	7.3	9.3	9.5	9.7	17.9	18.4	8.1	27.0	7.5	8.7	0.0	20.5
Cycle Q Clear(g_c), s	7.3	9.3	9.5	9.7	17.9	18.4	8.1	27.0	7.5	8.7	0.0	20.5
Prop In Lane	1.00		0.37	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	164	533	527	205	604	504	198	553	473	359	0	541
V/C Ratio(X)	0.89	0.43	0.44	0.95	0.71	0.72	0.83	1.07	0.35	0.94	0.00	0.83
Avail Cap(c_a), veh/h	164	533	527	205	604	504	205	553	473	359	0	541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.4	25.4	25.4	39.6	26.8	27.0	39.2	31.5	24.7	40.1	0.0	29.8
Incr Delay (d2), s/veh	41.0	0.7	0.7	47.6	6.8	8.6	23.7	58.9	0.5	32.0	0.0	10.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	4.7	4.7	7.5	10.4	9.2	5.3	22.7	3.3	5.8	0.0	12.0
LnGrp Delay(d),s/veh	81.5	26.0	26.1	87.2	33.7	35.5	62.9	90.4	25.2	72.1	0.0	40.6
LnGrp LOS	F	C	C	F	C	D	E	F	C	E		D
Approach Vol, veh/h		605			984			925			787	
Approach Delay, s/veh		39.4			44.9			73.7			54.1	
Approach LOS		D			D			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	31.1	13.7	31.2	12.0	33.1	13.0	31.9				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	11.7	11.5	10.1	22.5	9.3	20.4	10.7	29.0				
Green Ext Time (p_c), s	0.0	7.6	0.0	2.3	0.0	5.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay					54.2							
HCM 2010 LOS					D							

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Cum + Proj Alt 1 PM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	177	462	138	163	456	47	348	9	169	43	8	86
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1867	1900	1881	1883	1900	1881	1865	1900	1900	1900	1900
Adj Flow Rate, veh/h	179	467	139	165	461	47	352	9	171	43	8	87
Adj No. of Lanes	1	2	0	1	2	0	2	1	0	1	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	0	2	2	1	1	1	1	0	0	0	0	0
Cap, veh/h	168	1233	364	166	1498	152	461	23	434	221	13	142
Arrive On Green	0.09	0.46	0.46	0.09	0.46	0.46	0.13	0.29	0.29	0.10	0.10	0.10
Sat Flow, veh/h	1810	2698	797	1792	3278	333	3476	80	1517	1223	136	1481
Grp Volume(v), veh/h	179	306	300	165	251	257	352	0	180	43	0	95
Grp Sat Flow(s),veh/h/ln	1810	1774	1722	1792	1789	1822	1738	0	1597	1223	0	1617
Q Serve(g_s), s	6.5	7.9	8.0	6.4	6.2	6.2	6.8	0.0	6.4	2.3	0.0	3.9
Cycle Q Clear(g_c), s	6.5	7.9	8.0	6.4	6.2	6.2	6.8	0.0	6.4	2.3	0.0	3.9
Prop In Lane	1.00		0.46	1.00		0.18	1.00		0.95	1.00		0.92
Lane Grp Cap(c), veh/h	168	810	787	166	817	833	461	0	457	221	0	156
V/C Ratio(X)	1.07	0.38	0.38	0.99	0.31	0.31	0.76	0.00	0.39	0.19	0.00	0.61
Avail Cap(c_a), veh/h	168	810	787	166	817	833	794	0	457	382	0	370
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	0.78	0.98	0.98	0.98	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.8	12.5	12.5	31.7	12.0	12.0	29.3	0.0	20.1	29.6	0.0	30.4
Incr Delay (d2), s/veh	79.8	1.0	1.1	66.6	1.0	0.9	1.0	0.0	0.2	0.4	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	4.1	4.0	6.2	3.3	3.4	3.3	0.0	2.8	0.8	0.0	1.9
LnGrp Delay(d),s/veh	111.5	13.5	13.6	98.3	13.0	13.0	30.3	0.0	20.3	30.1	0.0	34.2
LnGrp LOS	F	B	B	F	B	B	C		C	C		C
Approach Vol, veh/h	785			673			532			138		
Approach Delay, s/veh	35.9			33.9			26.9			32.9		
Approach LOS	D			C			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	36.0	13.3	10.7	10.0	36.0		24.0				
Change Period (Y+Rc), s	3.5	4.0	4.0	4.0	3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0	16.0	16.0	6.5	16.0		16.0				
Max Q Clear Time (g_c+I1), s	8.4	10.0	8.8	5.9	8.5	8.2		8.4				
Green Ext Time (p_c), s	0.0	2.6	0.4	0.5	0.0	3.1		0.9				
Intersection Summary												
HCM 2010 Ctrl Delay	32.8											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Cum + Proj Alt 1 PM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	620	54	85	580	0	86	0	110	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1881	1900	1900	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	639	56	88	598	0	89	0	113	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
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
Percent Heavy Veh, %	0	2	2	2	1	1	0	0	0	0	0	0
Cap, veh/h	0	1976	173	111	2619	0	297	0	173	0	204	0
Arrive On Green	0.00	0.60	0.60	0.06	0.73	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	0	3386	288	1774	3668	0	1422	0	1610	0	1900	0
Grp Volume(v), veh/h	0	343	352	88	598	0	89	0	113	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1812	1774	1787	0	1422	0	1610	0	1900	0
Q Serve(g_s), s	0.0	4.8	4.8	2.4	2.7	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	4.8	4.8	2.4	2.7	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Prop In Lane	0.00		0.16	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1062	1087	111	2619	0	297	0	173	0	204	0
V/C Ratio(X)	0.00	0.32	0.32	0.79	0.23	0.00	0.30	0.00	0.65	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1062	1087	231	2619	0	599	0	515	0	608	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.88	0.88	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.0	5.0	23.1	2.1	0.0	21.3	0.0	21.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.7	4.6	0.2	0.0	0.2	0.0	1.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.5	2.6	1.3	1.3	0.0	1.2	0.0	1.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	5.7	5.7	27.7	2.3	0.0	21.5	0.0	23.0	0.0	0.0	0.0
LnGrp LOS		A	A	C	A		C		C			
Approach Vol, veh/h	695			686			202			0		
Approach Delay, s/veh	5.7			5.6			22.3			0.0		
Approach LOS	A			A			C					
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	34.0		9.4		40.6		9.4				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.4	6.8		0.0		4.7		5.4				
Green Ext Time (p_c), s	0.0	5.9		0.0		10.4		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay	7.8											
HCM 2010 LOS	A											

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Cum + Proj Alt 1 PM.syn
3/14/2016

Intersection												
Int Delay, s/veh		3.6										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	496	0	65	0	1	0	34	25	0	0	22	506
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	92	91	92	92	92	91	91	92	92	91	91
Heavy Vehicles, %	2	0	0	0	0	0	4	0	0	0	0	1
Mvmt Flow	545	0	71	0	1	0	37	27	0	0	24	556
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1	0	0	2	0	0	15	1093	2	17	1093	1
Stage 1	-	-	-	-	-	-	2	1092	-	1	1	-
Stage 2	-	-	-	-	-	-	13	1	-	16	1092	-
Critical Hdwy	4.12	-	-	-	-	-	7.14	6.5	-	7.1	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.536	4	-	3.5	4	3.309
Pot Cap-1 Maneuver	1622	-	-	-	-	-	996	216	-	1003	216	1087
Stage 1	-	-	-	-	-	-	-	-	-	1027	899	-
Stage 2	-	-	-	-	-	-	1002	899	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	-	-	-	547	143	-	-	143	1087
Mov Cap-2 Maneuver	-	-	-	-	-	-	235 ~	-283	-	-	~32	-
Stage 1	-	-	-	-	-	-	-	-	-	682	899	-
Stage 2	-	-	-	-	-	-	476	899	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.4			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	235	-	1622	-	-	-	-	-	-	1087		
HCM Lane V/C Ratio	0.159	-	0.336	-	-	-	-	-	-	0.512		
HCM Control Delay (s)	23.2	-	8.3	-	-	0	-	-	-	11.7		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.6	-	1.5	-	-	-	-	-	-	3		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Cum + Proj Alt 1 PM.syn
3/14/2016

																															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																			
Lane Configurations																															
Volume (veh/h)	277	22	232	34	13	18	285	1659	10	13	1547	153																			
Number	5	2	12	1	6	16	3	8	18	7	4	14																			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0																			
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.99	1.00		1.00																			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00																			
Adj Sat Flow, veh/h/ln	1863	1871	1900	1863	1763	1900	1900	1845	1900	1900	1881	1881																			
Adj Flow Rate, veh/h	280	40	244	34	16	19	300	1746	11	14	1628	0																			
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1																			
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																			
Percent Heavy Veh, %	2	7	7	2	5	5	0	3	3	0	1	1																			
Cap, veh/h	332	42	257	114	46	55	292	1906	12	42	1414	633																			
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.16	0.53	0.53	0.02	0.40	0.00																			
Sat Flow, veh/h	1774	225	1374	1774	717	852	1810	3571	22	1810	3574	1599																			
Grp Volume(v), veh/h	280	0	284	34	0	35	300	856	901	14	1628	0																			
Grp Sat Flow(s),veh/h/ln	1774	0	1599	1774	0	1569	1810	1753	1841	1810	1787	1599																			
Q Serve(g_s), s	13.5	0.0	15.6	1.6	0.0	1.9	14.3	39.5	39.6	0.7	35.1	0.0																			
Cycle Q Clear(g_c), s	13.5	0.0	15.6	1.6	0.0	1.9	14.3	39.5	39.6	0.7	35.1	0.0																			
Prop In Lane	1.00		0.86	1.00		0.54	1.00		0.01	1.00		1.00																			
Lane Grp Cap(c), veh/h	332	0	299	114	0	101	292	936	983	42	1414	633																			
V/C Ratio(X)	0.84	0.00	0.95	0.30	0.00	0.35	1.03	0.92	0.92	0.34	1.15	0.00																			
Avail Cap(c_a), veh/h	332	0	299	140	0	124	292	936	983	149	1414	633																			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00																			
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00																			
Uniform Delay (d), s/veh	34.8	0.0	35.6	39.6	0.0	39.7	37.2	18.9	18.9	42.7	26.8	0.0																			
Incr Delay (d2), s/veh	17.9	0.0	38.6	2.0	0.0	2.9	60.3	13.7	13.3	4.7	76.7	0.0																			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																			
%ile BackOfQ(50%),veh/ln	8.3	0.0	10.1	0.9	0.0	0.9	11.9	22.3	23.6	0.4	32.1	0.0																			
LnGrp Delay(d),s/veh	52.7	0.0	74.3	41.6	0.0	42.6	97.5	32.5	32.2	47.3	103.5	0.0																			
LnGrp LOS	D		E	D		D	F	C	C	D	F																				
Approach Vol, veh/h	564			69			2057			1642																					
Approach Delay, s/veh	63.6			42.1			41.9			103.0																					
Approach LOS	E			D			D			F																					
Timer	1	2	3	4	5	6	7	8																							
Assigned Phs	2	3	4			6	7	8																							
Phs Duration (G+Y+Rc), s	20.8	18.0	40.0			9.9	5.7	52.3																							
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9																							
Max Green Setting (Gmax), s	* 17	14.3	35.1			7.0	7.3	42.1																							
Max Q Clear Time (g_c+I1), s	17.6	16.3	37.1			3.9	2.7	41.6																							
Green Ext Time (p_c), s	0.0	0.0	0.0			0.1	0.0	0.5																							
Intersection Summary																															
HCM 2010 Ctrl Delay	67.9																														
HCM 2010 LOS	E																														
Notes																															
User approved volume balancing among the lanes for turning movement.																															

HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Cum + Proj Alt 1 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1907	14	54	1738	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3535		1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3535		1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1986	15	56	1810	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	1	0	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	2000	0	56	1810	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Effective Green, g (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48		0.04	0.50	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	1038	521		85	87	80	39	1684		80	1797	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.57		0.03	0.51	
v/s Ratio Perm						0.00						c0.49
v/c Ratio	0.99	0.04		0.21	0.21	0.03	0.36	1.19		0.70	1.01	0.49
Uniform Delay, d1	48.9	34.8		64.5	64.4	63.9	68.1	36.9		66.5	35.1	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1		2.1	2.0	0.3	5.6	90.9		23.4	23.0	1.1
Delay (s)	73.3	34.9		66.6	66.5	64.2	73.6	127.8		90.0	58.1	1.1
Level of Service	E	C		E	E	E	E	F		F	E	A
Approach Delay (s)		72.0			65.1			127.4			42.0	
Approach LOS		E			E			F			D	

Intersection Summary

HCM 2000 Control Delay	77.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	141.2	Sum of lost time (s)	17.9
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

9: Carmel Rancho Blvd & Shopping Center Dwy

Cum + Proj Alt 1 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	183	10	20	40	10	30	38	605	18	11	455	89
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1887	1900	1900	1800	1863	1881	1846	1900	1827	1851	1900
Adj Flow Rate, veh/h	197	11	22	43	11	32	41	651	19	12	489	96
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
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
Percent Heavy Veh. %	2	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	610	145	290	526	105	407	540	1447	42	502	1218	238
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1347	558	1117	1016	403	1569	832	3480	102	747	2929	572
Grp Volume(v), veh/h	197	0	33	54	0	32	41	328	342	12	292	293
Grp Sat Flow(s),veh/h/ln	1347	0	1675	1419	0	1569	832	1754	1827	747	1758	1743
Q Serve(g_s), s	3.2	0.0	0.4	0.1	0.0	0.4	0.9	3.3	3.3	0.3	2.9	2.9
Cycle Q Clear(g_c), s	3.8	0.0	0.4	0.6	0.0	0.4	3.8	3.3	3.3	3.6	2.9	2.9
Prop In Lane	1.00		0.67	0.80		1.00	1.00		0.06	1.00		0.33
Lane Grp Cap(c), veh/h	610	0	435	631	0	407	540	729	760	502	731	725
V/C Ratio(X)	0.32	0.00	0.08	0.09	0.00	0.08	0.08	0.45	0.45	0.02	0.40	0.40
Avail Cap(c_a), veh/h	1353	0	1359	1396	0	1273	768	1210	1260	707	1213	1202
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.4	0.0	6.9	7.0	0.0	6.9	6.4	5.2	5.2	6.5	5.0	5.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.2	0.3	0.0	0.2	0.2	1.6	1.6	0.1	1.4	1.4
LnGrp Delay(d),s/veh	8.5	0.0	6.9	7.0	0.0	6.9	6.4	5.3	5.3	6.5	5.2	5.2
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		230			86			711			597	
Approach Delay, s/veh		8.3			7.0			5.4			5.2	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		10.4		14.2		10.4		14.2
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0
Max Q Clear Time (g_c+I1), s		5.8		5.6		2.6		5.8
Green Ext Time (p_c), s		0.6		4.2		0.6		4.1

Intersection Summary

HCM 2010 Ctrl Delay	5.8
HCM 2010 LOS	A

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Existing + Proj Alt 1 AM-Miti.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1230	10	32	1568	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Flt pb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flt pb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1430	12	37	1823	816
RTOR Reduction (vph)	0	17	0	0	0	54	0	0	5	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1430	7	37	1823	816
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6	69.6	4.5	70.1	117.7
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6	69.6	4.5	70.1	117.7
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59	0.59	0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	551	269		96	102	90	66	2092	824	67	2047	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.40		0.02	c0.53	
v/s Ratio Perm						0.00			0.01			c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.68	0.01	0.55	0.89	0.53
Uniform Delay, d1	48.0	41.7		52.8	52.8	52.4	55.1	16.5	9.9	55.6	20.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.4	0.1		1.6	1.5	0.3	3.0	1.2	0.0	9.5	5.7	1.3
Delay (s)	60.4	41.8		54.5	54.3	52.6	58.1	17.7	9.9	65.1	26.2	1.3
Level of Service	E	D		D	D	D	E	B	A	E	C	A
Approach Delay (s)		59.4			53.3			18.2			19.1	
Approach LOS		E			D			B			B	

Intersection Summary												
HCM 2000 Control Delay		23.7		HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio		0.89										
Actuated Cycle Length (s)		117.7		Sum of lost time (s)						17.9		
Intersection Capacity Utilization		69.4%		ICU Level of Service						C		
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Existing + Proj Alt 1 PM-Miti.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1621	14	54	1472	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1689	15	56	1533	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	0	8	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1689	7	56	1533	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	42.3	42.3		7.0	7.0	7.0	3.1	67.8	67.8	6.2	71.4	141.2
Effective Green, g (s)	42.3	42.3		7.0	7.0	7.0	3.1	67.8	67.8	6.2	71.4	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48	0.48	0.04	0.51	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	1028	516		85	87	80	39	1699	752	79	1807	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.48		0.03	0.43	
v/s Ratio Perm						0.00			0.00			c0.49
v/c Ratio	1.00	0.05		0.21	0.21	0.03	0.36	0.99	0.01	0.71	0.85	0.49
Uniform Delay, d1	49.3	35.1		64.5	64.4	63.9	68.1	36.5	19.2	66.6	30.2	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.8	0.1		2.1	2.0	0.3	5.6	20.4	0.0	25.1	4.3	1.1
Delay (s)	76.1	35.2		66.6	66.5	64.2	73.6	56.9	19.2	91.7	34.6	1.1
Level of Service	E	D		E	E	E	E	B	F	C	A	
Approach Delay (s)		74.7			65.1			56.7			24.9	
Approach LOS		E			E			E			C	

Intersection Summary												
HCM 2000 Control Delay		46.1		HCM 2000 Level of Service						D		
HCM 2000 Volume to Capacity ratio		0.97										
Actuated Cycle Length (s)		141.2		Sum of lost time (s)						17.9		
Intersection Capacity Utilization		90.9%		ICU Level of Service						E		
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Back + Proj Alt 1 AM-Miti.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1291	10	32	1619	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1501	12	37	1883	816
RTOR Reduction (vph)	0	17	0	0	0	54	0	0	5	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1501	7	37	1883	816
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	18.4	18.4		6.9	6.9	6.9	4.6	70.6	70.6	4.5	71.0	118.3
Effective Green, g (s)	18.4	18.4		6.9	6.9	6.9	4.6	70.6	70.6	4.5	71.0	118.3
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.60	0.60	0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	533	261		97	103	91	67	2112	832	67	2063	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.42		0.02	c0.55	
v/s Ratio Perm						0.00			0.01			c0.53
v/c Ratio	0.88	0.03		0.19	0.18	0.04	0.33	0.71	0.01	0.55	0.91	0.53
Uniform Delay, d1	48.8	42.4		53.0	53.0	52.6	55.3	16.7	9.7	55.9	20.9	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.7	0.1		1.6	1.5	0.3	2.9	1.4	0.0	9.5	7.0	1.3
Delay (s)	64.6	42.5		54.6	54.5	52.8	58.2	18.1	9.7	65.4	28.0	1.3
Level of Service	E	D		D	D	D	E	B	A	E	C	A
Approach Delay (s)		63.4			53.5			18.6			20.5	
Approach LOS		E			D			B			C	

Intersection Summary												
HCM 2000 Control Delay		24.9		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio		0.91										
Actuated Cycle Length (s)		118.3		Sum of lost time (s)				17.9				
Intersection Capacity Utilization		70.8%		ICU Level of Service				C				
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Back + Proj Alt 1 PM-Miti.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1689	14	54	1548	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1759	15	56	1612	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	0	8	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1759	7	56	1612	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	41.3	41.3		7.0	7.0	7.0	3.1	68.8	68.8	6.2	72.4	141.2
Effective Green, g (s)	41.3	41.3		7.0	7.0	7.0	3.1	68.8	68.8	6.2	72.4	141.2
Actuated g/C Ratio	0.29	0.29		0.05	0.05	0.05	0.02	0.49	0.49	0.04	0.51	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	1004	503		85	87	80	39	1724	764	79	1832	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.50		0.03	0.45	
v/s Ratio Perm						0.00			0.00			c0.49
v/c Ratio	1.02	0.05		0.21	0.21	0.03	0.36	1.02	0.01	0.71	0.88	0.49
Uniform Delay, d1	49.9	35.8		64.5	64.4	63.9	68.1	36.2	18.6	66.6	30.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.2	0.1		2.1	2.0	0.3	5.6	26.9	0.0	25.1	5.6	1.1
Delay (s)	83.2	35.9		66.6	66.5	64.2	73.6	63.1	18.7	91.7	36.2	1.1
Level of Service	F	D		E	E	E	E	E	B	F	D	A
Approach Delay (s)		81.6			65.1			62.8			26.3	
Approach LOS		F			E			E			C	

Intersection Summary												
HCM 2000 Control Delay		50.0		HCM 2000 Level of Service				D				
HCM 2000 Volume to Capacity ratio		1.00										
Actuated Cycle Length (s)		141.2		Sum of lost time (s)				17.9				
Intersection Capacity Utilization		92.8%		ICU Level of Service				F				
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Cum + Proj Alt 1 AM-Miti.syn

3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	855	539	61	1140	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9	4.0
Lane Util. Factor		0.88	0.95		0.97	1.00
Frt		0.85	0.98		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		2760	3468		3335	1759
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		2760	3468		3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	929	586	66	1239	908
RTOR Reduction (vph)	0	185	9	0	0	0
Lane Group Flow (vph)	0	744	643	0	1239	908
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA		Prot	NA	
Protected Phases	3	2		3	Free	
Permitted Phases						
Actuated Green, G (s)		25.2	15.8		25.2	50.8
Effective Green, g (s)		25.2	15.8		25.2	50.8
Actuated g/C Ratio		0.50	0.31		0.50	1.00
Clearance Time (s)		4.9	4.9		4.9	
Vehicle Extension (s)		4.5	3.5		4.5	
Lane Grp Cap (vph)	1369	1078		1654	1759	
v/s Ratio Prot	0.27	0.19		0.37	0.52	
v/s Ratio Perm						
v/c Ratio	0.54	0.60		0.75	0.52	
Uniform Delay, d1	8.8	14.8		10.3	0.0	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.9		2.2	1.1	
Delay (s)	9.5	15.8		12.4	1.1	
Level of Service	A	B		B	A	
Approach Delay (s)	9.5	15.8		7.6		
Approach LOS	A	B		A		

Intersection Summary

HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	50.8	Sum of lost time (s)	9.8
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Cum + Proj Alt 1 AM-Miti.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	229	36	140	183	173	23	294	85	326	468	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1835	1900	1827	1827	1759
Adj Flow Rate, veh/h	145	249	39	152	199	188	25	320	92	354	509	45
Adj No. of Lanes	1	2	0	1	1	2	1	2	0	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	4	4	4	8
Cap, veh/h	209	644	100	211	386	576	76	700	198	486	657	534
Arrive On Green	0.12	0.21	0.21	0.12	0.21	0.21	0.05	0.26	0.26	0.14	0.36	0.36
Sat Flow, veh/h	1774	3038	470	1774	1810	2701	1675	2681	758	3375	1827	1485
Grp Volume(v), veh/h	145	142	146	152	199	188	25	206	206	354	509	45
Grp Sat Flow(s),veh/h/ln	1774	1750	1758	1774	1810	1351	1675	1743	1696	1688	1827	1485
Q Serve(g_s), s	4.9	4.3	4.5	5.2	6.1	3.7	0.9	6.2	6.4	6.3	15.4	1.2
Cycle Q Clear(g_c), s	4.9	4.3	4.5	5.2	6.1	3.7	0.9	6.2	6.4	6.3	15.4	1.2
Prop In Lane	1.00		0.27	1.00		1.00	1.00		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	209	371	373	211	386	576	76	455	443	486	657	534
V/C Ratio(X)	0.69	0.38	0.39	0.72	0.52	0.33	0.33	0.45	0.47	0.73	0.77	0.08
Avail Cap(c_a), veh/h	264	782	786	264	809	1207	215	726	706	557	828	673
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	21.1	21.1	26.5	21.7	20.8	28.9	19.3	19.4	25.6	17.7	13.2
Incr Delay (d2), s/veh	5.5	0.8	0.8	7.0	1.3	0.4	2.5	0.9	0.9	4.1	3.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	2.2	2.2	2.9	3.2	1.4	0.5	3.1	3.1	3.2	8.5	0.5
LnGrp Delay(d),s/veh	32.0	21.9	21.9	33.5	23.0	21.2	31.4	20.2	20.3	29.7	21.6	13.3
LnGrp LOS	C	C	C	C	C	C	C	C	C	C	C	B
Approach Vol, veh/h		433			539			437			908	
Approach Delay, s/veh		25.3			25.3			20.9			24.4	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.1	17.4	6.5	27.4	11.1	17.5	12.7	21.2				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	7.2	6.5	2.9	17.4	6.9	8.1	8.3	8.4				
Green Ext Time (p_c), s	0.1	4.6	0.0	4.7	0.1	4.5	0.3	6.1				

