CALENDAR FOR THE BOARD OF SUPERVISORS
CONTRA COSTA COUNTY
AND FOR SPECIAL DISTRICTS, AGENCIES, AND AUTHORITIES GOVERNED BY THE BOARD
BOARD CHAMBERS ROOM 107, ADMINISTRATION BUILDING, 651 PINE STREET
MARTINEZ, CALIFORNIA 94553-1229

FEDERAL D. GLOVER, *CHAIR,* 5TH DISTRICT
KAREN MITCHOFF, *VICE CHAIR,* 4TH DISTRICT
JOHN GIOIA, 1ST DISTRICT
CANDACE ANDERSEN, 2ND DISTRICT
DIANE BURGIS, 3RD DISTRICT

DAVID J. TWA, CLERK OF THE BOARD AND COUNTY ADMINISTRATOR, (925) 335-1900

PERSONS WHO WISH TO ADDRESS THE BOARD DURING PUBLIC COMMENT OR WITH RESPECT TO AN ITEM THAT IS ON THE AGENDA, MAY BE LIMITED TO TWO (2) MINUTES.
A LUNCH BREAK MAY BE CALLED AT THE DISCRETION OF THE BOARD CHAIR.

The Board of Supervisors respects your time, and every attempt is made to accurately estimate when an item may be heard by the Board. All times specified for items on the Board of Supervisors agenda are approximate. Items may be heard later than indicated depending on the business of the day. Your patience is appreciated.

ANNOTATED AGENDA & MINUTES
May 1, 2018

9:00 A.M. Convene and announce adjournment to closed session in Room 101.
Closed Session
A. CONFERENCE WITH LABOR NEGOTIATORS

1. Agency Negotiators: David Twa and Richard Bolanos.

Employee Organizations: Public Employees Union, Local 1; AFSCME Locals 512 and 2700; California Nurses Assn.; SEIU Locals 1021 and 2015; District Attorney Investigators' Assn.; Deputy Sheriffs Assn.; United Prof. Firefighters I.A.F.F., Local 1230; Physicians' & Dentists' Org. of Contra Costa; Western Council of Engineers; United Chief Officers Assn.; Contra Costa County Defenders Assn.; Contra Costa County Deputy District Attorneys' Assn.; Prof. & Tech. Engineers IFPTE, Local 21; and Teamsters Local 856.

2. Agency Negotiators: David Twa.

Unrepresented Employees: All unrepresented employees.

B. CONFERENCE WITH LEGAL COUNSEL--EXISTING LITIGATION (Gov. Code, § 54956.9(d)(1))

1. *Brian Cuevas, et al. v. Contra Costa County Health Services, et al.*, Contra Costa County Superior Court Case No. C09-01786

C. CONFERENCE WITH LEGAL COUNSEL--ANTICIPATED LITIGATION
Initiation of litigation pursuant to Gov. Code, § 54956.9(d)(4): One potential case

9:30 A.M. Call to order and opening ceremonies.

Inspirational Thought- *"In three words I can sum up everything I've learned about life: it goes on."* ~ Robert Frost

Present: John Gioia, District I Supervisor; Candace Andersen, District II Supervisor; Diane Burgis, District III Supervisor; Karen Mitchoff, District IV Supervisor; Federal D. Glover, District V Supervisor

Staff Present: David Twa, County Administrator
Sharon Anderson, County Counsel

By unanimous vote the Board of Supervisors authorized the initiation of litigation against the manufacturers and distributers of prescription opioid drugs for their role in the opioid epidemic. The intended lawsuit will include a cost recovery action to reimburse the County for taxpayer funds that already have been spent responding to the epidemic, as well as the costs of continuing the fight, including equitable relief to help alleviate opioid use dependence and fund local action to counteract this crisis.

CONSIDER CONSENT ITEMS (Items listed as C.1 through C.57 on the following agenda) – Items are subject to removal from Consent Calendar by request of any Supervisor or on request for discussion by a member of the public. **Items removed from the Consent Calendar will be considered with the Discussion Items.**

PRESENTATIONS (5 Minutes Each)

PRESENTATION recognizing the month of May 2018 as "Community Action Month" in Contra Costa County. (Camilla Rand, Community Services Bureau Director)

PRESENTATION recognizing May 2018 as Older Americans Month in support of Intergenerational Network of All-Age Friendly Cities and Communities efforts. (Kathy Gallagher, Employment and Human Services Director and Victoria Tolbert, Aging and Adult Bureau Director)

PRESENTATION recognizing Meals on Wheels Diablo Region on its 50th anniversary. (Supervisor Mitchoff)

DISCUSSION ITEMS

D. 1 CONSIDER Consent Items previously removed.

There were no items removed from consent for discussion.

D. 2 PUBLIC COMMENT (2 Minutes/Speaker)

Ron Reynolds, spoke on difficulties with Rodeo Auto Wreckers, an employee of which hit his vehicle, and an unpleasant and lingering order and fumes emanating from the business;

Paul Burgarino, Contra Costa Elections Division, Clerk-Recorder, the candidate roundtable conversations for the upcoming June elections are now available on the website for viewing at cocovote.us\election.preview. Additionally, a candidate workshop will be held on May 12, 2018 from 9:00 a.m. to 12:30 p.m. at the Pacheco Community Center, to review the processes involved in running for public office. Thank you to Supervisor Burgis for volunteering as a moderator.

D.3 HEARING to consider appeal of Planning Commission decision to deny a proposal to merge three lots, defer road improvements, and allow a 13,887-square-foot single family residence in the Alamo Summit subdivision, Alamo area. (Discovery Builders, Inc., Appellant) (Alamo Land Investors, LLC, Owners) (Lashun Cross and Sean Tully, Department of Conservation and Development)

CONTINUED the hearing to June 5, 2018 at 9:30 a.m.

D.4 HEARING to consider adoption of Ordinance No. 2018-06 to regulate farm animal raising and keeping in residential zoning districts and rooster keeping in agricultural zoning districts, and adoption of Ordinance Nos. 2018-11 and 2018-12 to prohibit farm animal raising and keeping in residential zoning districts in Bethel Island, Byron, Discovery Bay, and Knightsen. (Aruna Bhat and Stanley Muraoka, Department of Conservation and Development)

Mike Vigo, Mt. Diablo Beekeepers Association; Paula McCauley, 4-H; Norman Lott, Mt. Diablo Beekeepers Association; Jan pinkerton Spieth, Mt. Diablo Beekeepers Association.
CLOSED the public hearing;
DETERMINED that adoption of Ordinance No. 2018-06, Ordinance No. 2018-11, and Ordinance No. 2018-12 is exempt from the California Environmental Quality Act (CEQA);
ADOPTED Ordinance No. 2018-06, regulating the raising and keeping of farm animals in residential zoning districts and the keeping of roosters in agricultural zoning districts;

ADOPTED Ordinance No. 2018-11, establishing an Urban Farm Animal Exclusion (-UE) Combining District to exclude the raising and keeping of farm animals in specified residential district;
ADOPTED Ordinance No. 2018-12, applying the Urban Farm Animal Exclusion (-UE) Combining District to specified residential districts in Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen; and
DIRECTED the Department of Conservation and Development to file a CEQA Notice of Exemption with the County Clerk.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

D.5 CONSIDER options for Board of Supervisors representation on the Countywide Redevelopment Successor Oversight Board. (Supervisor Mitchoff)

The Board appointed Supervisor Glover to Seat 1 on the Countywide Redevelopment Oversight Board.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

D.6 CONSIDER approving the Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan and authorizing staff to pursue funding opportunities for implementation, as recommended by the Transportation, Water and Infrastructure Committee. (Jamar Stamps, Department of Conservation and Development)

Speakers: Bruce Ohlson, Delta Pedalers Bicycle Club

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

D.7 ACCEPT report regarding media coverage asserting that loads of soil that may not have been adequately screened for radioactivity were trucked from Hunters Point site to multiple different landfills in the state, including Keller Canyon Landfill. (Marilyn Underwood, Health Services Department and John Kopchik, Department of Conservation & Development)

Speakers: Laura Wright, Environmental Affairs Manager, City of Pittsburg; Joe Sbranti, Pittsburg City Manager; Wolfgang Roskey, resident of Pittsburg; Nancy Parent, resident of Pittsburg; Lisa Della Rocca, resident of Pittsburg; Frank Aiello, Citizen United; Luis Arroyo, Citizens United; Jesus Hernandez; Citizens United; A.J. Fardella, Oak Hills Community Group; Russel Row, resident of Pittsburg, Rosa Fallon, resident of Pittsburg.

The following did not wish to speak but left written comments for the Board's consideration (attached): Isvan G. Tolnay, resident of Pittsburg; Rosa Fallon, resident of Pittsburg; Jen Borcic, resident of Pittsburg.

Rick King, General Manager of Keller Canyon Landfill provided a powerpoint presentation (attached).
Dr. Marilyn C. Underwood, Director of Environmental Health, presented an oral report. She said that regulatory agencies have found that a contractor hired by the U.S. Navy to clean up Hunter's Point shipyard in San Francisco misrepresented radiologic sampling data that was taken from soil at the shipyard. To date, these misrepresentations are tied to potentially contaminated soil and material being left on the site instead of being removed. The studies that have so far been published (U.S. Nuclear Regulatory Commission and the Environmental Protection Agency) reveal that data were falsified to allow potentially contaminated soil to remain in place at Hunter's Point shipyard.
Dr. Underwood said that at this point there is no evidence that radiological material was sent to Keller Canyon Landfill. She noted the investigation is ongoing.
Dr. Underwood made the following recommendations: 1) Formally request the Department of the Navy to make itself available for meetings with the community and all stakeholders as soon as possible to provide information on the soil date falsification incident and what further investigation(s) are ongoing; 2) Formally request the Navy to investigate whether the soil data falsification incident affected Keller Canyon Landfill, including whether any contaminated soil was transported from Hunter's Point shipyard to Keller Canyon Landfill; 3) Formally request the Navy to conduct a surface survey of Keller Canyon Landfill to determine if is there is any radiological hazard at the landfill.
Rick King, General Manager of Keller Canyon Landfill, provided the Board with a detailed explanation of how

material was received from the site, the reporting responsibility of the source of the material, and procedures in place to inspect incoming material. He noted that immediately upon hearing of the false data issue, he suspended receipt of any material from Hunter's Point shipyard. He provided a PowerPoint presentation for reference (attached).

Having discussed the matter at length, and receiving public comment, the Board gave the following direction:

1. Implement all the recommendations put forth by Dr. Underwood;

2. Dr. Underwood will return to the Board in 30 days with a written report and any updated information;

3. Staff will seek answers on the notification process from the state and federal agencies to find out why the County, the City of Pittsburg, and Keller Canyon Landfill were not notified of the investigation into the soil data falsification;

4. Staff will examine its notification protocols and work with Keller Canyon landfill to ensure timely communication with the District Supervisor and the Board;

5. Staff will compose letters for the Chair of the Board to sign that will the assistance of state and federal legislative representatives in obtaining swift and appropriate help from the Navy and other applicable agencies with expertise in radiological matters;

6. Staff will seek information from consultant TetraTech regarding the incident;

7. Staff will research what, if any, mechanism is in place to hold the contractor hired by the Navy financially responsible for any third-party investigative and/or testing to be conducted at Keller Canyon Landfill;

8. Staff will provide further information for the Board on the history of alerts from the radiologic sensors located at Keller Canyon Landfill, and how those incidents are documented;

9. Staff will immediately look into the hiring of an expert consultant to assist the County on next steps and appropriate actions to be taken going forward with respect to this incident;

10. Staff will prepare a report addressing the effects of designating the City of Pittsburg as the Local Enforcement Agency (LEA) for the Keller Canyon Landfill site.

Dr. Underwood and John Kopchik will be in attendance at an emergency meeting of the Bay Point Municipal Advisory Committee at 7 p.m. this evening. Supervisor Glover said more community meetings will be arranged and the public notified as soon as is possible.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

D. 8 CONSIDER reports of Board members.

There were no items reported today.

Closed Session

ADJOURN

Adjourned today's meeting in memory of
Kenneth Harry Hofmann

CONSENT ITEMS

Road and Transportation

C. 1 APPROVE the Camino Tassajara Bike Lane Gap Closure Project and take related actions under the California Environmental Quality Act, and AUTHORIZE the Public Works Director, or designee, to advertise the Project. San Ramon Valley area. (40% Tri-Valley Transportation Council Funds, 30% Measure J Funds, and 30% South County Area of Benefit Funds)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 2 APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with Dynamic Dzyne Associates, Inc., dba Substrate, Inc., in the amount of $600,000 for construction management services for the Marsh Creek Road Bridge Replacement Project, for the period May 1, 2018 through June 30, 2019, Clayton area. (11% Local Road Funds and 89% Federal Highway Bridge Program)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 3 APPROVE and AUTHORIZE the Public Works Director, or designee, to execute, on behalf of the County, a right of way contract and easement agreement with Mt. Diablo Unified School District, to acquire easements in district property located at 425 Castle Rock Road, Walnut Creek (North Gate High School), in connection with the Pedestrian Crossing Enhancement Project, as recommended by the Public Works Director, Walnut Creek area. (28% Transportation Development Act Grant; 72% Local Road Funds.)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Engineering Services

C. 4 ADOPT Resolution No. 2018/153 approving and authorizing the Public Works Director, or designee, to fully close a portion of Willow Pass Road between Marin Avenue and Manor Drive, on May 28, 2018, from 10:00 AM through 11:00 AM, for the purpose of Bay Point Spring Derby Parade, Bay Point area. (No fiscal impact)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Claims, Collections & Litigation

C. 5 DENY claims filed by Ernest F. Broussal Jr., Tommie Clayton, Deandre Antoine Lewis, Doug MacMaster, and Precision Risk Management Inc., DENY late claims filed by Wali Jahangiri (2), Nadieh Kakar, and Mario Torres.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Honors & Proclamations

C. 6 ADOPT Resolution No. 2018/147 recognizing the month of May 2018 as "Community Action Month" in Contra Costa County, as recommended by the Employment and Human Services Director.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 7 ADOPT Resolution No. 2018/164 recognizing May 2018 as Older Americans Month in support of Intergenerational Network of All-Age Friendly Cities and Communities efforts, as recommended by the Employment and Human Services Director.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 8 ADOPT Resolution No. 2018/169 honoring Meals on Wheels Diablo Region on its 50th anniversary, as recommended by Supervisor Mitchoff.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Ordinances

C. 9 ADOPT Ordinance No. 2018-13 to require the humane treatment of roosters, as recommended by the Animal Services Director.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Appointments & Resignations

C. 10 APPOINT Walter Fields to the District V Representative Alternate seat on the Contra Costa Fire Protection District Advisory Commission, as recommended by Supervisor Glover.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 11 APPROVE the medical staff appointments and reappointments, department changes, additional privileges, advancements, voluntary resignations, and changes to the anesthesiology privileges, as recommended by the Medical Staff Executive Committee and the Health Services Director.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 12 ACCEPT resignation of Lanita Mims, DECLARE a vacancy in the District 3-A seat on the Alcohol and Other Drugs Advisory Board, and DIRECT the Clerk of the Board to post the vacancy, as recommended by Supervisor Burgis.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 13 ADOPT Resolution No. 2018/170 to reappoint Supervisor Candace Andersen and Supervisor Federal D. Glover as the Board of Supervisors' representatives to the Contra Costa Local Agency Formation Commission and to update the Master List of Board Member appointments for 2018, as recommended by Supervisor Mitchoff.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Intergovernmental Relations

C. 14 ADOPT a position of "Support" on the Water Supply and Water Quality Act of 2018, a citizens initiative water bond that may appear on the November 2018 statewide California ballot, as recommended by the Legislation Committee.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Personnel Actions

C. 15 ADOPT Position Adjustment Resolution No. 22265 to abolish the Deputy Director of Animal Services-Exempt (unrepresented) classification and cancel one vacant position in the Animal Services Department. (No fiscal impact)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 16 ADOPT Position Adjustment Resolution No. 22275 to add one Senior Health Education Specialist position (represented) and cancel one vacant Health Education Specialist position (represented) in the Health Services Department. (50% Family, Maternal and Child Health Program, 50% Proposition 56 - Children's Oral Health)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 17 ADOPT Position Adjustment Resolution No. 22276 to add one full-time Deputy County Counsel Advanced-Exempt (unrepresented) position and cancel one full-time Deputy County Counsel Advanced (unrepresented) vacant position in the Office of the County Counsel. (No fiscal impact)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Leases

C. 18 APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a lease with Cove Investments, LLC, for a term of five years for 1,340 square feet of office space for the Health Services Department - CORE Program at 1160 Brickyard Cove Road, Suite 111, Richmond, at an initial annual rent of $37,788 for the first year with annual increases thereafter, with two two-year renewal terms, under the terms and conditions set forth in the lease. (100% Mental Health Services Act Funds)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Grants & Contracts

APPROVE and AUTHORIZE execution of agreements between the County and the following agencies for receipt of fund and/or services:

C. 19 APPROVE and AUTHORIZE the Agricultural Commissioner, or designee, to execute a contract with the California Department of Food and Agriculture in an amount not to exceed $23,443 to place and service traps for the detection of the European Grapevine Moth from January 1, 2018 through December 31, 2018.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 20 APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to apply for and accept funding in an amount not to exceed $3,540,487 from the Department of Health and Human Services Administration for Children and Families for Early Head Start supplemental funding for the period September 1, 2018 through August 31, 2019. (20% In-kind County match)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 21 APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to apply for and accept grant funding in an amount not to exceed $12,000 from the City of Brentwood to provide economic development advising, training, and outreach services to Brentwood businesses for the period July 1, 2018 through June 30, 2019. (100% match, Federal)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 22 APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract and accept reimbursement in an amount not to exceed $15,000 from Mount Diablo Unified School District for the provision of food services at the Crossroads High School childcare program for the period July 1, 2018 through June 30, 2019. (No County match)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

APPROVE and AUTHORIZE execution of agreement between the County and the following parties as noted for the purchase of equipment and/or services:

C. 23 APPROVE and AUTHORIZE the Sheriff-Coroner, or designee, to execute a Maintenance and Support Agreement with Gemalto Cogent, Inc., in an amount not to exceed, $454,772 for the purchase of Livescan specific hardware, implementation services, and support of the software for the period January 1, 2018 through December 31, 2022. (100% CAL-ID funds)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 24 APPROVE and AUTHORIZE the Agricultural Commissioner, or designee, to execute Agreement #18-73-06-0251-RA with the United States Department of Agriculture (USDA) Wildlife Services in an amount not to exceed $40,649 to provide wildlife damage management for the period July 1, 2018 through June 30, 2019. (State 60%, County 40%)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 25 APPROVE and AUTHORIZE the Sheriff-Coroner, or designee, to execute a software and licensing agreement, including modified indemnification language, with Shotcaller Global, Inc., in an annual amount of $25,500 for the "GunOps" crime tracking system software tracking system for the period April 17, 2018 and renewed annually unless canceled by either party. (100% State)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 26 APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract with Language Line Services, Inc. in an amount not to exceed $1,250,000 for interpretation and translation services for the period July 1, 2018 through June 30, 2019. (10% County, 48% State, 42% Federal)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 27 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Contra Costa Hearing Aid Center, Inc., in an amount not to exceed $250,000 to provide audiology and hearing aid services to Contra Costa Health Plan members for the period May 1, 2018 through April 30, 2020. (100% Contra Costa Health Plan Enterprise Fund II)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 28 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Paladin Managed Care Services, Inc., in an amount not to exceed $300,000 to provide claims processing and negotiation services to Contra Costa Health Plan members for the period June 1, 2018 through May 31, 2020. (100% Contingency fee from savings)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 29 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with California Center for Behavioral Health in an amount not to exceed $150,000 to provide outpatient psychiatry services to Contra Costa Health Plan members for the period June 1, 2018 through May 31, 2020. (100% Contra Costa Health Plan Enterprise Fund II)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 30 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Estelita Marquez-Floyd, M.D., in an amount not to exceed $266,240 to provide outpatient psychiatric services to children and adolescents at the East County Mental Health Clinic for the period July 1, 2018 through June 30, 2019. (50% Federal Medi-Cal, 50% Mental Health Realignment)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 31 APPROVE and AUTHORIZE the Director of Risk Management to execute a contract amendment with BSI EHS Services and Solutions to increase the payment limit by $508,600 to a new total payment limit of $1,727,400 for additional Occupational Safety Health Administration (OSHA) compliance support during the period of July 1, 2017 through June 30, 2018. (100% Workers' Compensation Internal Service Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 32 APPROVE and AUTHORIZE the Sheriff-Coroner, or designee, to execute a contract with Men and Women of Purpose in an amount not to exceed $191,650 for the provision of mentoring and placement services to assist adult inmates transitioning back into the community for the period July 1, 2018 through June 30, 2019. (100% AB109 Public Safety Realignment)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 33 APPROVE and AUTHORIZE the Sheriff-Coroner, or designee, to execute a contract with Bay Area Chaplains, Inc., in an amount not to exceed $156,100 for chaplaincy services in adult detention facilities for the period July 1, 2018 through June 30, 2019. (100% Inmate Welfare Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 34 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Archer Business Solutions, LLC, in an amount not to exceed $145,000 to provide technical support and consulting for the Health Services Department's Information Systems Unit for the period July 1, 2018 through June 30, 2019. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 35 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Contra Costa Crisis Center in an amount not to exceed $310,685 to provide prevention and early intervention services pursuant to the Mental Health Services Act for the period July 1, 2018 through June 30, 2019, with a six-month automatic extension through December 31, 2019, in an amount not to exceed $155,342. (100% Mental Health Services Act)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 36 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Yana Wirengard, M.D., in an amount not to exceed $467,000 to provide general surgery services at Contra Costa Regional Medical Center and Health Centers for the period July 1, 2018 through June 30, 2019. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 37 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract amendment with Crestwood Behavioral Health, Inc., effective May 1, 2018, to increase the payment limit by $1,006,976 to a new payment limit of $8,389,976, to provide additional subacute skilled nursing care services for the period July 1, 2017 through June 30, 2018. (92% Mental Health Realignment, 8% Mental Health Services Act)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 38 RESCIND Board Action of February 13, 2018 (C.52) and APPROVE and AUTHORIZE the Sheriff-Coroner, or designee, to execute a Services Agreement with Gemalto Cogent, Inc., in an amount not to exceed, $120,000 for the services and maintenance enhancement of a dedicated on-site support engineer for a term of July 1, 2018 through June 30, 2019 with no change in payment limit. (100% CAL-ID)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 39 APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract amendment with CocoKids, Inc., effective May 1, 2018, to increase the payment limit by $40,000 to a new payment limit of $120,000 and to extend the term date from June 30, 2018 to December 31, 2018, to provide additional ongoing Promoting Safe and Stable Families Program Services. (30% County; 70% State)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 40 APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract amendment with Aspiranet, effective May 1, 2018, to increase the payment limit by $36,964 to a new payment limit of $155,311, and to extend the term end date from June 30, 2018 to December 31, 2018, to provide ongoing outreach, advocacy, and support to adoptive families. (100% Federal)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 41 APPROVE and AUTHORIZE the Health Services Director, or designee, to terminate the existing contract with D. R. Ruecker M.D., Inc., and enter into a new contract with David Robert Ruecker, M.D., in an amount not to exceed $300,800 to provide outpatient psychiatric care for seriously emotionally disturbed children and adolescents in Central Contra Costa County for the period May 1, 2018 through April 30, 2019. (50% Federal Medi-Cal, 50% Mental Health Realignment)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 42 APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract amendment with Paul Gibson, LCSW, to increase the payment limit by $52,500 to a new payment limit of $145,300 to provide Clinical Supervision Services to Children and Family Services Bureau staff seeking licensure, effective July 1, 2018 with no change to the original contract term of July 1, 2017 through June 30, 2019. (100% State)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 43 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with God's Grace Caring Home, Inc. in an amount not to exceed $358,800 to provide augmented board and care services for County-referred mentally disordered clients for the period from July 1, 2018 through June 30, 2019. (100% Mental Health Realignment)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 44 APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute an interagency agreement with Contra Costa Community College District – Diablo Valley College in an amount not to exceed $30,000 to provide Resource Family Pre-Approval training for the period July 1, 2018 through June 30, 2019. (75% Federal, 25% State)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 45 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract amendment with Ena Rios, LCSW (dba Ena Rios Corporation), effective May 1, 2018, to increase the payment limit by $130,000 to a new payment limit of $230,000 to provide additional specialty mental health services for the period July 1, 2016 through June 30, 2018. (50% Federal Medi-Cal, 50% Mental Health Realignment)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 46 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract amendment with Bay Area Doctors, Inc., effective May 1, 2018, to increase the payment limit by $100,000 to a new payment limit of $800,000 to provide additional specialty mental health services for the period July 1, 2016 through June 30, 2018. (50% Federal Medi-Cal, 50% Mental Health Realignment)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 47 APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract with Family Support Services in an amount not to exceed $360,317 to provide comprehensive respite services to foster parents and relative caregivers for the period of July 1, 2018 through June 30, 2019. (79% State, 21% County)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 48 APPROVE and AUTHORIZE the Director of Risk Management to execute a contract amendment with Ah Hing (dba Risk Management Outsourcing, LLC), increase the payment limit by $59,494 to a new payment limit of $178,482 and extend the term from June 30, 2018 to December 31, 2018 to continue providing risk management services on behalf of Contra Costa County. (100% Self Insurance Internal Service Funds)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 49 APPROVE and AUTHORIZE the County Administrator, or designee to execute a contract between the County and Steckbauer Weinhart, LLP, in an amount not to exceed $150,000, for legal services in the area of tax-related bankruptcy matters for the period from May 1, 2018 through April 30, 2021. (100% General Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 50 APPROVE and AUTHORIZE the Auditor-Controller to pay Concord Yellow Cab, Inc., in an amount not to exceed $16,465.69 for non-emergency transportation services for County clients and patients with HIV disease for services rendered to Contra Costa County residents during the period November 1, 2017 through February 28, 2018. (100% State)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 51 APPROVE clarification of Board action of February 13, 2018 (Item C.51), which authorized the Purchasing Agent to execute a purchase order with Beckman Coulter, Inc., in the amount of $253,395 to reflect the correct payment limit of $264,009. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 52 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Nancy E. Ebbert, M.D., in an amount not to exceed $332,800 to provide outpatient psychiatric services to adolescent and transitional age adult patients for the period July 1, 2018 through June 30, 2019. (24% Mental Health Services Act, 38% State Mental Health Realignment, 38% Federal Medi-Cal)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 53 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Antoine Samman, M.D., in an amount not to exceed $240,000 to provide neurology services at Contra Costa Regional Medical Center and Health Centers for the period May 1, 2018 through April 30, 2019. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Other Actions

C. 54 APPROVE and AUTHORIZE the Conservation and Development Department to initiate a General Plan Amendment process to consider changing the General Plan land use designation from "Multiple-Family Residential-Very High Density" to "Multiple-Family Residential-Very High Special Density" for a group of five parcels located at the intersection of Del Hombre Lane and Roble Road, in the Contra Costa Centre area. (100% Applicant Fees)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 55 ACCEPT the report prepared by the Office of the Sheriff in accordance with Penal Code Section 4025(e) representing an accounting of all Inmate Welfare Fund receipts and disbursements for Fiscal Year 2016/17, as recommended by the Sheriff-Coroner. (No fiscal impact)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 56 APPROVE and AUTHORIZE the County Librarian to close the Kensington Library from June 4, 2018 through and including June 12, 2018 in order to repaint the interior, upgrade the employee work area and replace furniture in the public area. (70% Library Fund, 30% Friends of the Kensington Library)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 57 RECEIVE Civil Grand Jury Report No. 1802, entitled "Los Medanos Community Healthcare District" (attached), and FORWARD to the County Administrator for response. (No fiscal impact)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

GENERAL INFORMATION

The Board meets in all its capacities pursuant to Ordinance Code Section 24-2.402, including as the Housing Authority and the Successor Agency to the Redevelopment Agency. Persons who wish to address the Board should complete the form provided for that purpose and furnish a copy of any written statement to the Clerk.