Intersection Summary

HCM 2010 Ctrl Delay	24.1
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Cum + Proj Alt 1 AM-Miti.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1410	10	32	1774	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.2	4.9	4.0	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1640	12	37	2063	816
RTOR Reduction (vph)	0	17	0	0	0	54	0	0	5	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1640	7	37	2063	816
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	17.2	17.2		6.9	6.9	6.9	4.6	71.7	71.7	4.5	72.1	118.2
Effective Green, g (s)	17.2	17.2		6.9	6.9	6.9	4.6	71.7	71.7	4.5	72.1	118.2
Actuated g/C Ratio	0.15	0.15		0.06	0.06	0.06	0.04	0.61	0.61	0.04	0.61	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	499	244		97	104	91	67	2146	846	67	2097	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.46		0.02	c0.60	
v/s Ratio Perm						0.00			0.01			c0.53
v/c Ratio	0.94	0.04		0.19	0.18	0.04	0.33	0.76	0.01	0.55	0.98	0.53
Uniform Delay, d1	50.0	43.4		53.0	53.0	52.5	55.3	17.1	9.2	55.9	22.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.6	0.1		1.6	1.5	0.3	2.9	2.0	0.0	9.5	16.0	1.3
Delay (s)	75.5	43.5		54.6	54.4	52.8	58.2	19.0	9.2	65.4	38.5	1.3
Level of Service	E	D		D	D	D	E	B	A	E	D	A
Approach Delay (s)		73.8			53.5			19.5			28.4	
Approach LOS		E			D			B			C	
Intersection Summary												
HCM 2000 Control Delay		30.3										
HCM 2000 Volume to Capacity ratio		0.97										
Actuated Cycle Length (s)		118.2										
Intersection Capacity Utilization		75.1%										
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Cum + Proj Alt 1 PM-Miti.syn

3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	968	975	105	993	771
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9	4.0
Lane Util. Factor		0.88	0.95		0.97	1.00
Frt		0.85	0.99		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		2814	3481		3467	1881
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		2814	3481		3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1030	1037	112	1056	820
RTOR Reduction (vph)	0	96	5	0	0	0
Lane Group Flow (vph)	0	934	1144	0	1056	820
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA		Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases						
Actuated Green, G (s)		20.3	26.8		20.3	56.9
Effective Green, g (s)		20.3	26.8		20.3	56.9
Actuated g/C Ratio		0.36	0.47		0.36	1.00
Clearance Time (s)		4.9	4.9		4.9	
Vehicle Extension (s)		4.5	3.5		4.5	
Lane Grp Cap (vph)		1003	1639		1236	1881
v/s Ratio Prot		c0.33	c0.33		0.30	0.44
v/s Ratio Perm						
v/c Ratio		0.93	0.70		0.85	0.44
Uniform Delay, d1		17.6	11.9		16.9	0.0
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		15.0	1.4		6.4	0.7
Delay (s)		32.6	13.2		23.3	0.7
Level of Service		C	B		C	A
Approach Delay (s)	32.6		13.2			13.4
Approach LOS	C		B			B
Intersection Summary						
HCM 2000 Control Delay		18.3			HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio		0.80				
Actuated Cycle Length (s)		56.9			Sum of lost time (s)	9.8
Intersection Capacity Utilization		72.3%			ICU Level of Service	C
Analysis Period (min)		15				
c Critical Lane Group						

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary 3: SR 1 & Rio Rd

Cum + Proj Alt 1 PM-Miti.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	367	83	190	418	356	162	581	164	330	397	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1849	1900	1881	1881	1900
Adj Flow Rate, veh/h	146	374	85	194	427	363	165	593	167	337	405	45
Adj No. of Lanes	1	2	0	1	1	2	1	2	0	2	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	1	2	1	3	3	1	1	0
Cap, veh/h	169	893	201	211	623	916	199	752	211	370	514	437
Arrive On Green	0.10	0.31	0.31	0.12	0.33	0.33	0.11	0.28	0.28	0.11	0.27	0.27
Sat Flow, veh/h	1774	2896	651	1792	1881	2766	1792	2706	760	3476	1881	1600
Grp Volume(v), veh/h	146	229	230	194	427	363	165	384	376	337	405	45
Grp Sat Flow(s),veh/h/ln	1774	1784	1763	1792	1881	1383	1792	1756	1710	1738	1881	1600
Q Serve(g, s)	7.1	8.9	9.1	9.3	17.1	8.8	7.9	17.7	17.7	8.4	17.4	1.8
Cycle Q Clear(g_c), s	7.1	8.9	9.1	9.3	17.1	8.8	7.9	17.7	17.7	8.4	17.4	1.8
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.44	1.00		1.00
Lane Grp Cap(c), veh/h	169	550	543	211	623	916	199	488	475	370	514	437
V/C Ratio(X)	0.87	0.42	0.42	0.92	0.69	0.40	0.83	0.79	0.79	0.91	0.79	0.10
Avail Cap(c_a), veh/h	169	550	543	211	623	916	211	543	529	370	561	477
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.9	23.9	24.0	38.1	25.2	22.5	38.0	29.1	38.6	29.4	23.7	
Incr Delay (d2), s/veh	34.4	0.6	0.6	39.7	6.0	1.3	22.2	7.2	7.5	25.7	7.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	4.5	4.5	7.0	9.9	3.5	5.1	9.5	9.3	5.3	10.0	0.8
LnGrp Delay(d),s/veh	73.4	24.6	24.6	77.8	31.3	23.7	60.1	36.3	36.7	64.3	36.5	23.8
LnGrp LOS	E	C	C	E	C	C	E	D	D	E	D	C
Approach Vol, veh/h		605			984			925			787	
Approach Delay, s/veh		36.4			37.7			40.7			47.7	
Approach LOS		D			D			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	31.1	13.4	28.8	12.0	33.1	13.0	29.2				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	11.3	11.1	9.9	19.4	9.1	19.1	10.4	19.7				
Green Ext Time (p_c), s	0.0	7.8	0.0	4.0	0.0	5.7	0.0	4.3				

Intersection Summary

HCM 2010 Ctrl Delay	40.7
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis 8: SR 1 & Carpenter St

Cum + Proj Alt 1 PM-Miti.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1907	14	54	1738	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1986	15	56	1810	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	0	7	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1986	8	56	1810	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	2%	3%	0%	1%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	39.2	39.2		7.0	7.0	7.0	3.1	70.8	70.8	6.2	74.4	141.1
Effective Green, g (s)	39.2	39.2		7.0	7.0	7.0	3.1	70.8	70.8	6.2	74.4	141.1
Actuated g/C Ratio	0.28	0.28		0.05	0.05	0.05	0.02	0.50	0.50	0.04	0.53	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	953	478		85	88	80	39	1775	786	79	1884	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.56		0.03	0.51	
v/s Ratio Perm						0.00			0.00			c0.49
v/c Ratio	1.07	0.05		0.21	0.20	0.03	0.36	1.12	0.01	0.71	0.96	0.49
Uniform Delay, d1	50.9	37.3		64.4	64.4	63.8	68.0	35.1	17.6	66.6	32.0	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	51.0	0.1		2.1	2.0	0.3	5.6	61.8	0.0	25.1	12.9	1.1
Delay (s)	101.9	37.4		66.5	66.4	64.1	73.6	96.9	17.6	91.7	44.9	1.1
Level of Service	F	D		E	E	E	E	F	B	F	D	A
Approach Delay (s)		99.7			65.1			96.2			33.0	
Approach LOS		F			E			F			C	

Intersection Summary

HCM 2000 Control Delay	67.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	141.1	Sum of lost time (s)	17.9
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Existing + Proj Alt 2 AM.syn

3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑	↘	↗	↑
Volume (vph)	0	731	458	54	1059	694
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2760	1863	1509	3335	1759
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2760	1863	1509	3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	795	498	59	1151	754
RTOR Reduction (vph)	0	259	0	12	0	0
Lane Group Flow (vph)	0	536	498	47	1151	754
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA	Perm	Prot	NA	
Protected Phases	3	2		3	Free	
Permitted Phases			2			
Actuated Green, G (s)		25.1	20.6	20.6	25.1	55.5
Effective Green, g (s)		25.1	20.6	20.6	25.1	55.5
Actuated g/C Ratio		0.45	0.37	0.37	0.45	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)	1248	691	560	1508	1759	
v/s Ratio Prot	0.19	c0.27		c0.35	0.43	
v/s Ratio Perm			0.03			
v/c Ratio	0.43	0.72	0.08	0.76	0.43	
Uniform Delay, d1	10.3	15.0	11.3	12.7	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	3.8	0.1	2.6	0.8	
Delay (s)	10.7	18.8	11.4	15.4	0.8	
Level of Service		B	B	B	A	
Approach Delay (s)	10.7		18.0		9.6	
Approach LOS	B		B		A	
Intersection Summary						
HCM 2000 Control Delay		11.3		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.74				
Actuated Cycle Length (s)		55.5		Sum of lost time (s)	9.8	
Intersection Capacity Utilization		62.5%		ICU Level of Service	B	
Analysis Period (min)		15				
c Critical Lane Group						

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Existing + Proj Alt 2 AM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	27	685	401	395	612	5	86	5	257	10	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (prot)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1560
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (perm)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1560
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	31	778	456	449	695	6	98	6	292	11	19	38
RTOR Reduction (vph)	0	0	291	0	1	0	0	0	243	0	0	37
Lane Group Flow (vph)	31	778	165	449	700	0	52	52	49	0	30	1
Confl. Peds. (#/hr)	2		1				1			1		2
Heavy Vehicles (%)	4%	7%	2%	1%	3%	0%	6%	0%	6%	30%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.8	20.2	20.2	9.3	27.8		4.3	4.3	9.3		1.5	1.5
Effective Green, g (s)	1.8	20.2	20.2	9.3	27.8		4.3	4.3	9.3		1.5	1.5
Actuated g/C Ratio	0.03	0.36	0.36	0.17	0.50		0.08	0.08	0.17		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	56	1223	566	578	1747		124	126	254		45	42
v/s Ratio Prot	0.02	c0.23		c0.13	0.20		c0.03	0.03	0.03		c0.02	
v/s Ratio Perm			0.11									0.00
v/c Ratio	0.55	0.64	0.29	0.78	0.40		0.42	0.41	0.19		0.67	0.02
Uniform Delay, d1	26.6	14.7	12.7	22.2	8.7		24.5	24.5	20.0		26.9	26.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.6	0.8	0.1	5.9	0.1		0.8	0.8	0.1		25.2	0.1
Delay (s)	33.1	15.5	12.8	28.1	8.8		25.3	25.3	20.1		52.1	26.5
Level of Service	C	B	B	C	A		C	C	C		D	C
Approach Delay (s)		14.9			16.3			21.5			37.8	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			16.9		HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			55.7		Sum of lost time (s)				20.4			
Intersection Capacity Utilization			52.3%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Existing + Proj Alt 2 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	221	36	124	177	151	23	228	81	298	355	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1827	1863	1827	1820	1900
Adj Flow Rate, veh/h	145	240	39	135	192	164	25	248	88	324	386	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	2	4	4	4
Cap, veh/h	215	640	103	212	379	322	76	447	385	504	557	65
Arrive On Green	0.12	0.21	0.21	0.12	0.21	0.21	0.05	0.24	0.24	0.15	0.35	0.35
Sat Flow, veh/h	1774	3021	484	1774	1810	1534	1675	1827	1574	3375	1599	186
Grp Volume(v), veh/h	145	138	141	135	192	164	25	248	88	324	0	431
Grp Sat Flow(s),veh/h/ln	1774	1750	1755	1774	1810	1534	1675	1827	1574	1688	0	1785
Q Serve(g_s), s	4.7	4.0	4.1	4.4	5.6	5.7	0.9	7.1	2.7	5.4	0.0	12.4
Cycle Q Clear(g_c), s	4.7	4.0	4.1	4.4	5.6	5.7	0.9	7.1	2.7	5.4	0.0	12.4
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	215	371	372	212	379	322	76	447	385	504	0	622
V/C Ratio(X)	0.67	0.37	0.38	0.64	0.51	0.51	0.33	0.55	0.23	0.64	0.00	0.69
Avail Cap(c_a), veh/h	275	814	816	275	841	713	223	791	682	579	0	842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.2	20.2	20.3	25.2	21.0	21.0	27.8	19.8	18.1	24.0	0.0	16.8
Incr Delay (d2), s/veh	4.3	0.7	0.8	3.2	1.3	1.5	2.5	1.3	0.4	2.0	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.0	2.1	2.3	3.0	2.5	0.5	3.7	1.2	2.7	0.0	6.4
LnGrp Delay(d),s/veh	29.6	21.0	21.0	28.4	22.2	22.5	30.2	21.1	18.5	26.0	0.0	18.6
LnGrp LOS	C	C	C	C	C	C	C	C	B	C		B
Approach Vol, veh/h		424			491			361			755	
Approach Delay, s/veh		23.9			24.0			21.1			21.8	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.9	16.9	6.4	25.8	11.0	16.8	12.7	19.6				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	6.4	6.1	2.9	14.4	6.7	7.7	7.4	9.1				
Green Ext Time (p_c), s	0.1	4.3	0.0	4.2	0.1	4.2	0.3	4.6				

Intersection Summary

HCM 2010 Ctrl Delay 22.6
HCM 2010 LOS C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Existing + Proj Alt 2 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	53	388	83	86	263	0	140	0	69	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1860	1900	1810	1792	0	1810	1696	1900			
Adj Flow Rate, veh/h	58	426	91	95	289	0	154	0	76			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	2	2	5	6	0	5	0	5			
Cap, veh/h	80	1759	373	118	2148	0	317	0	137			
Arrive On Green	0.04	0.61	0.61	0.14	1.00	0.00	0.09	0.00	0.09			
Sat Flow, veh/h	1810	2901	615	1723	3495	0	3343	0	1442			
Grp Volume(v), veh/h	58	258	259	95	289	0	154	0	76			
Grp Sat Flow(s),veh/h/ln	1810	1767	1749	1723	1703	0	1672	0	1442			
Q Serve(g_s), s	1.6	3.4	3.4	2.7	0.0	0.0	2.2	0.0	2.5			
Cycle Q Clear(g_c), s	1.6	3.4	3.4	2.7	0.0	0.0	2.2	0.0	2.5			
Prop In Lane	1.00		0.35	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	80	1071	1061	118	2148	0	317	0	137			
V/C Ratio(X)	0.72	0.24	0.24	0.80	0.13	0.00	0.49	0.00	0.56			
Avail Cap(c_a), veh/h	199	1071	1061	224	2148	0	1070	0	461			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.88	0.88	0.88	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.6	4.5	4.5	21.2	0.0	0.0	21.5	0.0	21.6			
Incr Delay (d2), s/veh	4.0	0.5	0.5	4.7	0.1	0.0	0.4	0.0	1.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.9	1.7	1.7	1.4	0.0	0.0	1.0	0.0	1.0			
LnGrp Delay(d),s/veh	27.6	5.0	5.0	26.0	0.1	0.0	21.9	0.0	22.9			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		575			384			230				
Approach Delay, s/veh		7.3			6.5			22.2				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	6.9	34.3			5.7	35.5		8.7				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			5.5	17.0		16.0				
Max Q Clear Time (g_c+I1), s	4.7	5.4			3.6	2.0		4.5				
Green Ext Time (p_c), s	0.0	2.8			0.0	3.3		0.4				

Intersection Summary

HCM 2010 Ctrl Delay 9.9
HCM 2010 LOS A

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Existing + Proj Alt 2 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	365	92	61	317	1	32	0	38	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1820	1900	1845	1845	1900	1900	1638	1712	1900	1900	1900
Adj Flow Rate, veh/h	0	440	111	73	382	1	39	0	46	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	3	3	3	0	0	11	0	0	0
Cap, veh/h	0	1817	455	91	2814	7	212	0	80	0	105	0
Arrive On Green	0.00	0.22	0.22	0.05	0.78	0.78	0.06	0.00	0.06	0.00	0.00	0.00
Sat Flow, veh/h	0	2832	686	1757	3586	9	1228	0	1444	0	1900	0
Grp Volume(v), veh/h	0	276	275	73	187	196	39	0	46	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1729	1698	1757	1753	1843	1228	0	1444	0	1900	0
Q Serve(g_s), s	0.0	6.6	6.7	2.1	1.3	1.3	1.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.6	6.7	2.1	1.3	1.3	1.5	0.0	1.6	0.0	0.0	0.0
Prop In Lane	0.00		0.40	1.00		0.01	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1146	1125	91	1375	1446	212	0	80	0	105	0
V/C Ratio(X)	0.00	0.24	0.24	0.80	0.14	0.14	0.18	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1146	1125	193	1375	1446	537	0	462	0	608	0
HCM Platoon Ratio	1.00	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.98	0.98	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.2	9.2	23.5	1.3	1.3	23.0	0.0	23.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	6.1	0.2	0.2	0.2	0.0	2.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.3	3.3	1.1	0.6	0.7	0.5	0.0	0.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	9.6	9.7	29.5	1.5	1.5	23.2	0.0	25.4	0.0	0.0	0.0
LnGrp LOS	A	A	C	A	A	C	C		C			
Approach Vol, veh/h		551			456			85			0	
Approach Delay, s/veh		9.7			6.0			24.4			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.1	37.1		6.8		43.2		6.8				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	5.5	17.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.1	8.7		0.0		3.3		3.6				
Green Ext Time (p_c), s	0.0	3.9		0.0		6.8		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			9.3									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Existing + Proj Alt 2 AM.syn
3/14/2016

Intersection												
Int Delay, s/veh		2.8										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	218	0	16	0	1	0	17	14	0	0	32	307
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	1	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	92	80	92	92	92	80	80	92	92	80	80
Heavy Vehicles, %	7	0	0	2	2	2	0	7	0	0	0	2
Mvmt Flow	272	0	20	0	1	0	21	18	0	0	40	384
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	2	0	0	25	550	2	14	550	5
Stage 1	-	-	-	-	-	-	2	547	-	3	3	-
Stage 2	-	-	-	-	-	-	23	3	-	11	547	-
Critical Hdwy	4.17	-	-	-	-	-	7.1	6.57	-	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.57	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.5	4.063	-	3.5	4	3.318
Pot Cap-1 Maneuver	1587	-	-	-	-	-	991	436	-	1007	446	1078
Stage 1	-	-	-	-	-	-	-	-	-	1025	897	-
Stage 2	-	-	-	-	-	-	1000	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1584	-	-	-	-	-	571	360	-	-	368	1074
Mov Cap-2 Maneuver	-	-	-	-	-	-	371	1061	-	-	783	-
Stage 1	-	-	-	-	-	-	-	-	-	847	896	-
Stage 2	-	-	-	-	-	-	613	882	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.2			0								
HCM LOS							-			-		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	371	-	1584	-	-	-	-	-	-	1074		
HCM Lane V/C Ratio	0.057	-	0.172	-	-	-	-	-	-	0.357		
HCM Control Delay (s)	15.3	-	7.7	-	-	0	-	-	-	10.2		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.2	-	0.6	-	-	-	-	-	-	1.6		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Existing + Proj Alt 2 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	213	40	113	134	38	50	136	992	37	16	1427	137
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1869	1900	1900	1842	1900	1827	1839	1900	1357	1827	1845
Adj Flow Rate, veh/h	210	94	130	128	81	57	156	1140	43	18	1640	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh. %	3	0	0	0	9	9	4	3	3	40	4	3
Cap, veh/h	288	114	158	151	82	58	163	1827	69	37	1620	732
Arrive On Green	0.16	0.16	0.16	0.08	0.08	0.08	0.09	0.53	0.53	0.03	0.47	0.00
Sat Flow, veh/h	1757	697	965	1810	977	688	1740	3432	129	1293	3471	1568
Grp Volume(v), veh/h	210	0	224	128	0	138	156	580	603	18	1640	0
Grp Sat Flow(s),veh/h/ln	1757	0	1662	1810	0	1665	1740	1747	1814	1293	1736	1568
Q Serve(g, s), s	10.0	0.0	11.5	6.2	0.0	7.3	7.9	20.6	20.6	1.2	41.3	0.0
Cycle Q Clear(g_c), s	10.0	0.0	11.5	6.2	0.0	7.3	7.9	20.6	20.6	1.2	41.3	0.0
Prop In Lane	1.00		0.58	1.00		0.41	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	288	0	272	151	0	139	163	930	965	37	1620	732
V/C Ratio(X)	0.73	0.00	0.82	0.85	0.00	0.99	0.96	0.62	0.62	0.49	1.01	0.00
Avail Cap(c_a), veh/h	318	0	300	151	0	139	163	930	965	107	1620	732
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.1	0.0	35.8	40.0	0.0	40.5	39.9	14.5	14.5	42.4	23.6	0.0
Incr Delay (d2), s/veh	7.9	0.0	16.0	34.4	0.0	73.5	57.3	1.7	1.6	9.9	25.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	6.5	4.5	0.0	6.2	6.4	10.3	10.6	0.5	25.3	0.0
LnGrp Delay(d),s/veh	43.1	0.0	51.7	74.3	0.0	114.0	97.2	16.2	16.1	52.3	49.0	0.0
LnGrp LOS	D		D	E		F	F	B	B	D	F	
Approach Vol, veh/h		434			266			1339			1658	
Approach Delay, s/veh		47.5			94.9			25.6			49.1	
Approach LOS		D			F			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		18.7	12.0	46.2		11.6	6.2	52.0				
Change Period (Y+Rc), s		* 4.2	3.7	4.9		4.2	3.7	4.9				
Max Green Setting (Gmax), s		* 16	8.3	41.3		7.4	7.3	42.3				
Max Q Clear Time (g_c+I1), s		13.5	9.9	43.3		9.3	3.2	22.6				
Green Ext Time (p_c), s		0.6	0.0	0.0		0.0	0.0	18.9				
Intersection Summary												
HCM 2010 Ctrl Delay			43.7									
HCM 2010 LOS			D									

Notes

User approved volume balancing among the lanes for turning movement.