Any disclosable public records related to an open session item on a regular meeting agenda and distributed by the Clerk of the Board to a majority of the members of the Board of Supervisors less than 72 hours prior to that meeting are available for public inspection at 651 Pine Street, First Floor, Room 106, Martinez, CA 94553, during normal business hours.

All matters listed under CONSENT ITEMS are considered by the Board to be routine and will be enacted by one motion. There will be no separate discussion of these items unless requested by a member of the Board or a member of the public prior to the time the Board votes on the motion to adopt.

Persons who wish to speak on matters set for PUBLIC HEARINGS will be heard when the Chair calls for comments from those persons who are in support thereof or in opposition thereto. After persons have spoken, the hearing is closed and the matter is subject to discussion and action by the Board. Comments on matters listed on the agenda or otherwise within the purview of the Board of Supervisors can be submitted to the office of the Clerk of the Board via mail: Board of Supervisors, 651 Pine Street Room 106, Martinez, CA 94553; by fax: 925-335-1913.

The County will provide reasonable accommodations for persons with disabilities planning to attend Board meetings who contact the Clerk of the Board at least 24 hours before the meeting, at (925) 335-1900; TDD (925) 335-1915. An assistive listening device is available from the Clerk, Room 106.

Copies of recordings of all or portions of a Board meeting may be purchased from the Clerk of the Board. Please telephone the Office of the Clerk of the Board, (925) 335-1900, to make the necessary arrangements.

Forms are available to anyone desiring to submit an inspirational thought nomination for inclusion on the Board Agenda. Forms may be obtained at the Office of the County Administrator or Office of the Clerk of the Board, 651 Pine Street, Martinez, California.

Applications for personal subscriptions to the weekly Board Agenda may be obtained by calling the Office of the Clerk of the Board, (925) 335-1900. The weekly agenda may also be viewed on the County's Internet Web Page:
www.co.contra-costa.ca.us

STANDING COMMITTEES

The **Airport Committee** (Supervisors Diane Burgis and Karen Mitchoff) meets on the second Wednesday of the month at 11:00 a.m. at Director of Airports Office, 550 Sally Ride Drive, Concord.

The **Family and Human Services Committee** (Supervisors Candace Andersen and John Gioia) meets on the fourth Monday of the month at 10:30 a.m. in Room 101, County Administration Building, 651 Pine Street, Martinez.

The **Finance Committee** (Supervisors Karen Mitchoff and John Gioia) meets on the fourth Monday of the month at 9:00 a.m. in Room 101, County Administration Building, 651 Pine Street, Martinez.

The **Hiring Outreach Oversight Committee** (Supervisors Candace Andersen and Federal D. Glover) meets on the first Monday of every other month at 1:00 p.m. in Room 101, County Administration Building, 651 Pine Street, Martinez.

The **Internal Operations Committee** (Supervisors Diane Burgis and Candace Andersen) meets on the second Monday of the month at 1:00 p.m. in Room 101, County Administration Building, 651 Pine Street, Martinez.

The **Legislation Committee** (Supervisors Karen Mitchoff and Diane Burgis) meets on the second Monday of the month at 10:30 a.m. in Room 101, County Administration Building, 651 Pine Street, Martinez.

The **Public Protection Committee** (Supervisors John Gioia and Federal D. Glover) meets on the first Monday of the month at 10:30 a.m. in Room 101, County Administration Building, 651 Pine Street, Martinez.

The **Transportation, Water & Infrastructure Committee** (Supervisors Karen Mitchoff and Candace Andersen) meets on the second Monday of the month at 9:00 a.m. in Room 101, County Administration Building, 651 Pine Street, Martinez.

Airports Committee	June 13, 2018	11:00 a.m.	See above
Family & Human Services Committee	TBD	TBD	See above
Finance Committee	TBD	TBD	See above

Hiring Outreach Oversight Committee	June 4, 2018	1:00 p.m.	See above
Internal Operations Committee	May 14, 2018 Canceled June 11, 2018	1:00 p.m.	See above
Legislation Committee	May 14, 2018	10:30 a.m.	See above
Public Protection Committee	May 7, 2018 Canceled Next Meeting TBD	TBD	See above
Transportation, Water & Infrastructure Committee	May 14, 2018	9:00 a.m.	See above

PERSONS WHO WISH TO ADDRESS THE BOARD DURING PUBLIC COMMENT OR WITH RESPECT TO AN ITEM THAT IS ON THE AGENDA, MAY BE LIMITED TO TWO (2) MINUTES

A LUNCH BREAK MAY BE CALLED AT THE DISCRETION OF THE BOARD CHAIR

AGENDA DEADLINE: Thursday, 12 noon, 12 days before the Tuesday Board meetings.

Glossary of Acronyms, Abbreviations, and other Terms (in alphabetical order):

Contra Costa County has a policy of making limited use of acronyms, abbreviations, and industry-specific language in its Board of Supervisors meetings and written materials. Following is a list of commonly used language that may appear in oral presentations and written materials associated with Board meetings:

AB Assembly Bill
ABAG Association of Bay Area Governments
ACA Assembly Constitutional Amendment
ADA Americans with Disabilities Act of 1990
AFSCME American Federation of State County and Municipal Employees
AICP American Institute of Certified Planners
AIDS Acquired Immunodeficiency Syndrome
ALUC Airport Land Use Commission
AOD Alcohol and Other Drugs
ARRA American Recovery & Reinvestment Act of 2009
BAAQMD Bay Area Air Quality Management District
BART Bay Area Rapid Transit District
BayRICS Bay Area Regional Interoperable Communications System
BCDC Bay Conservation & Development Commission
BGO Better Government Ordinance
BOS Board of Supervisors
CALTRANS California Department of Transportation
CalWIN California Works Information Network
CalWORKS California Work Opportunity and Responsibility to Kids
CAER Community Awareness Emergency Response
CAO County Administrative Officer or Office
CCCPFD (ConFire) Contra Costa County Fire Protection District
CCHP Contra Costa Health Plan
CCTA Contra Costa Transportation Authority
CCRMC Contra Costa Regional Medical Center
CCWD Contra Costa Water District
CDBG Community Development Block Grant
CFDA Catalog of Federal Domestic Assistance
CEQA California Environmental Quality Act
CIO Chief Information Officer
COLA Cost of living adjustment
ConFire (CCCFPD) Contra Costa County Fire Protection District
CPA Certified Public Accountant
CPI Consumer Price Index

CSA County Service Area
CSAC California State Association of Counties
CTC California Transportation Commission
dba doing business as
DSRIP Delivery System Reform Incentive Program
EBMUD East Bay Municipal Utility District
ECCFPD East Contra Costa Fire Protection District
EIR Environmental Impact Report
EIS Environmental Impact Statement
EMCC Emergency Medical Care Committee
EMS Emergency Medical Services
EPSDT Early State Periodic Screening, Diagnosis and Treatment Program (Mental Health)
et al. et alii (and others)
FAA Federal Aviation Administration
FEMA Federal Emergency Management Agency
F&HS Family and Human Services Committee
First 5 First Five Children and Families Commission (Proposition 10)
FTE Full Time Equivalent
FY Fiscal Year
GHAD Geologic Hazard Abatement District
GIS Geographic Information System
HCD (State Dept of) Housing & Community Development
HHS (State Dept of) Health and Human Services
HIPAA Health Insurance Portability and Accountability Act
HIV Human Immunodeficiency Syndrome
HOV High Occupancy Vehicle
HR Human Resources
HUD United States Department of Housing and Urban Development
IHSS In-Home Supportive Services
Inc. Incorporated
IOC Internal Operations Committee
ISO Industrial Safety Ordinance
JPA Joint (exercise of) Powers Authority or Agreement
Lamorinda Lafayette-Moraga-Orinda Area
LAFCo Local Agency Formation Commission
LLC Limited Liability Company
LLP Limited Liability Partnership
Local 1 Public Employees Union Local 1
LVN Licensed Vocational Nurse
MAC Municipal Advisory Council
MBE Minority Business Enterprise
M.D. Medical Doctor
M.F.T. Marriage and Family Therapist
MIS Management Information System
MOE Maintenance of Effort
MOU Memorandum of Understanding
MTC Metropolitan Transportation Commission
NACo National Association of Counties
NEPA National Environmental Policy Act
OB-GYN Obstetrics and Gynecology
O.D. Doctor of Optometry
OES-EOC Office of Emergency Services-Emergency Operations Center
OPEB Other Post Employment Benefits
OSHA Occupational Safety and Health Administration
PARS Public Agencies Retirement Services
PEPRA Public Employees Pension Reform Act
Psy.D. Doctor of Psychology
RDA Redevelopment Agency
RFI Request For Information
RFP Request For Proposal

RFQ Request For Qualifications
RN Registered Nurse
SB Senate Bill
SBE Small Business Enterprise
SEIU Service Employees International Union
SUASI Super Urban Area Security Initiative
SWAT Southwest Area Transportation Committee
TRANSPAC Transportation Partnership & Cooperation (Central)
TRANSPLAN Transportation Planning Committee (East County)
TRE or **TTE** Trustee
TWIC Transportation, Water and Infrastructure Committee
UASI Urban Area Security Initiative
VA Department of Veterans Affairs
vs. versus (against)
WAN Wide Area Network
WBE Women Business Enterprise
WCCTAC West Contra Costa Transportation Advisory Committee

Contra Costa County

To: Board of Supervisors

From: John Kopchik, Director, Conservation & Development Department

Date: May 1, 2018

Subject: Alamo Summit - Modification to Final Development Plan #DP90-3030 for a Single Family Residence

RECOMMENDATION(S):

1. OPEN the public hearing, RECEIVE testimony, and CLOSE the public hearing.

2. AFFIRM the Planning Commission decision to deny a proposal to merge three lots, defer road improvements, and allow a 13,888-square-foot single family residence in the Alamo Summit subdivision (DP15-3039).

3. DENY the appeal of Discovery Builders, Inc.

4. DETERMINE that the Board's decision is exempt from the California Environmental Quality Act (CEQA) under CEQA Guidelines section 15270(a), projects that a public agency rejects or disapproves.

5. DIRECT the Department of Conservation and Development to file a CEQA Notice of Exemption with the County Clerk

☑ APPROVE ☐ OTHER

☐ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☐ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

Contact: (925) 674-7798

By: , Deputy

cc:

FISCAL IMPACT:

None. The applicant has paid the initial application deposit, and is obligated to pay supplemental fees to cover any and all additional staff time and material costs associated with the processing of this application.

BACKGROUND:

Project Description:

Discovery Builders, the applicant is requesting modification to Final Development Plan #DP90-3030 to allow the merger of three lots for construction of a single family residence. The applicant also requests to amend Conditions of Approval (COA) #25 and #26 to modify the construction timing of Alamo Summit Drive and the required improvements to Ridgewood Road. These roadway improvements would be postponed until a future date when the developer elects to build out the remainder of the subdivision. The applicant proposes a gravel roadway along the alignment of Alamo Summit Drive for use as a construction route to the home site. Construction vehicles would access the gravel construction route via Ridgewood Road, which the applicant indicates will be monitored and repaired as necessary during construction of the proposed residence.

Site Description:

The project site is located within the boundaries of Alamo Summit, a 37-lot subdivision (SD 7553) that was previously approved by the County. The Alamo Summit subdivision is located on a hillside at the southern terminus of Castle Crest Road, approximately ½ mile west of Danville Boulevard at Livorna Road. The project site overlooks the Rossmoor community to the west, and the Alamo community to the south and east. Surrounding land uses are predominantly residential with the exception of open space to the north of the Alamo Summit subdivision. Vehicular access to the subdivision is available via Castle Crest Road from the north, and Ridgewood Road to the east. The project approval was conditioned to require Alamo Summit Drive, a paved road connecting these two existing access points, be constructed prior to the first phase of development. None of the 37 approved lots have been developed to date.

General Plan:

The project site has a General Plan land use designation of Agricultural Lands (AL). Single-family residences are a compatible use within the AL designation. The proposed merger of three lots, resulting in a 12.8-acre home site is consistent with the allowed density of one dwelling unit per five acres for the AL land use designation.

Zoning:

The project site is within a Planned Unit District (P-1), a zoning district that was specifically adopted for the 177-acre Alamo Summit subdivision. Residential development within this P-1 development is subject to design guidelines, which were also adopted with the approved Final Development plan for the Alamo Summit Subdivision.

Environmental Review:

Pursuant to the California Environmental Quality Act (CEQA) guidelines § 15270(a), CEQA does not apply to projects for which a public agency disapproves. Staff is presenting this application with a

recommendation for denial, thus, no environmental review has been performed.

Staff Analysis of the Proposed Project:

The project proposal involves combining lots 7, 8, and 9 of the approved subdivision (approximately 12.8 acres total) and constructing a 13,888 square-foot single-family residence at this location. This location is at one of the higher points within the subdivision boundaries. Alamo Summit Drive is to be located along the eastern boundary of the proposed home site.

The primary issue regarding this application is the requirement for roadway improvements and a request to modify the timing of roadway improvements. The applicant requests to amend COA's #25 and #26 to allow construction of one single-family residence prior to the construction of Alamo Summit Drive and improving/widening Ridgewood Road. As noted, the applicant has requested to construct these roads at a future date when the remaining lots of the subdivision are developed.

The applicant's request to modify the timing for constructing required roadway improvements is a substantial modification to the Final Development Plan that was approved with the subdivision in 1992. The adopted EIR for the Alamo Summit project concluded that the use of either of the existing access routes, Ridgewood Road and Castle Crest Road, by construction traffic would add significantly to existing safety hazards for normal traffic on the route. These hazards were mitigated to a less than significant level by requiring improvements to Ridgewood Road, prior to development. It was also required that Alamo Summit Road be constructed to provide a temporary means of access for those residences located on Upper Ridgewood Road, during lower Ridgewood Road improvements. Mitigation Measure 3(d) required the construction of improvements and widening of Ridgewood Road as part of the first construction phase. The applicant's request to construct a single-family residence is the first construction phase of the project. Additionally, Mitigation Measure 3(d) stipulated that construction vehicles would only be allowed access to the site via the improved Ridgewood Road. Mitigation Measure 3(d) was incorporated into the Final Development Plan approval as COA's #25 and #26.

Pursuant to County Ordinance Code 84-66.1804(b), the County must find the proposed modification to the Final Development Plan is consistent with the intent and purpose of the P-1 district adopted for the site. The proposed modification does not comply with approved COA's #25-27, or Mitigation Measure 3(d). As previously stated, these conditions were a major element of the project approval, without which safe development of any portion of the Alamo Summit subdivision is not possible. Therefore, the proposed modification is not consistent with the intent and purpose of the P-1 district adopted for the Alamo Summit Subdivision and should be denied.

County Planning Commission (CPC) Hearing and Decision on February 14, 2018

The proposed Development Plan modification was presented to the CPC on February 14, 2018 with a recommendation for denial from staff. Dozens of residents from the Alamo community appeared to voice their opposition to the project. The concerns raised were primarily over the narrow configuration of the existing roads that are located on steep terrain. There is great concern amongst local residents that these roads cannot safely accommodate existing residential traffic and the added construction traffic without the access improvements that the original subdivision was conditioned to perform prior to the first phase of development on Alamo Summit. Neither representative of the applicant appeared to present to the CPC in support of this application. The CPC voted unanimously (5-0) to deny the requested modification to the approved Final Development Plan.

Appeal of County Planning Commission's February 14, 2018 Decision

The County received an appeal of the County Planning Commission's decision on February 22, 2018, from Louis Parsons, President of Discovery Builders Inc. Below is a summary of the appeal points along with staff's response.

- *Appeal Point: We are asking for the timing of the improvements to be modified. We are not requesting deletion of any of the conditions.*

Staff Response: As already stated previously, the adopted EIR for the Alamo Summit project concluded that the use of either of the existing access routes, Ridgewood Road and Castle Crest Road, by construction traffic would add significantly to existing safety hazards for normal traffic on the route. These hazards were mitigated to a less than significant level by requiring improvements to Ridgewood Road, and requiring all construction traffic to use the improved Ridgewood Road. In order to reduce the impact of closing Ridgewood Road to perform these improvements, it was required that Alamo Summit Road first be constructed to provide a temporary means of access for those residences located on Upper Ridgewood Road.

The adopted EIR for the Alamo Summit project also found that utilizing Ridgewood Road in its existing condition "would add significantly to existing safety hazards for normal traffic on the route". The applicant has proposed to assess the condition of Ridgewood Road during the construction phase and promptly repair any damage caused by construction activities. This proposal is inadequate in that it fails to address the primary intent of the Ridgewood Road improvements, which was to improve the road's ability to safely accommodate construction traffic for the Alamo Summit subdivision. There have been no significant improvements to Ridgewood Road since the approval of the Alamo Summit subdivision that may have reduced these hazardous conditions, and that may warrant consideration of the requested modified timing of improvements. Thus, the preexisting hazardous situation for construction traffic and residents on upper Ridgewood Road remains.

- *Appeal Point: We have offered a solution for construction traffic through the project site, and we are simply proposing the construction of a single home. We are proposing to merge 3 lots into 1, which will lessen the ultimate overall development impact.*

Staff Response: Monitoring Ridgewood Road and repairing damage caused by construction traffic does not alleviate or mitigate hazards that would be posed by the routing construction traffic on this roadway given its current hazardous conditions. Furthermore, the current proposal does not provide a paved alternative access route for residents on upper Ridgewood Road in the event that lower Ridgewood Road needs to be closed to repair construction damage. The proposed gravel road may provide construction vehicles access through the project site, but it fails to provide an alternative access point for those residences most likely to be impacted by construction activity on lower Ridgewood Road. Lastly, it is the existing hazardous conditions of Ridgewood Road combined with its proposed use as a construction access that necessitates the required improvements; not the scale of the proposed construction. Therefore, a decrease in the number of lots for the entire subdivision does not eliminate the need to improve Ridgewood Road prior to construction activities.

CONSEQUENCE OF NEGATIVE ACTION:

If the Board is inclined to approve the applicant's appeal, it should direct staff to perform necessary environmental review and take necessary steps to approve the request.

CHILDREN'S IMPACT STATEMENT:

This application is a request for approval of modifications to a Final Development Plan to allow for construction of a single-family residence. The proposed project will not impact children's programs within the County. The applicant's requirement to contribute to childcare facilities will still be required as a condition of approval for the subdivision.

CLERK'S ADDENDUM

CONTINUED the hearing to June 5, 2018 at 9:30 a.m.

ATTACHMENTS

Appeal Letter

DP90-3030 COA

DP Modification Map

Alamo Summit Subdivision Map

Zoning Maps

Power Point- Alamo Summit

APPEAL LETTER

DISCOVERY BUILDERS INC

4061 Port Chicago Highway, Suite H
Concord, California 94520
(925) 682-6419
Fax (925) 689-7741
CA Lic. #753652 / NV Lic. #7070

February 20, 2018

Mr. John Kopchik
Director, Contra Costa County
Department of Conservation
and Development
30 Muir Road
Martinez, California 94553

RE: Appeal of County Planning Commission Denial of Request for Modification of Final Development Plan and Amendment to Conditions of Approval; Discovery Builders, Inc.; Applicant
Alamo Summit; County File Numbers Tract 7553/DP90-3030

Dear Mr. Kopchik:

As the applicant and on behalf of the owner, Alamo Investors, LLC, we are hereby submitting an appeal to the Contra Costa County Board of Supervisors of the February 14, 2018 County Planning Commission decision referred to above. Enclosed is our check payable to the Department of Conservation and Development in the amount of $125.00 for the appeal fee.

Our grounds for the appeal are that we are asking for the timing of the improvements to be modified. We are not requesting deleting any of the conditions. We have offered a solution for construction traffic through the project site and we are simply proposing the construction of a single home. We are also proposing to merge 3 lots into 1, which will lesson the ultimate overall development impact.

We ask that our appeal be calendared for hearing before the Board of Supervisors. Please advise me immediately if there is any additional information or documentation necessary to complete the filing of this appeal.

Thank you for your attention to this matter.

Sincerely,

Louis Parsons
President

LP:kmb
enc

DP90-3030 CONDITIONS OF APPROVAL

EXHIBIT A

FINDINGS AND CONDITIONS OF APPROVAL FOR FINAL DEVELOPMENT PLAN 3030-90 AND VESTING TENTATIVE SUBDIVISION 7553 (ALAMO SUMMIT)

FINDINGS

1. The applicant has indicated that they intend to commence construction within two and one-half years of the effective date of final project approval.

2. These applications were accepted as complete by the County on September 21, 1990 and are, therefore, governed by the policies and ordinances in effect at that time. The 1977 San Ramon Valley Area General Plan was the general plan document in effect at that time for this site. That plan designated this site General Open Space, Country Estates, and Single Family Residential-Low Density.

   The proposed site plan and associated submittals are consistent with the policies of that plan. The current applications are also consistent with the June, 1990 preliminary development plan, File #2776-RZ, adopted by the Board of Supervisors for this site.

3. The Alamo Summit project will constitute a residential environment of sustained desirability and stability, and will be in harmony with the character of the nearby community. The majority of this hillside site will be dedicated to the County as a scenic easement in which further development is precluded. The project provides for protection of virtually all of the mature oak trees that cover this site. Existing trees and supplemental landscaping will be utilized to screen residential development. Exterior colors of residences shall be limited to earth-tone, non-reflective hues so that residences will blend into the natural terrain. Design guidelines and staff plan review will assure sensitive development.

4. In accord with the required findings of the Planned Unit (P-1) District, the County finds that the development of a harmonious, integrated plan like the Alamo Summit project, justifies exceptions from the normal application of the code, including variations in parcel configuration and design to provide better conformity with existing natural terrain features.

CONDITIONS OF APPROVAL

General

1. Development shall be based on the following submitted exhibits and documents except as modified by the conditions below:

   A. Vesting Tentative Map - 100 scale (Sheet 1).

   B. Ridgewood Road Improvements and Typical Street Sections (Sheet 2).

   C. Vesting Tentative Map - 40 scale (Central Section) (Sheet 3).

   D. Vesting Tentative Map - 40 scale (North Section) (Sheet 4).

E. Vesting Tentative Map - 40 scale (South Section) (Sheet 5).

F. Final Development Plan (Sheet 6).

G. Entry Design (Sheet 7).

H. "Geotechnical Exploration, Alamo Summit", Engeo, Inc., August 8, 1990.

I. "Project Design Guidelines", August, 1990.

J. Alamo Summit Final Development Plan and Subdivision Booklet, May 8, 1991.

K. "Arborist Report", Michael Baesky, Horticultural Consultant, August 29, 1990.

L. June 25, 1991 letter from Christopherson & Graff regarding Alamo Summit Building Color Samples.

M. October 20, 1990 Alamo Summit Child Care Response Program Agreement between Alamo Summit, Inc., Mt. Diablo Regional YMCA, and County of Contra Costa.