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Existing + Proj Alt 2 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1230	10	32	1568	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1430	12	37	1823	816
RTOR Reduction (vph)	0	17	0	0	54	0	0	0	0	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1442	0	37	1823	816
Confl. Peds. (#/hr)				1		1			1			
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6		4.5	70.1	117.7
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6		4.5	70.1	117.7
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59		0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	551	269		96	102	90	66	2088		67	2047	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.41		0.02	c0.53	
v/s Ratio Perm						0.00						c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.69		0.55	0.89	0.53
Uniform Delay, d1	48.0	41.7		52.8	52.8	52.4	55.1	16.6		55.6	20.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.4	0.1		1.6	1.5	0.3	3.0	1.3		9.5	5.7	1.3
Delay (s)	60.4	41.8		54.5	54.3	52.6	58.1	17.9		65.1	26.2	1.3
Level of Service	E	D		D	D	D	E	B		E	C	A
Approach Delay (s)		59.4			53.3		18.5				19.1	
Approach LOS		E			D		B				B	
Intersection Summary												
HCM 2000 Control Delay			23.8									
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			117.7							17.9		
Intersection Capacity Utilization			69.4%									
Analysis Period (min)			15									
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
9: Carmel Rancho Blvd & Shopping Center Dwy

Existing + Proj Alt 2 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	51	1	19	9	1	20	17	200	15	76	499	163
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1785	1863	1881	1848	1900	1827	1854	1900
Adj Flow Rate, veh/h	66	1	25	12	1	26	22	260	19	99	648	212
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh. %	0	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	485	7	177	463	15	180	563	1638	119	835	1286	420
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	1392	62	1545	1084	134	1574	645	3320	241	1072	2607	852
Grp Volume(v), veh/h	66	0	26	13	0	26	22	137	142	99	438	422
Grp Sat Flow(s),veh/h/ln	1392	0	1607	1218	0	1574	645	1756	1805	1072	1761	1698
Q Serve(g, s), s	0.9	0.0	0.3	0.1	0.0	0.3	0.5	0.9	0.9	1.1	3.4	3.4
Cycle Q Clear(g_c), s	1.3	0.0	0.3	0.4	0.0	0.3	3.9	0.9	0.9	2.0	3.4	3.4
Prop In Lane	1.00		0.96	0.92		1.00	1.00		0.13	1.00		0.50
Lane Grp Cap(c), veh/h	485	0	184	479	0	180	563	866	890	835	869	838
V/C Ratio(X)	0.14	0.00	0.14	0.03	0.00	0.14	0.04	0.16	0.16	0.12	0.50	0.50
Avail Cap(c_a), veh/h	1690	0	1575	1643	0	1542	782	1463	1503	1199	1467	1415
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.8	0.0	8.1	8.2	0.0	8.1	4.8	2.8	2.8	3.4	3.5	3.5
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.1	0.0	0.1	0.1	0.4	0.4	0.3	1.6	1.6
LnGrp Delay(d),s/veh	8.8	0.0	8.3	8.2	0.0	8.3	4.8	2.9	2.9	3.4	3.7	3.7
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		92			39			301			959	
Approach Delay, s/veh		8.7			8.2			3.0			3.6	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		6.3		14.1		6.3		14.1				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		3.3		5.4		2.4		5.9				
Green Ext Time (p_c), s		0.2		4.1		0.2		4.0				
Intersection Summary												
HCM 2010 Ctrl Delay			4.0									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Existing + Proj Alt 2 PM.syn
3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	853	777	88	847	617
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2814	1863	1553	3467	1881
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2814	1863	1553	3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	907	827	94	901	656
RTOR Reduction (vph)	0	170	0	10	0	0
Lane Group Flow (vph)	0	737	827	84	901	656
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases				2		
Actuated Green, G (s)		20.3	31.1	31.1	20.3	61.2
Effective Green, g (s)		20.3	31.1	31.1	20.3	61.2
Actuated g/C Ratio		0.33	0.51	0.51	0.33	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		933	946	789	1150	1881
v/s Ratio Prot		c0.26	c0.44		0.26	0.35
v/s Ratio Perm				0.05		
v/c Ratio		0.79	0.87	0.11	0.78	0.35
Uniform Delay, d1		18.5	13.3	7.8	18.5	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.0	9.2	0.1	4.0	0.5
Delay (s)		23.5	22.6	7.9	22.4	0.5
Level of Service		C	C	A	C	A
Approach Delay (s)	23.5		21.1			13.2
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			18.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			61.2		Sum of lost time (s)	9.8
Intersection Capacity Utilization			78.9%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Existing + Proj Alt 2 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	711	193	301	558	4	277	17	510	4	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (prot)	1805	3539	1615	3467	3571		1715	1728	1599		1887	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	1.00
Satd. Flow (perm)	1805	3539	1615	3467	3571		1715	1728	1599		1887	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	33	756	205	320	594	4	295	18	543	4	24	19
RTOR Reduction (vph)	0	0	139	0	1	0	0	0	460	0	0	19
Lane Group Flow (vph)	33	756	66	320	597	0	156	157	83	0	28	0
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	0%	1%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.8	19.1	19.1	9.0	26.4		8.9	8.9	9.0		1.5	1.5
Effective Green, g (s)	1.8	19.1	19.1	9.0	26.4		8.9	8.9	9.0		1.5	1.5
Actuated g/C Ratio	0.03	0.32	0.32	0.15	0.45		0.15	0.15	0.15		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	55	1147	523	529	1600		259	261	244		48	39
v/s Ratio Prot	0.02	c0.21		c0.09	0.17		c0.09	0.09	0.05		c0.01	
v/s Ratio Perm			0.04									0.00
v/c Ratio	0.60	0.66	0.13	0.60	0.37		0.60	0.60	0.34		0.58	0.01
Uniform Delay, d1	28.2	17.1	14.0	23.3	10.8		23.3	23.3	22.3		28.4	28.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	11.2	1.1	0.0	1.3	0.1		2.7	2.7	0.3		11.1	0.0
Delay (s)	39.4	18.2	14.1	24.6	10.8		26.0	26.0	22.6		39.5	28.0
Level of Service	D	B	B	C	B		C	C	C		D	C
Approach Delay (s)		18.0			15.6			23.9			34.9	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		19.3				HCM 2000 Level of Service		B				
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		58.9				Sum of lost time (s)		20.4				
Intersection Capacity Utilization		66.7%				ICU Level of Service		C				
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Existing + Proj Alt 2 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	348	83	166	401	295	162	427	155	264	309	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1845	1863	1881	1884	1900
Adj Flow Rate, veh/h	146	355	85	169	409	301	165	436	158	269	315	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh. %	2	1	1	1	1	2	1	3	2	1	1	1
Cap, veh/h	169	898	213	203	624	521	199	517	441	359	438	63
Arrive On Green	0.10	0.31	0.31	0.11	0.33	0.33	0.11	0.28	0.28	0.10	0.27	0.27
Sat Flow, veh/h	1774	2864	678	1792	1881	1571	1792	1845	1575	3476	1610	230
Grp Volume(v), veh/h	146	219	221	169	409	301	165	436	158	269	0	360
Grp Sat Flow(s),veh/h/ln	1774	1784	1758	1792	1881	1571	1792	1845	1575	1738	0	1840
Q Serve(g_s), s	7.1	8.4	8.6	8.0	16.2	13.8	7.9	19.4	7.0	6.6	0.0	15.4
Cycle Q Clear(g_c), s	7.1	8.4	8.6	8.0	16.2	13.8	7.9	19.4	7.0	6.6	0.0	15.4
Prop In Lane	1.00		0.39	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	169	559	551	203	624	521	199	517	441	359	0	501
V/C Ratio(X)	0.86	0.39	0.40	0.83	0.66	0.58	0.83	0.84	0.36	0.75	0.00	0.72
Avail Cap(c_a), veh/h	169	559	551	212	624	521	212	572	488	371	0	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.8	23.4	23.5	37.8	24.8	24.0	37.9	29.5	25.1	38.0	0.0	28.7
Incr Delay (d2), s/veh	34.1	0.5	0.6	22.9	5.3	4.6	22.1	10.6	0.6	8.0	0.0	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	4.2	4.3	5.3	9.3	6.6	5.1	11.3	3.1	3.5	0.0	8.4
LnGrp Delay(d),s/veh	72.9	23.9	24.0	60.6	30.1	28.6	60.0	40.1	25.7	46.0	0.0	33.0
LnGrp LOS	E	C	C	E	C	C	E	D	C	D		C
Approach Vol, veh/h		586			879			759			629	
Approach Delay, s/veh		36.2			35.5			41.4			38.6	
Approach LOS		D			D			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.6	31.5	13.4	28.6	12.0	33.1	12.7	29.3				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	10.0	10.6	9.9	17.4	9.1	18.2	8.6	21.4				
Green Ext Time (p_c), s	0.0	7.3	0.0	3.8	0.0	5.6	0.1	2.8				
Intersection Summary												
HCM 2010 Ctrl Delay		37.9										
HCM 2010 LOS		D										

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Existing + Proj Alt 2 PM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	84	461	138	137	440	0	348	0	133	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1867	1900	1881	1881	0	1881	1863	1900			
Adj Flow Rate, veh/h	85	466	139	138	444	0	352	0	134			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	0	2	2	1	1	0	1	0	1			
Cap, veh/h	108	1401	415	173	1989	0	534	0	243			
Arrive On Green	0.06	0.52	0.52	0.19	1.00	0.00	0.15	0.00	0.15			
Sat Flow, veh/h	1810	2697	799	1792	3668	0	3476	0	1583			
Grp Volume(v), veh/h	85	305	300	138	444	0	352	0	134			
Grp Sat Flow(s),veh/h/ln	1810	1774	1722	1792	1787	0	1738	0	1583			
Q Serve(g_s), s	2.3	5.0	5.1	3.7	0.0	0.0	4.8	0.0	3.9			
Cycle Q Clear(g_c), s	2.3	5.0	5.1	3.7	0.0	0.0	4.8	0.0	3.9			
Prop In Lane	1.00		0.46	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	108	921	895	173	1989	0	534	0	243			
V/C Ratio(X)	0.78	0.33	0.33	0.80	0.22	0.00	0.66	0.00	0.55			
Avail Cap(c_a), veh/h	235	921	895	233	1989	0	1112	0	507			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.87	0.99	0.99	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.2	7.0	7.0	19.7	0.0	0.0	19.9	0.0	19.6			
Incr Delay (d2), s/veh	4.0	0.8	0.9	9.1	0.3	0.0	0.5	0.0	0.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	2.6	2.5	2.2	0.1	0.0	2.3	0.0	1.8			
LnGrp Delay(d),s/veh	27.2	7.8	7.9	28.8	0.3	0.0	20.4	0.0	20.3			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		690			582			486				
Approach Delay, s/veh		10.2			7.0			20.4				
Approach LOS		B			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	8.3	30.0			6.5	31.8		11.7				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			6.5	16.0		16.0				
Max Q Clear Time (g_c+I1), s	5.7	7.1			4.3	2.0		6.8				
Green Ext Time (p_c), s	0.0	3.4			0.0	4.3		0.9				
Intersection Summary												
HCM 2010 Ctrl Delay			12.0									
HCM 2010 LOS			B									

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Existing + Proj Alt 2 PM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	540	54	85	491	0	86	0	110	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1881	1900	1900	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	557	56	88	506	0	89	0	113	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
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
Percent Heavy Veh, %	0	2	2	2	1	1	0	0	0	0	0	0
Cap, veh/h	0	1949	126	111	2619	0	297	0	173	0	204	0
Arrive On Green	0.00	1.00	1.00	0.06	0.73	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	0	3342	326	1774	3668	0	1422	0	1610	0	1900	0
Grp Volume(v), veh/h	0	303	310	88	506	0	89	0	113	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1805	1774	1787	0	1422	0	1610	0	1900	0
Q Serve(g_s), s	0.0	0.0	0.0	2.4	2.2	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.4	2.2	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Prop In Lane	0.00		0.18	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1062	1083	111	2619	0	297	0	173	0	204	0
V/C Ratio(X)	0.00	0.29	0.29	0.79	0.19	0.00	0.30	0.00	0.65	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1062	1083	231	2619	0	599	0	515	0	608	0
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.94	0.94	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	23.1	2.1	0.0	21.3	0.0	21.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.6	4.6	0.2	0.0	0.2	0.0	1.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	1.3	1.1	0.0	1.2	0.0	1.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.6	0.6	27.7	2.2	0.0	21.5	0.0	23.0	0.0	0.0	0.0
LnGrp LOS		A	A	C	A		C		C			
Approach Vol, veh/h		613			594			202			0	
Approach Delay, s/veh		0.6			6.0			22.3			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	34.0		9.4		40.6		9.4				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.4	2.0		0.0		4.2		5.4				
Green Ext Time (p_c), s	0.0	7.0		0.0		8.9		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			6.0									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Existing + Proj Alt 2 PM.syn
3/14/2016

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	417	0	64	0	1	0	33	25	0	0	22	418
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	92	91	92	92	92	91	91	92	92	91	91
Heavy Vehicles, %	2	0	0	0	0	0	4	0	0	0	0	1
Mvmt Flow	458	0	70	0	1	0	36	27	0	0	24	459
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1	0	0	2	0	0	15	919	2	17	919	1
Stage 1	-	-	-	-	-	-	2	918	-	1	1	-
Stage 2	-	-	-	-	-	-	13	1	-	16	918	-
Critical Hdwy	4.12	-	-	-	-	-	7.14	6.5	-	7.1	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.536	4	-	3.5	4	3.309
Pot Cap-1 Maneuver	1622	-	-	-	-	-	996	273	-	1003	273	1087
Stage 1	-	-	-	-	-	-	-	-	-	1027	899	-
Stage 2	-	-	-	-	-	-	1002	899	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	-	-	-	557	196	-	-	196	1087
Mov Cap-2 Maneuver	-	-	-	-	-	-	280 ~	-739	-	-	~ 71	-
Stage 1	-	-	-	-	-	-	-	-	-	737	899	-
Stage 2	-	-	-	-	-	-	563	899	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	280	-	1622	-	-	-	-	-	-	1087		
HCM Lane V/C Ratio	0.13	-	0.283	-	-	-	-	-	-	0.423		
HCM Control Delay (s)	19.8	-	8.1	-	-	0	-	-	-	10.7		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.4	-	1.2	-	-	-	-	-	-	2.1		
Notes												
~: Volume exceeds capacity	\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon				

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Existing + Proj Alt 2 PM.syn
3/14/2016

																															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																			
Lane Configurations																															
Volume (veh/h)	277	22	199	34	13	18	259	1372	10	13	1280	153																			
Number	5	2	12	1	6	16	3	8	18	7	4	14																			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0																			
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.99	1.00		1.00																			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00																			
Adj Sat Flow, veh/h/ln	1863	1869	1900	1863	1763	1900	1900	1845	1900	1900	1881	1881																			
Adj Flow Rate, veh/h	262	65	209	34	16	19	273	1444	11	14	1347	0																			
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1																			
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																			
Percent Heavy Veh, %	2	7	7	2	5	5	0	3	3	0	1	1																			
Cap, veh/h	333	72	233	115	46	55	293	1897	14	42	1406	629																			
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.16	0.53	0.53	0.02	0.39	0.00																			
Sat Flow, veh/h	1774	385	1239	1774	717	852	1810	3566	27	1810	3574	1599																			
Grp Volume(v), veh/h	262	0	274	34	0	35	273	710	745	14	1347	0																			
Grp Sat Flow(s),veh/h/ln	1774	0	1625	1774	0	1569	1810	1753	1840	1810	1787	1599																			
Q Serve(g_s), s	12.4	0.0	14.6	1.6	0.0	1.9	13.1	28.1	28.1	0.7	32.4	0.0																			
Cycle Q Clear(g_c), s	12.4	0.0	14.6	1.6	0.0	1.9	13.1	28.1	28.1	0.7	32.4	0.0																			
Prop In Lane	1.00		0.76	1.00		0.54	1.00		0.01	1.00		1.00																			
Lane Grp Cap(c), veh/h	333	0	305	115	0	102	293	933	979	42	1406	629																			
V/C Ratio(X)	0.79	0.00	0.90	0.30	0.00	0.34	0.93	0.76	0.76	0.34	0.96	0.00																			
Avail Cap(c_a), veh/h	333	0	305	141	0	124	293	933	979	150	1421	636																			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00																			
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00																			
Uniform Delay (d), s/veh	34.2	0.0	35.0	39.4	0.0	39.5	36.5	16.2	16.2	42.5	26.1	0.0																			
Incr Delay (d2), s/veh	12.1	0.0	27.7	2.0	0.0	2.8	35.0	4.1	4.0	4.6	15.2	0.0																			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																			
%ile BackOfQ(50%),veh/ln	7.2	0.0	8.9	0.9	0.0	0.9	9.4	14.5	15.2	0.4	18.9	0.0																			
LnGrp Delay(d),s/veh	46.3	0.0	62.7	41.4	0.0	42.4	71.5	20.4	20.2	47.1	41.3	0.0																			
LnGrp LOS	D		E	D		D	E	C	C	D	D																				
Approach Vol, veh/h	536			69			1728			1361																					
Approach Delay, s/veh	54.7			41.9			28.4			41.4																					
Approach LOS	D			D			C			D																					
Timer	1	2	3	4	5	6	7	8																							
Assigned Phs	2	3	4			6	7	8																							
Phs Duration (G+Y+Rc), s	20.8	18.0	39.6			9.9	5.7	51.9																							
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9																							
Max Green Setting (Gmax), s	* 17	14.3	35.1			7.0	7.3	42.1																							
Max Q Clear Time (g_c+I1), s	16.6	15.1	34.4			3.9	2.7	30.1																							
Green Ext Time (p_c), s	0.0	0.0	0.3			0.1	0.0	11.6																							
Intersection Summary																															
HCM 2010 Ctrl Delay	37.2																														
HCM 2010 LOS	D																														
Notes																															
User approved volume balancing among the lanes for turning movement.																															

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Existing + Proj Alt 2 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1620	14	54	1471	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Flt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1688	15	56	1532	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	1	0	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1702	0	56	1532	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.4		6.2	71.0	141.2
Effective Green, g (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.4		6.2	71.0	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48		0.04	0.50	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	1038	521		85	87	80	39	1686		79	1797	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.48		0.03	0.43	
v/s Ratio Perm						0.00						c0.49
v/c Ratio	0.99	0.04		0.21	0.21	0.03	0.36	1.01		0.71	0.85	0.49
Uniform Delay, d1	48.9	34.8		64.5	64.4	63.9	68.1	36.9		66.6	30.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1		2.1	2.0	0.3	5.6	24.3		25.1	4.6	1.1
Delay (s)	73.3	34.9		66.6	66.5	64.2	73.6	61.2		91.7	35.1	1.1
Level of Service	E	C		E	E	E	E	E		F	D	A
Approach Delay (s)		72.0			65.1			61.3			25.3	
Approach LOS		E			E			E			C	

Intersection Summary

HCM 2000 Control Delay	47.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	141.2	Sum of lost time (s)	17.9
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

9: Carmel Rancho Blvd & Shopping Center Dwy

Existing + Proj Alt 2 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	171	10	20	40	10	30	38	526	18	11	367	78
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1887	1900	1900	1800	1863	1881	1846	1900	1827	1851	1900
Adj Flow Rate, veh/h	184	11	22	43	11	32	41	566	19	12	395	84
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
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
Percent Heavy Veh. %	2	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	627	141	282	540	105	396	590	1362	46	541	1135	239
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1346	558	1116	1006	417	1568	917	3463	116	808	2887	608
Grp Volume(v), veh/h	184	0	33	54	0	32	41	286	299	12	239	240
Grp Sat Flow(s),veh/h/ln	1346	0	1675	1423	0	1568	917	1754	1825	808	1758	1736
Q Serve(g_s), s	2.8	0.0	0.3	0.0	0.0	0.4	0.7	2.7	2.7	0.2	2.2	2.2
Cycle Q Clear(g_c), s	3.3	0.0	0.3	0.5	0.0	0.4	2.9	2.7	2.7	2.9	2.2	2.2
Prop In Lane	1.00		0.67	0.80		1.00	1.00		0.06	1.00		0.35
Lane Grp Cap(c), veh/h	627	0	422	646	0	396	590	690	718	541	692	683
V/C Ratio(X)	0.29	0.00	0.08	0.08	0.00	0.08	0.07	0.42	0.42	0.02	0.35	0.35
Avail Cap(c_a), veh/h	1481	0	1484	1524	0	1390	920	1321	1374	832	1325	1308
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.8	0.0	6.4	6.5	0.0	6.4	5.9	5.0	5.0	6.0	4.8	4.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.2	0.3	0.0	0.2	0.2	1.3	1.4	0.1	1.0	1.0
LnGrp Delay(d),s/veh	7.9	0.0	6.5	6.5	0.0	6.5	5.9	5.1	5.1	6.0	4.9	4.9
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		217			86			626			491	
Approach Delay, s/veh		7.7			6.5			5.2			5.0	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		9.7		12.9		9.7		12.9
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0
Max Q Clear Time (g_c+I1), s		5.3		4.9		2.5		4.9
Green Ext Time (p_c), s		0.6		3.6		0.6		3.6

Intersection Summary

HCM 2010 Ctrl Delay	5.6
HCM 2010 LOS	A

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Back + Proj Alt 2 AM.syn

3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	802	458	59	1116	694
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2760	1863	1509	3335	1759
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2760	1863	1509	3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	872	498	64	1213	754
RTOR Reduction (vph)	0	258	0	9	0	0
Lane Group Flow (vph)	0	614	498	55	1213	754
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA	Perm	Prot	NA	
Protected Phases	3	2		3	Free	
Permitted Phases			2			
Actuated Green, G (s)		25.4	20.6	20.6	25.4	55.8
Effective Green, g (s)		25.4	20.6	20.6	25.4	55.8
Actuated g/C Ratio		0.46	0.37	0.37	0.46	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)	1256	687	557	1518	1759	
v/s Ratio Prot	0.22	c0.27		c0.36	0.43	
v/s Ratio Perm			0.04			
v/c Ratio	0.49	0.72	0.10	0.80	0.43	
Uniform Delay, d1	10.7	15.2	11.5	13.0	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	3.9	0.1	3.4	0.8	
Delay (s)	11.2	19.1	11.6	16.4	0.8	
Level of Service		B	B	B	A	
Approach Delay (s)	11.2		18.2		10.4	
Approach LOS	B		B		B	
Intersection Summary						
HCM 2000 Control Delay		11.9		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.77				
Actuated Cycle Length (s)		55.8		Sum of lost time (s)	9.8	
Intersection Capacity Utilization		64.1%		ICU Level of Service	C	
Analysis Period (min)		15				
c Critical Lane Group						

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Back + Proj Alt 2 AM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	747	401	421	683	5	86	5	268	10	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (prot)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1559
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (perm)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1559
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	31	849	456	478	776	6	98	6	305	11	19	38
RTOR Reduction (vph)	0	0	278	0	0	0	0	0	257	0	0	37
Lane Group Flow (vph)	31	849	178	478	782	0	52	52	48	0	30	1
Confl. Peds. (#/hr)	2		1				1			1		2
Heavy Vehicles (%)	4%	7%	2%	1%	3%	0%	6%	0%	6%	30%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.8	22.6	22.6	9.2	30.1		4.3	4.3	9.2		1.5	1.5
Effective Green, g (s)	1.8	22.6	22.6	9.2	30.1		4.3	4.3	9.2		1.5	1.5
Actuated g/C Ratio	0.03	0.39	0.39	0.16	0.52		0.07	0.07	0.16		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	53	1314	609	549	1816		119	121	241		43	40
v/s Ratio Prot	0.02	c0.25		c0.14	0.22		c0.03	0.03	0.03		c0.02	
v/s Ratio Perm			0.11									0.00
v/c Ratio	0.58	0.65	0.29	0.87	0.43		0.44	0.43	0.20		0.70	0.02
Uniform Delay, d1	27.7	14.4	12.2	23.8	8.6		25.7	25.7	21.2		28.0	27.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.2	0.8	0.1	13.7	0.1		0.9	0.9	0.2		32.8	0.1
Delay (s)	37.9	15.3	12.3	37.5	8.7		26.6	26.6	21.4		60.9	27.6
Level of Service	D	B	B	D	A		C	C	C		E	C
Approach Delay (s)		14.8			19.6			22.7			42.3	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			18.4		HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			58.0		Sum of lost time (s)				20.4			
Intersection Capacity Utilization			54.7%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Back + Proj Alt 2 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	221	36	131	177	151	23	233	81	298	355	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1827	1863	1827	1820	1900
Adj Flow Rate, veh/h	145	240	39	142	192	164	25	253	88	324	386	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	2	4	4	4
Cap, veh/h	215	634	102	214	379	321	76	451	388	502	560	65
Arrive On Green	0.12	0.21	0.21	0.12	0.21	0.21	0.05	0.25	0.25	0.15	0.35	0.35
Sat Flow, veh/h	1774	3021	484	1774	1810	1534	1675	1827	1574	3375	1599	186
Grp Volume(v), veh/h	145	138		141	142	192	164	25	253	88	324	0
Grp Sat Flow(s),veh/h/ln	1774	1750		1774	1810	1534	1675	1827	1574	1688	0	1785
Q Serve(g_s), s	4.7	4.1	4.2	4.6	5.7	5.7	0.9	7.3	2.7	5.4	0.0	12.5
Cycle Q Clear(g_c), s	4.7	4.1	4.2	4.6	5.7	5.7	0.9	7.3	2.7	5.4	0.0	12.5
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	215	367	368	214	379	321	76	451	388	502	0	625
V/C Ratio(X)	0.67	0.37	0.38	0.66	0.51	0.51	0.33	0.56	0.23	0.65	0.00	0.69
Avail Cap(c_a), veh/h	274	811	813	274	838	711	223	789	679	577	0	839
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.3	20.4	20.4	25.3	21.1	21.1	27.9	19.8	18.1	24.1	0.0	16.8
Incr Delay (d2), s/veh	4.4	0.8	0.8	4.0	1.3	1.5	2.5	1.3	0.4	2.0	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.0	2.1	2.5	3.0	2.5	0.5	3.8	1.2	2.7	0.0	6.4
LnGrp Delay(d),s/veh	29.7	21.2	21.2	29.3	22.3	22.6	30.3	21.2	18.4	26.1	0.0	18.5
LnGrp LOS	C	C	C	C	C	C	C	C	B	C		B
Approach Vol, veh/h		424			498			366			755	
Approach Delay, s/veh		24.1			24.4			21.1			21.8	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	16.8	6.4	26.0	11.0	16.8	12.7	19.8				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	6.6	6.2	2.9	14.5	6.7	7.7	7.4	9.3				
Green Ext Time (p_c), s	0.1	4.3	0.0	4.2	0.1	4.2	0.3	4.6				
Intersection Summary												
HCM 2010 Ctrl Delay				22.8								
HCM 2010 LOS				C								