N. Display scale renderings of the development as viewed from Livorna Road, Ramona Way, Stone Valley Road, and I-680/La Gonda Way.

O. September 4, 1991 Staff Study - Lot 37 conversion to snake habitat, scenic easement area.

2. A maximum of 37 single family residential lots shall be permitted. Any proposed increase in the number of lots shall require additional environmental review and approval of an application to amend the final development plan. Any proposed creation of new parcels for non-residential purposes (e.g., EBMUD, neighborhood antenna parcel) shall be reviewed and approved by the Zoning Administrator for consistency with the approved Final Development Plan.

3. At least 30 days prior to filing a final map or issuance of grading permits, the following documents shall be submitted for the review and approval of the Zoning Administrator:

A. Revised Final Development Plan.

B. Revised Grading/Tree Preservation Plan.

C. Construction Period and Long-Term Erosion Control Plan.

D. Landslide Repair and Road Construction Landscape Plans.

E. Final Project Entry Plans.

F. Construction Activity Policy Program (per PDP condition 8.J.).

G. Revised Whipsnake Habitat Protection Program (per PDP condition 8.A., FDP 12.B.2.).

H. Willow Thicket Protection Program (per PDP condition 8.B.).

I. Vegetation Control Plan for Fire Protection (per PDP condition 8.C.).

Utility Service

4. Prior to filing a final map, provide evidence to the Public Works Department that the project has been annexed to East Bay Municipal Utility District and Central Sanitary District.

Revised Development Plan

5. Prior to issuance of grading permits or filing a final map, a revised final development plan shall be submitted providing for the following changes:

A. Designation of identified portions of Lot 37 as Alameda Whipsnake Habitat Area and 30-foot wide buffer zone in accord with the September 4, 1991 Staff Study; and inclusion of the designated habitat and buffer in scenic easement dedication.

Jonathan Lane may be constructed within the buffer zone as shown in the FDP, so long as no incursions into the actual habitat area occur. Placement, design and construction of road improvements shall maximize protection of the Whipsnake habitat.

B. The residential lot and satellite antennae easement proposed for Lot 37 may be relocated elsewhere on the site consistent with the findings in the environmental impact reports for this project and with the objectives of the Alamo Summit Project Design Guidelines.

C. The boundaries of the proposed scenic easement area shall be precisely identified by metes and bounds description on the final development plan and grading plan. Adjustments to the scenic easement boundaries should be provided to conform more closely with the natural terrain contours.

6. Prior to filing the final map, the Final Development and/or Project Design Guidelines shall be revised to reflect that at least one of the following three design measures shall be applied to development on Lots 2, 9, and 11. Similar revisions shall apply Measures B and C (but not A) to Lots 1, 4, 5, 7, 10, 31, and 32. The Zoning Administrator shall review and approve individual proposals for development of these lots in terms of potential visual impacts, and apply this condition accordingly.

A. Relocation of the homesites to a lower or otherwise less visually prominent location, and/or reorientation of the structure "footprint" and/or articulation of its structural form to reduce the perceived building mass visible from one of the three vantage points analyzed in the SEIR, either Ramona Way, I-680/Stone Valley Road or I-680/Livorna Road;

B. Limitations on the height and scale of the residences on the homesites and incorporation of building shape and surface plane variations to reduce structural bulk and scale and increase design compatibility with the existing hillsides; in no event shall structures on Lots 1, 2, 4, 5, 7, 9, 10, 11, 31 or 32 protrude above a ridgeline including any existing tree canopy as viewed from Interstate 680 as the ridgeline exists as of October 17, 1991; and

C. Selective introduction of vegetative screening on the east side of the homesites to create natural-appearing arrays of trees and shrubs within approximately 30 feet of the building to be screened (location of vegetative screening close to the residential structure provides greater opportunity for selective placement and trimming to "frame" maintain selected views); screening vegetation should not be placed in unnatural-appearing linear rows.

Geotechnical

7. Development of this subdivision shall comply with the recommendations of the Preliminary Soil Report of Engeo, Inc. dated August 8, 1990, except as to recommended cut slope gradients which require special erosion control to permit 2H:1V slopes.

8. Owner shall make the report of Engeo, Inc. dated August 8, 1990 available for review to prospective purchasers of parcels of this subdivision. Relevant information from the report shall be provided to purchasers.

9. Prior to issuance of building permits on parcels of this subdivision, except Parcels 2, 5, 7, 11, 16, 17, 23, 35, and 37, submit an as-graded report of the engineering geologist and geotechnical engineer with a map showing final plan and grades for soil improvements installed during grading, as surveyed by a licensed land surveyor or civil engineer (when requested by the County Geologist based on a lot-by-lot determination.)

10. Construction of individual residential structures shall take into account the landslides mapped by Engeo, Inc. on Plate 2 of the report of August 8, 1990. Structures shall not be placed on active landslides unless repaired in accordance with advice of a geotechnical engineer. Structures may be placed on inactive landslides with the advice of a geotechnical engineer and approval of the Zoning Administrator.

11. Landslide repair grading in this subdivision shall be restored by erosion control and revegetation/landscaping in accordance with plans by a landscape architect submitted with the grading permit plans for review and approval of the Zoning Administrator.

Grading Plans and Restrictions

12. Grading/Tree Preservation Plans shall provide for the following programs and information:

A. To reduce long-term erosion and sedimentation impacts on downstream water quality, grading plans shall be designed such that no surface run-off shall be directed onto cut or fill slopes. All graded slopes shall have either brow ditches or berms at the crest to control surface run-off. These drainage structures shall be underlain by subdrains. Run-off from graded surfaces shall be intercepted by closed conduits and conveyed to adequate storm drainage facilities.

B. The following measures are intended to protect the habitat (Diablan sage scrub) of the Alameda Whipsnake during grading operations:

1) The Diablan sage scrub and associated 30-foot buffer areas designated on the revised Final Development Plan on Lots 1, 2, and 37 shall be preserved and protected from grading. The 3-foot, open-metal fence described in the application shall be constructed along the upper contours of the designated areas upon completion of grading.

The grading plans shall provide for clear delineation of the buffer area by several strands of durable marking tape strung between metal posts before any grading activities begin. No land disturbance, including the deposition of soil, shall be allowed in the designated buffer area.

2) A program shall be submitted with the grading plan to provide for daily monitoring by an independent observer selected by the Zoning Administrator to inspect the grading on Lots 1, 2, and the area of Lot 37 to ensure compliance with these restrictions. The program shall provide for daily inspection during any grading in the vicinity of the snake buffer zones and reporting to the Community Development Department of any violations of the buffer zone by grading activities.

3) Drainage measures shall be incorporated into the grading plan which would prevent run-off from the grading and subsequent development from entering the adjacent Diablan sage scrub habitat.

C. Trees with a trunk circumference of 72 inches or more in proximity to proposed improvements and building sites shall be identified on the plan; each tree shall be identified as to whether it is to be preserved or eliminated. Measures recommended in the arborist's report to protect the trees during the construction stage shall be identified on the grading plan.

D. A sample section and color of the proposed retaining walls along project roads shall be submitted.

E. The grading/tree preservation plan shall provide for a tree replacement program to replace mature trees approved for removal as a result of subdivision improvements (road, utility, slide repair). Trees with a trunk circumference of 72 inches or greater shall be replaced on a one-for-one basis by new tree plantings. The new trees shall consist of species that are naturally indigenous to the Bay Area and have a minimum size of 15 gallons. Siting of new trees shall be distributed throughout the project.

F. The applicant shall attempt to obtain one or more bonds to secure protection of each tree with a circumference of 72 inches or greater, measured 4.5 feet above grade, determined by the Zoning Administrator to be sufficiently near the proposed project grading and construction to cause concern for its safety, which is identified in the arborist's report as qualified for preservation. The bonds shall be posted with the County as a condition of issuing grading or construction permits for the particular work posing a risk to the tree(s) in question. Bonding shall generally follow the procedures established by the City of Walnut Creek in its Ordinance 1688, as described in the Final Development Plan application, or such other procedure as may be mutually acceptable. If the procedures associated with the City of Walnut Creek are not feasible, the applicant shall explore the feasibility of a bonding program similar to the one administered by the City of San Ramon.

In the event that the Zoning Administrator determines that the applicant is not able to obtain any such bond at a reasonable cost or in a timely manner, the Zoning Administrator may waive this requirement. In lieu thereof, the County shall provide for a program for regular-scheduled inspection and enforcement by a licensed arborist under contract to the County to assure protection of designated trees during grading and construction of project improvements in the vicinity of such trees. The costs of said program including administrative fee shall be borne by the applicant.

Erosion Control

13. Construction Period: A construction period erosion control plan in accord with the information requirements and standards of the San Francisco Regional Water Quality Control Board shall be submitted to the Community Development Department. Prior to submittal, the San Francisco Regional Water Quality Control Board shall have an opportunity to review and comment on the proposed plan. The plan shall include such measures as construction scheduling, mechanical and vegetative measures, and appropriate seasonal maintenance to reduce erosion and sedimentation. The plan shall remain in effect for a period of time sufficient to stabilize the site for all construction phases of the project. Construction in the central drainage channel shall be limited to the time period between April 15 and October 1.

14. Long Range: A long-range creek channel maintenance program shall be submitted to the Community Development Department. The maintenance program shall ensure the continued effectiveness of project design features in mitigating creek channel stability impacts to insignificant levels. The program shall be added to the Use Restrictions and Conservation Protection section to be included in the proposed Covenants, Conditions and Restrictions.

Landslide Repair and Infrastructure-Related Landscape Plans

15. A landscape plan prepared by a licensed landscape architect shall be submitted pursuant to the recommendation in the Geotechnical Report. The plan shall not only serve to minimize erosion impacts but also reduce the visual impacts of the landslide repair and infrastructure improvements. Where landslide repair activities involve excavation of existing landslide deposits on Lots 11, 30, 31, 32, 33, 34, 35, or 36, visually restore the associated grading scars through recontouring to achieve a natural-appearing landform, and revegetation (immediate hydroseeding with native grasses, followed by introduction of natural-appearing shrub and tree arrays).

    The plan shall also provide for effective restoration of the vegetation and associated wildlife habitat along the creek channel immediately following improvements for the project sewer line. This component of the plan shall provide erosion control, recontouring, hydroseeding, and revegetation.

    The plan shall be certified for compliance with the Water Conservation Ordinance (Ord. 82-26) and shall emphasize plant species that are naturally indigenous to the Bay Area. the plan shall describe these repair and visual restoration measures in detail. The objective of the visual restoration work shall be to reduce the visual impact of the slide repair and road restoration work as seen from the two vantage points of I-680/Livorna Road and Stone Valley Road east of I-680 within a period of 2 - 5 years.

    Installation of temporary irrigation systems to support landscape improvements in the first year may be necessary to accomplish this objective.

Internal Street Names

16. At least 30 days prior to filing a final map, proposed street names shall be submitted for the review and approval of the Community Development Department, Graphics Section.

Project Design Guidelines

17. The Project Design Guidelines shall be modified to provide for the following:

A. Development of all lots shall be subject to prior administrative review and approval of the Zoning Administrator to ensure compliance with the Project Design Guidelines. Development review shall include individual grading, site, architectural and landscape plans for each project lot. At least 30 days prior to issuance of a grading or building permit, developers or owners of individual lots shall submit plans to the Community Development Department. The Zoning Administrator has the authority to waive strict compliance with the guidelines when:

- the intent of the guidelines could be obtained through some other design approach; and

- compliance with the guidelines would prohibit reasonable development of the lot.

B. The Project Design Guidelines shall be modified so that the design concepts proposed are mandatory except under those special circumstances determined by the Zoning Administrator to merit relaxation of the requirements. The guidelines shall be revised to change language such as **minimize, maximize, avoid, encourage, whenever possible, to the extent possible, should, could, etc.** to include more definitive wording such as require, shall, etc. Exceptions to these mandatory provisions at the discretion of the Zoning Administrator shall be allowed only when the intent of the guidelines could be obtained through some other design approach, <u>and</u> literal interpretation would prohibit the reasonable development of the lot. The Zoning Administrator shall make specific findings to support any exceptions that are granted and shall provide at the applicant's expense, notice of tentative decision to grant such an exception. Such notice shall be provided to all owners of property within 300 feet of the building site as shown on the latest equalized assessment roll, the Alamo Improvement Association, and the Alamo Summit Homeowners Association. At the discretion of the Zoning Administrator, additional notice may be required for residents of Castle Crest Road and Ridgewood Road.

C. The Project Design Guidelines shall be modified to provide more specific requirements for the application of the "homesite zone" concept (see pg. 7 of Guidelines) to individual lots, depending on their visibility from off-site vantage points. Specifically, the "building zone", or the area of each lot which is proposed to accommodate the main structure, accessory structures, parking areas, fences, and irrigated landscaping, shall be reviewed by the Zoning Administrator on an individual lot basis. This "building zone" area should not exceed one acre in area, and should be reduced in area in those individual lot situations where the Zoning Administrator determines that a smaller "building zone" is warranted to off-set visual impacts of the proposed homesite.

D. The Zoning Administrator shall have final discretion regarding the extent of tree preservation to be required within the "building zone". Particular attention shall be given to Lots 1, 2, 3, 4, 5, 7, 9, 10, 11, and 28 - 36 based on the visual impact analysis reviewed in the Supplemental EIR.

E. A provision shall be added which identifies the homesites listed below for particular consideration in the design review process of potential visual impacts associated with particular vantage points reviewed in the Supplemental Environmental Impact Report. This provision is intended to alert the designer of individual project homes and the Zoning Administrator of the special visual sensitivity of these lots.

Vantage Point	Homesites (Lots)
Ramona Way	2, 3, 7, 9, 10, and 11
I-680/Livorna Road	2, 3, 7, 9, 10, 11, and 29 - 36
I-680/Stone Valley Road	1, 2, 4, 5, 9, 10, 11, and 28 - 31

F. The "Building Height" subsection of the "Development Standards" section of the Project Design Guidelines shall be revised to state the following:

"The proposed 35-foot maximum structural height limit shall be reviewed on a lot-by-lot basis as necessary to minimize visual impacts for the following lots and vantage points:

Vantage Point	Homesites (Lots)
Ramona Way	2, 3, 7, 9, 10, and 11
I-680/Livorna Road	2, 3, 7, 9, 10, 11, 24, & 29-36
I-680/Stone Valley Road	1, 2, 4, 5, 9, 10, 11, & 28 - 31

"The review shall include consideration of individual homesite characteristics (including the extent of existing vegetation to be retained and protected) and the need to implement other Project Design Guidelines pertaining to "the Built Zone", "apparent height", "accessory structures", and "concealment". The

applicant for each individual homesite shall graphically demonstrate to the Zoning Administrator's satisfaction how the proposed height characteristics serve to implement these specific guidelines and avoid significant visual impacts."

G. Design review for the homesites on Lots 1, 4, 5, 10, 31, and 32 shall provide for the introduction of vegetative screening on the east and east/southeast side of homesites. In addition to proposed efforts to achieve a visual blend of Homesites 31 and 32 and their grassland setting through use of a "light tone" color palette, incorporate natural-appearing vegetative screening techniques to reduce the visibility of these two units as viewed from the I-680/Stone Valley Road vantage point.

H. In the "Special Provisions" section of the Guidelines, specify prohibitions on grading of Lots 15 and 16 which could cause direct or indirect damage to the willow thicket.

I. The specifications on proposed mesh fencing shall be modified to allow movement of all sizes of wildlife through the site.

J. Design review submittals shall include a site plan of the property encompassing the building and transitional zones labelled "Existing Site Conditions." The plan shall identify existing contours and individual trees or tree masses. Individual trees with a trunk circumference of 20 inches or greater 4½ feet above the ground shall be identified with their dripline and species.

K. Introduced landscape materials in proximity to residential/garage structures shall be fire-resistant and consistent with any fire-hazard buffer measures of the San Ramon Valley Fire Protection District.

Covenants, Conditions, and Restrictions (CC & Rs)

18. A copy of the project's Covenants, Conditions and Restrictions shall be submitted to the Community Development Department. The conservation easement use restrictions shall be modified to include equivalent protection of the Diablo sage scrub area on Lot 37 to the restrictions proposed for Lots 1 and 2. Reference to the proposed communications facility easement on Lot 37 shall be adjusted to conform with the modifications to the final development plan approved by the Zoning Administrator.

The CC & Rs shall specify that each residential lot shall provide at least six, on-site, visitor parking spaces.

The CC & Rs shall include the long-range creek channel maintenance program described above under the "Erosion Control" heading. The program shall be inserted into the Conservation Protection section.

19. Prior to filing a final map, the applicant shall, as proposed, dedicate to the County the proposed enforcement powers associated with the Conservation Protection section of the modified CC & Rs.

Scenic Easement and Trail Dedications

20. A scenic easement over designated areas shall be dedicated to the County with the recording of the final map.

21. The applicant shall offer to dedicate to the County or other appropriate public agency, trail rights-of-way along the road alignments designated on the Final Development Plan. The trail dedication shall generally encompass the entire road bed. Where trails leave paved roads, the dedication should equal the width of the fire trail, creekside utility road or other path being used. Trail dedication along Ridgewood Road is limited to only that portion of right-of-way owned in fee by the applicant; use of this dedication may be further limited by restrictions on applicant's legal right to grant public access along Ridgewood Road without approval by other parties with an interest in the road.

    The dedication shall provide for access by trail users only. Trail dedication and public use shall become effective when trail access is secured to the south. Trail development and use shall be in conformance with the applicant's agreement with the R 7-A Service Area.

Common Facilities and Long-Term Circulation Controls

22. The final design of the project entries shall be subject to the review and approval of the Zoning Administrator. Illumination shall be limited to that required for security and gate operational purposes and shall be designed to avoid impacts on nearby residences. Design of the gated entries shall provide for:

    A. Easy over-ride for emergency vehicles;

    B. Easy manual operation from inside by residents; and

    C. Emergency use by Ridgewood and Castle Crest Road area residents for escape.

    Instructions for use of project roads in an emergency by Castle Crest and upper Ridgewood Road residents shall be submitted to the Community Development Department. Evidence shall be submitted that these instructions have been distributed to Castle Crest Road and upper Ridgewood Road residents.

23. The design and operation of the project entries shall be structured so as to permit use of the Castle Crest Road access by project residents and emergency vehicles only.

24. Design of the proposed satellite antenna facility shall be subject to the prior review and approval of the Zoning Administrator. The facility shall be placed or screened in accord with the Design Guidelines.

Construction Stage Requirements

25. To provide a temporary means of alternative access for upper Ridgewood Road residents during construction of improvements to the route segment below (east of) the proposed project entrance, a paved roadway link through the project site to Castle Crest Road shall be provided for temporary use as needed by upper Ridgewood Road residents during the lower Ridgewood Road construction period. The section of internal project road between Castle Crest and Ridgewood Roads ("Summit Road and Alyssa Lane") shall be constructed prior to commencement of the proposed Ridgewood Road improvements. Permanent or temporary vehicle barriers shall be constructed at the project's Ridgewood and Castle Crest Road entrances prior to completion of the Ridgewood Road improvements. Residents of upper Ridgewood Road and Castle Crest Road shall be notified at least 15 days in advance of any closure of Ridgewood Road longer than 20 minutes. Any such closure shall be limited to 30 days or less without prior approval of the Zoning Administrator and an additional 10 days notice.

    The developer shall maintain the closed road to be passable by responding emergency vehicles unless prior approval of the Public Works Department is obtained. Said request for closure to emergency vehicles shall be made at least 48 hours in advance. If approved, the developer shall notify all emergency response agencies (including San Ramon Valley Fire Protection District and Consolidated Fire District) by hand delivered written notice and shall provide evidence of receipt of the notice by emergency response agencies to the Public Works Department prior to closure of road for emergency vehicles.

26. Except as described above, project-related Ridgewood Road improvements (widening and guardrails) shall constitute the first phase of project construction and shall be conducted in two stages. First, the road will be widened and reconstructed, and the first layers of paving shall be installed. The second stage of improvement to Ridgewood Road shall commence after completion of project roads and utilities, at which time the final lift of pavement shall be installed. During the period between the two stages of road improvements, the applicant shall maintain the road surface to avoid dangerous conditions.

27. All construction-related traffic shall use Ridgewood Road rather than Castle Crest Road to gain access to and from the site. Ridgewood Road shall be temporarily closed between Lunada Lane and the project entry when trucks carrying wide loads are using the road. These closures shall be scheduled to occur during non-peak, weekday traffic hours. Contractors and sub-contractors shall be informed of this requirement in their contracts.

28. The applicant shall diligently attempt to minimize parking of construction-related vehicles along Ridgewood Road between the project entry and Lunada Lane.

29. Should archaeological materials be uncovered during grading, trenching or other on-site excavation(s), earthwork within 30 yards of these materials shall be stopped until a professional archaeologist who is certified by either the Society for California Archaeology (SCA) and/or the Society of Professional Archaeologists (SOPA) has had an opportunity to evaluate the significance of the find and suggest appropriate mitigation(s), if deemed necessary.

Danville Boulevard of Trees Project Contribution

30. Provide evidence that a contribution has been made of at least $10,000 to the Danville Boulevard of Trees project, prior to filing the final map.

Child Care

31. Provide evidence that a contribution of $9,051 to the Y.M.C.A. has been made for child care facilities at the Rancho Romero Elementary School in accord with the agreement entered into by the applicant, YMCA and the County, prior to filing the final map. These funds shall be used exclusively for capital improvements at Rancho Romero School for child care facilities.

Road, Drainage and Utility Requirements

32. The following requirements pertaining to drainage, road, and utility improvements will require the review and approval of the Public Works Department:

    A. In accordance with Section 92-2.006 of the County Ordinance Code, this subdivision shall conform to the provisions of the County Subdivision Ordinance (Title 9). Any exceptions therefrom must be specifically listed in this conditional approval statement. Conformance with the Ordinance includes the following requirements:

        1) County-maintained street lighting is not required.

        2) Constructing a paved turnaround at the end of each proposed private road.

        3) Underground of all utility distribution facilities.

        4) Conveying all storm waters entering or originating within the subject property, without diversion and within an adequate storm drainage facility, to a natural watercourse having definable bed and banks or to an existing public storm drainage facility which conveys the storm waters to a natural watercourse.

5) Designing and constructing storm drainage facilities required by the Ordinance in compliance with specifications outlined in Division 914 of the Ordinance and in compliance with design standards of the Pubic Works Department. The Ordinance prohibits the discharging of concentrated storm waters into roadside ditches.

   Individual and common drainage systems in the project shall be designed to satisfy the performance standards described in pages 173 - 175 of the September, 1989 Final Environmental Impact Report for this project.

6) Relinquishing "development rights" over that portion of the site that is within the structure setback area of the creek. The structure setback area shall be determined by using the criteria outlined in Chapter 914-14, "Rights of Way and Setbacks", of the Subdivision Ordinance.

7) Submitting improvement plans prepared by a registered civil engineer, payment of review and inspection fees, and security for all improvements required by the Ordinance Code or the conditions of approval for this subdivision.

8) Submitting a Final Map prepared by a registered civil engineer or licensed land surveyor.

B. Widen the existing pavement on Ridgewood Road from the project access to Lunada Lane as necessary to provide a continuous 20-foot pavement width.

C. Construct the on-site roadway system and the off-site portion of Mark Lane to current County private road standards with a minimum width of 16 feet within a 25-foot access easement.

D. Install safety related improvements on Ridgewood Road between the project entrance and Lunada Lane, including guardrails and pavement markers through the curves, subject to the review of the Public Works Department. Safety improvements shall include installation of guardrails and pavement markers through the curves to keep traffic in their lanes and posting curves with their safe driving speed. A stop sign shall be provided at the Lunada Lane approach to Ridgewood Road.

E. Review the super-elevation of the curves along the section of Ridgewood Road from Lunada Lane to the project access gate for safety and comfort, and improve the curves as necessary, subject to review by the Public Works Department and review and approval of the Zoning Administrator.

F. Furnish proof to the Public Works Department, Engineering Services Division, that legal access to the property is available from Ridgewood Road.

G. Provide for adequate sight distance at all internal intersections using a design speed of 25 miles per hour in accordance with CALTRANS standards. No on-street parking shall be permitted along sharp curves of internal roadways.

H. Prevent storm drainage, originating on the property and conveyed in a concentrated manner, from drainage across driveways.

I. Mitigate the impact of the additional storm water run-off from this development on San Ramon Creek by:

1) Removing 1 cubic yard of channel excavation material from the inadequate portion of San Ramon Creek near Chaney Road for each 50 square feet of new impervious surface area created by the development. All excavated material shall be disposed of off-site by the developer at his cost. The site selection, land rights, and construction staking will be by the Flood Control District. OR

2) Upon written request, the applicant may make a cash payment in lieu of actual excavation and removal of material from San Ramon Creek. The cash payment will be calculated at the rate of $0.10 per square foot of new impervious surface area created by the development. The added impervious surface area created by the development will be based on the Flood Control District's standard impervious surface area ordinance. The Flood Control District will use these funds to work on San Ramon Creek annually.

J. Furnish proof to the Public Works Department, Engineering Services Division, of the acquisition of all necessary rights of entry, permits and/or easements for the construction of off-site, temporary or permanent, road and drainage improvements.

The applicant shall make good faith efforts to acquire necessary rights of way and easements. Pursuant to Section 66462.5 of the State Subdivision Map Act, if the applicant is unable to secure the rights needed to construct off-site improvements, and the County fails to acquire or commence proceedings to acquire such rights, then before the County approves the final map the applicant shall enter into an agreement pursuant to Section 66462 to complete the improvements at such time as the County acquires the necessary property rights. The County may require the applicant to reimburse the County for the cost of acquiring off-site real property interests required in connection with this subdivision.

K. Construct a paved turnaround at the Ridgewood Road gate access in accordance with County private road standards.

L. Construct a paved turnaround at the Castle Crest Road gate access within a non-exclusive access easement, subject to the review and approval of the Zoning Administrator.

M. Prior to filing the Final Map, apply to the Public Works Department for annexation of the property to Drainage Area 67A for the maintenance and operation of the drainage area's drainage facilities. The application will require a metes and bounds description of the property.

N. Applicant shall use good faith efforts to attempt to develop and/or enter into a maintenance agreement with the other property owners that will use the private portion of Ridgewood Road, to insure its maintenance.

O. Furnish at least six off-street parking spaces per lot, subject to review and approval of the Zoning Administrator.

P. Assure permanent reliable access from the end of the public road portion of Ridgewood Road and Castle Crest Road. This may require the repair of all on-site landslides that impact the access road. The subdivision improvement plans shall be signed by a licensed geotechnical engineer.

Q. The following drainage requirements shall be required to mitigate any additional run-off from the northeast portion of the project. Individual and common drainage systems for the area of Lots 1 through 5 shall be designed to avoid any added contribution to existing periodic flooding problems in the Ramona Way and Livorna Road West neighborhoods below. These design requirements may require construction of improved ditches, channels, or storm drains, as necessary,

R. Install road signage on the northbound Crest Avenue approach to Castle Crest Road to warn oncoming drivers of the Castle Crest Road.

ADVISORY NOTES

A. This project may be subject to the requirements of the Department of Fish & Game. It is the applicant's responsibility to notify the Department of Fish & Game, P.O. Box 47, Yountville, California 94599, of any proposed construction within this development that may affect any fish and wildlife resources, per the Fish & Game Code.

B. This project may also be subject to the requirements of the Army Corps of Engineers. The applicant should notify the appropriate district of the Corps of Engineers to determine if a permit is required and if it can be obtained.

C. The applicant will be required to comply with the requirements of the Bridge/Thoroughfare Fee Ordinance for the Alamo Area of Benefit as adopted by the Board of Supervisors.

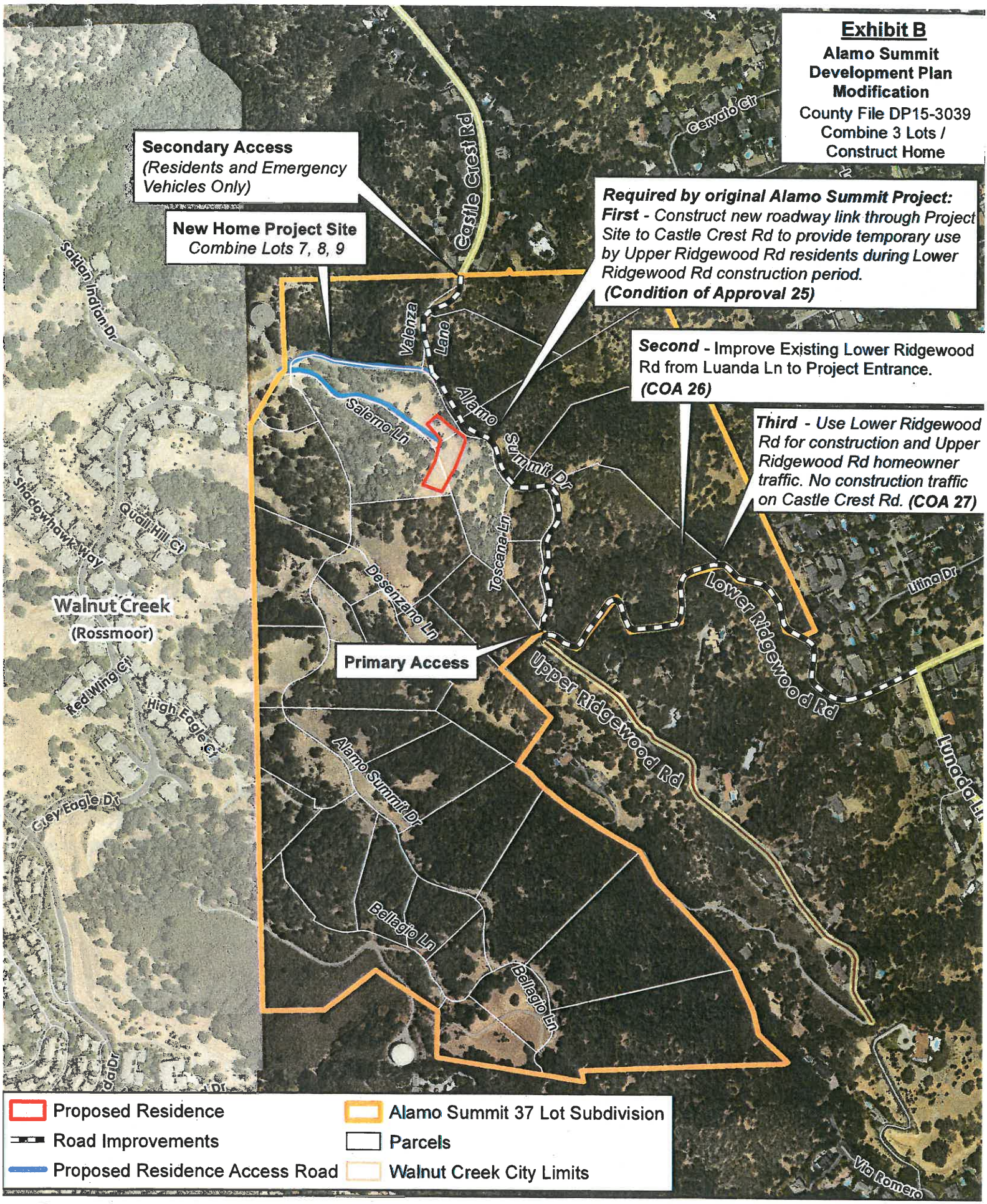
D. The applicant will be required to comply with the drainage fee requirements for Drainage Area 13 as adopted by the Board of Supervisors. When the property is annexed to Drainage Area 67A, the applicant will also be required to comply with the drainage fee requirements for that Drainage Area.

E. Community Development Department shall request Public Works Department to provide striping of Castle Crest Road between the project entrance and Crest Avenue prior to recordation of a final map. This item does not constitute a pre-condition for development of the Alamo Summit project.

F. In the event that the Commission's decision is appealed to the Board of Supervisors, the Commission registers its objection to the creation of a gated community for this project.

RD/aa
SUBVII/7553C.RD
9/9/91
9/17/91
9/26/91
10/17/91
10/17/91-SR(a)
11/20/91

DP MODIFICATION MAP



Map Created 2/7/2016
by Contra Costa County Department of Conservation and Development, GIS Group
30 Muir Road, Martinez, CA 94553
37:59:41.791N 122:07:03.756W

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ALAMO SUMMIT SUBDIVISION MAP

SUBDIVISION 7553

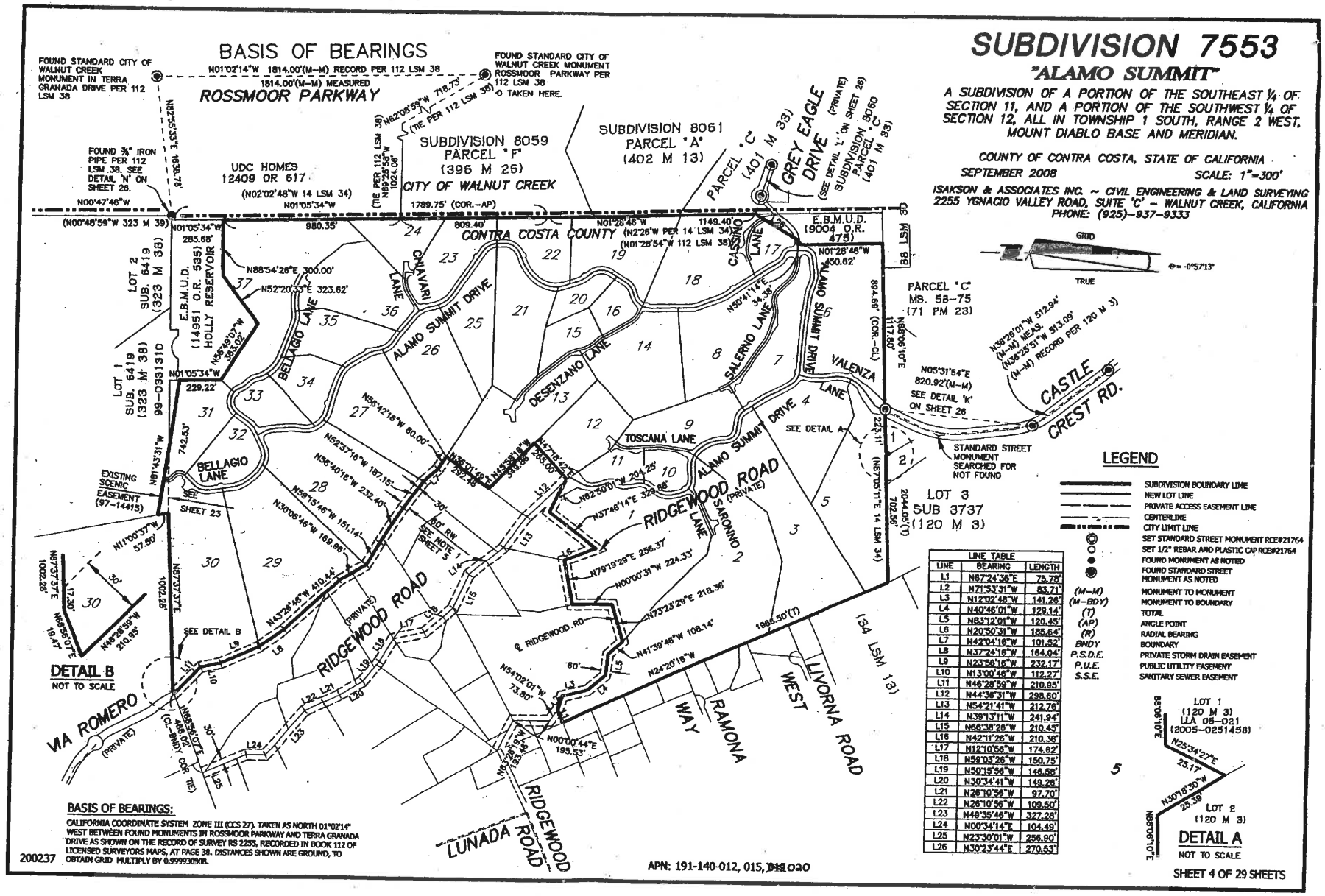
"ALAMO SUMMIT"

A SUBDIVISION OF A PORTION OF THE SOUTHEAST ¼ OF SECTION 11, AND A PORTION OF THE SOUTHWEST ¼ OF SECTION 12, ALL IN TOWNSHIP 1 SOUTH, RANGE 2 WEST, MOUNT DIABLO BASE AND MERIDIAN.

COUNTY OF CONTRA COSTA, STATE OF CALIFORNIA

SEPTEMBER 2008 SCALE: 1"=300'

ISAKSON & ASSOCIATES INC. ~ CIVIL ENGINEERING & LAND SURVEYING
2255 YGNACIO VALLEY ROAD, SUITE 'C' – WALNUT CREEK, CALIFORNIA
PHONE: (925)-937-9333



LINE TABLE		
LINE	BEARING	LENGTH
L1	N67°24'38"E	75.78'
L2	N71°33'31"W	83.71'
L3	N12°02'48"W	141.26'
L4	N40°46'01"W	129.14'
L5	N83°12'01"W	120.45'
L6	N20°50'31"W	185.64'
L7	N42°04'16"W	101.52'
L8	N37°24'16"W	164.04'
L9	N23°56'16"W	232.17'
L10	N13°00'46"W	112.27'
L11	N46°28'59"W	210.95'
L12	N44°38'31"W	298.60'
L13	N54°21'41"W	212.76'
L14	N39°13'11"W	241.94'
L15	N66°38'26"W	210.45'
L16	N42°11'26"W	210.38'
L17	N12°10'56"W	174.62'
L18	N59°03'26"W	150.75'
L19	N50°15'56"W	146.58'
L20	N30°34'41"W	149.26'
L21	N26°10'56"W	97.70'
L22	N26°10'56"W	109.50'
L23	N49°35'46"W	327.28'
L24	N00°34'14"E	104.49'
L25	N23°30'01"W	256.90'
L26	N30°23'44"E	270.53'

BASIS OF BEARINGS:

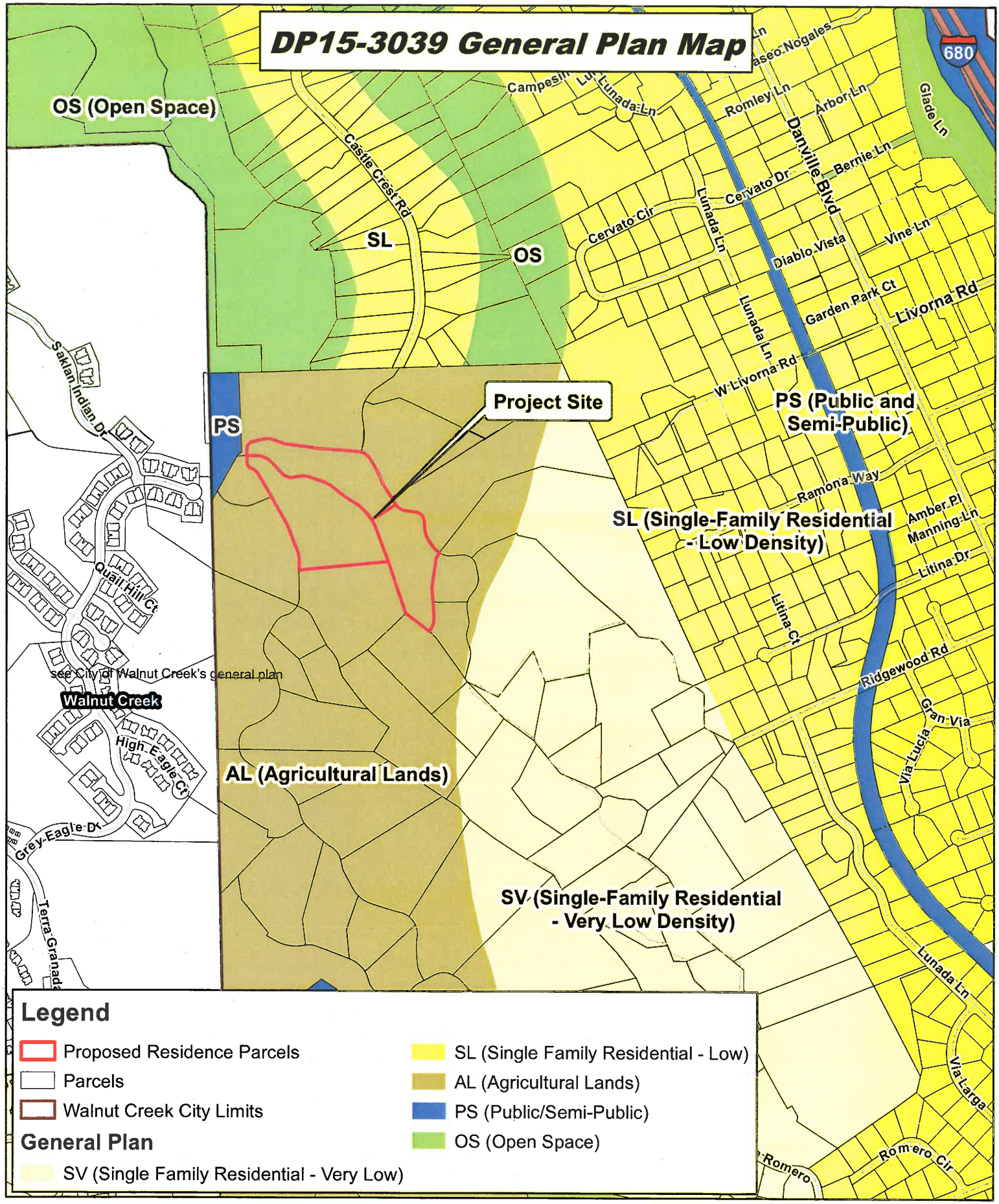
CALIFORNIA COORDINATE SYSTEM ZONE III (CCS 27). TAKEN AS NORTH 01°02'14" WEST BETWEEN FOUND MONUMENTS IN ROSSMOOR PARKWAY AND TERRA GRANADA DRIVE AS SHOWN ON THE RECORD OF SURVEY RS 2253, RECORDED IN BOOK 112 OF LICENSED SURVEYORS MAPS, AT PAGE 38. DISTANCES SHOWN ARE GROUND, TO OBTAIN GRID MULTIPLY BY 0.999930908.

200237

APN: 191-140-012, 015, 018, 020

SHEET 4 OF 29 SHEETS

ZONING MAPS



Map Created 4/18/2018
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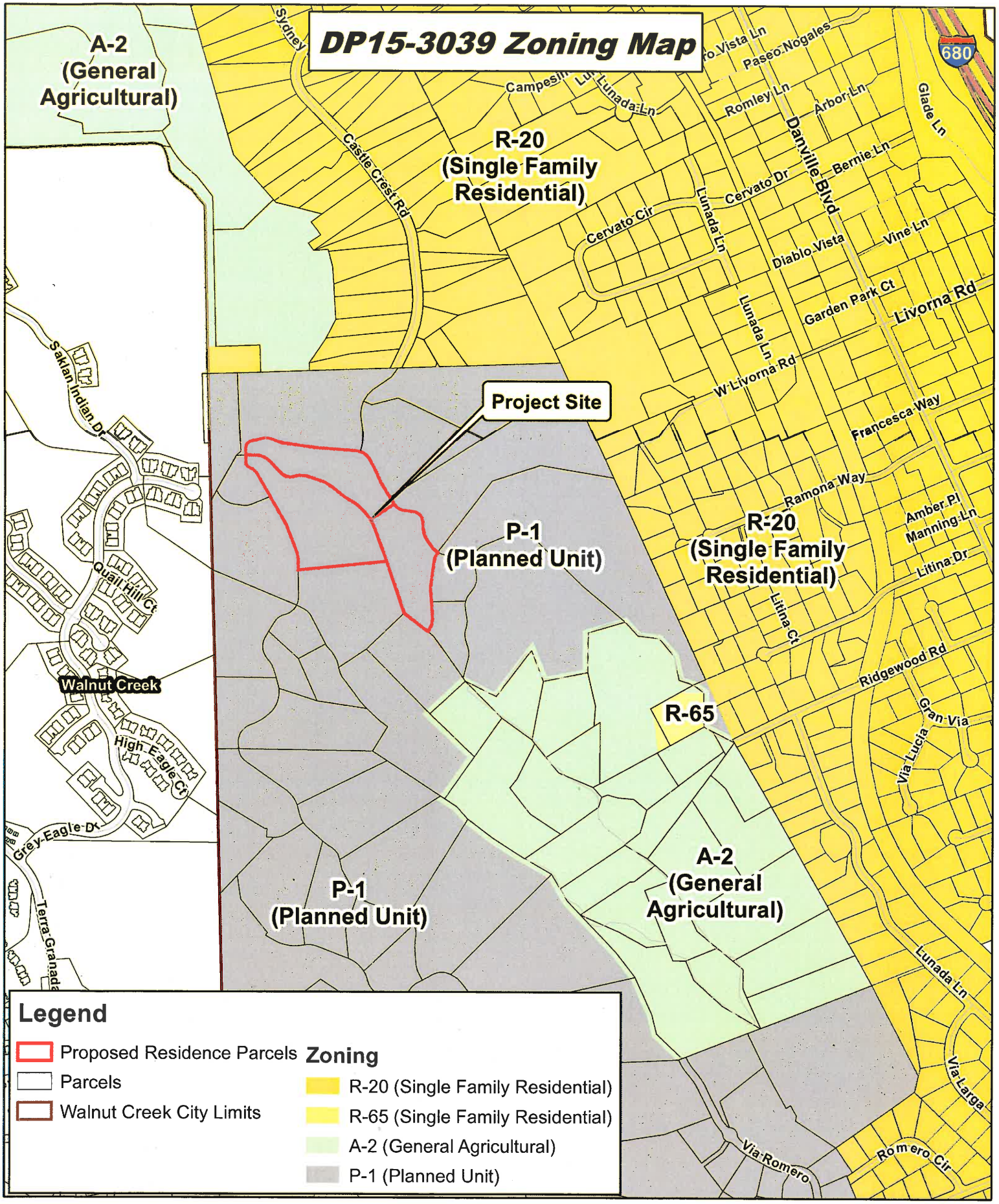

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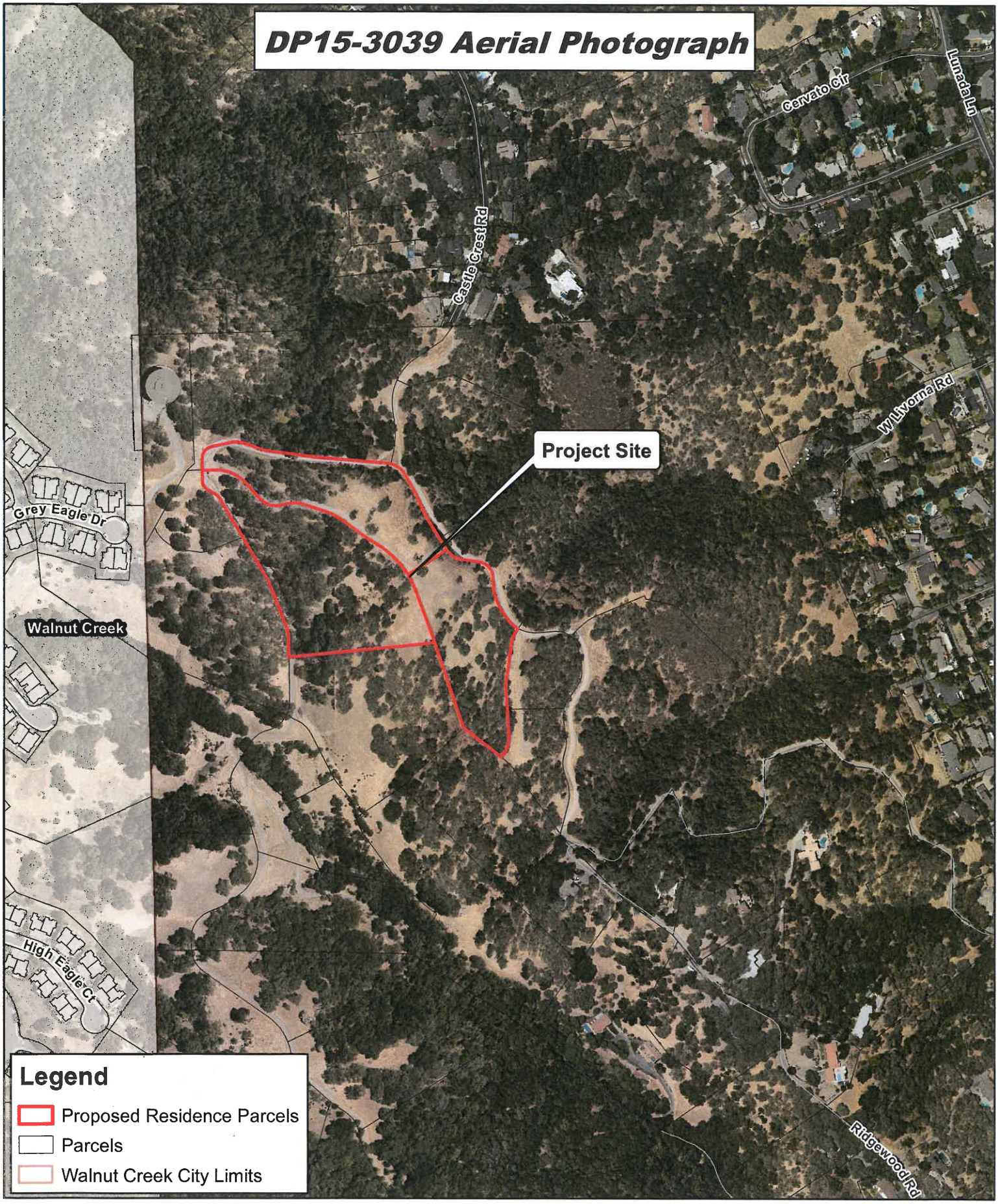
DP15-3039 Aerial Photograph



N

0 195 390 780 Feet

Map Created 4/18/2018
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POWERPOINT