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Back + Proj Alt 2 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	53	388	83	100	270	0	140	0	77	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1860	1900	1810	1792	0	1810	1696	1900			
Adj Flow Rate, veh/h	58	426	91	110	297	0	154	0	85			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	2	2	5	6	0	5	0	5			
Cap, veh/h	80	1708	362	137	2126	0	340	0	146			
Arrive On Green	0.04	0.59	0.59	0.16	1.00	0.00	0.10	0.00	0.10			
Sat Flow, veh/h	1810	2901	615	1723	3495	0	3343	0	1442			
Grp Volume(v), veh/h	58	258	259	110	297	0	154	0	85			
Grp Sat Flow(s),veh/h/ln	1810	1767	1749	1723	1703	0	1672	0	1442			
Q Serve(g_s), s	1.6	3.5	3.6	3.1	0.0	0.0	2.2	0.0	2.8			
Cycle Q Clear(g_c), s	1.6	3.5	3.6	3.1	0.0	0.0	2.2	0.0	2.8			
Prop In Lane	1.00		0.35	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	80	1040	1030	137	2126	0	340	0	146			
V/C Ratio(X)	0.72	0.25	0.25	0.80	0.14	0.00	0.45	0.00	0.58			
Avail Cap(c_a), veh/h	199	1040	1030	224	2126	0	1070	0	461			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.87	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.6	5.0	5.0	20.6	0.0	0.0	21.2	0.0	21.4			
Incr Delay (d2), s/veh	4.0	0.5	0.5	4.0	0.1	0.0	0.4	0.0	1.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.9	1.8	1.9	1.6	0.0	0.0	1.0	0.0	1.2			
LnGrp Delay(d),s/veh	27.6	5.4	5.5	24.7	0.1	0.0	21.5	0.0	22.8			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		575			407			239				
Approach Delay, s/veh		7.7			6.8			22.0				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	7.5	33.4			5.7	35.2		9.1				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			5.5	17.0		16.0				
Max Q Clear Time (g_c+I1), s	5.1	5.6			3.6	2.0		4.8				
Green Ext Time (p_c), s	0.0	2.8			0.0	3.3		0.5				
Intersection Summary												
HCM 2010 Ctrl Delay				10.2								
HCM 2010 LOS				B								

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Back + Proj Alt 2 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	373	92	61	338	1	32	0	38	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1820	1900	1845	1845	1900	1900	1638	1712	1900	1900	1900
Adj Flow Rate, veh/h	0	449	111	73	407	1	39	0	46	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	3	3	3	0	0	11	0	0	0
Cap, veh/h	0	1825	448	91	2814	7	212	0	80	0	105	0
Arrive On Green	0.00	0.22	0.22	0.05	0.78	0.78	0.06	0.00	0.06	0.00	0.00	0.00
Sat Flow, veh/h	0	2844	676	1757	3587	9	1228	0	1444	0	1900	0
Grp Volume(v), veh/h	0	281	279	73	199	209	39	0	46	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1729	1700	1757	1753	1843	1228	0	1444	0	1900	0
Q Serve(g_s), s	0.0	6.7	6.8	2.1	1.4	1.4	1.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.7	6.8	2.1	1.4	1.4	1.5	0.0	1.6	0.0	0.0	0.0
Prop In Lane	0.00		0.40	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1146	1127	91	1375	1446	212	0	80	0	105	0
V/C Ratio(X)	0.00	0.24	0.25	0.80	0.14	0.14	0.18	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1146	1127	193	1375	1446	537	0	462	0	608	0
HCM Platoon Ratio	1.00	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.98	0.98	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.2	9.2	23.5	1.3	1.3	23.0	0.0	23.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	6.1	0.2	0.2	0.2	0.0	2.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.4	3.4	1.1	0.7	0.8	0.5	0.0	0.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	9.7	9.7	29.5	1.5	1.5	23.2	0.0	25.4	0.0	0.0	0.0
LnGrp LOS	A	A	C	A	A	C	C		C			
Approach Vol, veh/h		560			481			85			0	
Approach Delay, s/veh		9.7			5.8			24.4			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.1	37.1		6.8		43.2		6.8				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	5.5	17.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.1	8.8		0.0		3.4		3.6				
Green Ext Time (p_c), s	0.0	4.0		0.0		7.2		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			9.1									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Back + Proj Alt 2 AM.syn
3/14/2016

Intersection												
Int Delay, s/veh		2.8										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	226	0	16	0	1	0	17	14	0	0	32	328
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	1	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	92	80	92	92	92	80	80	92	92	80	80
Heavy Vehicles, %	7	0	0	2	2	2	0	7	0	0	0	2
Mvmt Flow	282	0	20	0	1	0	21	18	0	0	40	410
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	2	0	0	25	570	2	14	570	5
Stage 1	-	-	-	-	-	-	2	567	-	3	3	-
Stage 2	-	-	-	-	-	-	23	3	-	11	567	-
Critical Hdwy	4.17	-	-	-	-	-	7.1	6.57	-	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.57	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.5	4.063	-	3.5	4	3.318
Pot Cap-1 Maneuver	1587	-	-	-	-	-	991	425	-	1007	434	1078
Stage 1	-	-	-	-	-	-	-	-	-	1025	897	-
Stage 2	-	-	-	-	-	-	1000	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1584	-	-	-	-	-	552	348	-	-	355	1074
Mov Cap-2 Maneuver	-	-	-	-	-	-	349	1134	-	-	-626	-
Stage 1	-	-	-	-	-	-	-	-	-	840	896	-
Stage 2	-	-	-	-	-	-	590	882	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.3			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	349	-	1584	-	-	-	-	-	-	1074		
HCM Lane V/C Ratio	0.061	-	0.178	-	-	-	-	-	-	0.382		
HCM Control Delay (s)	16	-	7.8	-	-	0	-	-	-	10.4		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.2	-	0.6	-	-	-	-	-	-	1.8		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Back + Proj Alt 2 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	213	40	119	134	38	50	146	1053	37	16	1478	137
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1869	1900	1900	1842	1900	1827	1840	1900	1357	1827	1845
Adj Flow Rate, veh/h	214	89	137	128	81	57	168	1210	43	18	1699	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh. %	3	0	0	0	9	9	4	3	3	40	4	3
Cap, veh/h	290	107	165	151	82	57	163	1829	65	37	1618	731
Arrive On Green	0.16	0.16	0.16	0.08	0.08	0.08	0.09	0.53	0.53	0.03	0.47	0.00
Sat Flow, veh/h	1757	651	1003	1810	977	688	1740	3441	122	1293	3471	1568
Grp Volume(v), veh/h	214	0	226	128	0	138	168	614	639	18	1699	0
Grp Sat Flow(s),veh/h/ln	1757	0	1654	1810	0	1665	1740	1748	1816	1293	1736	1568
Q Serve(g, s), s	10.3	0.0	11.7	6.2	0.0	7.3	8.3	22.5	22.5	1.2	41.3	0.0
Cycle Q Clear(g_c), s	10.3	0.0	11.7	6.2	0.0	7.3	8.3	22.5	22.5	1.2	41.3	0.0
Prop In Lane	1.00		0.61	1.00		0.41	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	290	0	273	151	0	139	163	929	965	37	1618	731
V/C Ratio(X)	0.74	0.00	0.83	0.85	0.00	0.99	1.03	0.66	0.66	0.49	1.05	0.00
Avail Cap(c_a), veh/h	317	0	299	151	0	139	163	929	965	106	1618	731
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.2	0.0	35.8	40.1	0.0	40.6	40.2	15.0	15.0	42.4	23.7	0.0
Incr Delay (d2), s/veh	8.5	0.0	16.8	34.6	0.0	74.0	78.9	2.1	2.1	9.9	36.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	6.6	4.5	0.0	6.2	7.5	11.3	11.7	0.5	27.8	0.0
LnGrp Delay(d),s/veh	43.7	0.0	52.5	74.7	0.0	114.6	119.3	17.1	17.1	52.3	60.5	0.0
LnGrp LOS	D		D	E		F	F	B	B	D	F	
Approach Vol, veh/h		440			266			1421			1717	
Approach Delay, s/veh		48.2			95.4			29.2			60.4	
Approach LOS		D			F			C			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		18.8	12.0	46.2		11.6	6.2	52.0				
Change Period (Y+Rc), s		* 4.2	3.7	4.9		4.2	3.7	4.9				
Max Green Setting (Gmax), s		* 16	8.3	41.3		7.4	7.3	42.3				
Max Q Clear Time (g_c+I1), s		13.7	10.3	43.3		9.3	3.2	24.5				
Green Ext Time (p_c), s		0.6	0.0	0.0		0.0	0.0	17.2				
Intersection Summary												
HCM 2010 Ctrl Delay			49.9									
HCM 2010 LOS			D									

Notes
User approved volume balancing among the lanes for turning movement.

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Back + Proj Alt 2 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1291	10	32	1619	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3531		1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1501	12	37	1883	816
RTOR Reduction (vph)	0	17	0	0	54	0	0	0	0	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1513	0	37	1883	816
Confl. Peds. (#/hr)				1		1			1			
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59		0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	550	269		96	102	90	66	2089		67	2048	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.43		0.02	c0.55	
v/s Ratio Perm						0.00						c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.72		0.55	0.92	0.53
Uniform Delay, d1	48.1	41.7		52.9	52.9	52.4	55.2	17.2		55.7	21.3	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.6	0.1		1.6	1.5	0.3	3.0	1.6		9.5	7.6	1.3
Delay (s)	60.6	41.8		54.5	54.4	52.7	58.2	18.7		65.2	28.8	1.3
Level of Service	E	D		D	D	D	E	B		E	C	A
Approach Delay (s)		59.6			53.4		19.3				21.1	
Approach LOS		E			D		B				C	
Intersection Summary												
HCM 2000 Control Delay			25.1									
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			117.8							17.9		
Intersection Capacity Utilization			70.8%									
Analysis Period (min)			15									
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
9: Carmel Rancho Blvd & Shopping Center Dwy

Back + Proj Alt 2 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	54	1	19	9	1	20	17	208	15	76	520	168
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1785	1863	1881	1848	1900	1827	1853	1900
Adj Flow Rate, veh/h	70	1	25	12	1	26	22	270	19	99	675	218
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	0	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	486	7	179	458	21	182	550	1664	116	829	1307	422
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.50	0.50	0.50	0.50	0.50	0.50
Sat Flow, veh/h	1392	62	1545	1086	179	1573	626	3329	233	1062	2616	844
Grp Volume(v), veh/h	70	0	26	13	0	26	22	142	147	99	454	439
Grp Sat Flow(s),veh/h/ln	1392	0	1606	1265	0	1573	626	1756	1806	1062	1761	1699
Q Serve(g, s), s	1.0	0.0	0.3	0.0	0.0	0.3	0.5	0.9	0.9	1.2	3.6	3.6
Cycle Q Clear(g_c), s	1.3	0.0	0.3	0.3	0.0	0.3	4.1	0.9	0.9	2.1	3.6	3.6
Prop In Lane	1.00		0.96	0.92		1.00	1.00		0.13	1.00		0.50
Lane Grp Cap(c), veh/h	486	0	186	479	0	182	550	877	903	829	880	849
V/C Ratio(X)	0.14	0.00	0.14	0.03	0.00	0.14	0.04	0.16	0.16	0.12	0.52	0.52
Avail Cap(c_a), veh/h	1662	0	1543	1616	0	1512	748	1434	1475	1166	1438	1388
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.9	0.0	8.3	8.2	0.0	8.3	4.9	2.8	2.8	3.4	3.5	3.5
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.1	0.0	0.1	0.1	0.4	0.5	0.3	1.7	1.6
LnGrp Delay(d),s/veh	8.9	0.0	8.4	8.2	0.0	8.4	4.9	2.9	2.9	3.4	3.7	3.7
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		96			39			311			992	
Approach Delay, s/veh		8.8			8.3			3.0			3.7	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		6.4		14.4		6.4		14.4				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		3.3		5.6		2.3		6.1				
Green Ext Time (p_c), s		0.2		4.2		0.2		4.1				
Intersection Summary												
HCM 2010 Ctrl Delay			4.0									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Back + Proj Alt 2 PM.syn
3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	930	777	98	936	617
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2814	1863	1553	3467	1881
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2814	1863	1553	3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	989	827	104	996	656
RTOR Reduction (vph)	0	170	0	6	0	0
Lane Group Flow (vph)	0	819	827	98	996	656
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases				2		
Actuated Green, G (s)		20.3	31.1	31.1	20.3	61.2
Effective Green, g (s)		20.3	31.1	31.1	20.3	61.2
Actuated g/C Ratio		0.33	0.51	0.51	0.33	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		933	946	789	1150	1881
v/s Ratio Prot		c0.29	c0.44		0.29	0.35
v/s Ratio Perm				0.06		
v/c Ratio		0.88	0.87	0.12	0.87	0.35
Uniform Delay, d1		19.3	13.3	7.9	19.2	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		9.9	9.2	0.1	7.5	0.5
Delay (s)		29.2	22.6	8.0	26.7	0.5
Level of Service		C	C	A	C	A
Approach Delay (s)	29.2		20.9			16.3
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay			21.1		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			61.2		Sum of lost time (s)	9.8
Intersection Capacity Utilization			81.6%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

Back + Proj Alt 2 PM.syn

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	810	193	331	635	4	277	17	534	4	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.99	1.00	1.00
Satd. Flow (prot)	1805	3539	1615	3467	3571		1715	1728	1599	1887	1553	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.99	1.00	1.00
Satd. Flow (perm)	1805	3539	1615	3467	3571		1715	1728	1599	1887	1553	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	33	862	205	352	676	4	295	18	568	4	24	19
RTOR Reduction (vph)	0	0	133	0	1	0	0	0	485	0	0	19
Lane Group Flow (vph)	33	862	72	352	679	0	156	157	83	0	28	0
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	0%	1%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.9	21.8	21.8	9.0	29.0		9.1	9.1	9.0	1.6	1.6	
Effective Green, g (s)	1.9	21.8	21.8	9.0	29.0		9.1	9.1	9.0	1.6	1.6	
Actuated g/C Ratio	0.03	0.35	0.35	0.15	0.47		0.15	0.15	0.15	0.03	0.03	
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6	5.0	5.0	
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0	1.0	1.0	
Lane Grp Cap (vph)	55	1246	568	504	1673		252	254	232	48	40	
v/s Ratio Prot	0.02	c0.24		c0.10	0.19		c0.09	0.09	0.05	c0.01		
v/s Ratio Perm			0.04								0.00	
v/c Ratio	0.60	0.69	0.13	0.70	0.41		0.62	0.62	0.36	0.58	0.01	
Uniform Delay, d1	29.6	17.2	13.6	25.2	10.8		24.8	24.8	23.8	29.8	29.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.2	1.4	0.0	3.4	0.1		3.2	3.1	0.3	11.1	0.0	
Delay (s)	40.8	18.5	13.6	28.6	10.9		27.9	27.9	24.2	40.9	29.4	
Level of Service	D	B	B	C	B		C	C	C	D	C	
Approach Delay (s)		18.3			16.9			25.5		36.3		
Approach LOS		B			B			C		D		

Intersection Summary

HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	61.9	Sum of lost time (s)	20.4
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

Back + Proj Alt 2 PM.syn

3: SR 1 & Rio Rd

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	348	83	175	401	295	162	437	155	264	309	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1845	1863	1881	1884	1900
Adj Flow Rate, veh/h	146	355	85	179	409	301	165	446	158	269	315	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh. %	2	1	1	1	2	1	3	2	1	1	1	1
Cap, veh/h	168	881	209	211	622	519	199	522	446	357	442	63
Arrive On Green	0.09	0.31	0.31	0.12	0.33	0.33	0.11	0.28	0.28	0.10	0.27	0.27
Sat Flow, veh/h	1774	2864	678	1792	1881	1571	1792	1845	1575	3476	1610	230
Grp Volume(v), veh/h	146	219	221	179	409	301	165	446	158	269	0	360
Grp Sat Flow(s),veh/h/ln	1774	1784	1758	1792	1881	1571	1792	1845	1575	1738	0	1840
Q Serve(g_s), s	7.1	8.5	8.7	8.6	16.3	13.9	7.9	20.0	7.0	6.6	0.0	15.4
Cycle Q Clear(g_c), s	7.1	8.5	8.7	8.6	16.3	13.9	7.9	20.0	7.0	6.6	0.0	15.4
Prop In Lane	1.00		0.39	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	168	549	541	211	622	519	199	522	446	357	0	505
V/C Ratio(X)	0.87	0.40	0.41	0.85	0.66	0.58	0.83	0.85	0.35	0.75	0.00	0.71
Avail Cap(c_a), veh/h	168	549	541	211	622	519	211	570	486	370	0	547
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.0	23.9	24.0	37.8	25.0	24.2	38.0	29.6	25.0	38.1	0.0	28.6
Incr Delay (d2), s/veh	34.8	0.6	0.6	26.2	5.4	4.7	22.3	11.7	0.6	8.2	0.0	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	4.2	4.3	5.8	9.3	6.7	5.1	11.9	3.1	3.6	0.0	8.4
LnGrp Delay(d),s/veh	73.8	24.5	24.6	64.0	30.4	28.9	60.3	41.3	25.6	46.3	0.0	32.8
LnGrp LOS	E	C	C	E	C	C	E	D	C	D		C
Approach Vol, veh/h		586			889			769			629	
Approach Delay, s/veh		36.8			36.7			42.2			38.6	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	31.1	13.4	28.9	12.0	33.1	12.7	29.6
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0
Max Q Clear Time (g_c+I1), s	10.6	10.7	9.9	17.4	9.1	18.3	8.6	22.0
Green Ext Time (p_c), s	0.0	7.2	0.0	3.9	0.0	5.6	0.1	2.6

Intersection Summary

HCM 2010 Ctrl Delay	38.6
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Back + Proj Alt 2 PM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	84	461	138	151	449	0	348	0	151	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1867	1900	1881	1881	0	1881	1863	1900			
Adj Flow Rate, veh/h	85	466	139	153	454	0	352	0	153			
Adj No. of Lanes	1	2	0	1	2	0	2	1	0			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	0	2	2	1	1	0	1	0	1			
Cap, veh/h	108	1372	406	191	1985	0	538	0	245			
Arrive On Green	0.06	0.51	0.51	0.21	1.00	0.00	0.15	0.00	0.15			
Sat Flow, veh/h	1810	2697	799	1792	3668	0	3476	0	1583			
Grp Volume(v), veh/h	85	305	300	153	454	0	352	0	153			
Grp Sat Flow(s),veh/h/ln	1810	1774	1722	1792	1787	0	1738	0	1583			
Q Serve(g_s), s	2.3	5.1	5.2	4.1	0.0	0.0	4.8	0.0	4.5			
Cycle Q Clear(g_c), s	2.3	5.1	5.2	4.1	0.0	0.0	4.8	0.0	4.5			
Prop In Lane	1.00		0.46	1.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	108	902	876	191	1985	0	538	0	245			
V/C Ratio(X)	0.78	0.34	0.34	0.80	0.23	0.00	0.65	0.00	0.62			
Avail Cap(c_a), veh/h	235	902	876	233	1985	0	1112	0	507			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.87	0.99	0.99	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.2	7.3	7.3	19.2	0.0	0.0	19.9	0.0	19.8			
Incr Delay (d2), s/veh	4.0	0.9	0.9	12.1	0.3	0.0	0.5	0.0	1.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	2.7	2.6	2.6	0.1	0.0	2.3	0.0	2.0			
LnGrp Delay(d),s/veh	27.2	8.2	8.2	31.3	0.3	0.0	20.4	0.0	20.7			
LnGrp LOS	C	A	A	C	A		C		C			
Approach Vol, veh/h		690			607			505				
Approach Delay, s/veh		10.5			8.1			20.5				
Approach LOS		B			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			5	6		8				
Phs Duration (G+Y+Rc), s	8.8	29.4			6.5	31.8		11.7				
Change Period (Y+Rc), s	3.5	4.0			3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0			6.5	16.0		16.0				
Max Q Clear Time (g_c+I1), s	6.1	7.2			4.3	2.0		6.8				
Green Ext Time (p_c), s	0.0	3.4			0.0	4.3		1.0				
Intersection Summary												
HCM 2010 Ctrl Delay			12.5									
HCM 2010 LOS			B									

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Back + Proj Alt 2 PM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	558	54	85	514	0	86	0	110	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1881	1900	1900	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	575	56	88	530	0	89	0	113	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
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
Percent Heavy Veh, %	0	2	2	2	1	1	0	0	0	0	0	0
Cap, veh/h	0	1955	190	111	2619	0	297	0	173	0	204	0
Arrive On Green	0.00	1.00	1.00	0.06	0.73	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	0	3353	317	1774	3668	0	1422	0	1610	0	1900	0
Grp Volume(v), veh/h	0	312	319	88	530	0	89	0	113	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1807	1774	1787	0	1422	0	1610	0	1900	0
Q Serve(g_s), s	0.0	0.0	0.0	2.4	2.3	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.4	2.3	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Prop In Lane	0.00		0.18	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1062	1084	111	2619	0	297	0	173	0	204	0
V/C Ratio(X)	0.00	0.29	0.29	0.79	0.20	0.00	0.30	0.00	0.65	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1062	1084	231	2619	0	599	0	515	0	608	0
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.93	0.93	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	23.1	2.1	0.0	21.3	0.0	21.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.6	4.6	0.2	0.0	0.2	0.0	1.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	1.3	1.2	0.0	1.2	0.0	1.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	0.7	0.6	27.7	2.3	0.0	21.5	0.0	23.0	0.0	0.0	0.0
LnGrp LOS		A	A	C	A		C		C			
Approach Vol, veh/h		631			618			202			0	
Approach Delay, s/veh		0.7			5.9			22.3			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	34.0		9.4		40.6		9.4				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.4	2.0		0.0		4.3		5.4				
Green Ext Time (p_c), s	0.0	7.2		0.0		9.3		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			5.9									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Back + Proj Alt 2 PM.syn
3/14/2016