Alamo Summit Single-Family Residence

County File Number DP15-3039

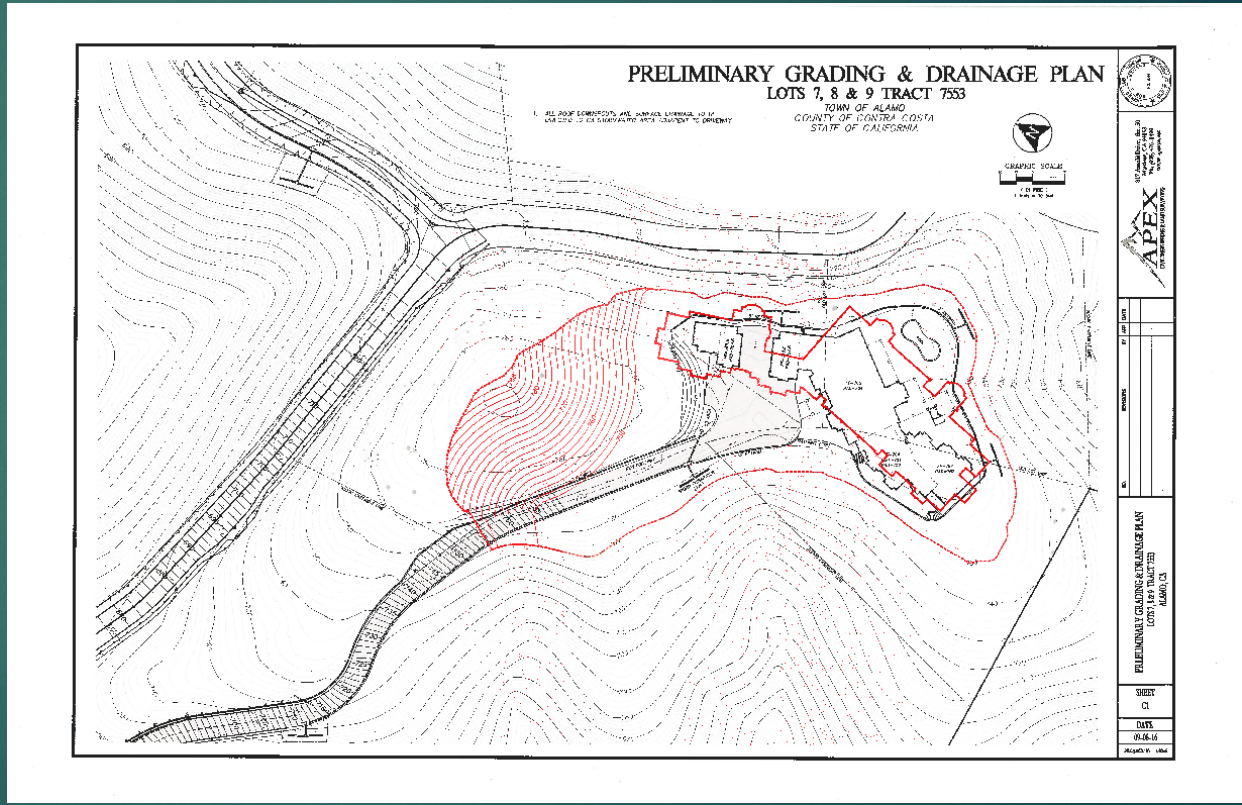
COUNTY BOARD OF SUPERVISORS
TUESDAY, MAY 1, 2018

Chronology

- **March 17, 1992** : 37-lot Alamo Summit Subdivision project (#SD91-7553 & #DP90-3030) approved by the County Board of Supervisors
- **January 22, 2010**: Final Map for subdivision recorded. None of the properties have been developed to date
- **November 12, 2015**: Applicant submits an application to allow merging of three lots, construction of a new residence, and modification of timing for required roadway improvements
- **February 14, 2018**: County Planning Commission unanimously denies proposed project
- **February 22, 2018**: Appeal of County Planning Commission filed with the County

Project Elements

- Lot Merger: Merging of Lots-7, -8, and -9 to create one 12.8-acre lot
- New Residence: Construction of a new 13,887 sq. ft. residence
- Roadway Improvement Timing: Modification to Conditions of Approval #25 and #26 of Final Development Plan #DP90-3030 to change the timing for construction of Alamo Summit Road and improvements to Ridgewood Road until after the residence is constructed and development of the remaining lots has begun.



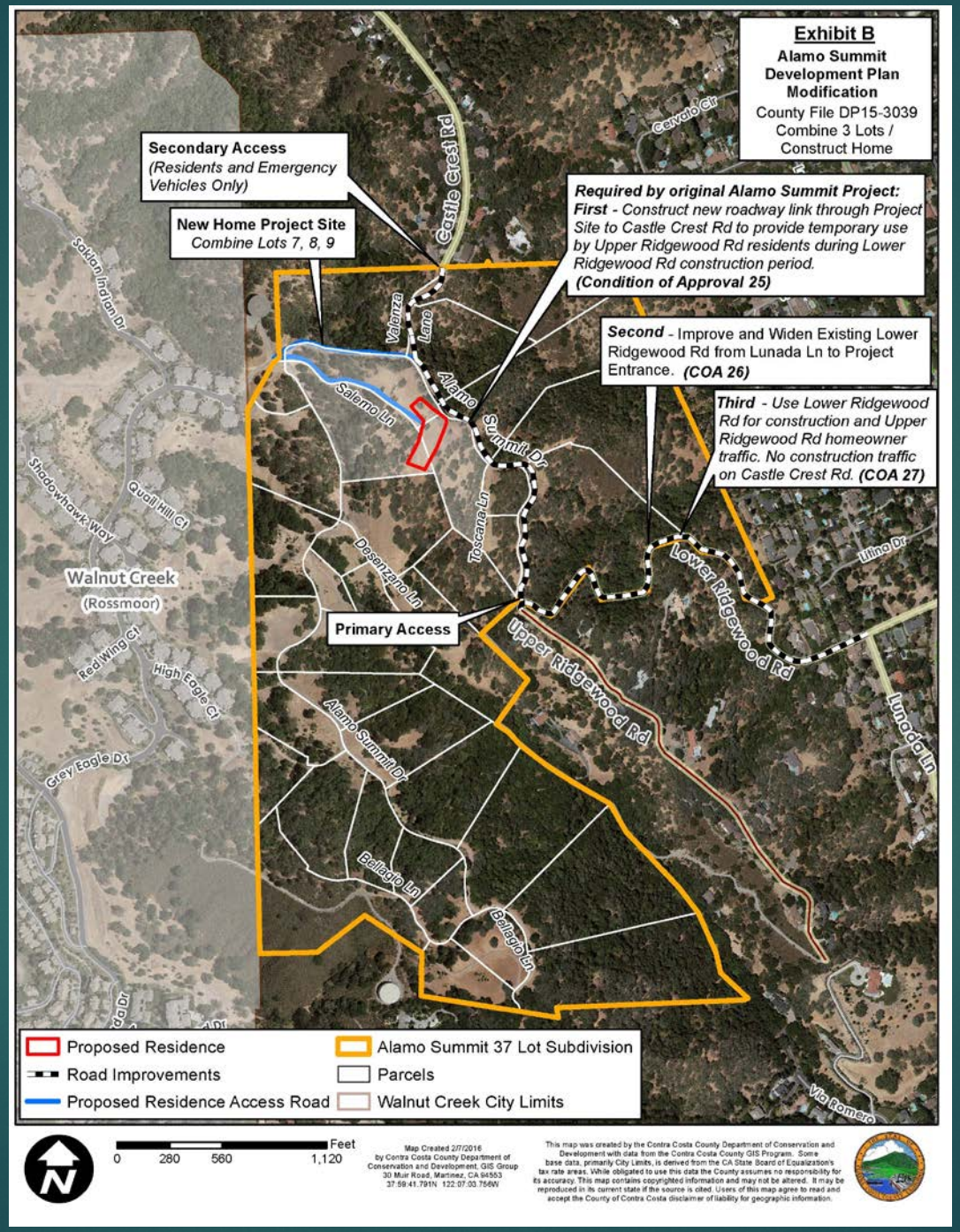


Exhibit B
Alamo Summit Development Plan Modification
County File DP15-3039
Combine 3 Lots / Construct Home
Secondary Access
(Residents and Emergency Vehicles Only)
New Home Project Site
Combine Lots 7, 8, 9
Required by original Alamo Summit Project:
First - Construct new roadway link through Project Site to Castle Crest Rd to provide temporary use by Upper Ridgewood Rd residents during Lower Ridgewood Rd construction period.
(Condition of Approval 25)
Second - Improve and Widen Existing Lower Ridgewood Rd from Lunada Ln to Project Entrance. (COA 26)
Third - Use Lower Ridgewood Rd for construction and Upper Ridgewood Rd homeowner traffic. No construction traffic on Castle Crest Rd. (COA 27)
Primary Access
Castle Crest Rd
Cervato Cir
Valenza Lane
Salerno Ln
Alamo Summit Dr
Toscana Ln
Dosenzano Ln
Lower Ridgewood Rd
Upper Ridgewood Rd
Lilina Dr
Lunada Ln
Via Romero
Sattan Indian Dr
Shadowhawk Way
Quail Hill Ct
Walnut Creek
(Rossmoor)
Redwing Ct
High Eagle Ct
Grey Eagle Dr
Bellagio Ln
Proposed Residence
Road Improvements
Proposed Residence Access Road
Alamo Summit 37 Lot Subdivision
Parcels
Walnut Creek City Limits
Feet
0 280 560 1,120
Map Created 2/7/2016
by Contra Costa County Department of Conservation and Development, GIS Group
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Summary of Appeal Points

- Requesting that the time for improvements be modified, and not for the deletion of any condition of approval
- A solution for construction traffic through the project site has been offered.
- Only one single-family residence is being proposed
- The proposal includes a request to merge three lots, which lessens the overall development impact.

Basis for Staff Recommendation

- Incorporation of mitigations and the addition of conditions of approval requiring roadway improvements addressed project concerns in a manner that allowed for approval of the Alamo Summit subdivision. The Ridgewood Road improvements are required to mitigate hazards created by the existing roadway conditions and the proposed construction traffic, to a less than significant level.

- Lessening the scale of the overall development (lot merger) and making as needed repairs during the construction phase does not mitigate or eliminate the roadway hazards identified in the project EIR.

Questions

Contra Costa County

To: Board of Supervisors

From: John Kopchik, Director, Conservation & Development Department

Date: May 1, 2018

Subject: Hearing on the Urban Farm Animals Ordinance, Urban Farm Animal Exclusion (-UE) Combining District Ordinance, and UE Combining District Rezoning Ord.

RECOMMENDATION(S):

1. OPEN the public hearing on Ordinance No. 2018-06, Ordinance No. 2018-11, and Ordinance No. 2018-12 RECEIVE testimony, and CLOSE the public hearing;
2. DETERMINE that adoption of Ordinance No. 2018-06, Ordinance No. 2018-11, and Ordinance No. 2018-12 is exempt from the California Environmental Quality Act (CEQA) under CEQA Guidelines section 15061(b)(3) ("General Rule" exemption);
3. ADOPT Ordinance No. 2018-06, regulating the raising and keeping of farm animals in residential zoning districts and the keeping of roosters in agricultural zoning districts;
4. ADOPT Ordinance No. 2018-11, establishing an Urban Farm Animal Exclusion (-UE) Combining District to exclude the raising and keeping of farm animals in specified residential district;
5. ADOPT Ordinance No. 2018-12, applying the Urban Farm Animal Exclusion (-UE) Combining District to specified residential districts in Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen; and
6. DIRECT the Department of Conservation and Development to file a CEQA Notice of Exemption with the County Clerk.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Jami Napier, Deputy

Contact: Stan Muraoka, 925-674-7781

cc:

FISCAL IMPACT:
The cost of preparing this ordinance has been funded by the Department of Conservation and Development.

BACKGROUND:
On September 16, 2014, the Board of Supervisors directed the Department of Conservation and Development to study the raising and keeping of small farm animals for non-commercial purposes on small residential lots in unincorporated areas of the County. On May 9, 2017, the Board directed the Department to prepare a countywide amendment of the County Ordinance Code to allow the raising and keeping of certain farm animals including chickens, goats, and honeybees for non-commercial purposes within residential land use districts (the Urban Farm Animals Ordinance). Subsequently, on June 6, 2017, the Board directed the Department to include regulations on the keeping of roosters in agricultural districts in the Urban Farm Animals Ordinance.

On February 6, 2018, the Board directed the Department to include nucleus honeybee hives in the Urban Farm Animals Ordinance, and exclude specific areas of District III, including Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen, from the application of the Urban Farm Animals Ordinance.

Current Status

The keeping of small farm animals, including fowl, rabbits, and other grain-fed rodents, and up to two head of livestock is allowed on any lot in the R-20, R-40, R-65, and R-100 Single-Family Residential Districts. The County Ordinance Code also regulates animal structures and livestock enclosures. Honeybees are not permitted on any residentially zoned lot. On agriculturally- zoned property, all farm animals are permitted with no restriction on the size of the lot or the number of animals.

Proposed Ordinances

A. *Ordinance No. 2018-06 Urban Farm Animals Ordinance*: The Urban Farm Animals Ordinance would add Chapter 82-50 to the County Ordinance Code to establish regulations for the raising and keeping of farm animals, including fowl, rabbits, grain-fed rodents, honeybees, and livestock, on a lot in any single-family residential (R-) district or two-family residential (D-1) district, or a single-family residential lot in a planned unit (P-1) district. The Urban Farm Animals Ordinance would also add Article 84-38.14 to the County Ordinance Code to regulate rooster keeping in agricultural zoning districts.

The following summarizes the regulations contained in the Urban Farm Animals Ordinance related to urban farm animal raising and keeping:

1. The minimum area of a lot on which fowl (except for hens), rabbits, or grain-fed rodents may be raised or kept is 20,000 square feet.
2. The maximum number of domesticated female chickens (hens) allowed on a single lot is one hen per 1,000 square feet of lot area.
3. No more than an aggregate total of 20 fowl (including hens), rabbits, and grain-fed rodents may be kept on a single lot.
4. The minimum area of a lot on which an apiary (honeybees) may be kept is 6,000 square feet.
5. The maximum number of beehives allowed on a single lot is determined by lot area, as follows:

Lot Area	Maximum Number of Beehives
6,000 square feet or more, but less than 20,000 square feet	4
20,000 square feet or more, but less than 40,000 square feet	6
40,000 square feet or more	8

6. For each beehive kept on a lot one nucleus hive may also be kept on the lot. A nucleus hive is defined as a small beehive of a few thousand bees with a queen, created from a larger hive, and typically kept in a small box or container.
7. The minimum area of a lot on which livestock may be raised or kept is 40,000 square feet. The lot must be contiguous.
8. The maximum number of livestock on a single lot is two head of livestock per 40,000 square feet of lot area.

The Urban Farm Animals Ordinance includes specific location and design requirements for animal structures, such as minimum distances from the front, side, and rear property lines, height limits, and honeybee flyway barriers.

The Urban Farm Animals Ordinance would also revise the County Ordinance Code to allow the keeping of up to two roosters on lots of five or more acres in any agricultural district, unless expressly exempted from the limitation (e.g., commercial poultry ranches registered with the California Department of Food and Agriculture and which primarily produce eggs or meat for commercial sale). The Urban Farm Animals Ordinance would also authorize the Animal Services Director to enforce the rooster keeping regulations in Title 8 of the County Ordinance Code.

B. *Ordinance No. 2018-11 Urban Farm Animal Exclusion (-UE) Combining District Ordinance*: The Urban Farm Animal Exclusion (-UE) Combining District Ordinance was prepared at the direction of the Board to exclude specific areas of District III from the application of the Urban Farm Animals Ordinance. The Urban Farm Animal Exclusion (-UE) Combining District Ordinance would add Chapter 84-79 to the County Ordinance Code to establish the UE Combining District. The UE Combining District would apply to single-family residential (R-) districts, single-family residential areas in planned unit (P-1) districts, and two-family residential (D-1) districts, in the communities of Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen.

Keeping or maintaining apiaries would be prohibited in a UE Combining District. Urban farm animal raising and keeping would be prohibited in a UE Combining District, where the underlying zoning district is a R-6, R-7, R-10, R-12, or R-15 single-family residential district, or a single-family residential area in a P-1 planned unit district, or a D-1 two-family residential district. The establishment and application of the UE Combining District will leave the communities of Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen subject to the existing zoning regulations despite adoption of the Urban Farm Animals Ordinance.

C. *Ordinance No. 2018-12 UE Combining District Rezoning Ordinance*: The UE Combining District Rezoning Ordinance would apply the Urban Farm Animal Exclusion (-UE) Combining District to single-family residential (R-) districts, single-family residential areas in planned unit (P-1) districts,

and two-family residential (D-1) districts in the communities of Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen. Rezoning maps showing the UE Combining District are included in rezoning Ordinance No. 2018-12 (attached). The UE Combining District is an overlay that applies zoning regulations in addition to those imposed by the underlying zoning designation. In the Urban Farm Animal Exclusion (-UE) Combining District, uses otherwise permitted under the Urban Farm Animals Ordinance are prohibited.

County Planning Commission Hearing

The County Planning Commission held a public hearing on the revised draft Urban Farm Animals Ordinance, the draft Urban Farm Animal Exclusion (-UE) Combining District, and Rezoning RZ18-3241 on March 14, 2018. The Commission received oral testimony from one person, who commented on the proliferation of hobbyist beekeeping in the Bay Area and the problems created by bee excrement in areas with large numbers of honeybees. As explained in the staff report considered by the Planning Commission, the proposed Urban Farm Animals Ordinance addresses the impact of bees in urban neighborhoods in Contra Costa County and potential problems that may be created by bee excrement, by requiring a minimum lot area to keep honeybees, apiary registration and identification pursuant to the California Food and Agricultural Code, and a fresh water source at all times, along with setting a maximum height for beehive structures, minimum distances from property lines, and requiring flyway barriers for distances of less than 25 feet from any property line. At the conclusion of testimony on March 14, 2018, the County Planning Commission voted to recommend that the Board approve the proposed ordinances and rezoning.

Consistency with General Plan

A. The Urban Farm Animals Ordinance implements General Plan goals and policies such as the following:

• *Land Use Goal 3-A*: To coordinate land use with circulation, development of other infrastructure facilities, and protection of agriculture and open space, and to allow growth and the maintenance of the County's quality of life. In such an environment, all residential, commercial, industrial, recreational and agricultural activities may take place in safety, harmony, and to mutual advantage.

• *Land Use Goal 3-C*: To encourage aesthetically and functionally compatible development which reinforces the physical character and desired images of the County.

The Urban Farm Animals Ordinance would not adversely affect the physical character and quality of life in single-family and two-family residential districts. The Urban Farm Animals Ordinance would assist in the implementation of land use goals and policies for single-family and two-family residential areas by providing for the raising and keeping of urban farm animals on single-family and two-family residential lots, but would not otherwise affect the single-family and two-family residential areas.

The Urban Farm Animals Ordinance would facilitate the maintenance of the physical character and quality of life in agricultural districts. The limitation on the number of roosters on lots in agricultural districts and regulations for rooster keeping on such lots would allow Animal Services staff to control rooster fighting in the County, but would not affect agricultural activities.

B. *County Code Section 26-2.1806(1): The change proposed will substantially comply with the General Plan.* The Urban Farm Animal Exclusion (-UE) Combining District Ordinance and the UE Combining District Rezoning Ordinance would exclude specific areas of District III from the

application of the Urban Farm Animals Ordinance. Under the rezoning, keeping or maintaining an apiary would not be allowed in any residential area of Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen, and farm animal raising and keeping would not be allowed in the R-6, R-7, R-10, R-12, and R-15 single-family residential districts, or in a P-1 planned unit district for which single-family residential uses are approved, or in a D-1 two-family residential district in these residential areas. However, the areas to be rezoned would remain subject to and consistent with existing General Plan goals and policies, and thereby, would substantially comply with the General Plan.

C. *Growth Management Performance Standards*. The Urban Farm Animals Ordinance, Urban Farm Animal Exclusion (-UE) Combining District Ordinance, and UE Combining District Rezoning Ordinance would also be consistent with the Growth Management Performance Standards. The Urban Farm Animals Ordinance would allow for the raising and keeping of farm animals on residential parcels and restrict the number of roosters on agricultural parcels, but it would not alter the underlying use of the parcels, or substantially increase the intensity of use of the parcels, or increase the number of persons on the parcels. Thus, the Urban Farm Animals Ordinance would not create any significant impact on traffic, water, sewage, fire protection, public protection, parks and recreation or flood control and drainage. The Urban Farm Animal Exclusion (-UE) Combining District Ordinance and the UE Combining District Rezoning Ordinance would exclude specified properties from the application of the Urban Farm Animals Ordinance, and therefore, no change would occur on the subject properties and there would be no effect on traffic, water, sewage, fire protection, public protection, parks and recreation, or flood control and drainage.

Consistency with Zoning

A. The Urban Farm Animals Ordinance would expand allowable uses on lots in single-family residential districts (R-6, R-7, R-10, R-12, R-15, R-20, R-40, R-65, and R-100 Districts), on single-family residential lots in a planned unit (P-1) district, and on lots in a two-family residential (D-1) district. The Urban Farm Animals Ordinance would also establish standards for animal structures and livestock enclosures. The proposed Ordinance would not conflict in any manner with applicable zoning regulations.

The Urban Farm Animals Ordinance would reduce the number of code enforcement actions for unpermitted uses by making the raising and keeping of urban farm animals a permitted use. The zoning aspects of these uses (e.g., number of animals, animal structure setbacks) would be regulated by the provisions of the Urban Farm Animals Ordinance and Title 8 of the County Code. Animal noise and animal odors would continue to be addressed by existing regulations in Title 4 of the County Code.

With respect to rooster keeping, the limitation on the number of roosters that can be kept on a lot in an agricultural district would allow for the control of rooster fighting, but would not otherwise affect agricultural activities.

B. *County Code Section 26-2.1806(2): The uses authorized or proposed in the land use district is compatible within the district and with uses authorized in adjacent districts.* The Urban Farm Animal Exclusion (-UE) Combining District Ordinance and UE Combining District Rezoning Ordinance would exclude specific areas of District III from the application of the Urban Farm Animals Ordinance. The rezoned areas would remain subject to the existing regulations of the underlying zoning district, and therefore, would remain consistent with existing zoning regulations. Further, the residential areas of Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen are adjacent to large areas in agricultural zoning districts. Application of the UE Combining District to these residential areas would maintain the current relationship of the residential areas to the adjacent

agricultural areas. Thus, the authorized uses in areas to be rezoned and the regulation of these uses would remain compatible with the uses and regulations of the underlying zoning district and the uses and regulations of adjacent zoning districts.

C. *County Code Section 26-2.1806(3): Community need has been demonstrated for the use proposed, but this does not require demonstration of future financial success.* A distinguishing characteristic of District III is that the unincorporated residential communities in the District, including Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen, are relatively small communities adjacent to large areas of agricultural land, where farm animal raising and keeping is a prevalent land use activity. Accordingly, the residential communities are distinctly urban locations in a predominantly agricultural setting. Application of the Urban Farm Animals Ordinance in the residential areas of Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen would weaken existing distinctions between urban and rural areas by allowing farm animal raising and keeping in the urban areas in a manner similar to the adjacent rural areas. Thus, there is a community need for the rezoning, because the proposed rezoning of these residential areas to the UE Combining District would maintain the existing separation of urban and rural activities and the distinct urban character of the communities.

California Environmental Quality Act

Adoption of the Urban Farm Animals Ordinance, Urban Farm Animal Exclusion (-UE) Combining District Ordinance, and UE Combining District Rezoning Ordinance is exempt from the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines Section 15061(b)(3). The Urban Farm Animals Ordinance would authorize only minor alterations to land and new construction or conversion of small structures. The Urban Farm Animal Exclusion (-UE) Combining District Ordinance and UE Combining District Rezoning Ordinance would not result in any change to existing land use regulations and would result in no physical change. Therefore, it can be seen with certainty that there is no possibility that the project could have a significant effect on the environment.

Conclusion and Recommendation

The Urban Farm Animals Ordinance allows for the raising and keeping of urban farm animals on single-family and two-family residential lots and regulates the keeping of roosters on agricultural lots, in a manner consistent with the overall physical character and quality of life in the County. The Urban Farm Animals Ordinance would provide clear parameters for the raising and keeping of urban farm animals and for rooster keeping, to ensure the health, safety, and general welfare of the community. The Urban Farm Animal Exclusion (-UE) Combining District Ordinance and the UE Combining District Rezoning Ordinance would exclude certain areas of District III, including residential areas of Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen, from the application of the Urban Farm Animals Ordinance, and would maintain the existing separation of urban and rural activities and the distinct urban character of these communities. Staff recommends that the Board of Supervisors adopt Ordinance No. 2018-06, Ordinance No. 2018-11, and Ordinance No. 2018-12.

CONSEQUENCE OF NEGATIVE ACTION:

The County will continue to allow the keeping of urban farm animals, but not including honeybees, on lots in the R-20, R-40, R-65, and R-100 Single-Family Residential Districts. Property owners in the R-6, R-7, R-10, R-12, R-15, D-1, and P-1 districts will not be allowed to keep urban farm animals. The keeping of honeybees would not be permitted on any residentially-zoned lot. The number of roosters allowed on an agriculturally-zoned property would not be restricted.

CLERK'S ADDENDUM

Mike Vigo, Mt. Diablo Beekeepers Association; Paula McCauley, 4-H; Norman Lott, Mt. Diablo Beekeepers Association; Jan pinkerton Spieth, Mt. Diablo Beekeepers Association.

CLOSED the public hearing; DETERMINED that adoption of Ordinance No. 2018-06, Ordinance No. 2018-11, and Ordinance No. 2018-12 is exempt from the California Environmental Quality Act (CEQA); ADOPTED Ordinance No. 2018-06, regulating the raising and keeping of farm animals in residential zoning districts and the keeping of roosters in agricultural zoning districts; ADOPTED Ordinance No. 2018-11, establishing an Urban Farm Animal Exclusion (-UE) Combining District to exclude the raising and keeping of farm animals in specified residential district; ADOPTED Ordinance No. 2018-12, applying the Urban Farm Animal Exclusion (-UE) Combining District to specified residential districts in Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen; and DIRECTED the Department of Conservation and Development to file a CEQA Notice of Exemption with the County Clerk.

AGENDA ATTACHMENTS

Ordinance No. 2018-06

Ordinance No. 2018-11

Ordinance No. 2018-12

MINUTES ATTACHMENTS

Signed Ordinance No. 2018-06

Signed Ordinance No. 2018-11

Signed Ordinance 2018-12

Correspondence Received

ORDINANCE NO. 2018-06

URBAN FARM ANIMALS

The Contra Costa County Board of Supervisors ordains as follows (omitting the parenthetical footnotes from the official text of the enacted or amended provisions of the County Ordinance Code):

SECTION I. SUMMARY. This ordinance adds Chapter 82-50 to the County Ordinance Code to regulate the raising and keeping of farm animals in residential zoning districts. This ordinance also amends the County Ordinance Code to regulate the keeping of roosters in agricultural zoning districts.

SECTION II. Chapter 82-50 is added to the County Ordinance Code, to read:

Chapter 82-50
URBAN FARM ANIMALS

Article 82-50.2
General

82-50.202 Purpose. The primary purpose of this chapter is to establish regulations for the raising and keeping of farm animals in residential zoning districts. The provisions of this chapter do not apply in any agricultural zoning district. (Ord. 2018-06 § 2).

82-50.204 Definitions. For the purposes of this chapter, the following words and phrases have the following meanings:

(a) "Apiary" has the meaning set forth in Food and Agricultural Code section 29002.

(b) "Bird enclosure" means one or more coops, cotes, pens, cages, or other similar enclosures, used to house one or more birds, including pigeons, but not including poultry, fowl, roosters, peacocks, or guinea fowl.

(c) "Farm animals" means one or more fowl, rabbits, grain-fed rodents, bees, or livestock.

(d) "Fowl" means one or more domesticated chickens, ducks, geese, turkeys, or similar birds customarily kept for eggs or meat. "Fowl" does not include roosters, peacocks, or guinea fowl.

(e) "Nucleus hive" means a small beehive of a few thousand bees with a queen, created from a larger hive, and typically kept in a small box or container.

(f) "Urban farm animal raising and keeping" means the raising or keeping of farm animals in residential zoning districts for non-commercial purposes. (Ord. 2018-06 § 2).

Article 82-50.4
Urban Farm Animal Raising and Keeping

82-50.402 Location requirements. Urban farm animal raising and keeping is allowed on any lot in a single-family residential district (R-6, R-7, R-10, R-12, R-15, R-20, R-40, R-65, and R-100), a planned unit (P-1) district for which single-family residential uses are approved, or a two-family residential (D-1) district. (Ord. 2018-06 § 2).

82-50.404 Standards - Small animals.

(a) The minimum area of a lot on which fowl (except for hens), rabbits, or grain-fed rodents may be raised or kept is 20,000 square feet.

(b) The maximum number of domesticated female chickens (hens) allowed on a single lot is one hen per 1,000 square feet of lot area.

(c) No more than an aggregate total of 20 fowl (including hens), rabbits, and grain-fed rodents may be kept on a single lot.

(d) The maximum height of a chicken coop, rabbit hutch, or similar accessory structure for the housing of small animals is 12 feet.

(e) Chicken coops, rabbit hutches, and similar accessory structures for the housing of small animals must be set back from property lines by the following distances:

Average Lot Width	**Minimum Distance From**		
	Front Property Line	**Side Property Line**	**Rear Property Line**
Less than 80 feet	**50 feet**	**10 feet**	**10 feet**
80 feet or more, but less than 120 feet	**50 feet**	**25 feet**	**25 feet**
120 feet or more	**60 feet**	**40 feet**	**40 feet**

(f) Bird enclosures are governed by Article 82-50.6. (Ord. 2018-06 § 2).

82-50.406 Standards - Apiaries.

(a) The minimum area of a lot on which an apiary may be kept is 6,000 square feet.

(b) The maximum number of beehives allowed on a single lot, excluding nucleus hives, is determined by lot area, as follows:

Lot Area	**Maximum Number of Beehives**
6,000 square feet or more, but less than 20,000 square feet	**4**
20,000 square feet or more, but less than 40,000 square feet	**6**
40,000 square feet or more	**8**

(c) For each beehive kept on a lot in accordance with subsection (b) of this section, one nucleus hive may also be kept on the lot.

(d) An apiary must be registered and identified in accordance with Article 4 of Chapter 1 of Division 13 of the Food and Agricultural Code.

(e) A fresh water source for bees must be provided at all times on a lot on which an apiary is located.

(f) The maximum height of an accessory structure for the housing of beehives is 12 feet.

(g) Accessory structures for the housing of beehives must be set back from property lines by the following distances:

Average Lot Width	**Minimum Distance From**		
	Front Property Line	**Side Property Line**	**Rear Property Line**
Less than 80 feet	**50 feet**	**15 feet**	**15 feet**
80 feet or more, but less than 120 feet	**50 feet**	**25 feet**	**25 feet**
120 feet or more	**60 feet**	**40 feet**	**40 feet**

(h) If an accessory structure for the housing of beehives is located less than 25 feet from any property line, the structure must be enclosed by a six-foot tall solid barrier located 10 feet or less from the structure in all directions. (Ord. 2018-06 § 2).

82-50.408 Standards - Livestock.

(a) The minimum area of a lot on which livestock may be raised or kept is 40,000 square feet. The lot must be contiguous.

(b) The maximum number of livestock on a single lot is two head of livestock per 40,000 square feet of lot area.

(c) Barns, stables, and other buildings or structures used to shelter livestock must be set back at least 100 feet from the front property line and all streets, and must be set back at least 50 feet from all side and rear property lines. Fenced pasture, paddocks, or other enclosed livestock areas must be located at least 10 feet from all property lines. (Ord. 2018-06 § 2).

Article 82-50.6
Bird Enclosures

82-50.602 Location requirements. A bird enclosure is allowed on any lot in a single-family residential district (R-6, R-7, R-10, R-12, R-15, R-20, R-40, R-65, and R-100), a planned unit (P-1) district for which single-family residential uses are approved, or a two-family residential (D-1) district. (Ord. 2018-06 § 2).

82-50.604 Standards.

(a) The maximum size of a bird enclosure is one square foot per 50 square feet of lot area. A bird enclosure may not exceed 1,600 square feet.

(b) The maximum height of a bird enclosure is 12 feet.

(c) A bird enclosure must be set back at least 25 feet from the front property line and all streets, and must be set back at least 10 feet from all side and rear property lines.

(d) A bird enclosure must be maintained in a sanitary manner as determined by the county health department. (Ord. 2018-06 § 2).

Article 82-50.8
Variance Permits

82-50.802 Variance permit - Granting. Variance permits to modify the height or setback provisions in Article 82-50.4 and Article 82-50.6 may be granted in accordance with Chapter 26-2. (Ord. 2018-06 § 2).

SECTION III. Section 82-4.238 of the County Ordinance Code is deleted in its entirety.

SECTION IV. Section 84-4.402 of the County Ordinance Code is amended to read:

84-4.402 Uses–Permitted. The following uses are allowed in an R-6 district:

(1) A detached single-family dwelling on each lot and the accessory structures and uses normally auxiliary to it;

(2) Crop and tree farming;

(3) Publicly owned parks and playgrounds;

(4) A residential care facility for the elderly, operated by a person with all required state and local agency approvals or licenses, where no more than six persons reside or receive care, not including the licensee or members of the licensee's family or persons employed as facility staff;

(5) A family day care home where care, protection and supervision of twelve or fewer children in the provider's own home are provided for periods of less than twenty-four hours per day, while the parents or guardians are away;

(6) Bird enclosures in compliance with the provisions of Chapter 82-50.

(7) Accessory dwelling units complying with the provisions of Chapter 82-24.

(8) Urban farm animal raising and keeping in compliance with the provisions of Chapter 82-50. (Ords. 2018-06 § 4, 2003-17 § 4, 86-43 § 2, 78-83 § 1, 77-51 § 2, 68-25 § 2: prior code § 8142(a): Ords. 1269 § 1, 1179 § 3, 1039, 1028, 382 § 4A).

SECTION V. Section 84-14.402 of the County Ordinance Code is amended to read:

84-14.402 Uses–Allowed. The following uses are allowed in the R-20 district:

(1) A detached single-family dwelling on each lot and the accessory structures and uses normally auxiliary to it;

(2) Crop and tree farming, and horticulture;

(3) A temporary stand for the sale of agricultural products grown on the premises, with two and one-half acres per stand, set back at least thirty-five feet from the front property line, and operated not more than three months in any calendar year;

(4) Urban farm animal raising and keeping in compliance with the provisions of Chapter 82-50;

(5) Publicly owned parks and playgrounds;

(6) A residential care facility for the elderly, operated by a person with all required state and local agency approvals or licenses, where not more than six persons

reside or receive care, not including the licensee or members of the licensee's family or persons employed as facility staff;

(7) A family day care home where care, protection, and supervision of twelve or fewer children in the provider's own home are provided for periods of less than twenty-four hours per day, while the parents or guardians are away;

(8) Bird enclosures in compliance with the provisions of Chapter 82-50;

(9) Accessory dwelling units complying with the provisions of Chapter 82-24. (Ords. 2018-06 § 5, 2017-11 § 4, 86-43 § 4, 78-83 § 2, 77-51 § 8, 68-25 § 2, 2033, 2032, 1768 § 2: prior code § 8146(a): Ords. 1269, 1179 § 8, 382 § 4V).

SECTION VI. Section 84-14.404 of the County Ordinance Code is amended to read:

84-14.404 Uses–Requiring land use permit. In the R-20 district the following uses are permitted on the issuance of a land use permit:

(1) Same as in the R-6 district (Section 84-4.404) except for the deletion of "Greenhouses, over three hundred square feet";

(2) Horse riding academies and horse riding instruction, provided that the standards in Section 82-50.408 are complied with. (Ords. 2018-06 § 6, 86-43 § 5, 1768, 1569: prior code § 8146(b): Ord. 1269: Ord. 1179).

SECTION VII. Article 84-14.14 of the County Ordinance Code is deleted in its entirety.

SECTION VIII. Section 84-14.1602 of the County Ordinance Code is amended to read:

84-14.1602 Land use and variance permit - Granting. Land use permits for the special uses enumerated in Section 84-14.404, and variance permits to modify the provisions in Sections 84-14.402(7) and 84-14.602 through 84-14.1202, may be granted in accordance with Chapters 26-2 and 82-6. (Ords. 2018-06 § 8, 77-51 § 9, 1768 § 4: prior code § 8146(l): Ords. 1179 § 8 [382 § 4V]).

SECTION IX. Article 84-16.14 of the County Ordinance Code is deleted in its entirety.

SECTION X. Section 84-16.1602 of the County Ordinance Code is amended to read:

84-16.1602 Land use and variance permit - Granting. Land use permits for the special uses enumerated in Section 84-16.404, and variance permits to modify the provisions in Sections 84-14.402(7) and 84-16.602 through 84-16.1202, may be granted in accordance with Chapters 26-2 and 82-6. (Ords. 2018-06 § 10, 77-51 § 10, 1768 § 4: prior code § 8148(l): Ords. 1179 § 9, 420 § 6 [382 § 46]).

SECTION XI. Section 84-18.404 of the County Ordinance Code is amended to read:

84-18.404 Uses–Requiring land use permit. In the R-65 district the following uses are permitted after the issuance of a land use permit:

(1) All the uses designated for the R-6 district in Section 84-4.404 except for the deletion of:

(A) Greenhouses, over three hundred square feet;

(B) Hospitals, eleemosynary and philanthropic institutions and convalescent homes;

(2) Horse riding academies and horse riding instruction, provided that the standards in Section 82-50.408 are complied with. (Ords. 2018-06 § 11, 1768, 1569: prior code § 8148.5(b): Ord. 1405).

SECTION XII. Article 84-18.14 of the County Ordinance Code is deleted in its entirety.

SECTION XIII. Section 84-18.1602 of the County Ordinance Code is amended to read:

84-18.1602 Land use and variance permit - Granting. Land use permits for the special uses enumerated in Section 84-18.404, and variance permits to modify the provisions in Sections 84-14.402(7) and 84-18.602 through 84-18.1202, may be granted in accordance with Chapters 26-2 and 82-6. (Ords. 2018-06 § 13, 77-51 § 11, 1768 § 4: prior code § 8148.5(l): Ord. 1405).

SECTION XIV. Article 84-20.14 of the County Ordinance Code is deleted in its entirety.

SECTION XV. Section 84-20.1602 of the County Ordinance Code is amended to read:

84-20.1602 Land use and variance permit - Granting. Land use permits for the special uses enumerated in Section 84-20.404, and variance permits to modify the provisions in Sections 84-14.402(7) and 84-20.602 through 84-20.1202, may be granted in accordance with Chapters 26-2 and 82-6. (Ords. 2018-06 § 15, 77-51 § 12, 1768 § 4, 1549: prior code § 8148.7(l)).

SECTION XVI. Section 82-4.320 is added to the County Ordinance Code, to read:

82-4.320 Poultry. "Poultry" means one or more domesticated birds or roosters customarily kept for the production of eggs or meat for commercial use. (Ord. 2018-06 § 16).

SECTION XVII. Section 82-4.322 is added to the County Ordinance Code, to read:

82-4.322 Rooster. "Rooster" means any male chicken that: (1) is six months or older, (2) has

full adult plumage, or (3) is capable of crowing. (Ord. 2018-06 § 17).

SECTION XVIII. Article 84-38.14 is added to the County Ordinance Code, to read:

Article 84-38.14
Rooster Keeping

84-38.1402 Standards.

(a) The minimum lot size on which to keep a rooster is five acres.

(b) No person may keep, maintain, or harbor more than two roosters on a lot except as part of, or in connection with, any of the following:

(1) Commercial poultry ranches registered with the California Department of Food and Agriculture and which primarily produce eggs or meat for commercial sale.

(2) Public or private schools registered with the California Department of Education.

(3) Projects sponsored by Future Farmers of America or other similar programs focused on youth agricultural education.

(4) Legitimate poultry hobbyists as approved in writing by the animal services director.

(c) In addition to any other remedy allowed by this code or applicable law, the animal services director may issue an administrative penalty under Article 416-4.8 to any responsible person for a violation of this article. (Ord. 2018-06 § 18).

SECTION XIX. Article 84-40.14 is added to the County Ordinance Code, to read:

Article 84-40.14
Rooster Keeping

84-40.1402 Standards. Rooster keeping standards for the A-3 district shall be the same as those for the A-2 district (Section 84-38.1402). (Ord. 2018-06 § 19).

SECTION XX. Article 84-42.16 is added to the County Ordinance Code, to read:

Article 84-42.16
Rooster Keeping

84-42.1602 Standards. Rooster keeping standards for the A-4 district shall be the same as those for the A-2 district (Section 84-38.1402). (Ord. 2018-06 § 20).

SECTION XXI. Article 84-80.14 is added to the County Ordinance Code, to read:

Article 84-80.14
Rooster Keeping

84-80.1402 Standards. Rooster keeping standards for the A-20 district shall be the same as those for the A-2 district (Section 84-38.1402). (Ord. 2018-06 § 21).

SECTION XXII. EFFECTIVE DATE. This ordinance becomes effective 30 days after passage, and within 15 days after passage shall be published once with the names of supervisors voting for or against it in the Contra Costa Times, a newspaper published in this County.

PASSED on _____, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

ATTEST: DAVID J. TWA,
Clerk of the Board of Supervisors
and County Administrator

_____
Board Chair

By: _____
Deputy

[SEAL]

KCK:
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ORDINANCE NO. 2018-11

URBAN FARM ANIMAL EXCLUSION COMBINING DISTRICT

The Contra Costa County Board of Supervisors ordains as follows (omitting the parenthetical footnotes from the official text of the enacted or amended provisions of the County Ordinance Code):

SECTION I. SUMMARY. This ordinance adds Chapter 84-79 to the County Ordinance Code to establish the Urban Farm Animal Exclusion (-UE) Combining District. The ordinance prohibits urban farm animal raising and keeping in specified residential zoning districts in Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen.

SECTION II. Chapter 84-79 is added to the County Ordinance Code, to read:

Chapter 84-79
URBAN FARM ANIMAL EXCLUSION (-UE) COMBINING DISTRICT

Article 84-79.2
General

84-79.202 Urban farm animal exclusion (-UE) combining district. All land within a land use district combined with an urban farm animal exclusion (-UE) combining district is subject to the additional regulations set forth in this chapter. (Ord. 2018-11 § 2).

84-79.204 Applicability. The -UE district applies to all property in any of the following zoning districts located in the following communities:

(a) Zoning districts.

(1) Single-family residential districts (R-6, R-7, R-10, R-12, R-15, R-20, R-40, R-65, and R-100).

(2) Planned unit (P-1) districts for which single-family residential uses are approved.

(3) Two-family residential (D-1) districts.

(b) Communities.

(1) Bethel Island.

(2) Byron.

(3) Diablo.

(4) Discovery Bay.

(5) Knightsen. (Ord. 2018-11 § 2).

84-79.206 Priority. If there is any conflict between the regulations of this chapter and those of the underlying zoning district, the requirements of this chapter govern. (Ord. 2018-11 § 2).

84-79.208 Definitions. For the purposes of this chapter, the following words and phrases have the following meanings:

(a) "Apiary" has the meaning set forth in Section 82-50.204.

(b) "Urban farm animal raising and keeping" has the meaning set forth in Section 82-50.204. (Ord. 2018-11 § 2).

Article 84-79.4
Uses

84-79.402 Permitted uses.

(a) Except as otherwise provided in Section 84-79.404, all uses authorized in the underlying zoning district are permitted in a -UE district.

(b) Urban farm animal raising and keeping is permitted in a -UE district where the underlying zoning district is a single-family residential district with an R-20, R-40, R-65, or R-100 designation. (Ord. 2018-11 § 2).

84-79.404 Prohibited uses.

(a) Keeping or maintaining an apiary is prohibited in a -UE district.

(b) Urban farm animal raising and keeping is prohibited in a -UE district where the underlying zoning district is a listed single-family residential district (R-6, R-7, R-10, R-12, R-15), a planned unit (P-1) district for which single-family residential uses are approved, or a two-family residential (D-1) district. (Ord. 2018-11 § 2).

SECTION III. EFFECTIVE DATE. This ordinance becomes effective 30 days after passage, and within 15 days after passage shall be published once with the names of supervisors voting for or against it in the Contra Costa Times, a newspaper published in this County.

PASSED on _____, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

ATTEST: DAVID J. TWA,
Clerk of the Board of Supervisors
and County Administrator

_____
Board Chair

By: _____
Deputy

[SEAL]

KCK:
H:\Client Matters\2018\DCD\Ordinance No. 2018-11 Urban Farm Animal Exclusion Combining District.wpd

ORDINANCE NO. **2018 - 12**
(Re-Zoning Land in the

East County Area)

New Zoning
The Contra Costa County Board of Supervisors ordains as follows:

SECTION I: Pages **E-26, F-27, F-28, G-28, H-28, J-26, M-28m, M-28, M-29, N-28, N-29, P-27, P-28, P-29, Q-27, Q-28m, R-17, S-17** of the County's 2005 Zoning Map (Ord. No. 2005-03) is amended by re-zoning the land in the above area shown shaded on the map(s) attached hereto and incorporated herein (see also Department of Conservation and Development File No. **RZ18-3241** .)

FROM: Land Use District

D-1	**(Two Family Residential)**
R-6, R-10, R-20, R-40	**(Single Family Residential)**
R-6 -FH, R-40 -FH	**(Single Family Residential -Flood Hazard Combining District)**
P-1	**(Planned Unit)**
P-1 -FH	**(Planned Unit -Flood Hazard Combining District)**

TO: Land Use District

D-1 -UE	**(Two Family Residential -Urban Farm Animal Exclusion Combining District)**
R-6 -UE, R-10 -UE, R-20 -UE, R-40 -UE }	**(Single Family Residential -Urban Farm Animal Exclusion Combining District)**
R-6 -FH -UE, R-40 -FH -UE }	**(Single Family Residential -Flood Hazard Combining District -Urban Farm Animal Exclusion Combining District)**
P-1 -UE	**(Planned Unit -Urban Farm Animal Exclusion Combining District)**
P-1 -FH -UE	**(Planned Unit -Flood Hazard Combining District -Urban Farm Animal Exclusion Combining District)**

and the Department of Conservation and Development Director shall change the Zoning Map accordingly, pursuant to Ordinance Code Sec. 84.2.002.

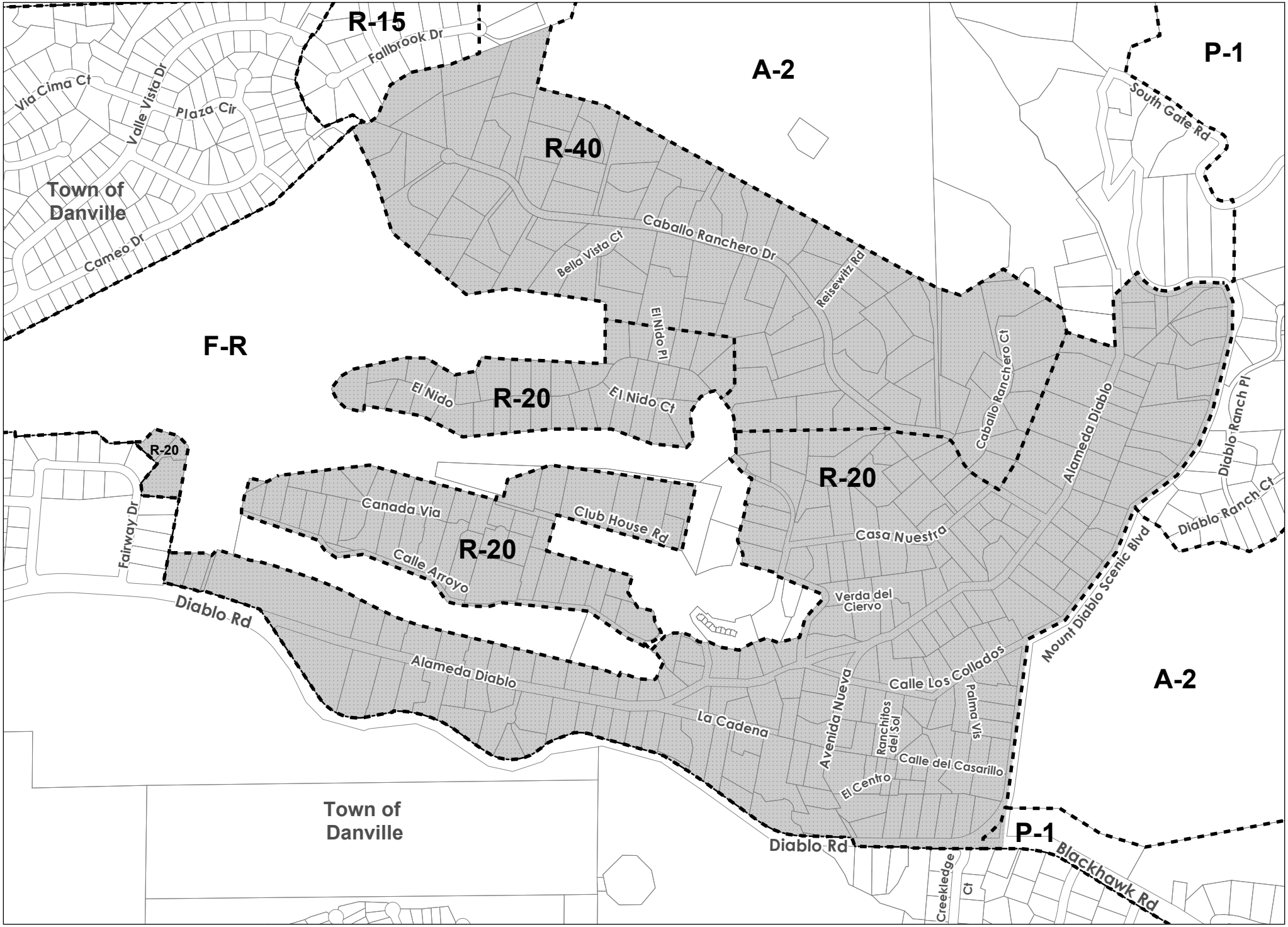
SECTION II. EFFECTIVE DATE. This ordinance becomes effective 30 days after passage, and within 15 days of passage shall be published once with the names of supervisors voting for and against it in the _____ , a newspaper published in this County.