Intersection												
Int Delay, s/veh		3.5										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	435	0	64	0	1	0	33	25	0	0	22	441
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	92	91	92	92	92	91	91	92	92	91	91
Heavy Vehicles, %	2	0	0	0	0	0	4	0	0	0	0	1
Mvmt Flow	478	0	70	0	1	0	36	27	0	0	24	485
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1	0	0	2	0	0	15	959	2	17	959	1
Stage 1	-	-	-	-	-	-	2	958	-	1	1	-
Stage 2	-	-	-	-	-	-	13	1	-	16	958	-
Critical Hdwy	4.12	-	-	-	-	-	7.14	6.5	-	7.1	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.536	4	-	3.5	4	3.309
Pot Cap-1 Maneuver	1622	-	-	-	-	-	996	259	-	1003	259	1087
Stage 1	-	-	-	-	-	-	-	-	-	1027	899	-
Stage 2	-	-	-	-	-	-	1002	899	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	-	-	-	551	182	-	-	182	1087
Mov Cap-2 Maneuver	-	-	-	-	-	-	266 ~	~547	-	-	~58	-
Stage 1	-	-	-	-	-	-	-	-	-	724	899	-
Stage 2	-	-	-	-	-	-	540	899	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.1			0								
HCM LOS												
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	266	-	1622	-	-	-	-	-	-	1087		
HCM Lane V/C Ratio	0.136	-	0.295	-	-	-	-	-	-	0.446		
HCM Control Delay (s)	20.7	-	8.1	-	-	0	-	-	-	10.9		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.5	-	1.2	-	-	-	-	-	-	2.3		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Back + Proj Alt 2 PM.syn
3/14/2016

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Volume (veh/h)	277	22	212	34	13	18	268	1440	10	13	1356	153												
Number	5	2	12	1	6	16	3	8	18	7	4	14												
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0												
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.99	1.00		1.00												
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00												
Adj Sat Flow, veh/h/ln	1863	1870	1900	1863	1763	1900	1900	1845	1900	1900	1881	1881												
Adj Flow Rate, veh/h	269	55	223	34	16	19	282	1516	11	14	1427	0												
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1												
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												
Percent Heavy Veh, %	2	7	7	2	5	5	0	3	3	0	1	1												
Cap, veh/h	332	60	242	114	46	55	292	1904	14	42	1414	633												
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.16	0.53	0.53	0.02	0.40	0.00												
Sat Flow, veh/h	1774	319	1295	1774	717	852	1810	3567	26	1810	3574	1599												
Grp Volume(v), veh/h	269	0	278	34	0	35	282	745	782	14	1427	0												
Grp Sat Flow(s),veh/h/ln	1774	0	1614	1774	0	1569	1810	1753	1840	1810	1787	1599												
Q Serve(g_s), s	12.9	0.0	15.0	1.6	0.0	1.9	13.7	30.5	30.6	0.7	35.1	0.0												
Cycle Q Clear(g_c), s	12.9	0.0	15.0	1.6	0.0	1.9	13.7	30.5	30.6	0.7	35.1	0.0												
Prop In Lane	1.00		0.80	1.00		0.54	1.00		0.01	1.00		1.00												
Lane Grp Cap(c), veh/h	332	0	302	114	0	101	292	936	982	42	1414	633												
V/C Ratio(X)	0.81	0.00	0.92	0.30	0.00	0.35	0.97	0.80	0.80	0.34	1.01	0.00												
Avail Cap(c_a), veh/h	332	0	302	140	0	124	292	936	982	149	1414	633												
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00												
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00												
Uniform Delay (d), s/veh	34.6	0.0	35.4	39.6	0.0	39.7	37.0	16.8	16.8	42.7	26.8	0.0												
Incr Delay (d2), s/veh	14.3	0.0	32.1	2.0	0.0	2.9	43.6	5.3	5.1	4.7	26.2	0.0												
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0												
%ile BackOfQ(50%),veh/ln	7.6	0.0	9.4	0.9	0.0	0.9	10.3	16.1	16.8	0.4	22.2	0.0												
LnGrp Delay(d),s/veh	48.8	0.0	67.5	41.6	0.0	42.6	80.5	22.0	21.8	47.3	53.0	0.0												
LnGrp LOS	D		E	D		D	F	C	C	D	F													
Approach Vol, veh/h	547			69			1809			1441														
Approach Delay, s/veh	58.3			42.1			31.1			52.9														
Approach LOS	E			D			C			D														
Timer	1	2	3	4	5	6	7	8																
Assigned Phs	2	3	4			6	7	8																
Phs Duration (G+Y+Rc), s	20.8	18.0	40.0			9.9	5.7	52.3																
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9																
Max Green Setting (Gmax), s	* 17	14.3	35.1			7.0	7.3	42.1																
Max Q Clear Time (g_c+I1), s	17.0	15.7	37.1			3.9	2.7	32.6																
Green Ext Time (p_c), s	0.0	0.0	0.0			0.1	0.0	9.3																
Intersection Summary																								
HCM 2010 Ctrl Delay	43.3																							
HCM 2010 LOS	D																							
Notes																								
User approved volume balancing among the lanes for turning movement.																								

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Back + Proj Alt 2 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1688	14	54	1547	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3534		1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1758	15	56	1611	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	1	0	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1772	0	56	1611	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Effective Green, g (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48		0.04	0.50	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	1038	521		85	87	80	39	1684		80	1797	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.50		0.03	0.45	
v/s Ratio Perm						0.00						c0.49
v/c Ratio	0.99	0.04		0.21	0.21	0.03	0.36	1.05		0.70	0.90	0.49
Uniform Delay, d1	48.9	34.8		64.5	64.4	63.9	68.1	36.9		66.5	31.8	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1		2.1	2.0	0.3	5.6	37.2		23.4	6.7	1.1
Delay (s)	73.3	34.9		66.6	66.5	64.2	73.6	74.2		90.0	38.5	1.1
Level of Service	E	C		E	E	E	E	E		F	D	A
Approach Delay (s)		72.0			65.1			74.2			27.8	
Approach LOS		E			E			E			C	

Intersection Summary

HCM 2000 Control Delay	52.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	141.2	Sum of lost time (s)	17.9
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

9: Carmel Rancho Blvd & Shopping Center Dwy

Back + Proj Alt 2 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	177	10	20	40	10	30	38	544	18	11	390	85
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1887	1900	1900	1800	1863	1881	1846	1900	1827	1851	1900
Adj Flow Rate, veh/h	190	11	22	43	11	32	41	585	19	12	419	91
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
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
Percent Heavy Veh, %	2	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	624	143	286	537	105	402	574	1384	45	530	1148	247
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1347	558	1117	1010	412	1568	891	3467	113	794	2874	619
Grp Volume(v), veh/h	190	0	33	54	0	32	41	296	308	12	255	255
Grp Sat Flow(s),veh/h/ln	1347	0	1675	1422	0	1568	891	1754	1825	794	1759	1735
Q Serve(g_s), s	2.9	0.0	0.3	0.0	0.0	0.4	0.8	2.8	2.8	0.3	2.4	2.4
Cycle Q Clear(g_c), s	3.5	0.0	0.3	0.5	0.0	0.4	3.2	2.8	2.8	3.1	2.4	2.4
Prop In Lane	1.00		0.67	0.80		1.00	1.00		0.06	1.00		0.36
Lane Grp Cap(c), veh/h	624	0	429	643	0	402	574	700	729	530	702	693
V/C Ratio(X)	0.30	0.00	0.08	0.08	0.00	0.08	0.07	0.42	0.42	0.02	0.36	0.37
Avail Cap(c_a), veh/h	1439	0	1443	1482	0	1351	870	1285	1337	795	1288	1270
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.0	0.0	6.6	6.6	0.0	6.6	6.0	5.0	5.0	6.2	4.9	4.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.2	0.3	0.0	0.2	0.2	1.3	1.4	0.1	1.2	1.2
LnGrp Delay(d),s/veh	8.1	0.0	6.6	6.6	0.0	6.6	6.1	5.2	5.2	6.2	5.0	5.0
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		223			86			645			522	
Approach Delay, s/veh		7.8			6.6			5.2			5.1	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		9.9		13.3		9.9		13.3
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0
Max Q Clear Time (g_c+I1), s		5.5		5.1		2.5		5.2
Green Ext Time (p_c), s		0.6		3.8		0.6		3.7

Intersection Summary

HCM 2010 Ctrl Delay	5.6
HCM 2010 LOS	A

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Cum + Proj Alt 2 AM.syn

3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	853	539	61	1140	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2760	1863	1509	3335	1759
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2760	1863	1509	3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	927	586	66	1239	908
RTOR Reduction (vph)	0	208	0	8	0	0
Lane Group Flow (vph)	0	719	586	58	1239	908
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA	Perm	Prot	NA	
Protected Phases	3	2		3	Free	
Permitted Phases			2			
Actuated Green, G (s)		25.4	23.4	23.4	25.4	58.6
Effective Green, g (s)		25.4	23.4	23.4	25.4	58.6
Actuated g/C Ratio		0.43	0.40	0.40	0.43	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)	1196	743	602	1445	1759	
v/s Ratio Prot	0.26	c0.31		c0.37	0.52	
v/s Ratio Perm			0.04			
v/c Ratio	0.60	0.79	0.10	0.86	0.52	
Uniform Delay, d1	12.7	15.4	11.0	15.0	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	5.7	0.1	5.6	1.1	
Delay (s)	13.8	21.2	11.1	20.6	1.1	
Level of Service		B	C	B	C	A
Approach Delay (s)	13.8		20.1		12.4	
Approach LOS	B		C		B	
Intersection Summary						
HCM 2000 Control Delay		14.1		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.82				
Actuated Cycle Length (s)		58.6		Sum of lost time (s)	9.8	
Intersection Capacity Utilization		69.1%		ICU Level of Service	C	
Analysis Period (min)		15				
c Critical Lane Group						

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Cum + Proj Alt 2 AM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	773	401	468	734	5	86	5	293	10	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	1.00		1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (prot)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1558
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.98	1.00
Satd. Flow (perm)	1736	3374	1563	3467	3501		1618	1641	1524		1681	1558
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	31	878	456	532	834	6	98	6	333	11	19	38
RTOR Reduction (vph)	0	0	275	0	0	0	0	0	281	0	0	37
Lane Group Flow (vph)	31	878	181	532	840	0	52	52	52	0	30	1
Confl. Peds. (#/hr)	2		1			1	1			1		2
Heavy Vehicles (%)	4%	7%	2%	1%	3%	0%	6%	0%	6%	30%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.8	23.4	23.4	9.2	30.9		4.3	4.3	9.2		1.5	1.5
Effective Green, g (s)	1.8	23.4	23.4	9.2	30.9		4.3	4.3	9.2		1.5	1.5
Actuated g/C Ratio	0.03	0.40	0.40	0.16	0.53		0.07	0.07	0.16		0.03	0.03
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6		5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0		1.0	1.0
Lane Grp Cap (vph)	53	1342	622	542	1839		118	120	238		42	39
v/s Ratio Prot	0.02	c0.26		c0.15	0.24		c0.03	0.03	0.03		c0.02	
v/s Ratio Perm			0.12									0.00
v/c Ratio	0.58	0.65	0.29	0.98	0.46		0.44	0.43	0.22		0.71	0.02
Uniform Delay, d1	28.1	14.4	12.1	24.7	8.7		26.1	26.1	21.7		28.4	27.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.2	0.9	0.1	33.7	0.1		1.0	0.9	0.2		38.0	0.1
Delay (s)	38.3	15.3	12.2	58.4	8.8		27.1	27.0	21.8		66.5	28.0
Level of Service	D	B	B	E	A		C	C	C		E	C
Approach Delay (s)		14.8			28.0			23.1			45.0	
Approach LOS		B			C			C			D	
Intersection Summary												
HCM 2000 Control Delay		22.1		HCM 2000 Level of Service	C							
HCM 2000 Volume to Capacity ratio		0.71										
Actuated Cycle Length (s)		58.8		Sum of lost time (s)				20.4				
Intersection Capacity Utilization		56.7%		ICU Level of Service	B							
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
3: SR 1 & Rio Rd

Cum + Proj Alt 2 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	229	36	140	183	173	23	294	85	326	468	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1827	1863	1827	1821	1900
Adj Flow Rate, veh/h	145	249	39	152	199	188	25	320	92	354	509	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	3	2	5	4	8	4	2	4	4	4
Cap, veh/h	202	656	101	204	392	333	75	510	440	465	613	54
Arrive On Green	0.11	0.22	0.22	0.11	0.22	0.22	0.04	0.28	0.28	0.14	0.37	0.37
Sat Flow, veh/h	1774	3038	470	1774	1810	1535	1675	1827	1575	3375	1649	146
Grp Volume(v), veh/h	145	142	146	152	199	188	25	320	92	354	0	554
Grp Sat Flow(s),veh/h/ln	1774	1750	1758	1774	1810	1535	1675	1827	1575	1688	0	1794
Q Serve(g_s), s	5.2	4.5	4.6	5.4	6.3	7.1	0.9	10.0	2.9	6.6	0.0	18.3
Cycle Q Clear(g_c), s	5.2	4.5	4.6	5.4	6.3	7.1	0.9	10.0	2.9	6.6	0.0	18.3
Prop In Lane	1.00		0.27	1.00		1.00	1.00		1.00	1.00		0.08
Lane Grp Cap(c), veh/h	202	378	379	204	392	333	75	510	440	465	0	668
V/C Ratio(X)	0.72	0.38	0.38	0.75	0.51	0.56	0.33	0.63	0.21	0.76	0.00	0.83
Avail Cap(c_a), veh/h	253	748	751	253	773	656	205	728	627	533	0	778
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.9	21.9	21.9	28.0	22.5	22.8	30.2	20.6	18.0	27.1	0.0	18.6
Incr Delay (d2), s/veh	7.2	0.7	0.8	9.1	1.2	1.8	2.6	1.5	0.3	5.6	0.0	6.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.2	2.3	3.2	3.3	3.2	0.5	5.2	1.3	3.4	0.0	10.2
LnGrp Delay(d),s/veh	35.1	22.6	22.7	37.0	23.7	24.6	32.8	22.1	18.3	32.7	0.0	25.5
LnGrp LOS	D	C	C	D	C	C	C	C	B	C	C	C
Approach Vol, veh/h		433			539			437		908		
Approach Delay, s/veh		26.8			27.8			21.9		28.3		
Approach LOS		C			C			C		C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.2	18.3	6.6	29.2	11.1	18.4	12.7	23.1				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	7.4	6.6	2.9	20.3	7.2	9.1	8.6	12.0				
Green Ext Time (p_c), s	0.1	4.5	0.0	3.8	0.1	4.3	0.2	5.5				

Intersection Summary

HCM 2010 Ctrl Delay 26.7
HCM 2010 LOS C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Cum + Proj Alt 2 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	93	388	83	115	276	20	140	4	85	15	3	31
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1860	1900	1810	1799	1900	1810	1704	1900	1900	1900	1900
Adj Flow Rate, veh/h	102	426	91	126	303	22	154	4	93	16	3	34
Adj No. of Lanes	1	2	0	1	2	0	2	1	0	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	0	2	2	5	6	6	5	0	0	0	0	0
Cap, veh/h	131	1618	343	158	1865	135	252	11	261	174	7	81
Arrive On Green	0.07	0.56	0.56	0.09	0.58	0.58	0.08	0.19	0.19	0.05	0.05	0.05
Sat Flow, veh/h	1810	2901	615	1723	3233	233	3343	60	1397	1319	133	1502
Grp Volume(v), veh/h	102	258	259	126	159	166	154	0	97	16	0	37
Grp Sat Flow(s),veh/h/ln	1810	1767	1749	1723	1709	1757	1672	0	1457	1319	0	1635
Q Serve(g_s), s	3.9	5.3	5.4	5.0	3.0	3.1	3.1	0.0	4.1	0.8	0.0	1.5
Cycle Q Clear(g_c), s	3.9	5.3	5.4	5.0	3.0	3.1	3.1	0.0	4.1	0.8	0.0	1.5
Prop In Lane	1.00		0.35	1.00		0.13	1.00		0.96	1.00		0.92
Lane Grp Cap(c), veh/h	131	985	975	158	986	1014	252	0	272	174	0	88
V/C Ratio(X)	0.78	0.26	0.27	0.80	0.16	0.16	0.61	0.00	0.36	0.09	0.00	0.42
Avail Cap(c_a), veh/h	142	985	975	160	986	1014	764	0	333	404	0	374
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	0.85	0.99	0.99	0.99	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.9	8.0	8.0	31.2	6.9	6.9	31.4	0.0	24.8	31.7	0.0	32.0
Incr Delay (d2), s/veh	16.8	0.5	0.6	22.0	0.3	0.3	0.9	0.0	0.3	0.2	0.0	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.7	2.7	3.3	1.5	1.6	1.5	0.0	1.6	0.3	0.0	0.8
LnGrp Delay(d),s/veh	48.7	8.6	8.6	53.1	7.3	7.3	32.3	0.0	25.1	31.9	0.0	35.2
LnGrp LOS	D	A	A	D	A	A	C		C	C		D
Approach Vol, veh/h		619			451			251		53		
Approach Delay, s/veh		15.2			20.1			29.5		34.2		
Approach LOS		B			C			C		C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	43.0	9.3	7.8	8.6	44.4		17.1				
Change Period (Y+Rc), s	3.5	4.0	4.0	4.0	3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0	16.0	16.0	5.5	17.0		16.0				
Max Q Clear Time (g_c+I1), s	7.0	7.4	5.1	3.5	5.9	5.1		6.1				
Green Ext Time (p_c), s	0.0	2.5	0.2	0.4	0.0	3.0		0.4				

Intersection Summary

HCM 2010 Ctrl Delay 20.1
HCM 2010 LOS C

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Cum + Proj Alt 2 AM.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	396	92	61	379	1	32	0	38	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1820	1900	1845	1845	1900	1900	1638	1712	1900	1900	1900
Adj Flow Rate, veh/h	0	477	111	73	457	1	39	0	46	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	4	4	3	3	3	0	0	11	0	0	0
Cap, veh/h	0	1849	428	91	2815	6	212	0	80	0	105	0
Arrive On Green	0.00	0.66	0.66	0.05	0.78	0.78	0.06	0.00	0.06	0.00	0.00	0.00
Sat Flow, veh/h	0	2880	645	1757	3588	8	1228	0	1444	0	1900	0
Grp Volume(v), veh/h	0	295	293	73	223	235	39	0	46	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1729	1705	1757	1753	1843	1228	0	1444	0	1900	0
Q Serve(g_s), s	0.0	3.5	3.5	2.1	1.6	1.6	1.5	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	3.5	3.5	2.1	1.6	1.6	1.5	0.0	1.6	0.0	0.0	0.0
Prop In Lane	0.00		0.38	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1146	1130	91	1375	1446	212	0	80	0	105	0
V/C Ratio(X)	0.00	0.26	0.26	0.80	0.16	0.16	0.18	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1146	1130	193	1375	1446	537	0	462	0	608	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.97	0.97	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	3.4	3.4	23.5	1.3	1.3	23.0	0.0	23.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	0.5	6.1	0.3	0.2	0.2	0.0	2.4	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.8	1.8	1.1	0.8	0.9	0.5	0.0	0.7	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	3.9	4.0	29.5	1.6	1.6	23.2	0.0	25.4	0.0	0.0	0.0
LnGrp LOS	A	A	C	A	A	C	C		C			
Approach Vol, veh/h		588			531			85			0	
Approach Delay, s/veh		4.0			5.4			24.4			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.1	37.1		6.8		43.2		6.8				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	5.5	17.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.1	5.5		0.0		3.6		3.6				
Green Ext Time (p_c), s	0.0	5.5		0.0		8.0		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			6.0									
HCM 2010 LOS			A									

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HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Cum + Proj Alt 2 AM.syn
3/14/2016

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	249	0	16	0	1	0	17	14	0	0	32	369
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	1	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	92	80	92	92	92	80	80	92	92	80	80
Heavy Vehicles, %	7	0	0	2	2	2	0	7	0	0	0	2
Mvmt Flow	311	0	20	0	1	0	21	18	0	0	40	461
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	2	0	0	25	628	2	14	628	5
Stage 1	-	-	-	-	-	-	2	625	-	3	3	-
Stage 2	-	-	-	-	-	-	23	3	-	11	625	-
Critical Hdwy	4.17	-	-	-	-	-	7.1	6.57	-	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.57	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.5	4.063	-	3.5	4	3.318
Pot Cap-1 Maneuver	1587	-	-	-	-	-	991	393	-	1007	402	1078
Stage 1	-	-	-	-	-	-	-	-	-	1025	897	-
Stage 2	-	-	-	-	-	-	1000	883	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1584	-	-	-	-	-	515	315	-	-	322	1074
Mov Cap-2 Maneuver	-	-	-	-	-	-	304	1518	-	-	380	-
Stage 1	-	-	-	-	-	-	-	-	-	822	896	-
Stage 2	-	-	-	-	-	-	544	882	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.4			0								
HCM LOS							-			-		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	304	-	1584	-	-	-	-	-	-	1074		
HCM Lane V/C Ratio	0.07	-	0.196	-	-	-	-	-	-	0.429		
HCM Control Delay (s)	17.7	-	7.8	-	-	0	-	-	-	10.9		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.2	-	0.7	-	-	-	-	-	-	2.2		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Cum + Proj Alt 2 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	213	40	129	134	38	50	159	1172	37	16	1633	137
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1868	1900	1900	1842	1900	1827	1840	1900	1357	1827	1845
Adj Flow Rate, veh/h	220	82	148	128	81	57	183	1347	43	18	1877	0
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh. %	3	0	0	0	9	9	4	3	3	40	4	3
Cap, veh/h	293	98	177	151	81	57	163	1832	58	37	1614	729
Arrive On Green	0.17	0.17	0.17	0.08	0.08	0.08	0.09	0.53	0.53	0.03	0.46	0.00
Sat Flow, veh/h	1757	586	1057	1810	977	688	1740	3456	110	1293	3471	1568
Grp Volume(v), veh/h	220	0	230	128	0	138	183	681	709	18	1877	0
Grp Sat Flow(s),veh/h/ln	1757	0	1643	1810	0	1665	1740	1748	1818	1293	1736	1568
Q Serve(g, s), s	10.6	0.0	12.0	6.2	0.0	7.4	8.3	26.6	26.7	1.2	41.3	0.0
Cycle Q Clear(g_c), s	10.6	0.0	12.0	6.2	0.0	7.4	8.3	26.6	26.7	1.2	41.3	0.0
Prop In Lane	1.00		0.64	1.00		0.41	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	293	0	274	151	0	139	163	927	964	37	1614	729
V/C Ratio(X)	0.75	0.00	0.84	0.85	0.00	1.00	1.13	0.73	0.74	0.49	1.16	0.00
Avail Cap(c_a), veh/h	316	0	296	151	0	139	163	927	964	106	1614	729
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.2	0.0	35.8	40.2	0.0	40.7	40.3	16.1	16.1	42.5	23.8	0.0
Incr Delay (d2), s/veh	9.3	0.0	18.2	35.1	0.0	74.9	108.4	3.5	3.4	9.9	80.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	0.0	6.8	4.6	0.0	6.2	8.8	13.6	14.1	0.5	37.6	0.0
LnGrp Delay(d),s/veh	44.6	0.0	54.1	75.3	0.0	115.6	148.6	19.5	19.5	52.5	104.4	0.0
LnGrp LOS	D		D	E		F	F	B	B	D	F	
Approach Vol, veh/h		450			266			1573			1895	
Approach Delay, s/veh		49.4			96.2			34.5			103.9	
Approach LOS		D			F			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.0	12.0	46.2		11.6	6.2	52.0				
Change Period (Y+Rc), s		* 4.2	3.7	4.9		4.2	3.7	4.9				
Max Green Setting (Gmax), s		* 16	8.3	41.3		7.4	7.3	42.3				
Max Q Clear Time (g_c+I1), s		14.0	10.3	43.3		9.4	3.2	28.7				
Green Ext Time (p_c), s		0.5	0.0	0.0		0.0	0.0	13.4				
Intersection Summary												
HCM 2010 Ctrl Delay			71.5									
HCM 2010 LOS			E									

Notes

User approved volume balancing among the lanes for turning movement.