PASSED on _____by the following vote:

Supervisor	Aye	No	Absent	Abstain
1. J. Gioia	( )	( )	( )	( )
2. C. Andersen	( )	( )	( )	( )
3. D. Burgis	( )	( )	( )	( )
4. K. Mitchoff	( )	( )	( )	( )
5. F.D. Glover	( )	( )	( )	( )

ATTEST: David Twa, County Administrator
and Clerk of the Board of Supervisors _____
Chairman of the Board
By_____, Dep. (SEAL)

ORDINANCE NO. **2018 - 12**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A-2
P-1
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Bella Vista Ct
Reisewitz Rd
El Nido Pl
F-R
El Nido
R-20
El Nido Ct
Caballo Ranchero Ct
Alameda Diablo
Diablo Ranch Pl
R-20
R-20
Diablo Ranch Ct
Canada Via
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Casa Nuestra
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Diablo Rd
Calle Los Collados
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Avenida Nueva
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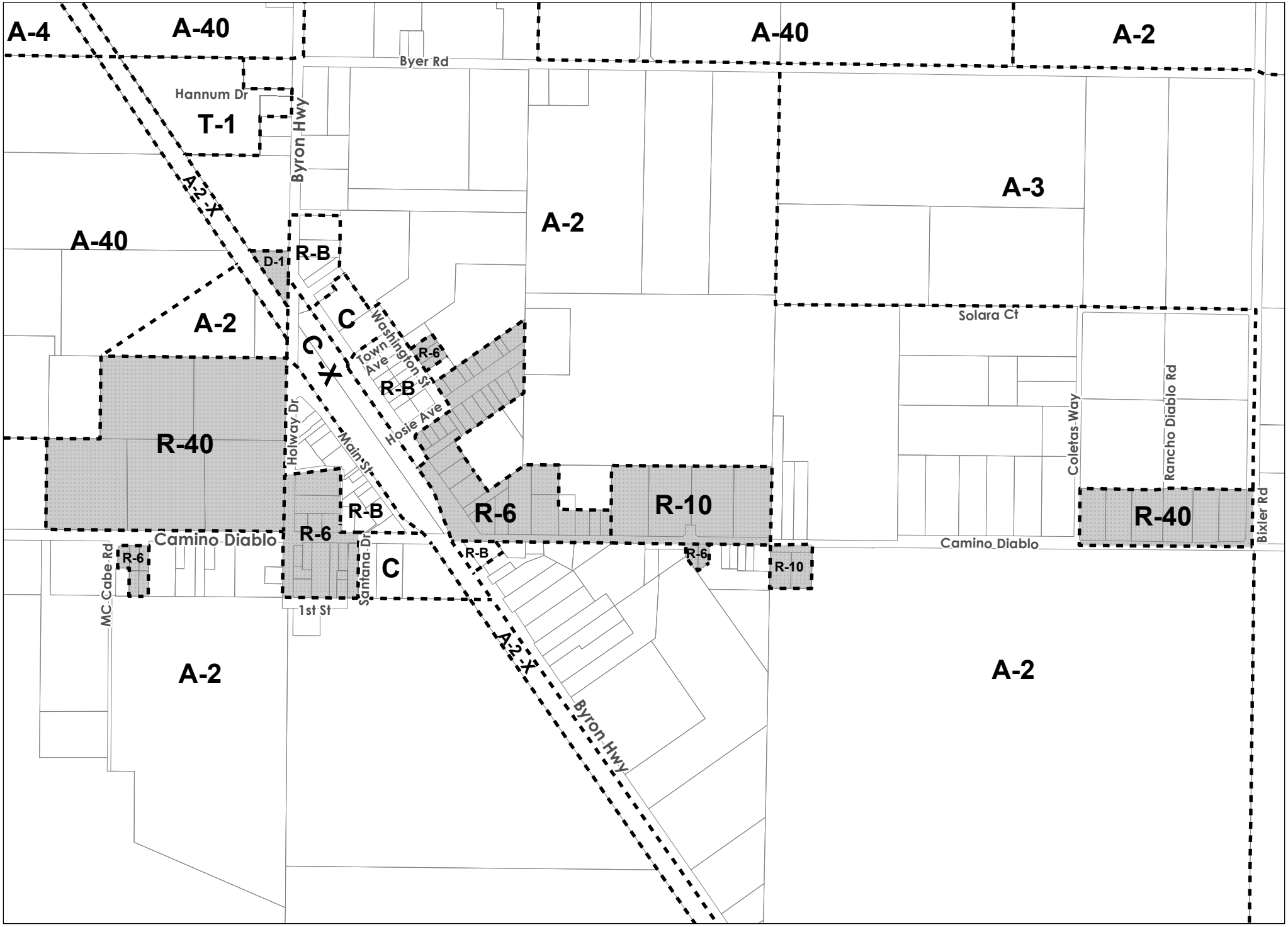
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R-B
C
Washington St
Town Ave
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C-X
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A-2
Solara Ct
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Coletas Way
Rancho Diablo Rd
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A-40
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P-1
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F-1
Ellisa Ln
Fertado Ln
Marsh Creek Rd
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Bixler Rd
Newport Dr
State Highway 4
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Newport Ln
Bolinas Pl
Lighthouse Pl
Beacon Pl
Pier Pt
Capstan Pl
Goleta Pl
Newport Ct
Surfside Pl
Sand Point Ct
Sand Point Rd
Surfside Ct
Dune Point Way
Riverlake Rd
Dolphin Pl
Seal Way
Windward Ct
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Cypress Pt
Monterey Ct
Reef Ct
Clipper Dr
Venice Ct
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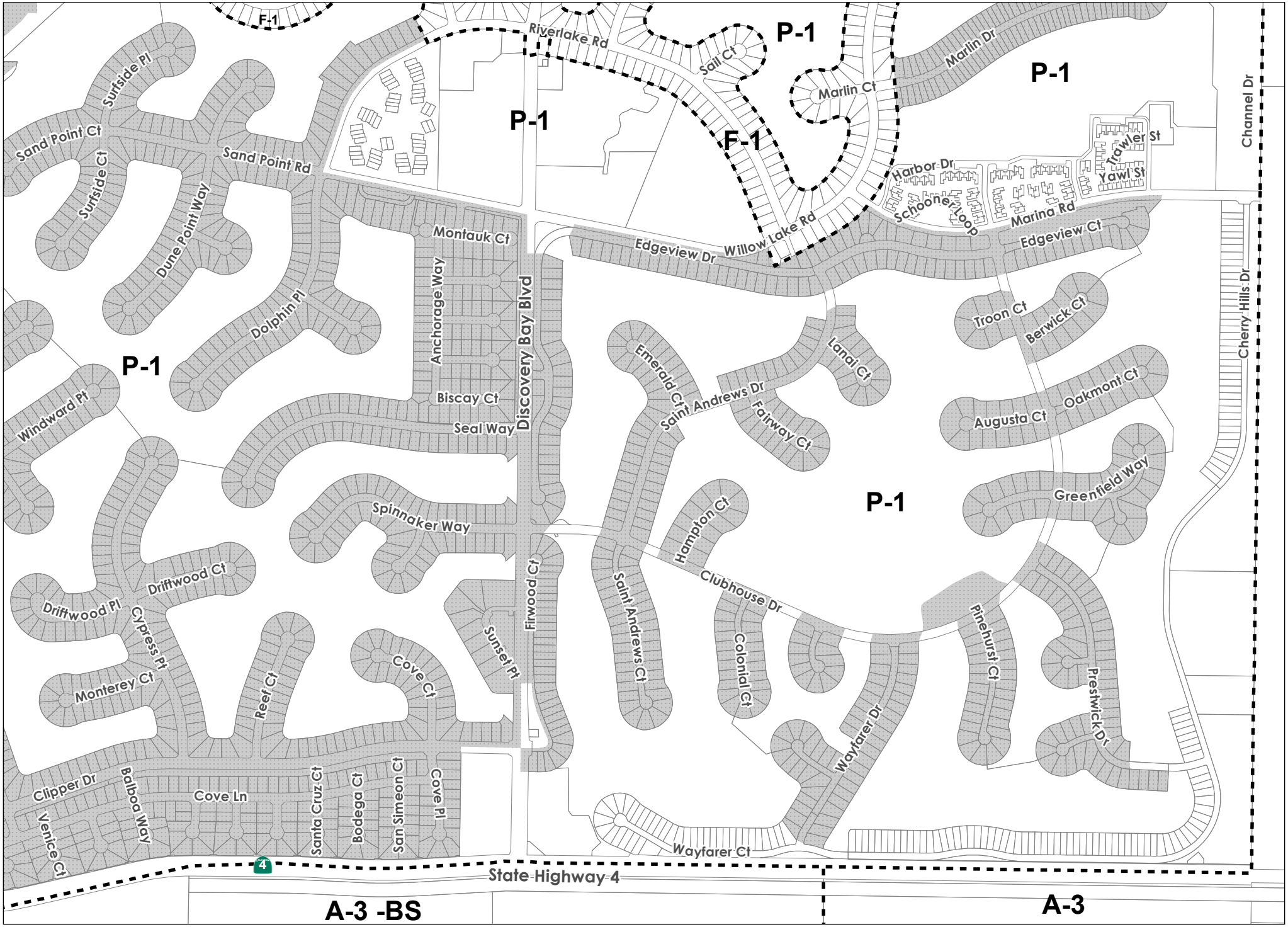
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P-1
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Marlin Ct
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Channel Dr
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Harbor Dr
Yawl St
Schooner Loop
Marina Rd
Edgeview Ct
Willow Lake Rd
Edgeview Dr
Surfside Pl
Sand Point Ct
Surfside Ct
Sand Point Rd
Dune Point Way
Dolphin Pl
Montauk Ct
Anchorage Way
Discovery Bay Blvd
P-1
Windward Pt
Biscay Ct
Seal Way
Emerald Ct
Saint Andrews Dr
Fairway Ct
Lanai Ct
Troon Ct
Berwick Ct
Cherry Hills Dr
Augusta Ct
Oakmont Ct
Greenfield Way
P-1
Spinnaker Way
Hampton Ct
Clubhouse Dr
Driftwood Ct
Driftwood Pl
Cypress Pt
Firwood Ct
Sunset Pt
Saint Andrews Ct
Colonial Ct
Pinehurst Ct
Prestwick Dr
Monterey Ct
Reef Ct
Cove Ct
Wayfarer Dr
Clipper Dr
Balboa Way
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Cove Pl
Venice Ct
Wayfarer Ct
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State Highway 4
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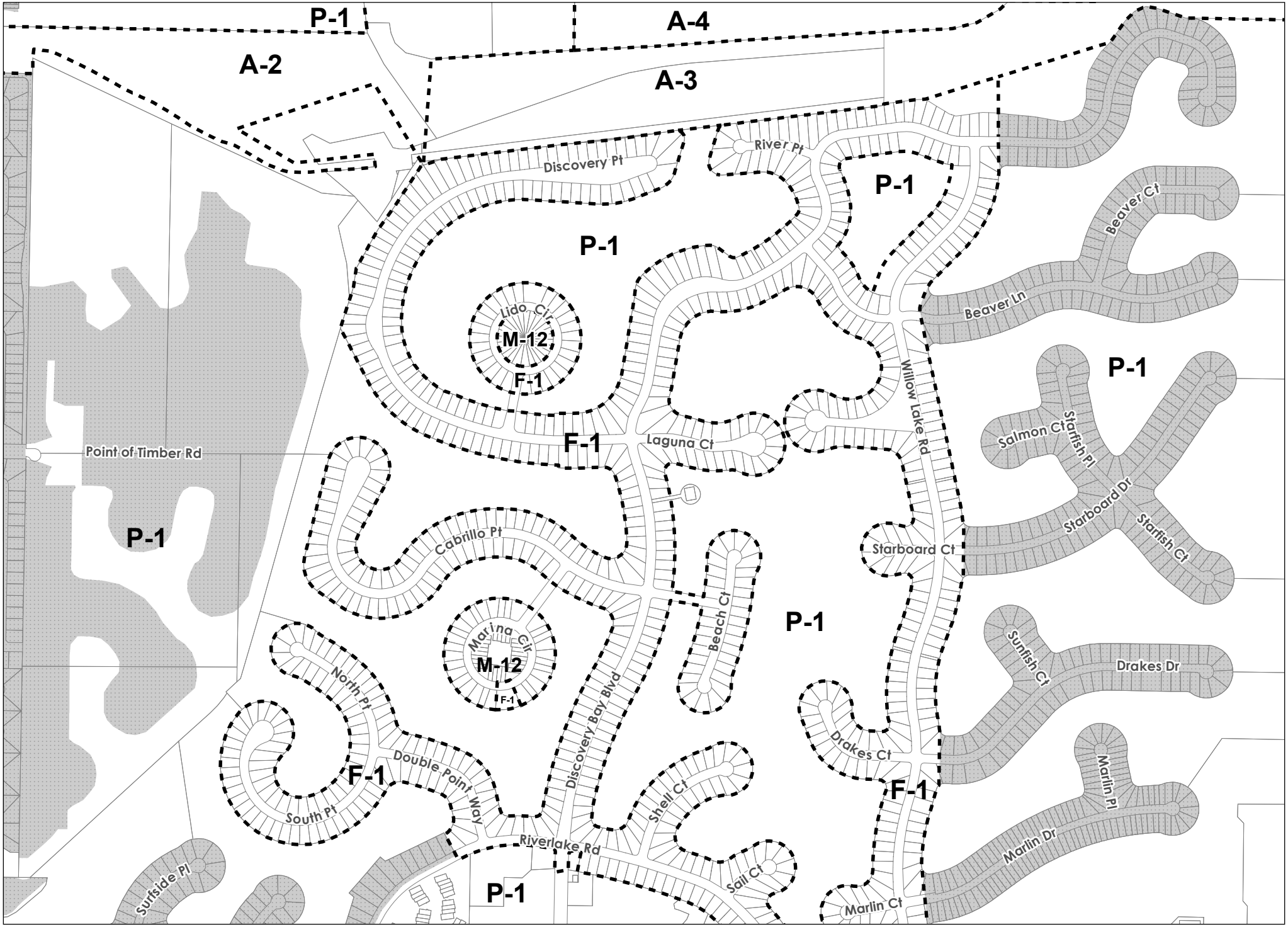
A-3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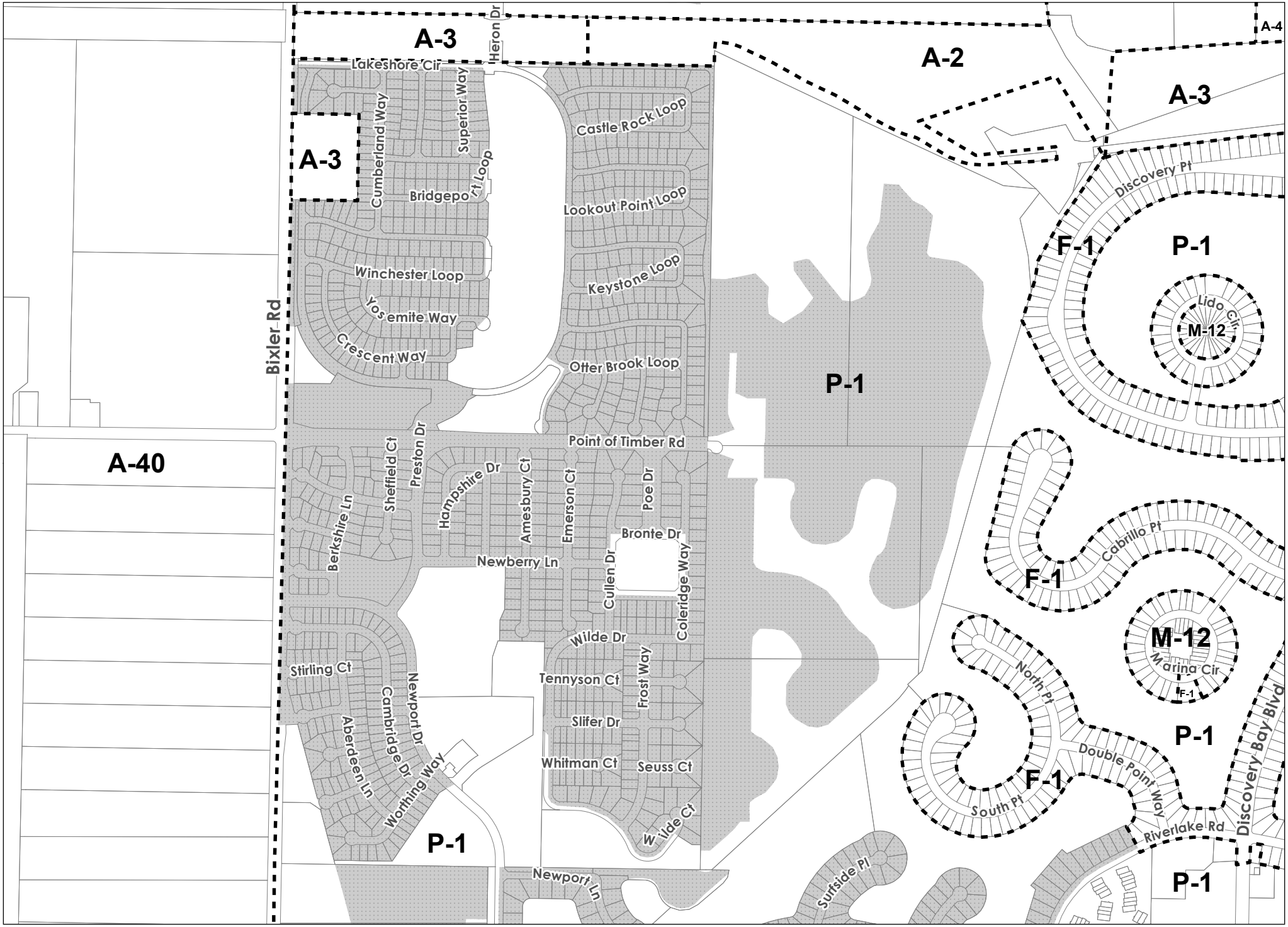
Salmon Ct
Starfish Pl
Starboard Dr
Starfish Ct
F-1
Laguna Ct
Point of Timber Rd
P-1
Cabrillo Pt
Starboard Ct
Beach Ct
P-1
Marina Cir
M-12
F-1
Sunfish Ct
Drakes Dr
North Pt
Double Point Way
Discovery Bay Blvd
Drakes Ct
F-1
F-1
South Pt
Shell Ct
Marlin Pl
Riverlake Rd
Marlin Dr
Surfside Pl
P-1
Sail Ct
Marlin Ct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Discovery Pt
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P-1
Winchester Loop
Keystone Loop
Lido Cir
M-12
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Bixler Rd
Crescent Way
Otter Brook Loop
P-1
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A-40
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Hampshire Dr
Amesbury Ct
Emerson Ct
Poe Dr
Berkshire Ln
Bronte Dr
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Newberry Ln
Cullen Dr
Coleridge Way
F-1
Wilde Dr
M-12
Marina Cir
F-1
Stirling Ct
Tennyson Ct
Frost Way
North Pt
Newport Dr
Cambridge Dr
Slifer Dr
P-1
Aberdeen Ln
Double Point Way
Discovery Bay Blvd
Whitman Ct
Seuss Ct
F-1
South Pt
Worthing Way
Wilde Ct
Riverlake Rd
P-1
Newport Ln
Surfside Pl
P-1

A-4
Westport Cir
Mystic Ct
Outrigger Way
Pyramid Way
Key West Way
Monticello Way
Boca Raton Way
Brookhaven Cir
Pinehollow Cir
Livingston Ct
Merritt Ct
Pardee Ct
Rainbow Ct
Natoma Ct
Harbor Haven Way
Bay Harbor Way
Pescadero Cir
Davenport Cir
Freeport Ct
Shearwater Cir
P-1
A-3
Bixler Rd
Balfour Rd
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N Lakefront Loop
A-40
Oroville Ct
Tahoe Ct
New Melones Cir
A-2
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S Lakefront Loop
Yellowstone Cir
Fern Ridge Cir
Green Castle Cir
Gold Creek Cir
Crystal Springs Cir
Arcadia Cir
Seneca Cir
Heron Dr
A-3
A-2