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Cum + Proj Alt 2 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1410	10	32	1774	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3532		1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3532		1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1640	12	37	2063	816
RTOR Reduction (vph)	0	17	0	0	54	0	0	0	0	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1652	0	37	2063	816
Confl. Peds. (#/hr)				1		1			1			
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.7		4.5	70.2	117.8
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59		0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	550	269		96	102	90	66	2089		67	2048	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.47		0.02	c0.60	
v/s Ratio Perm						0.00						c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.79		0.55	1.01	0.53
Uniform Delay, d1	48.1	41.7		52.9	52.9	52.4	55.2	18.5		55.7	23.8	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.6	0.1		1.6	1.5	0.3	3.0	2.4		9.5	21.7	1.3
Delay (s)	60.6	41.8		54.5	54.4	52.7	58.2	20.9		65.2	45.5	1.3
Level of Service	E	D		D	D	D	E	C		E	D	A
Approach Delay (s)		59.6			53.4		21.4				33.4	
Approach LOS		E			D		C				C	
Intersection Summary												
HCM 2000 Control Delay			32.4									
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			117.8							17.9		
Intersection Capacity Utilization			75.1%									
Analysis Period (min)			15									
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
9: Carmel Rancho Blvd & Shopping Center Dwy

Cum + Proj Alt 2 AM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	56	1	19	9	1	20	17	231	15	76	561	174
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1785	1863	1881	1848	1900	1827	1853	1900
Adj Flow Rate, veh/h	73	1	25	12	1	26	22	300	19	99	729	226
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	0	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	475	7	179	447	24	183	527	1720	108	814	1356	420
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.51	0.51	0.51	0.51	0.51	0.51
Sat Flow, veh/h	1392	62	1545	1086	205	1573	591	3354	211	1034	2644	820
Grp Volume(v), veh/h	73	0	26	13	0	26	22	156	163	99	485	470
Grp Sat Flow(s),veh/h/ln	1392	0	1606	1291	0	1573	591	1755	1810	1034	1761	1704
Q Serve(g, s), s	1.1	0.0	0.3	0.0	0.0	0.3	0.6	1.0	1.0	1.2	4.0	4.0
Cycle Q Clear(g_c), s	1.4	0.0	0.3	0.3	0.0	0.3	4.6	1.0	1.0	2.3	4.0	4.0
Prop In Lane	1.00		0.96	0.92		1.00	1.00		0.12	1.00		0.48
Lane Grp Cap(c), veh/h	475	0	187	471	0	183	527	900	928	814	903	874
V/C Ratio(X)	0.15	0.00	0.14	0.03	0.00	0.14	0.04	0.17	0.18	0.12	0.54	0.54
Avail Cap(c_a), veh/h	1605	0	1491	1563	0	1460	690	1385	1427	1099	1389	1344
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	0.0	8.6	8.5	0.0	8.6	5.1	2.8	2.8	3.4	3.5	3.5
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.1	0.0	0.1	0.1	0.5	0.5	0.3	1.9	1.9
LnGrp Delay(d),s/veh	9.2	0.0	8.7	8.5	0.0	8.7	5.1	2.8	2.8	3.4	3.7	3.7
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		99			39			341			1054	
Approach Delay, s/veh		9.1			8.6			3.0			3.7	
Approach LOS		A			A			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		6.5		15.1		6.5		15.1				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0				
Max Q Clear Time (g_c+I1), s		3.4		6.0		2.3		6.6				
Green Ext Time (p_c), s		0.2		4.5		0.2		4.4				
Intersection Summary												
HCM 2010 Ctrl Delay			4.0									
HCM 2010 LOS			A									

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Cum + Proj Alt 2 PM.syn
3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	968	974	105	993	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9	4.9	4.9	4.0
Lane Util. Factor		0.88	1.00	1.00	0.97	1.00
Frt		0.85	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		2814	1863	1553	3467	1881
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2814	1863	1553	3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1030	1036	112	1056	819
RTOR Reduction (vph)	0	104	0	5	0	0
Lane Group Flow (vph)	0	926	1036	107	1056	819
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA	Perm	Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases				2		
Actuated Green, G (s)		20.1	35.1	35.1	20.1	65.0
Effective Green, g (s)		20.1	35.1	35.1	20.1	65.0
Actuated g/C Ratio		0.31	0.54	0.54	0.31	1.00
Clearance Time (s)		4.9	4.9	4.9	4.9	
Vehicle Extension (s)		4.5	3.5	3.5	4.5	
Lane Grp Cap (vph)		870	1006	838	1072	1881
v/s Ratio Prot		c0.33	c0.56		0.30	0.44
v/s Ratio Perm				0.07		
v/c Ratio		1.06	1.03	0.13	0.99	0.44
Uniform Delay, d1		22.4	14.9	7.4	22.3	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		49.3	36.3	0.1	23.8	0.7
Delay (s)		71.7	51.2	7.5	46.1	0.7
Level of Service		E	D	A	D	A
Approach Delay (s)	71.7		47.0			26.3
Approach LOS	E		D			C
Intersection Summary						
HCM 2000 Control Delay			43.7		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.04			
Actuated Cycle Length (s)			65.0		Sum of lost time (s)	9.8
Intersection Capacity Utilization			93.3%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

2: Carmel Rancho Blvd/Carmel Knolls Dr & Carmel Valley Rd

Cum + Proj Alt 2 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	874	193	400	673	4	277	17	601	4	23	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.99	1.00	1.00
Satd. Flow (prot)	1805	3539	1615	3467	3571		1715	1728	1599	1887	1553	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.99	1.00	1.00
Satd. Flow (perm)	1805	3539	1615	3467	3571		1715	1728	1599	1887	1553	1553
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	33	930	205	426	716	4	295	18	639	4	24	19
RTOR Reduction (vph)	0	0	121	0	1	0	0	0	536	0	0	19
Lane Group Flow (vph)	33	930	84	426	719	0	156	157	103	0	28	0
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	0%	1%	0%	0%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Over	Split	NA	Perm
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases			2									7
Actuated Green, G (s)	1.9	23.9	23.9	9.0	31.1		9.2	9.2	9.0	1.6	1.6	1.6
Effective Green, g (s)	1.9	23.9	23.9	9.0	31.1		9.2	9.2	9.0	1.6	1.6	1.6
Actuated g/C Ratio	0.03	0.37	0.37	0.14	0.49		0.14	0.14	0.14	0.02	0.02	0.02
Clearance Time (s)	4.5	5.0	5.0	4.6	5.0		5.8	5.8	4.6	5.0	5.0	5.0
Vehicle Extension (s)	1.0	1.3	1.3	1.0	1.3		1.0	1.0	1.0	1.0	1.0	1.0
Lane Grp Cap (vph)	53	1319	602	486	1732		246	248	224	47	38	
v/s Ratio Prot	0.02	c0.26		c0.12	0.20		c0.09	0.09	0.06	c0.01		
v/s Ratio Perm			0.05								0.00	
v/c Ratio	0.62	0.71	0.14	0.88	0.42		0.63	0.63	0.46	0.60	0.01	
Uniform Delay, d1	30.7	17.1	13.3	27.0	10.6		25.9	25.9	25.3	30.9	30.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.2	1.4	0.0	15.7	0.1		3.9	3.8	0.5	12.8	0.0	
Delay (s)	46.0	18.5	13.3	42.7	10.7		29.8	29.7	25.9	43.7	30.5	
Level of Service	D	B	B	D	B		C	C	C	D	C	
Approach Delay (s)		18.4			22.6			27.1		38.4		
Approach LOS		B			C			C		D		
Intersection Summary												
HCM 2000 Control Delay		22.6			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		64.1			Sum of lost time (s)		20.4					
Intersection Capacity Utilization		76.9%			ICU Level of Service		D					
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Cum + Proj Alt 2 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	367	83	190	418	355	162	581	164	329	397	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1845	1863	1881	1883	1900
Adj Flow Rate, veh/h	146	374	85	194	427	362	165	593	167	336	405	45
Adj No. of Lanes	1	2	0	1	1	1	1	1	1	2	1	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	2	1	3	2	1	1	1	1
Cap, veh/h	164	865	195	205	604	504	198	553	473	359	487	54
Arrive On Green	0.09	0.30	0.30	0.11	0.32	0.32	0.11	0.30	0.30	0.10	0.29	0.29
Sat Flow, veh/h	1774	2896	651	1792	1881	1571	1792	1845	1575	3476	1664	185
Grp Volume(v), veh/h	146	229	230	194	427	362	165	593	167	336	0	450
Grp Sat Flow(s),veh/h/ln	1774	1784	1763	1792	1881	1571	1792	1845	1575	1738	0	1849
Q Serve(g_s), s	7.3	9.3	9.5	9.7	17.9	18.3	8.1	27.0	7.5	8.6	0.0	20.5
Cycle Q Clear(g_c), s	7.3	9.3	9.5	9.7	17.9	18.3	8.1	27.0	7.5	8.6	0.0	20.5
Prop In Lane	1.00		0.37	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	164	533	527	205	604	504	198	553	473	359	0	541
V/C Ratio(X)	0.89	0.43	0.44	0.95	0.71	0.72	0.83	1.07	0.35	0.94	0.00	0.83
Avail Cap(c_a), veh/h	164	533	527	205	604	504	205	553	473	359	0	541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.4	25.4	25.4	39.6	26.8	27.0	39.2	31.5	24.7	40.1	0.0	29.8
Incr Delay (d2), s/veh	41.0	0.7	0.7	47.6	6.8	8.5	23.7	58.9	0.5	31.4	0.0	10.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	4.7	4.7	7.5	10.4	9.0	5.3	22.7	3.3	5.7	0.0	12.0
LnGrp Delay(d),s/veh	81.5	26.0	26.1	87.2	33.7	35.4	62.9	90.4	25.2	71.4	0.0	40.6
LnGrp LOS	F	C	C	F	C	D	E	F	C	E		D
Approach Vol, veh/h		605			983			925			786	
Approach Delay, s/veh		39.4			44.9			73.7			53.8	
Approach LOS		D			D			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	31.1	13.7	31.2	12.0	33.1	13.0	31.9				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	11.7	11.5	10.1	22.5	9.3	20.3	10.6	29.0				
Green Ext Time (p_c), s	0.0	7.6	0.0	2.3	0.0	5.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay				54.1								
HCM 2010 LOS				D								

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary
4: Crossroads Blvd & Rio Rd

Cum + Proj Alt 2 PM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	177	461	138	163	455	47	348	9	169	43	8	86
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1867	1900	1881	1883	1900	1881	1865	1900	1900	1900	1900
Adj Flow Rate, veh/h	179	466	139	165	460	47	352	9	171	43	8	87
Adj No. of Lanes	1	2	0	1	2	0	2	1	0	1	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	0	2	2	1	1	1	1	0	0	0	0	0
Cap, veh/h	168	1232	365	166	1498	152	461	23	434	221	13	142
Arrive On Green	0.09	0.46	0.46	0.09	0.46	0.46	0.13	0.29	0.29	0.10	0.10	0.10
Sat Flow, veh/h	1810	2697	799	1792	3278	334	3476	80	1517	1223	136	1481
Grp Volume(v), veh/h	179	305	300	165	250	257	352	0	180	43	0	95
Grp Sat Flow(s),veh/h/ln	1810	1774	1722	1792	1789	1822	1738	0	1597	1223	0	1617
Q Serve(g_s), s	6.5	7.9	8.0	6.4	6.2	6.2	6.8	0.0	6.4	2.3	0.0	3.9
Cycle Q Clear(g_c), s	6.5	7.9	8.0	6.4	6.2	6.2	6.8	0.0	6.4	2.3	0.0	3.9
Prop In Lane	1.00		0.46	1.00		0.18	1.00		0.95	1.00		0.92
Lane Grp Cap(c), veh/h	168	810	787	166	817	833	461	0	457	221	0	156
V/C Ratio(X)	1.07	0.38	0.38	0.99	0.31	0.31	0.76	0.00	0.39	0.19	0.00	0.61
Avail Cap(c_a), veh/h	168	810	787	166	817	833	794	0	457	382	0	370
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	0.78	0.98	0.98	0.98	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.8	12.5	12.5	31.7	12.0	12.0	29.3	0.0	20.1	29.6	0.0	30.4
Incr Delay (d2), s/veh	79.8	1.0	1.1	66.6	1.0	0.9	1.0	0.0	0.2	0.4	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	4.1	4.0	6.2	3.3	3.4	3.3	0.0	2.8	0.8	0.0	1.9
LnGrp Delay(d),s/veh	111.6	13.5	13.6	98.3	13.0	13.0	30.3	0.0	20.3	30.1	0.0	34.2
LnGrp LOS	F	B	B	F	B	B	C		C	C		C
Approach Vol, veh/h		784			672			532			138	
Approach Delay, s/veh		35.9			33.9			26.9			32.9	
Approach LOS		D			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	36.0	13.3	10.7	10.0	36.0		24.0				
Change Period (Y+Rc), s	3.5	4.0	4.0	4.0	3.5	4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0	16.0	16.0	6.5	16.0		16.0				
Max Q Clear Time (g_c+I1), s	8.4	10.0	8.8	5.9	8.5	8.2		8.4				
Green Ext Time (p_c), s	0.0	2.6	0.4	0.5	0.0	3.1		0.9				
Intersection Summary												
HCM 2010 Ctrl Delay			32.8									
HCM 2010 LOS			C									

Synchro 8 Report

HCM 2010 Signalized Intersection Summary
5: Carmel Center PI & Rio Rd

Cum + Proj Alt 2 PM.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	619	54	85	579	0	86	0	110	0	0	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1881	1900	1900	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	638	56	88	597	0	89	0	113	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	1	1	0	1	0
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
Percent Heavy Veh, %	0	2	2	2	1	1	0	0	0	0	0	0
Cap, veh/h	0	1975	173	111	2619	0	297	0	173	0	204	0
Arrive On Green	0.00	0.60	0.60	0.06	0.73	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	0	3386	289	1774	3668	0	1422	0	1610	0	1900	0
Grp Volume(v), veh/h	0	343	351	88	597	0	89	0	113	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1812	1774	1787	0	1422	0	1610	0	1900	0
Q Serve(g_s), s	0.0	4.8	4.8	2.4	2.7	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	4.8	4.8	2.4	2.7	0.0	3.0	0.0	3.4	0.0	0.0	0.0
Prop In Lane	0.00		0.16	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	1062	1087	111	2619	0	297	0	173	0	204	0
V/C Ratio(X)	0.00	0.32	0.32	0.79	0.23	0.00	0.30	0.00	0.65	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	1062	1087	231	2619	0	599	0	515	0	608	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.88	0.88	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.0	5.0	23.1	2.1	0.0	21.3	0.0	21.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.7	4.6	0.2	0.0	0.2	0.0	1.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.5	2.6	1.3	1.3	0.0	1.2	0.0	1.6	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	5.7	5.7	27.7	2.3	0.0	21.5	0.0	23.0	0.0	0.0	0.0
LnGrp LOS		A	A	C	A		C		C			
Approach Vol, veh/h		694			685			202			0	
Approach Delay, s/veh		5.7			5.6			22.3			0.0	
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	6.6	34.0		9.4		40.6		9.4				
Change Period (Y+Rc), s	3.5	4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s	6.5	16.0		16.0		26.0		16.0				
Max Q Clear Time (g_c+I1), s	4.4	6.8		0.0		4.7		5.4				
Green Ext Time (p_c), s	0.0	5.9		0.0		10.4		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			7.8									
HCM 2010 LOS			A									

Synchro 8 Report

HCM 2010 TWSC
6: Carmel Rancho Blvd & Rio Rd

Cum + Proj Alt 2 PM.syn
3/14/2016

Intersection												
Int Delay, s/veh		3.6										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	496	0	64	0	1	0	33	25	0	0	22	506
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	210	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	92	91	92	92	92	91	91	92	92	91	91
Heavy Vehicles, %	2	0	0	0	0	0	4	0	0	0	0	1
Mvmt Flow	545	0	70	0	1	0	36	27	0	0	24	556
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1	0	0	2	0	0	15	1093	2	17	1093	1
Stage 1	-	-	-	-	-	-	2	1092	-	1	1	-
Stage 2	-	-	-	-	-	-	13	1	-	16	1092	-
Critical Hdwy	4.12	-	-	-	-	-	7.14	6.5	-	7.1	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.536	4	-	3.5	4	3.309
Pot Cap-1 Maneuver	1622	-	-	-	-	-	996	216	-	1003	216	1087
Stage 1	-	-	-	-	-	-	-	-	-	1027	899	-
Stage 2	-	-	-	-	-	-	1002	899	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	-	-	-	547	143	-	-	143	1087
Mov Cap-2 Maneuver	-	-	-	-	-	-	235 ~	-283	-	-	~32	-
Stage 1	-	-	-	-	-	-	-	-	-	682	899	-
Stage 2	-	-	-	-	-	-	476	899	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.4			0								
HCM LOS							-			-		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	235	-	1622	-	-	-	-	-	-	1087		
HCM Lane V/C Ratio	0.154	-	0.336	-	-	-	-	-	-	0.512		
HCM Control Delay (s)	23.1	-	8.3	-	-	0	-	-	-	11.7		
HCM Lane LOS	C	-	A	-	-	A	-	-	-	B		
HCM 95th %tile Q(veh)	0.5	-	1.5	-	-	-	-	-	-	3		
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 2010 Signalized Intersection Summary
7: SR 1 & Ocean Ave

Cum + Proj Alt 2 PM.syn
3/14/2016

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Volume (veh/h)	277	22	232	34	13	18	285	1658	10	13	1546	153			
Number	5	2	12	1	6	16	3	8	18	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1871	1900	1863	1763	1900	1900	1845	1900	1900	1881	1881			
Adj Flow Rate, veh/h	280	40	244	34	16	19	300	1745	11	14	1627	0			
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1			
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			
Percent Heavy Veh, %	2	7	7	2	5	5	0	3	3	0	1	1			
Cap, veh/h	332	42	257	114	46	55	292	1906	12	42	1414	633			
Arrive On Green	0.19	0.19	0.19	0.06	0.06	0.06	0.16	0.53	0.53	0.02	0.40	0.00			
Sat Flow, veh/h	1774	225	1374	1774	717	852	1810	3571	22	1810	3574	1599			
Grp Volume(v), veh/h	280	0	284	34	0	35	300	856	900	14	1627	0			
Grp Sat Flow(s),veh/h/ln	1774	0	1599	1774	0	1569	1810	1753	1841	1810	1787	1599			
Q Serve(g_s), s	13.5	0.0	15.6	1.6	0.0	1.9	14.3	39.5	39.6	0.7	35.1	0.0			
Cycle Q Clear(g_c), s	13.5	0.0	15.6	1.6	0.0	1.9	14.3	39.5	39.6	0.7	35.1	0.0			
Prop In Lane	1.00		0.86	1.00		0.54	1.00		0.01	1.00		1.00			
Lane Grp Cap(c), veh/h	332	0	299	114	0	101	292	936	983	42	1414	633			
V/C Ratio(X)	0.84	0.00	0.95	0.30	0.00	0.35	1.03	0.91	0.92	0.34	1.15	0.00			
Avail Cap(c_a), veh/h	332	0	299	140	0	124	292	936	983	149	1414	633			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	34.8	0.0	35.6	39.6	0.0	39.7	37.2	18.8	18.9	42.7	26.8	0.0			
Incr Delay (d2), s/veh	17.9	0.0	38.6	2.0	0.0	2.9	60.3	13.6	13.2	4.7	76.4	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.3	0.0	10.1	0.9	0.0	0.9	11.9	22.3	23.6	0.4	32.1	0.0			
LnGrp Delay(d),s/veh	52.7	0.0	74.3	41.6	0.0	42.6	97.5	32.5	32.1	47.3	103.2	0.0			
LnGrp LOS	D		E	D		D	F	C	C	D	F				
Approach Vol, veh/h	564			69			2056			1641					
Approach Delay, s/veh	63.6			42.1			41.8			102.7					
Approach LOS	E			D			D			F					
Timer	1	2	3	4	5	6	7	8							
Assigned Phs	2	3	4			6	7	8							
Phs Duration (G+Y+Rc), s	20.8	18.0	40.0			9.9	5.7	52.3							
Change Period (Y+Rc), s	* 4.2	3.7	4.9			4.2	3.7	4.9							
Max Green Setting (Gmax), s	* 17	14.3	35.1			7.0	7.3	42.1							
Max Q Clear Time (g_c+I1), s	17.6	16.3	37.1			3.9	2.7	41.6							
Green Ext Time (p_c), s	0.0	0.0	0.0			0.1	0.0	0.5							
Intersection Summary															
HCM 2010 Ctrl Delay	67.7														
HCM 2010 LOS	E														

HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Cum + Proj Alt 2 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1906	14	54	1737	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Flt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3535		1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3535		1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1985	15	56	1809	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	1	0	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1999	0	56	1809	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						Free
Actuated Green, G (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Effective Green, g (s)	42.7	42.7		7.0	7.0	7.0	3.1	67.3		6.3	71.0	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48		0.04	0.50	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9		4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	1038	521		85	87	80	39	1684		80	1797	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.57		0.03	0.51	
v/s Ratio Perm						0.00						c0.49
v/c Ratio	0.99	0.04		0.21	0.21	0.03	0.36	1.19		0.70	1.01	0.49
Uniform Delay, d1	48.9	34.8		64.5	64.4	63.9	68.1	36.9		66.5	35.1	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1		2.1	2.0	0.3	5.6	90.6		23.4	22.9	1.1
Delay (s)	73.3	34.9		66.6	66.5	64.2	73.6	127.6		90.0	58.0	1.1
Level of Service	E	C		E	E	E	E	F		F	E	A
Approach Delay (s)		72.0			65.1			127.2			41.9	
Approach LOS		E			E			F			D	

Intersection Summary

HCM 2000 Control Delay	77.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	141.2	Sum of lost time (s)	17.9
Intersection Capacity Utilization	99.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

9: Carmel Rancho Blvd & Shopping Center Dwy

Cum + Proj Alt 2 PM.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	183	10	20	40	10	30	38	605	18	11	455	89
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1887	1900	1900	1800	1863	1881	1846	1900	1827	1851	1900
Adj Flow Rate, veh/h	197	11	22	43	11	32	41	651	19	12	489	96
Adj No. of Lanes	1	1	0	0	1	1	1	2	0	1	2	0
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
Percent Heavy Veh. %	2	0	0	0	0	2	1	3	3	4	3	3
Cap, veh/h	610	145	290	526	105	407	540	1447	42	502	1218	238
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1347	558	1117	1016	403	1569	832	3480	102	747	2929	572
Grp Volume(v), veh/h	197	0	33	54	0	32	41	328	342	12	292	293
Grp Sat Flow(s),veh/h/ln	1347	0	1675	1419	0	1569	832	1754	1827	747	1758	1743
Q Serve(g_s), s	3.2	0.0	0.4	0.1	0.0	0.4	0.9	3.3	3.3	0.3	2.9	2.9
Cycle Q Clear(g_c), s	3.8	0.0	0.4	0.6	0.0	0.4	3.8	3.3	3.3	3.6	2.9	2.9
Prop In Lane	1.00		0.67	0.80		1.00	1.00		0.06	1.00		0.33
Lane Grp Cap(c), veh/h	610	0	435	631	0	407	540	729	760	502	731	725
V/C Ratio(X)	0.32	0.00	0.08	0.09	0.00	0.08	0.08	0.45	0.45	0.02	0.40	0.40
Avail Cap(c_a), veh/h	1353	0	1359	1396	0	1273	768	1210	1260	707	1213	1202
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.4	0.0	6.9	7.0	0.0	6.9	6.4	5.2	5.2	6.5	5.0	5.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.2	0.3	0.0	0.2	0.2	1.6	1.6	0.1	1.4	1.4
LnGrp Delay(d),s/veh	8.5	0.0	6.9	7.0	0.0	6.9	6.4	5.3	5.3	6.5	5.2	5.2
LnGrp LOS	A		A	A		A	A	A	A	A	A	A
Approach Vol, veh/h		230			86			711			597	
Approach Delay, s/veh		8.3			7.0			5.4			5.2	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		10.4		14.2		10.4		14.2
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		20.0		17.0		20.0		17.0
Max Q Clear Time (g_c+I1), s		5.8		5.6		2.6		5.8
Green Ext Time (p_c), s		0.6		4.2		0.6		4.1

Intersection Summary

HCM 2010 Ctrl Delay	5.8
HCM 2010 LOS	A

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis 8: SR 1 & Carpenter St

Existing + Proj Alt 2 AM-Miti.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1230	10	32	1568	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1430	12	37	1823	816
RTOR Reduction (vph)	0	17	0	0	0	54	0	0	5	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1430	7	37	1823	816
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6	69.6	4.5	70.1	117.7
Effective Green, g (s)	18.9	18.9		6.8	6.8	6.8	4.5	69.6	69.6	4.5	70.1	117.7
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.59	0.59	0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	551	269		96	102	90	66	2092	824	67	2047	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.40		0.02	c0.53	
v/s Ratio Perm						0.00			0.01			c0.53
v/c Ratio	0.85	0.03		0.19	0.19	0.04	0.33	0.68	0.01	0.55	0.89	0.53
Uniform Delay, d1	48.0	41.7		52.8	52.8	52.4	55.1	16.5	9.9	55.6	20.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.4	0.1		1.6	1.5	0.3	3.0	1.2	0.0	9.5	5.7	1.3
Delay (s)	60.4	41.8		54.5	54.3	52.6	58.1	17.7	9.9	65.1	26.2	1.3
Level of Service	E	D		D	D	D	E	B	A	E	C	A
Approach Delay (s)		59.4			53.3			18.2			19.1	
Approach LOS		E			D			B			B	
Intersection Summary												
HCM 2000 Control Delay		23.7										
HCM 2000 Volume to Capacity ratio		0.89										
Actuated Cycle Length (s)		117.7										
Intersection Capacity Utilization		69.4%										
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis 8: SR 1 & Carpenter St

Existing + Proj Alt 2 PM-Miti.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1620	14	54	1471	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1688	15	56	1532	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	0	8	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1688	7	56	1532	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	42.3	42.3		7.0	7.0	7.0	3.1	67.8	67.8	6.2	71.4	141.2
Effective Green, g (s)	42.3	42.3		7.0	7.0	7.0	3.1	67.8	67.8	6.2	71.4	141.2
Actuated g/C Ratio	0.30	0.30		0.05	0.05	0.05	0.02	0.48	0.48	0.04	0.51	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	1028	516		85	87	80	39	1699	752	79	1807	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.48		0.03	0.43	
v/s Ratio Perm						0.00			0.00			c0.49
v/c Ratio	1.00	0.05		0.21	0.21	0.03	0.36	0.99	0.01	0.71	0.85	0.49
Uniform Delay, d1	49.3	35.1		64.5	64.4	63.9	68.1	36.5	19.2	66.6	30.2	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.8	0.1		2.1	2.0	0.3	5.6	20.2	0.0	25.1	4.3	1.1
Delay (s)	76.1	35.2		66.6	66.5	64.2	73.6	56.7	19.2	91.7	34.5	1.1
Level of Service	E	D		E	E	E	E	B	F	C	A	
Approach Delay (s)		74.7			65.1			56.5			24.9	
Approach LOS		E			E			E			C	
Intersection Summary												
HCM 2000 Control Delay		46.1										
HCM 2000 Volume to Capacity ratio		0.97										
Actuated Cycle Length (s)		141.2										
Intersection Capacity Utilization		90.9%										
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Back + Proj Alt 2 AM-Miti.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1291	10	32	1619	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Flt Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1501	12	37	1883	816
RTOR Reduction (vph)	0	17	0	0	0	54	0	0	5	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1501	7	37	1883	816
Confl. Peds. (#/hr)				1		1			1		1	
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	18.4	18.4		6.9	6.9	6.9	4.6	70.6	70.6	4.5	71.0	118.3
Effective Green, g (s)	18.4	18.4		6.9	6.9	6.9	4.6	70.6	70.6	4.5	71.0	118.3
Actuated g/C Ratio	0.16	0.16		0.06	0.06	0.06	0.04	0.60	0.60	0.04	0.60	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	533	261		97	103	91	67	2112	832	67	2063	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.42		0.02	c0.55	
v/s Ratio Perm						0.00			0.01			c0.53
v/c Ratio	0.88	0.03		0.19	0.18	0.04	0.33	0.71	0.01	0.55	0.91	0.53
Uniform Delay, d1	48.8	42.4		53.0	53.0	52.6	55.3	16.7	9.7	55.9	20.9	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.7	0.1		1.6	1.5	0.3	2.9	1.4	0.0	9.5	7.0	1.3
Delay (s)	64.6	42.5		54.6	54.5	52.8	58.2	18.1	9.7	65.4	28.0	1.3
Level of Service	E	D		D	D	D	E	B	A	E	C	A
Approach Delay (s)		63.4			53.5			18.6			20.5	
Approach LOS		E			D			B			C	

Intersection Summary												
HCM 2000 Control Delay		24.9		HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio		0.91										
Actuated Cycle Length (s)		118.3		Sum of lost time (s)						17.9		
Intersection Capacity Utilization		70.8%		ICU Level of Service						C		
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

8: SR 1 & Carpenter St

Back + Proj Alt 2 PM-Miti.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1688	14	54	1547	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1758	15	56	1611	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	0	8	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1758	7	56	1611	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	0%	2%	3%	0%	1%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	41.3	41.3		7.0	7.0	7.0	3.1	68.8	68.8	6.2	72.4	141.2
Effective Green, g (s)	41.3	41.3		7.0	7.0	7.0	3.1	68.8	68.8	6.2	72.4	141.2
Actuated g/C Ratio	0.29	0.29		0.05	0.05	0.05	0.02	0.49	0.49	0.04	0.51	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	1004	503		85	87	80	39	1724	764	79	1832	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.50		0.03	0.45	
v/s Ratio Perm						0.00			0.00			c0.49
v/c Ratio	1.02	0.05		0.21	0.21	0.03	0.36	1.02	0.01	0.71	0.88	0.49
Uniform Delay, d1	49.9	35.8		64.5	64.4	63.9	68.1	36.2	18.6	66.6	30.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.2	0.1		2.1	2.0	0.3	5.6	26.8	0.0	25.1	5.6	1.1
Delay (s)	83.2	35.9		66.6	66.5	64.2	73.6	63.0	18.7	91.7	36.1	1.1
Level of Service	F	D		E	E	E	E	E	B	F	D	A
Approach Delay (s)		81.6			65.1			62.7			26.3	
Approach LOS		F			E			E			C	

Intersection Summary												
HCM 2000 Control Delay		49.9		HCM 2000 Level of Service						D		
HCM 2000 Volume to Capacity ratio		1.00										
Actuated Cycle Length (s)		141.2		Sum of lost time (s)						17.9		
Intersection Capacity Utilization		92.8%		ICU Level of Service						F		
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis

1: SR 1 & Carmel Valley Rd

Cum + Proj Alt 2 AM-Miti.syn

3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	853	539	61	1140	835
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9	4.0
Lane Util. Factor		0.88	0.95		0.97	1.00
Frt		0.85	0.98		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		2760	3468		3335	1759
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		2760	3468		3335	1759
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	927	586	66	1239	908
RTOR Reduction (vph)	0	185	9	0	0	0
Lane Group Flow (vph)	0	742	643	0	1239	908
Heavy Vehicles (%)	0%	3%	2%	7%	5%	8%
Turn Type	Over	NA		Prot	NA	
Protected Phases	3	2		3	Free	
Permitted Phases						
Actuated Green, G (s)		25.2	15.8		25.2	50.8
Effective Green, g (s)		25.2	15.8		25.2	50.8
Actuated g/C Ratio		0.50	0.31		0.50	1.00
Clearance Time (s)		4.9	4.9		4.9	
Vehicle Extension (s)		4.5	3.5		4.5	
Lane Grp Cap (vph)	1369	1078		1654	1759	
v/s Ratio Prot	0.27	0.19		0.37	0.52	
v/s Ratio Perm						
v/c Ratio	0.54	0.60		0.75	0.52	
Uniform Delay, d1	8.8	14.8		10.3	0.0	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.9		2.2	1.1	
Delay (s)		9.5	15.8		12.4	1.1
Level of Service		A	B		B	A
Approach Delay (s)	9.5		15.8			7.6
Approach LOS	A		B			A

Intersection Summary

HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	50.8	Sum of lost time (s)	9.8
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary

3: SR 1 & Rio Rd

Cum + Proj Alt 2 AM-Miti.syn

3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	229	36	140	183	173	23	294	85	326	468	41
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1842	1900	1863	1810	1827	1759	1835	1900	1827	1827	1759
Adj Flow Rate, veh/h	145	249	39	152	199	188	25	320	92	354	509	45
Adj No. of Lanes	1	2	0	1	1	2	1	2	0	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh. %	2	3	3	2	5	4	8	4	4	4	4	8
Cap, veh/h	209	644	100	211	386	576	76	700	198	486	657	534
Arrive On Green	0.12	0.21	0.21	0.12	0.21	0.21	0.05	0.26	0.26	0.14	0.36	0.36
Sat Flow, veh/h	1774	3038	470	1774	1810	2701	1675	2681	758	3375	1827	1485
Grp Volume(v), veh/h	145	142	146	152	199	188	25	206	206	354	509	45
Grp Sat Flow(s),veh/h/ln	1774	1750	1758	1774	1810	1351	1675	1743	1696	1688	1827	1485
Q Serve(g_s), s	4.9	4.3	4.5	5.2	6.1	3.7	0.9	6.2	6.4	6.3	15.4	1.2
Cycle Q Clear(g_c), s	4.9	4.3	4.5	5.2	6.1	3.7	0.9	6.2	6.4	6.3	15.4	1.2
Prop In Lane	1.00		0.27	1.00		1.00	1.00		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	209	371	373	211	386	576	76	455	443	486	657	534
V/C Ratio(X)	0.69	0.38	0.39	0.72	0.52	0.33	0.33	0.45	0.47	0.73	0.77	0.08
Avail Cap(c_a), veh/h	264	782	786	264	809	1207	215	726	706	557	828	673
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	21.1	21.1	26.5	21.7	20.8	28.9	19.3	19.4	25.6	17.7	13.2
Incr Delay (d2), s/veh	5.5	0.8	0.8	7.0	1.3	0.4	2.5	0.9	0.9	4.1	3.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	2.2	2.2	2.9	3.2	1.4	0.5	3.1	3.1	3.2	8.5	0.5
LnGrp Delay(d),s/veh	32.0	21.9	21.9	33.5	23.0	21.2	31.4	20.2	20.3	29.7	21.6	13.3
LnGrp LOS	C	C	C	C	C	C	C	C	C	C	C	B
Approach Vol, veh/h		433			539			437			908	
Approach Delay, s/veh		25.3			25.3			20.9			24.4	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.1	17.4	6.5	27.4	11.1	17.5	12.7	21.2				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	9.3	* 28	8.0	28.3	9.3	* 28	10.3	26.0				
Max Q Clear Time (g_c+I1), s	7.2	6.5	2.9	17.4	6.9	8.1	8.3	8.4				
Green Ext Time (p_c), s	0.1	4.6	0.0	4.7	0.1	4.5	0.3	6.1				

Intersection Summary

HCM 2010 Ctrl Delay	24.1
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
8: SR 1 & Carpenter St

Cum + Proj Alt 2 AM-Miti.syn
3/14/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	5	17	18	14	49	19	1410	10	32	1774	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.2	4.9	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Flt Protected	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flt Permitted	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Permitted	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Satd. Flow (prot)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Satd. Flow (perm)	3433	1681		1665	1782	1572	1736	3539	1395	1770	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	467	6	20	21	16	57	22	1640	12	37	2063	816
RTOR Reduction (vph)	0	17	0	0	0	54	0	0	5	0	0	0
Lane Group Flow (vph)	467	9	0	18	19	3	22	1640	7	37	2063	816
Confl. Peds. (#/hr)				1		1			1		1	
Heavy Vehicles (%)	2%	0%	0%	3%	0%	1%	4%	2%	13%	2%	5%	5%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	17.2	17.2		6.9	6.9	6.9	4.6	71.7	71.7	4.5	72.1	118.2
Effective Green, g (s)	17.2	17.2		6.9	6.9	6.9	4.6	71.7	71.7	4.5	72.1	118.2
Actuated g/C Ratio	0.15	0.15		0.06	0.06	0.06	0.04	0.61	0.61	0.04	0.61	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	499	244		97	104	91	67	2146	846	67	2097	1538
v/s Ratio Prot	c0.14	0.01		0.01	0.01		0.01	0.46		0.02	c0.60	
v/s Ratio Perm						0.00			0.01			c0.53
v/c Ratio	0.94	0.04		0.19	0.18	0.04	0.33	0.76	0.01	0.55	0.98	0.53
Uniform Delay, d1	50.0	43.4		53.0	53.0	52.5	55.3	17.1	9.2	55.9	22.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.6	0.1		1.6	1.5	0.3	2.9	2.0	0.0	9.5	16.0	1.3
Delay (s)	75.5	43.5		54.6	54.4	52.8	58.2	19.0	9.2	65.4	38.5	1.3
Level of Service	E	D		D	D	D	E	B	A	E	D	A
Approach Delay (s)		73.8			53.5			19.5			28.4	
Approach LOS		E			D			B			C	
Intersection Summary												
HCM 2000 Control Delay		30.3										
HCM 2000 Volume to Capacity ratio		0.97										
Actuated Cycle Length (s)		118.2										
Intersection Capacity Utilization		75.1%										
Analysis Period (min)		15										
c Critical Lane Group												

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis
1: SR 1 & Carmel Valley Rd

Cum + Proj Alt 2 PM-Miti.syn
3/14/2016

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	968	974	105	993	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.9		4.9	4.0
Lane Util. Factor		0.88	0.95		0.97	1.00
Flt		0.85	0.99		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		2814	3481		3467	1881
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		2814	3481		3467	1881
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	1030	1036	112	1056	819
RTOR Reduction (vph)	0	96	5	0	0	0
Lane Group Flow (vph)	0	934	1143	0	1056	819
Heavy Vehicles (%)	0%	1%	2%	4%	1%	1%
Turn Type		Over	NA		Prot	NA
Protected Phases		3	2		3	Free
Permitted Phases						
Actuated Green, G (s)		20.3	26.8		20.3	56.9
Effective Green, g (s)		20.3	26.8		20.3	56.9
Actuated g/C Ratio		0.36	0.47		0.36	1.00
Clearance Time (s)		4.9	4.9		4.9	
Vehicle Extension (s)		4.5	3.5		4.5	
Lane Grp Cap (vph)		1003	1639		1236	1881
v/s Ratio Prot		c0.33	c0.33		0.30	0.44
v/s Ratio Perm						
v/c Ratio		0.93	0.70		0.85	0.44
Uniform Delay, d1		17.6	11.9		16.9	0.0
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		14.9	1.4		6.4	0.7
Delay (s)		32.6	13.2		23.3	0.7
Level of Service		C	B		C	A
Approach Delay (s)	32.6		13.2			13.5
Approach LOS	C		B			B
Intersection Summary						
HCM 2000 Control Delay		18.2			HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio		0.80				
Actuated Cycle Length (s)		56.9			Sum of lost time (s)	9.8
Intersection Capacity Utilization		72.3%			ICU Level of Service	C
Analysis Period (min)		15				
c Critical Lane Group						

Synchro 8 Report

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HCM 2010 Signalized Intersection Summary 3: SR 1 & Rio Rd

Cum + Proj Alt 2 PM-Miti.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	367	83	190	418	355	162	581	164	329	397	44
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1878	1900	1881	1881	1863	1881	1849	1900	1881	1881	1900
Adj Flow Rate, veh/h	146	374	85	194	427	362	165	593	167	336	405	45
Adj No. of Lanes	1	2	0	1	1	2	1	2	0	2	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	1	1	1	1	2	1	3	3	1	1	0
Cap, veh/h	169	893	201	211	623	916	199	752	211	370	514	437
Arrive On Green	0.10	0.31	0.31	0.12	0.33	0.33	0.11	0.28	0.28	0.11	0.27	0.27
Sat Flow, veh/h	1774	2896	651	1792	1881	2766	1792	2706	760	3476	1881	1600
Grp Volume(v), veh/h	146	229	230	194	427	362	165	384	376	336	405	45
Grp Sat Flow(s),veh/h/ln	1774	1784	1763	1792	1881	1383	1792	1756	1710	1738	1881	1600
Q Serve(g, s)	7.1	8.9	9.1	9.3	17.1	8.8	7.9	17.7	17.7	8.3	17.4	1.8
Cycle Q Clear(g_c), s	7.1	8.9	9.1	9.3	17.1	8.8	7.9	17.7	17.7	8.3	17.4	1.8
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.44	1.00		1.00
Lane Grp Cap(c), veh/h	169	550	543	211	623	916	199	488	475	370	514	437
V/C Ratio(X)	0.87	0.42	0.42	0.92	0.69	0.40	0.83	0.79	0.79	0.91	0.79	0.10
Avail Cap(c_a), veh/h	169	550	543	211	623	916	211	543	529	370	561	477
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.9	23.9	24.0	38.1	25.2	22.5	38.0	29.1	38.6	29.4	23.7	
Incr Delay (d2), s/veh	34.4	0.6	0.6	39.7	6.0	1.3	22.2	7.2	7.5	25.3	7.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	4.5	4.5	7.0	9.9	3.5	5.1	9.5	9.3	5.3	10.0	0.8
LnGrp Delay(d),s/veh	73.4	24.6	24.6	77.8	31.3	23.7	60.1	36.3	36.7	63.8	36.5	23.8
LnGrp LOS	E	C	C	E	C	C	E	D	D	E	D	C
Approach Vol, veh/h		605			983			925			786	
Approach Delay, s/veh		36.4			37.7			40.7			47.4	
Approach LOS		D			D			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	31.1	13.4	28.8	12.0	33.1	13.0	29.2				
Change Period (Y+Rc), s	3.7	* 4.2	3.7	4.9	3.7	* 4.2	3.7	4.9				
Max Green Setting (Gmax), s	10.3	* 27	10.3	26.0	8.3	* 29	9.3	27.0				
Max Q Clear Time (g_c+I1), s	11.3	11.1	9.9	19.4	9.1	19.1	10.3	19.7				
Green Ext Time (p_c), s	0.0	7.8	0.0	4.0	0.0	5.7	0.0	4.3				

Intersection Summary

HCM 2010 Ctrl Delay 40.6
HCM 2010 LOS D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Synchro 8 Report

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HCM Signalized Intersection Capacity Analysis 8: SR 1 & Carpenter St

Cum + Proj Alt 2 PM-Miti.syn
3/14/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	982	17	17	23	12	52	13	1906	14	54	1737	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	4.0
Lane Util. Factor	0.97	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1723		1715	1775	1615	1805	3539	1568	1805	3574	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1023	18	18	24	12	54	14	1985	15	56	1809	776
RTOR Reduction (vph)	0	13	0	0	0	51	0	0	7	0	0	0
Lane Group Flow (vph)	1023	23	0	18	18	3	14	1985	8	56	1809	776
Heavy Vehicles (%)	2%	0%	4%	0%	0%	0%	2%	3%	0%	1%	2%	2%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6			8			Free
Actuated Green, G (s)	39.2	39.2		7.0	7.0	7.0	3.1	70.8	70.8	6.2	74.4	141.1
Effective Green, g (s)	39.2	39.2		7.0	7.0	7.0	3.1	70.8	70.8	6.2	74.4	141.1
Actuated g/C Ratio	0.28	0.28		0.05	0.05	0.05	0.02	0.50	0.50	0.04	0.53	1.00
Clearance Time (s)	4.6	4.6		4.2	4.2	4.2	3.7	4.9	4.9	4.2	4.9	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	953	478		85	88	80	39	1775	786	79	1884	1583
v/s Ratio Prot	c0.30	0.01		0.01	0.01		0.01	c0.56		0.03	0.51	
v/s Ratio Perm						0.00			0.00			c0.49
v/c Ratio	1.07	0.05		0.21	0.20	0.03	0.36	1.12	0.01	0.71	0.96	0.49
Uniform Delay, d1	50.9	37.3		64.4	64.4	63.8	68.0	35.1	17.6	66.6	31.9	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	51.0	0.1		2.1	2.0	0.3	5.6	61.5	0.0	25.1	12.9	1.1
Delay (s)	101.9	37.4		66.5	66.4	64.1	73.6	96.7	17.6	91.7	44.8	1.1
Level of Service	F	D		E	E	E	E	F	B	F	D	A
Approach Delay (s)		99.7			65.1			95.9			33.0	
Approach LOS		F			E			F			C	

Intersection Summary

HCM 2000 Control Delay 67.5
HCM 2000 Volume to Capacity ratio 1.07
Actuated Cycle Length (s) 141.1
Intersection Capacity Utilization 98.8%
Analysis Period (min) 15
c Critical Lane Group

Synchro 8 Report

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Appendix M

Project Alternative Scenarios Road Segment LOS Calculations

Arterial Level of Service

Existing AM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	28.0	43.6	0.12	9.5	D
Total		IV		47.9	31.2	79.1	0.38	17.5	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.6	22.7	0.12	18.3	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.2	42.5	0.27	22.9	B
Total		IV		51.4	13.8	65.2	0.39	21.3	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	6.6	31.6	0.11	12.9	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	1.3	12.3	0.04	12.2	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.7	37.8	0.17	16.1	C
Total				132.2	39.5	171.7	0.76	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.2	32.3	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	4.6	15.6	0.04	9.6	D
13	From Crossroads Blvd to SR 1	IV	25	25.0	30.8	55.8	0.11	7.3	E
5	From SR 1 to Atherton Dr	IV	25	79.2	0.0	79.2	0.43	19.6	B
Total				145.3	37.6	182.9	0.77	15.1	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Existing + Project Alt 1 AM

Existing + Project Alt 1 AM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	28.0	43.6	0.12	9.5	D	28.0	43.6	0.12	9.5	D
Total		IV		47.9	31.2	79.1	0.38	17.5	C	31.2	79.1	0.38	17.5	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.6	22.7	0.12	18.3	C	3.6	22.7	0.12	18.3	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.2	42.5	0.27	22.9	B	10.2	42.5	0.27	22.9	B
Total		IV		51.4	13.8	65.2	0.39	21.3	B	13.8	65.2	0.39	21.3	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.8	89.9	0.43	17.3	C	22.9	89.0	0.43	17.5	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	6.7	31.7	0.11	12.9	D	6.6	31.6	0.11	12.9	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	1.3	12.3	0.04	12.2	D	1.3	12.3	0.04	12.2	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.7	37.8	0.17	16.1	C	7.7	37.8	0.17	16.1	C
Total				132.2	39.5	171.7	0.76	15.8	C	38.5	170.7	0.76	15.9	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.2	32.3	0.18	20.3	B	2.2	32.3	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	4.6	15.6	0.04	9.6	D	4.6	15.6	0.04	9.6	D
13	From Crossroads Blvd to SR 1	IV	25	25.0	30.8	55.8	0.11	7.3	E	29.4	54.4	0.11	7.5	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				132.2	37.6	169.8	0.77	16.3	C	36.2	168.4	0.77	16.4	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Existing PM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.6	38.9	0.27	24.9	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	30.9	46.5	0.12	8.9	E
Total		IV		47.9	37.5	85.4	0.38	16.2	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	5.7	24.8	0.12	16.8	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.7	43.0	0.27	22.6	B
Total		IV		51.4	16.4	67.8	0.39	20.5	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.7	89.8	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	9.9	34.9	0.11	11.7	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	2.6	13.6	0.04	11.0	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.1	37.7	0.18	17.1	C
Total				131.7	44.3	176.0	0.77	15.7	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.3	32.9	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	7.0	18.0	0.04	8.3	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.5	56.5	0.11	7.2	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				131.7	41.8	173.5	0.77	15.9	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Existing + Project Alt 1 PM

Existing + Project Alt 1 PM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.6	38.9	0.27	24.9	B	6.6	38.9	0.27	24.9	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	31.0	46.6	0.12	8.9	E	31.0	46.6	0.12	8.9	E
Total		IV		47.9	37.6	85.5	0.38	16.2	C	37.6	85.5	0.38	16.2	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	5.7	24.8	0.12	16.8	C	5.7	24.8	0.12	16.8	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.7	43.0	0.27	22.6	B	10.7	43.0	0.27	22.6	B
Total		IV		51.4	16.4	67.8	0.39	20.5	B	16.4	67.8	0.39	20.5	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.7	89.8	0.43	17.3	C	21.9	88.0	0.43	17.7	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	10.0	35.0	0.11	11.7	D	10.0	35.0	0.11	11.7	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	2.6	13.6	0.04	11.0	D	2.6	13.6	0.04	11.0	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.1	37.7	0.18	17.1	C	8.1	37.7	0.18	17.1	C
Total				131.7	44.4	176.1	0.77	15.7	C	42.6	174.3	0.77	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.3	32.9	0.18	19.6	B	3.3	32.9	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	7.0	18.0	0.04	8.3	E	7.0	18.0	0.04	8.3	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.6	56.6	0.11	7.2	E	28.7	53.7	0.11	7.6	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				131.7	41.9	173.6	0.77	15.9	C	39.0	170.7	0.77	16.2	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Background AM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	29.5	45.1	0.12	9.2	D
Total		IV		47.9	32.7	80.6	0.38	17.2	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.7	22.8	0.12	18.2	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.4	42.7	0.27	22.8	B
Total		IV		51.4	14.1	65.5	0.39	21.2	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	7.4	32.4	0.11	12.6	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	1.4	12.4	0.04	12.1	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.8	37.9	0.17	16.0	C
Total				132.2	40.5	172.7	0.76	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.2	32.3	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	4.6	15.6	0.04	9.6	D
13	From Crossroads Blvd to SR 1	IV	25	25.0	30.8	55.8	0.11	7.3	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				132.2	37.6	169.8	0.77	16.3	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Background + Project Alt 1 AM

Background + Project Alt 1 AM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	29.5	45.1	0.12	9.2	D	29.5	45.1	0.12	9.2	D
Total		IV		47.9	32.7	80.6	0.38	17.2	C	32.7	80.6	0.38	17.2	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.8	22.9	0.12	18.2	C	3.8	22.9	0.12	18.2	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.4	42.7	0.27	22.8	B	10.4	42.7	0.27	22.8	B
Total		IV		51.4	14.2	65.6	0.39	21.2	B	14.2	65.6	0.39	21.2	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C	23.7	89.8	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	7.4	32.4	0.11	12.6	D	7.4	32.4	0.11	12.6	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	1.4	12.4	0.04	12.1	D	1.4	12.4	0.04	12.1	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.8	37.9	0.17	16.0	C	7.8	37.9	0.17	16.0	C
Total				132.2	40.5	172.7	0.76	15.8	C	40.3	172.5	0.76	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.2	32.3	0.18	20.3	B	2.2	32.3	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	4.6	15.6	0.04	9.6	D	4.6	15.6	0.04	9.6	D
13	From Crossroads Blvd to SR 1	IV	25	25.0	30.8	55.8	0.11	7.3	E	29.5	54.5	0.11	7.5	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				132.2	37.6	169.8	0.77	16.3	C	36.3	168.5	0.77	16.4	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Background PM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.7	39.0	0.27	24.8	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	33.0	48.6	0.12	8.6	E
Total		IV		47.9	39.7	87.6	0.38	15.8	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	5.8	24.9	0.12	16.7	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.9	43.2	0.27	22.5	B
Total		IV		51.4	16.7	68.1	0.39	20.4	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	10.1	35.1	0.11	11.7	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	2.7	13.7	0.04	10.9	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.1	37.7	0.18	17.1	C
Total				131.7	44.8	176.5	0.77	15.6	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.3	32.9	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	6.9	17.9	0.04	8.4	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.7	56.7	0.11	7.2	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				131.7	41.9	173.6	0.77	15.9	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Background + Project Alt 1 PM

Background + Project Alt 1 PM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.7	39.0	0.27	24.8	B	6.7	39.0	0.27	24.8	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	33.1	48.7	0.12	8.5	E	33.1	48.7	0.12	8.5	E
Total		IV		47.9	39.8	87.7	0.38	15.8	C	39.8	87.7	0.38	15.8	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	5.8	24.9	0.12	16.7	C	5.8	24.9	0.12	16.7	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.9	43.2	0.27	22.5	B	10.9	43.2	0.27	22.5	B
Total		IV		51.4	16.7	68.1	0.39	20.4	B	16.7	68.1	0.39	20.4	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C	22.0	88.1	0.43	17.6	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	10.2	35.2	0.11	11.6	D	10.2	35.2	0.11	11.6	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	2.7	13.7	0.04	10.9	D	2.7	13.7	0.04	10.9	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.1	37.7	0.18	17.1	C	8.1	37.7	0.18	17.1	C
Total				131.7	44.9	176.6	0.77	15.6	C	43.0	174.7	0.77	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.3	32.9	0.18	19.6	B	3.3	32.9	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	6.9	17.9	0.04	8.4	E	6.9	17.9	0.04	8.4	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.7	56.7	0.11	7.2	E	28.8	53.8	0.11	7.6	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				131.7	41.9	173.6	0.77	15.9	C	39.0	170.7	0.77	16.2	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Cumulative AM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.3	35.6	0.27	27.2	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	29.9	45.5	0.12	9.1	D
Total		IV		47.9	33.2	81.1	0.38	17.1	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.9	23.0	0.12	18.1	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.9	43.2	0.27	22.5	B
Total		IV		51.4	14.8	66.2	0.39	21.0	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	24.7	90.8	0.43	17.1	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	12.5	37.5	0.11	10.9	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	5.9	16.9	0.04	8.9	E
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.8	37.9	0.17	16.0	C
Total				132.2	50.9	183.1	0.76	14.9	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.3	32.4	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	11.1	22.1	0.04	6.8	F
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.7	56.7	0.11	7.2	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				132.2	45.1	177.3	0.77	15.6	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Cumulative Plus Project Alt 1 AM

Cumulative Plus Project Alt 1 AM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.3	35.6	0.27	27.2	A	3.3	35.6	0.27	27.2	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	29.9	45.5	0.12	9.1	D	29.9	45.5	0.12	9.1	D
Total		IV		47.9	33.2	81.1	0.38	17.1	C	33.2	81.1	0.38	17.1	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.9	23.0	0.12	18.1	C	3.9	23.0	0.12	18.1	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.9	43.2	0.27	22.5	B	10.9	43.2	0.27	22.5	B
Total		IV		51.4	14.8	66.2	0.39	21.0	B	14.8	66.2	0.39	21.0	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	24.7	90.8	0.43	17.1	C	23.9	90.0	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	12.5	37.5	0.11	10.9	D	11.2	36.2	0.11	11.3	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	5.9	16.9	0.04	8.9	E	5.9	16.9	0.04	8.9	E
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.8	37.9	0.17	16.0	C	7.8	37.9	0.17	16.0	C
Total				132.2	50.9	183.1	0.76	14.9	C	48.8	181.0	0.76	15.0	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.3	32.4	0.18	20.3	B	2.3	32.4	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	11.2	22.2	0.04	6.8	F	10.0	21.0	0.04	7.1	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.7	56.7	0.11	7.2	E	30.7	55.7	0.11	7.3	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				132.2	45.2	177.4	0.77	15.6	C	43.0	175.2	0.77	15.8	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Cumulative PM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	7.0	39.3	0.27	24.6	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	34.7	50.3	0.12	8.3	E
Total		IV		47.9	41.7	89.6	0.38	15.4	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	6.2	25.3	0.12	16.4	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	11.7	44.0	0.27	22.1	B
Total		IV		51.4	17.9	69.3	0.39	20.0	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	25.1	91.2	0.43	17.0	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	19.5	44.5	0.11	9.2	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	8.2	19.2	0.04	7.8	E
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.3	37.9	0.18	17.0	C
Total				131.7	61.1	192.8	0.77	14.3	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.4	33.0	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	20.3	31.3	0.04	4.8	F
13	From Crossroads Blvd to SR 1	IV	25	25.0	34.3	59.3	0.11	6.9	F
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				131.7	58.0	189.7	0.77	14.6	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Cumulative Plus Project Alt 1 PM

Cumulative Plus Project Alt 1 PM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.9	39.2	0.27	24.7	B	6.9	39.2	0.27	24.7	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	34.9	50.5	0.12	8.2	E	34.9	50.5	0.12	8.2	E
Total		IV		47.9	41.8	89.7	0.38	15.4	C	41.8	89.7	0.38	15.4	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	6.1	25.2	0.12	16.5	C	6.1	25.2	0.12	16.5	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	11.7	44.0	0.27	22.1	B	11.7	44.0	0.27	22.1	B
Total		IV		51.4	17.8	69.2	0.39	20.1	B	17.8	69.2	0.39	20.1	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	25.1	91.2	0.43	17.0	C	24.1	90.2	0.43	17.2	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	19.6	44.6	0.11	9.2	D	18.7	43.7	0.11	9.4	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	8.2	19.2	0.04	7.8	E	8.2	19.2	0.04	7.8	E
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.3	37.9	0.18	17.0	C	8.3	37.9	0.18	17.0	C
Total				131.7	61.2	192.9	0.77	14.3	C	59.3	191.0	0.77	14.4	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.4	33.0	0.18	19.6	B	3.4	33.0	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	20.3	31.3	0.04	4.8	F	19.5	30.5	0.04	4.9	F
13	From Crossroads Blvd to SR 1	IV	25	25.0	34.4	59.4	0.11	6.9	F	32.4	57.4	0.11	7.1	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				131.7	58.1	189.8	0.77	14.6	C	55.3	187.0	0.77	14.8	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Existing AM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	28.0	43.6	0.12	9.5	D
Total		IV		47.9	31.2	79.1	0.38	17.5	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.6	22.7	0.12	18.3	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.2	42.5	0.27	22.9	B
Total		IV		51.4	13.8	65.2	0.39	21.3	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	6.6	31.6	0.11	12.9	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	1.3	12.3	0.04	12.2	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.7	37.8	0.17	16.1	C
Total				132.2	39.5	171.7	0.76	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.2	32.3	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	4.6	15.6	0.04	9.6	D
13	From Crossroads Blvd to SR 1	IV	25	25.0	30.8	55.8	0.11	7.3	E
5	From SR 1 to Atherton Dr	IV	25	79.2	0.0	79.2	0.43	19.6	B
Total				145.3	37.6	182.9	0.77	15.1	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Existing + Project Alt 2 AM

Existing + Project Alt 2 AM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	28.0	43.6	0.12	9.5	D	28.0	43.6	0.12	9.5	D
Total		IV		47.9	31.2	79.1	0.38	17.5	C	31.2	79.1	0.38	17.5	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.6	22.7	0.12	18.3	C	3.6	22.7	0.12	18.3	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.2	42.5	0.27	22.9	B	10.2	42.5	0.27	22.9	B
Total		IV		51.4	13.8	65.2	0.39	21.3	B	13.8	65.2	0.39	21.3	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C	22.9	89.0	0.43	17.5	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	6.6	31.6	0.11	12.9	D	6.6	31.6	0.11	12.9	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	1.3	12.3	0.04	12.2	D	1.3	12.3	0.04	12.2	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.7	37.8	0.17	16.1	C	7.7	37.8	0.17	16.1	C
Total				132.2	39.5	171.7	0.76	15.8	C	38.5	170.7	0.76	15.9	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.2	32.3	0.18	20.3	B	2.2	32.3	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	4.6	15.6	0.04	9.6	D	4.6	15.6	0.04	9.6	D
13	From Crossroads Blvd to SR 1	IV	25	25.0	30.8	55.8	0.11	7.3	E	29.4	54.4	0.11	7.5	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				132.2	37.6	169.8	0.77	16.3	C	36.2	168.4	0.77	16.4	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Existing PM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.6	38.9	0.27	24.9	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	30.9	46.5	0.12	8.9	E
Total		IV		47.9	37.5	85.4	0.38	16.2	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	5.7	24.8	0.12	16.8	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.7	43.0	0.27	22.6	B
Total		IV		51.4	16.4	67.8	0.39	20.5	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.7	89.8	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	9.9	34.9	0.11	11.7	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	2.6	13.6	0.04	11.0	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.1	37.7	0.18	17.1	C
Total				131.7	44.3	176.0	0.77	15.7	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.3	32.9	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	7.0	18.0	0.04	8.3	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.5	56.5	0.11	7.2	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				131.7	41.8	173.5	0.77	15.9	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Existing + Project Alt 2 PM

Existing + Project Alt 2 PM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.6	38.9	0.27	24.9	B	6.6	38.9	0.27	24.9	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	31.0	46.6	0.12	8.9	E	31.0	46.6	0.12	8.9	E
Total		IV		47.9	37.6	85.5	0.38	16.2	C	37.6	85.5	0.38	16.2	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	5.7	24.8	0.12	16.8	C	5.7	24.8	0.12	16.8	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.7	43.0	0.27	22.6	B	10.7	43.0	0.27	22.6	B
Total		IV		51.4	16.4	67.8	0.39	20.5	B	16.4	67.8	0.39	20.5	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.7	89.8	0.43	17.3	C	21.9	88.0	0.43	17.7	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	10.0	35.0	0.11	11.7	D	10.0	35.0	0.11	11.7	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	2.6	13.6	0.04	11.0	D	2.6	13.6	0.04	11.0	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.1	37.7	0.18	17.1	C	8.1	37.7	0.18	17.1	C
Total				131.7	44.4	176.1	0.77	15.7	C	42.6	174.3	0.77	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.3	32.9	0.18	19.6	B	3.3	32.9	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	7.0	18.0	0.04	8.3	E	7.0	18.0	0.04	8.3	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.6	56.6	0.11	7.2	E	28.7	53.7	0.11	7.6	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				131.7	41.9	173.6	0.77	15.9	C	39.0	170.7	0.77	16.2	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Background AM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	29.5	45.1	0.12	9.2	D
Total		IV		47.9	32.7	80.6	0.38	17.2	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.7	22.8	0.12	18.2	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.4	42.7	0.27	22.8	B
Total		IV		51.4	14.1	65.5	0.39	21.2	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	7.4	32.4	0.11	12.6	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	1.4	12.4	0.04	12.1	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.8	37.9	0.17	16.0	C
Total				132.2	40.5	172.7	0.76	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.2	32.3	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	4.6	15.6	0.04	9.6	D
13	From Crossroads Blvd to SR 1	IV	25	25.0	30.8	55.8	0.11	7.3	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				132.2	37.6	169.8	0.77	16.3	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Background + Project Alt 2 AM

Background + Project Alt 2 AM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.2	35.5	0.27	27.3	A	3.2	35.5	0.27	27.3	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	29.5	45.1	0.12	9.2	D	29.5	45.1	0.12	9.2	D
Total		IV		47.9	32.7	80.6	0.38	17.2	C	32.7	80.6	0.38	17.2	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.8	22.9	0.12	18.2	C	3.8	22.9	0.12	18.2	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.4	42.7	0.27	22.8	B	10.4	42.7	0.27	22.8	B
Total		IV		51.4	14.2	65.6	0.39	21.2	B	14.2	65.6	0.39	21.2	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C	23.7	89.8	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	7.4	32.4	0.11	12.6	D	7.4	32.4	0.11	12.6	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	1.4	12.4	0.04	12.1	D	1.4	12.4	0.04	12.1	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.8	37.9	0.17	16.0	C	7.8	37.9	0.17	16.0	C
Total				132.2	40.5	172.7	0.76	15.8	C	40.3	172.5	0.76	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.2	32.3	0.18	20.3	B	2.2	32.3	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	4.6	15.6	0.04	9.6	D	4.6	15.6	0.04	9.6	D
13	From Crossroads Blvd to SR 1	IV	25	25.0	30.8	55.8	0.11	7.3	E	29.5	54.5	0.11	7.5	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				132.2	37.6	169.8	0.77	16.3	C	36.3	168.5	0.77	16.4	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Background PM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.7	39.0	0.27	24.8	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	33.0	48.6	0.12	8.6	E
Total		IV		47.9	39.7	87.6	0.38	15.8	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	5.8	24.9	0.12	16.7	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.9	43.2	0.27	22.5	B
Total		IV		51.4	16.7	68.1	0.39	20.4	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	10.1	35.1	0.11	11.7	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	2.7	13.7	0.04	10.9	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.1	37.7	0.18	17.1	C
Total				131.7	44.8	176.5	0.77	15.6	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.3	32.9	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	6.9	17.9	0.04	8.4	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.7	56.7	0.11	7.2	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				131.7	41.9	173.6	0.77	15.9	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Background + Project Alt 2 PM

Background + Project Alt 2 PM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.7	39.0	0.27	24.8	B	6.7	39.0	0.27	24.8	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	33.1	48.7	0.12	8.5	E	33.1	48.7	0.12	8.5	E
Total		IV		47.9	39.8	87.7	0.38	15.8	C	39.8	87.7	0.38	15.8	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	5.8	24.9	0.12	16.7	C	5.8	24.9	0.12	16.7	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.9	43.2	0.27	22.5	B	10.9	43.2	0.27	22.5	B
Total		IV		51.4	16.7	68.1	0.39	20.4	B	16.7	68.1	0.39	20.4	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	23.9	90.0	0.43	17.3	C	22.0	88.1	0.43	17.6	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	10.2	35.2	0.11	11.6	D	10.2	35.2	0.11	11.6	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	2.7	13.7	0.04	10.9	D	2.7	13.7	0.04	10.9	D
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.1	37.7	0.18	17.1	C	8.1	37.7	0.18	17.1	C
Total				131.7	44.9	176.6	0.77	15.6	C	43.0	174.7	0.77	15.8	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.3	32.9	0.18	19.6	B	3.3	32.9	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	7.0	18.0	0.04	8.3	E	7.0	18.0	0.04	8.3	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.7	56.7	0.11	7.2	E	28.8	53.8	0.11	7.6	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				131.7	42.0	173.7	0.77	15.9	C	39.1	170.8	0.77	16.1	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Cumulative AM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.3	35.6	0.27	27.2	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	29.9	45.5	0.12	9.1	D
Total		IV		47.9	33.2	81.1	0.38	17.1	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.9	23.0	0.12	18.1	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.9	43.2	0.27	22.5	B
Total		IV		51.4	14.8	66.2	0.39	21.0	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	24.7	90.8	0.43	17.1	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	12.5	37.5	0.11	10.9	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	5.9	16.9	0.04	8.9	E
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.8	37.9	0.17	16.0	C
Total				132.2	50.9	183.1	0.76	14.9	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.3	32.4	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	11.1	22.1	0.04	6.8	F
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.7	56.7	0.11	7.2	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				132.2	45.1	177.3	0.77	15.6	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Cumulative Plus Project Alt 2 AM

Cumulative Plus Project Alt 2 AM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	3.3	35.6	0.27	27.2	A	3.3	35.6	0.27	27.2	A
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	29.9	45.5	0.12	9.1	D	29.9	45.5	0.12	9.1	D
Total		IV		47.9	33.2	81.1	0.38	17.1	C	33.2	81.1	0.38	17.1	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	3.9	23.0	0.12	18.1	C	3.9	23.0	0.12	18.1	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	10.9	43.2	0.27	22.5	B	10.9	43.2	0.27	22.5	B
Total		IV		51.4	14.8	66.2	0.39	21.0	B	14.8	66.2	0.39	21.0	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	24.7	90.8	0.43	17.1	C	23.9	90.0	0.43	17.3	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	12.5	37.5	0.11	10.9	D	11.2	36.2	0.11	11.3	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	5.9	16.9	0.04	8.9	E	5.9	16.9	0.04	8.9	E
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	30.1	7.8	37.9	0.17	16.0	C	7.8	37.9	0.17	16.0	C
Total				132.2	50.9	183.1	0.76	14.9	C	48.8	181.0	0.76	15.0	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	30.1	2.3	32.4	0.18	20.3	B	2.3	32.4	0.18	20.3	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	11.2	22.2	0.04	6.8	F	10.0	21.0	0.04	7.1	E
13	From Crossroads Blvd to SR 1	IV	25	25.0	31.7	56.7	0.11	7.2	E	30.7	55.7	0.11	7.3	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				132.2	45.2	177.4	0.77	15.6	C	43.0	175.2	0.77	15.8	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.

Arterial Level of Service

Cumulative PM

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	7.0	39.3	0.27	24.6	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	34.7	50.3	0.12	8.3	E
Total		IV		47.9	41.7	89.6	0.38	15.4	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	6.2	25.3	0.12	16.4	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	11.7	44.0	0.27	22.1	B
Total		IV		51.4	17.9	69.3	0.39	20.0	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	25.1	91.2	0.43	17.0	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	19.5	44.5	0.11	9.2	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	8.2	19.2	0.04	7.8	E
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.3	37.9	0.18	17.0	C
Total				131.7	61.1	192.8	0.77	14.3	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.4	33.0	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	20.3	31.3	0.04	4.8	F
13	From Crossroads Blvd to SR 1	IV	25	25.0	34.3	59.3	0.11	6.9	F
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B
Total				131.7	58.0	189.7	0.77	14.6	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

Arterial Level of Service

Cumulative Plus Project Alt 2 PM

Cumulative Plus Project Alt 2 PM-Miti

Seg # Arterial Level of Service: NB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
12	From Rio Rd to Shopping Center Dwy	IV	35	32.3	6.9	39.2	0.27	24.7	B	6.9	39.2	0.27	24.7	B
11	From Shopping Center Dwy to Carmel Valley Rd	IV	35	15.6	34.9	50.5	0.12	8.2	E	34.9	50.5	0.12	8.2	E
Total		IV		47.9	41.8	89.7	0.38	15.4	C	41.8	89.7	0.38	15.4	C

Arterial Level of Service: SB Carmel Rancho Blvd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
11	From Carmel Valley Rd to Shopping Center Dwy	IV	35	19.1	6.1	25.2	0.12	16.5	C	6.1	25.2	0.12	16.5	C
12	From Shopping Center Dwy to Rio Rd	IV	35	32.3	11.7	44.0	0.27	22.1	B	11.7	44.0	0.27	22.1	B
Total		IV		51.4	17.8	69.2	0.39	20.1	B	17.8	69.2	0.39	20.1	B

Arterial Level of Service: EB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
5	From Atherton Dr to SR 1	IV	25	66.1	25.1	91.2	0.43	17.0	C	24.1	90.2	0.43	17.2	C
13	From SR 1 to Crossroads Blvd	IV	25	25.0	19.5	44.5	0.11	9.2	D	18.7	43.7	0.11	9.4	D
14	From Crossroads Blvd to Carmel Center Pl	IV	25	11.0	8.2	19.2	0.04	7.8	E	8.2	19.2	0.04	7.8	E
15	From Carmel Center Pl to Carmel Rancho Blvd	IV	25	29.6	8.3	37.9	0.18	17.0	C	8.3	37.9	0.18	17.0	C
Total				131.7	61.1	192.8	0.77	14.3	C	59.3	191.0	0.77	14.4	C

Arterial Level of Service: WB Rio Rd

		Arterial Class	Flow Speed	Running Time	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS	Control Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
15	From Carmel Rancho Blvd to Carmel Center Pl	IV	25	29.6	3.4	33.0	0.18	19.6	B	3.4	33.0	0.18	19.6	B
14	From Carmel Center Pl to Crossroads Blvd	IV	25	11.0	20.3	31.3	0.04	4.8	F	19.5	30.5	0.04	4.9	F
13	From Crossroads Blvd to SR 1	IV	25	25.0	34.4	59.4	0.11	6.9	F	32.4	57.4	0.11	7.1	E
5	From SR 1 to Atherton Dr	IV	25	66.1	0.0	66.1	0.43	23.5	B	0.0	66.1	0.43	23.5	B
Total				131.7	58.1	189.8	0.77	14.6	C	55.3	187.0	0.77	14.8	C

Notes:

1. Level of service highlighted in red indicates LOS exceeds LOS standard.

2. Arterial speed highlighted in yellow indicates project impact.