A-2 -X
A-2
C
Vine Rd
Curlew Connex
C -X
R-10
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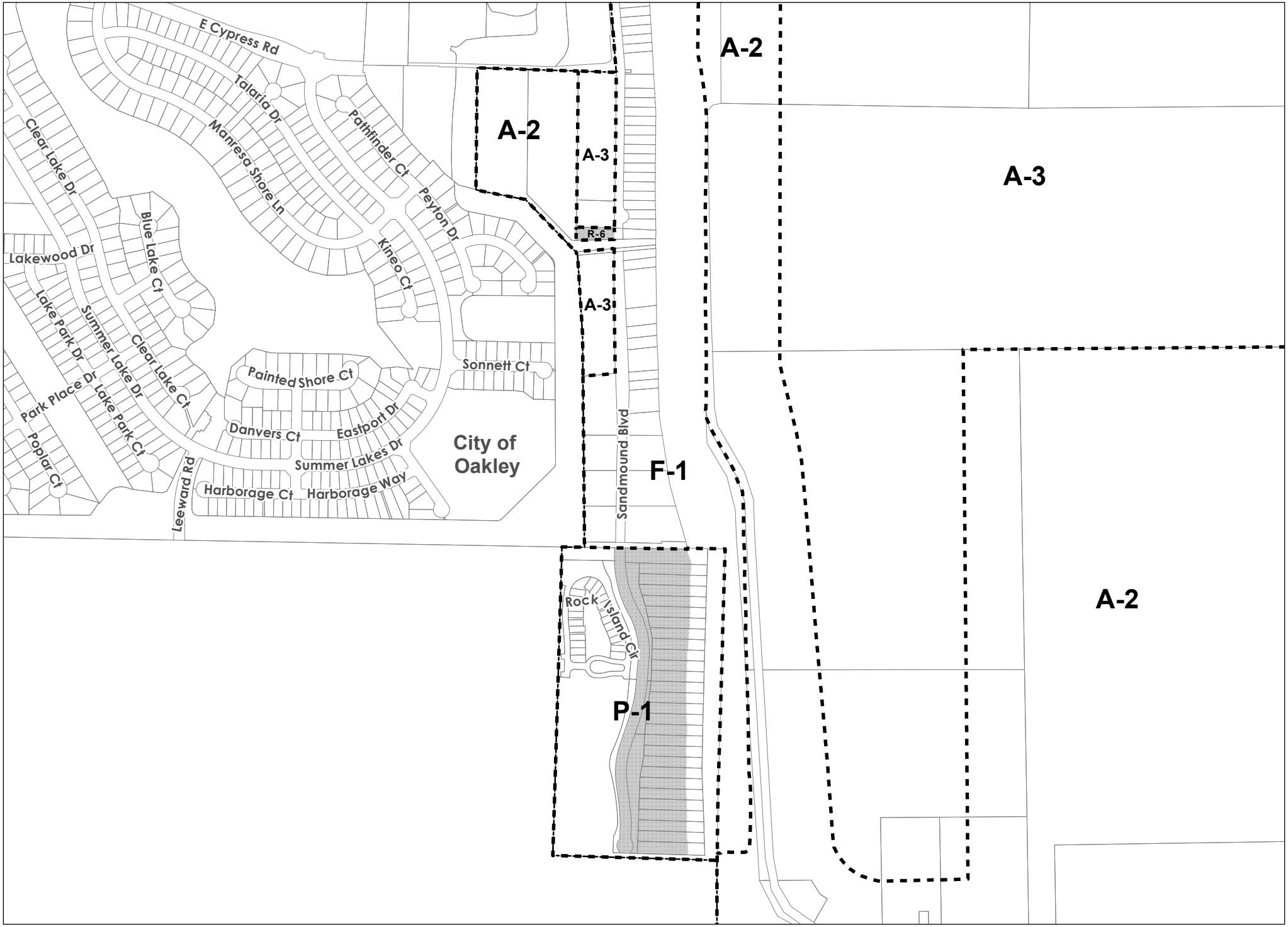
A St
R-6
R-B
First St
Ghigliazza Way
Delta Rd
A-2
Knightsen Ave
A-2 -X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Park Place Dr
Lake Park Ct
Poplar Ct
Painted Shore Ct
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Summer Lakes Dr
Harborage Ct
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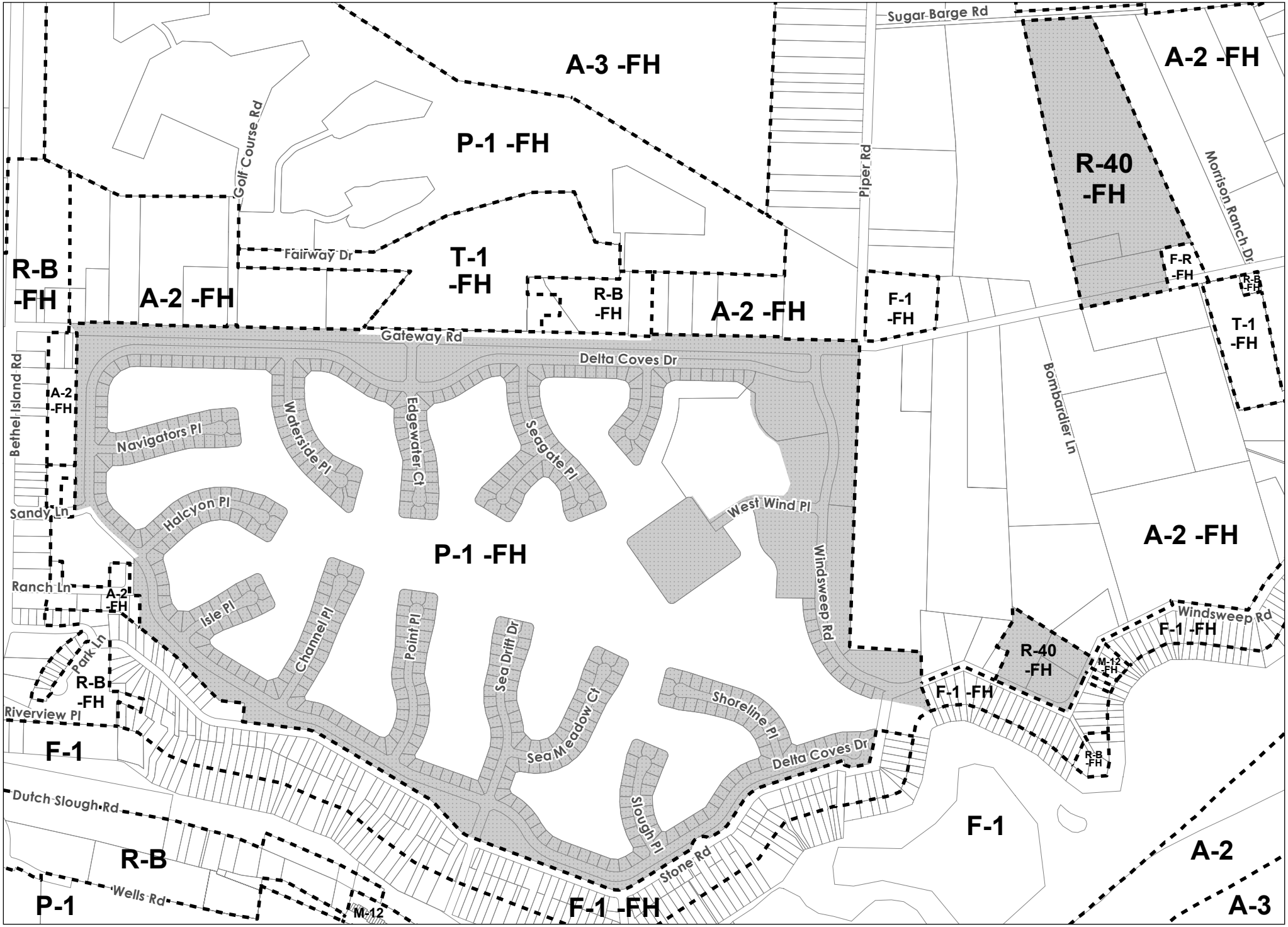
A-2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A-2 -FH
F-1 -FH
F-R -FH
R-B -FH
T-1 -FH
Gateway Rd
Delta Coves Dr
Bethel Island Rd
A-2 -FH
Navigators Pl
Waterside Pl
Edgewater Ct
Seagate Pl
Bombardier Ln
Sandy Ln
Halcyon Pl
West Wind Pl
P-1 -FH
Windsweep Rd
A-2 -FH
Ranch Ln
A-2 -FH
Isle Pl
Channel Pl
Point Pl
Sea Drift Dr
Windsweep Rd
F-1 -FH
R-40 -FH
M-12 -FH
Park Ln
R-B -FH
Riverview Pl
Sea Meadow Ct
Shoreline Pl
F-1 -FH
F-1
Delta Coves Dr
R-B -FH
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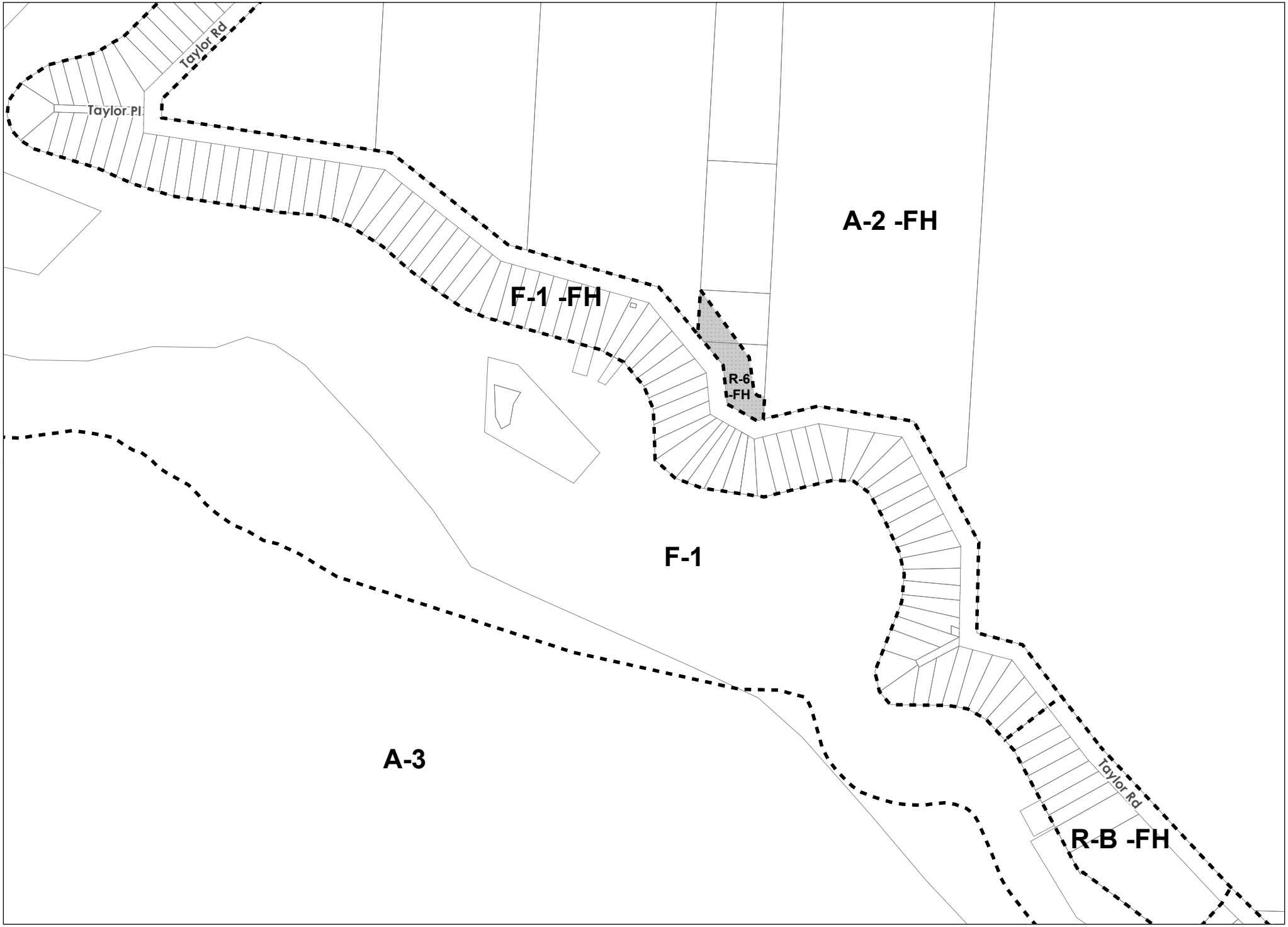
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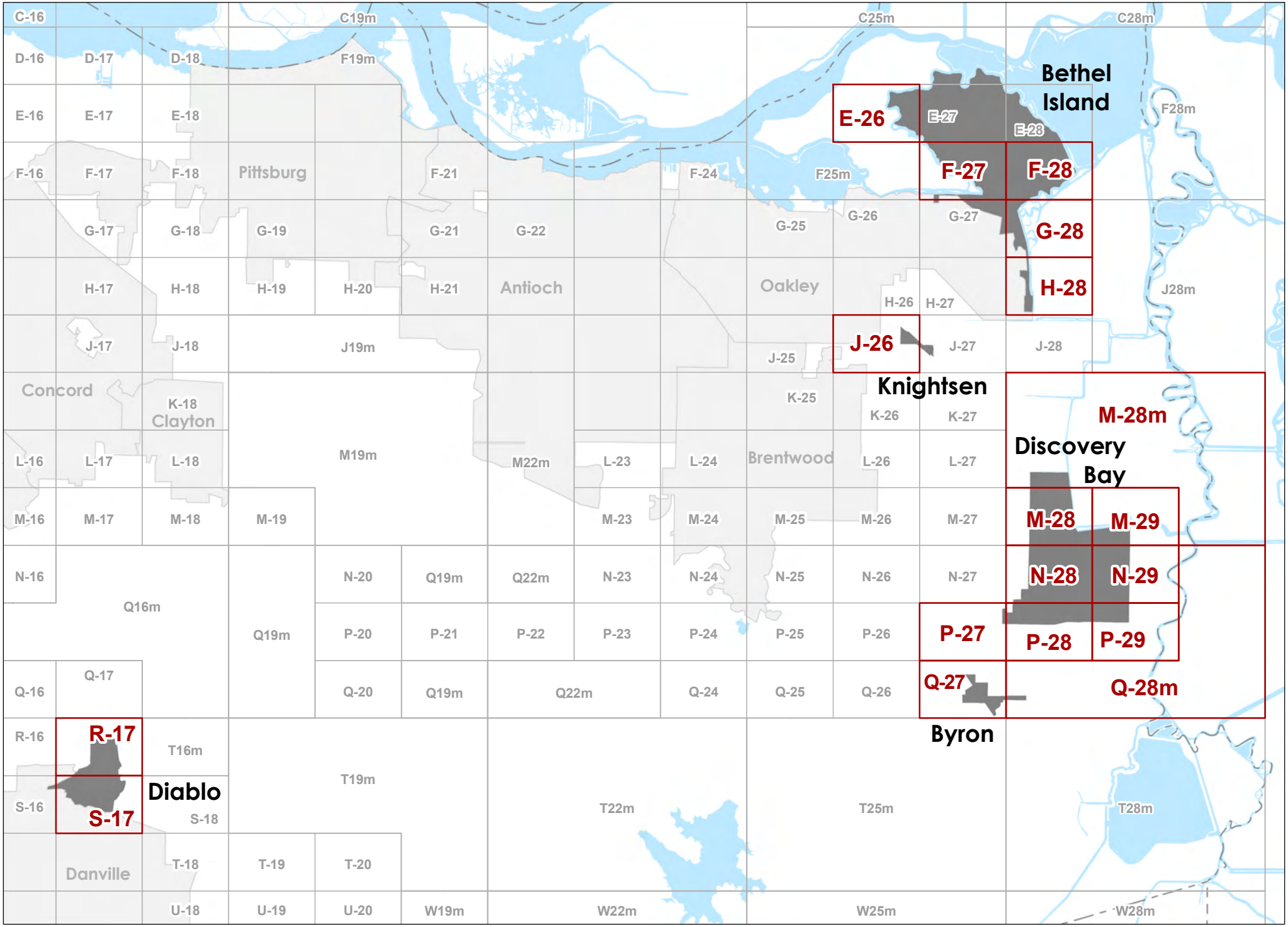
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U-19
U-20
W19m
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W25m
W28m

ORDINANCE NO. 2018-06

URBAN FARM ANIMALS

The Contra Costa County Board of Supervisors ordains as follows (omitting the parenthetical footnotes from the official text of the enacted or amended provisions of the County Ordinance Code):

SECTION I. SUMMARY. This ordinance adds Chapter 82-50 to the County Ordinance Code to regulate the raising and keeping of farm animals in residential zoning districts. This ordinance also amends the County Ordinance Code to regulate the keeping of roosters in agricultural zoning districts.

SECTION II. Chapter 82-50 is added to the County Ordinance Code, to read:

Chapter 82-50
URBAN FARM ANIMALS

Article 82-50.2
General

82-50.202 Purpose. The primary purpose of this chapter is to establish regulations for the raising and keeping of farm animals in residential zoning districts. The provisions of this chapter do not apply in any agricultural zoning district. (Ord. 2018-06 § 2).

82-50.204 Definitions. For the purposes of this chapter, the following words and phrases have the following meanings:

(a) "Apiary" has the meaning set forth in Food and Agricultural Code section 29002.

(b) "Bird enclosure" means one or more coops, cotes, pens, cages, or other similar enclosures, used to house one or more birds, including pigeons, but not including poultry, fowl, roosters, peacocks, or guinea fowl.

(c) "Farm animals" means one or more fowl, rabbits, grain-fed rodents, bees, or livestock.

(d) "Fowl" means one or more domesticated chickens, ducks, geese, turkeys, or similar birds customarily kept for eggs or meat. "Fowl" does not include roosters, peacocks, or guinea fowl.

(e) "Nucleus hive" means a small beehive of a few thousand bees with a queen, created from a larger hive, and typically kept in a small box or container.

(f) "Urban farm animal raising and keeping" means the raising or keeping of farm animals in residential zoning districts for non-commercial purposes. (Ord. 2018-06 § 2).

Article 82-50.4
Urban Farm Animal Raising and Keeping

82-50.402 Location requirements. Urban farm animal raising and keeping is allowed on any lot in a single-family residential district (R-6, R-7, R-10, R-12, R-15, R-20, R-40, R-65, and R-100), a planned unit (P-1) district for which single-family residential uses are approved, or a two-family residential (D-1) district. (Ord. 2018-06 § 2).

82-50.404 Standards - Small animals.

(a) The minimum area of a lot on which fowl (except for hens), rabbits, or grain-fed rodents may be raised or kept is 20,000 square feet.

(b) The maximum number of domesticated female chickens (hens) allowed on a single lot is one hen per 1,000 square feet of lot area.

(c) No more than an aggregate total of 20 fowl (including hens), rabbits, and grain-fed rodents may be kept on a single lot.

(d) The maximum height of a chicken coop, rabbit hutch, or similar accessory structure for the housing of small animals is 12 feet.

(e) Chicken coops, rabbit hutches, and similar accessory structures for the housing of small animals must be set back from property lines by the following distances:

Average Lot Width	Minimum Distance From		
	Front Property Line	Side Property Line	Rear Property Line
Less than 80 feet	50 feet	10 feet	10 feet
80 feet or more, but less than 120 feet	50 feet	25 feet	25 feet
120 feet or more	60 feet	40 feet	40 feet

(f) Bird enclosures are governed by Article 82-50.6. (Ord. 2018-06 § 2).

82-50.406 Standards - Apiaries.

(a) The minimum area of a lot on which an apiary may be kept is 6,000 square feet.

(b) The maximum number of beehives allowed on a single lot, excluding nucleus hives, is determined by lot area, as follows:

Lot Area	Maximum Number of Beehives
6,000 square feet or more, but less than 20,000 square feet	4
20,000 square feet or more, but less than 40,000 square feet	6
40,000 square feet or more	8

(c) For each beehive kept on a lot in accordance with subsection (b) of this section, one nucleus hive may also be kept on the lot.

(d) An apiary must be registered and identified in accordance with Article 4 of Chapter 1 of Division 13 of the Food and Agricultural Code.

(e) A fresh water source for bees must be provided at all times on a lot on which an apiary is located.

(f) The maximum height of an accessory structure for the housing of beehives is 12 feet.

(g) Accessory structures for the housing of beehives must be set back from property lines by the following distances:

Average Lot Width	Minimum Distance From		
	Front Property Line	Side Property Line	Rear Property Line
Less than 80 feet	50 feet	15 feet	15 feet
80 feet or more, but less than 120 feet	50 feet	25 feet	25 feet
120 feet or more	60 feet	40 feet	40 feet

(h) If an accessory structure for the housing of beehives is located less than 25 feet from any property line, the structure must be enclosed by a six-foot tall solid barrier located 10 feet or less from the structure in all directions. (Ord. 2018-06 § 2).

82-50.408 Standards - Livestock.

(a) The minimum area of a lot on which livestock may be raised or kept is 40,000 square feet. The lot must be contiguous.

(b) The maximum number of livestock on a single lot is two head of livestock per 40,000 square feet of lot area.

(c) Barns, stables, and other buildings or structures used to shelter livestock must be set back at least 100 feet from the front property line and all streets, and must be set back at least 50 feet from all side and rear property lines. Fenced pasture, paddocks, or other enclosed livestock areas must be located at least 10 feet from all property lines. (Ord. 2018-06 § 2).

Article 82-50.6
Bird Enclosures

82-50.602 Location requirements. A bird enclosure is allowed on any lot in a single-family residential district (R-6, R-7, R-10, R-12, R-15, R-20, R-40, R-65, and R-100), a planned unit (P-1) district for which single-family residential uses are approved, or a two-family residential (D-1) district. (Ord. 2018-06 § 2).

82-50.604 Standards.

(a) The maximum size of a bird enclosure is one square foot per 50 square feet of lot area. A bird enclosure may not exceed 1,600 square feet.

(b) The maximum height of a bird enclosure is 12 feet.

(c) A bird enclosure must be set back at least 25 feet from the front property line and all streets, and must be set back at least 10 feet from all side and rear property lines.

(d) A bird enclosure must be maintained in a sanitary manner as determined by the county health department. (Ord. 2018-06 § 2).

Article 82-50.8
Variance Permits

82-50.802 Variance permit - Granting. Variance permits to modify the height or setback provisions in Article 82-50.4 and Article 82-50.6 may be granted in accordance with Chapter 26-2. (Ord. 2018-06 § 2).

SECTION III. Section 82-4.238 of the County Ordinance Code is deleted in its entirety.

SECTION IV. Section 84-4.402 of the County Ordinance Code is amended to read:

84-4.402 Uses–Permitted. The following uses are allowed in an R-6 district:

(1) A detached single-family dwelling on each lot and the accessory structures and uses normally auxiliary to it;

(2) Crop and tree farming;

(3) Publicly owned parks and playgrounds;

(4) A residential care facility for the elderly, operated by a person with all required state and local agency approvals or licenses, where no more than six persons reside or receive care, not including the licensee or members of the licensee's family or persons employed as facility staff;

(5) A family day care home where care, protection and supervision of twelve or fewer children in the provider's own home are provided for periods of less than twenty-four hours per day, while the parents or guardians are away;

(6) Bird enclosures in compliance with the provisions of Chapter 82-50.

(7) Accessory dwelling units complying with the provisions of Chapter 82-24.

(8) Urban farm animal raising and keeping in compliance with the provisions of Chapter 82-50. (Ords. 2018-06 § 4, 2003-17 § 4, 86-43 § 2, 78-83 § 1, 77-51 § 2, 68-25 § 2: prior code § 8142(a): Ords. 1269 § 1, 1179 § 3, 1039, 1028, 382 § 4A).

SECTION V. Section 84-14.402 of the County Ordinance Code is amended to read:

84-14.402 Uses–Allowed. The following uses are allowed in the R-20 district:

(1) A detached single-family dwelling on each lot and the accessory structures and uses normally auxiliary to it;

(2) Crop and tree farming, and horticulture;

(3) A temporary stand for the sale of agricultural products grown on the premises, with two and one-half acres per stand, set back at least thirty-five feet from the front property line, and operated not more than three months in any calendar year;

(4) Urban farm animal raising and keeping in compliance with the provisions of Chapter 82-50;

(5) Publicly owned parks and playgrounds;

(6) A residential care facility for the elderly, operated by a person with all required state and local agency approvals or licenses, where not more than six persons

reside or receive care, not including the licensee or members of the licensee's family or persons employed as facility staff;

(7) A family day care home where care, protection, and supervision of twelve or fewer children in the provider's own home are provided for periods of less than twenty-four hours per day, while the parents or guardians are away;

(8) Bird enclosures in compliance with the provisions of Chapter 82-50;

(9) Accessory dwelling units complying with the provisions of Chapter 82-24. (Ords. 2018-06 § 5, 2017-11 § 4, 86-43 § 4, 78-83 § 2, 77-51 § 8, 68-25 § 2, 2033, 2032, 1768 § 2: prior code § 8146(a): Ords. 1269, 1179 § 8, 382 § 4V).

SECTION VI. Section 84-14.404 of the County Ordinance Code is amended to read:

84-14.404 Uses–Requiring land use permit. In the R-20 district the following uses are permitted on the issuance of a land use permit:

(1) Same as in the R-6 district (Section 84-4.404) except for the deletion of "Greenhouses, over three hundred square feet";

(2) Horse riding academies and horse riding instruction, provided that the standards in Section 82-50.408 are complied with. (Ords. 2018-06 § 6, 86-43 § 5, 1768, 1569: prior code § 8146(b): Ord. 1269: Ord. 1179).

SECTION VII. Article 84-14.14 of the County Ordinance Code is deleted in its entirety.

SECTION VIII. Section 84-14.1602 of the County Ordinance Code is amended to read:

84-14.1602 Land use and variance permit - Granting. Land use permits for the special uses enumerated in Section 84-14.404, and variance permits to modify the provisions in Sections 84-14.402(7) and 84-14.602 through 84-14.1202, may be granted in accordance with Chapters 26-2 and 82-6. (Ords. 2018-06 § 8, 77-51 § 9, 1768 § 4: prior code § 8146(l): Ords. 1179 § 8 [382 § 4V]).

SECTION IX. Article 84-16.14 of the County Ordinance Code is deleted in its entirety.

SECTION X. Section 84-16.1602 of the County Ordinance Code is amended to read:

84-16.1602 Land use and variance permit - Granting. Land use permits for the special uses enumerated in Section 84-16.404, and variance permits to modify the provisions in Sections 84-14.402(7) and 84-16.602 through 84-16.1202, may be granted in accordance with Chapters 26-2 and 82-6. (Ords. 2018-06 § 10, 77-51 § 10, 1768 § 4: prior code § 8148(l): Ords. 1179 § 9, 420 § 6 [382 § 46]).

SECTION XI. Section 84-18.404 of the County Ordinance Code is amended to read:

84-18.404 Uses–Requiring land use permit. In the R-65 district the following uses are permitted after the issuance of a land use permit:

(1) All the uses designated for the R-6 district in Section 84-4.404 except for the deletion of:

(A) Greenhouses, over three hundred square feet;

(B) Hospitals, eleemosynary and philanthropic institutions and convalescent homes;

(2) Horse riding academies and horse riding instruction, provided that the standards in Section 82-50.408 are complied with. (Ords. 2018-06 § 11, 1768, 1569: prior code § 8148.5(b): Ord. 1405).

SECTION XII. Article 84-18.14 of the County Ordinance Code is deleted in its entirety.

SECTION XIII. Section 84-18.1602 of the County Ordinance Code is amended to read:

84-18.1602 Land use and variance permit - Granting. Land use permits for the special uses enumerated in Section 84-18.404, and variance permits to modify the provisions in Sections 84-14.402(7) and 84-18.602 through 84-18.1202, may be granted in accordance with Chapters 26-2 and 82-6. (Ords. 2018-06 § 13, 77-51 § 11, 1768 § 4: prior code § 8148.5(l): Ord. 1405).

SECTION XIV. Article 84-20.14 of the County Ordinance Code is deleted in its entirety.

SECTION XV. Section 84-20.1602 of the County Ordinance Code is amended to read:

84-20.1602 Land use and variance permit - Granting. Land use permits for the special uses enumerated in Section 84-20.404, and variance permits to modify the provisions in Sections 84-14.402(7) and 84-20.602 through 84-20.1202, may be granted in accordance with Chapters 26-2 and 82-6. (Ords. 2018-06 § 15, 77-51 § 12, 1768 § 4, 1549: prior code § 8148.7(l)).

SECTION XVI. Section 82-4.320 is added to the County Ordinance Code, to read:

82-4.320 Poultry. "Poultry" means one or more domesticated birds or roosters customarily kept for the production of eggs or meat for commercial use. (Ord. 2018-06 § 16).

SECTION XVII. Section 82-4.322 is added to the County Ordinance Code, to read:

82-4.322 Rooster. "Rooster" means any male chicken that: (1) is six months or older, (2) has

full adult plumage, or (3) is capable of crowing. (Ord. 2018-06 § 17).

SECTION XVIII. Article 84-38.14 is added to the County Ordinance Code, to read:

Article 84-38.14
Rooster Keeping

84-38.1402 Standards.

(a) The minimum lot size on which to keep a rooster is five acres.

(b) No person may keep, maintain, or harbor more than two roosters on a lot except as part of, or in connection with, any of the following:

(1) Commercial poultry ranches registered with the California Department of Food and Agriculture and which primarily produce eggs or meat for commercial sale.

(2) Public or private schools registered with the California Department of Education.

(3) Projects sponsored by Future Farmers of America or other similar programs focused on youth agricultural education.

(4) Legitimate poultry hobbyists as approved in writing by the animal services director.

(c) In addition to any other remedy allowed by this code or applicable law, the animal services director may issue an administrative penalty under Article 416-4.8 to any responsible person for a violation of this article. (Ord. 2018-06 § 18).

SECTION XIX. Article 84-40.14 is added to the County Ordinance Code, to read:

Article 84-40.14
Rooster Keeping

84-40.1402 Standards. Rooster keeping standards for the A-3 district shall be the same as those for the A-2 district (Section 84-38.1402). (Ord. 2018-06 § 19).

SECTION XX. Article 84-42.16 is added to the County Ordinance Code, to read:

Article 84-42.16
Rooster Keeping

84-42.1602 Standards. Rooster keeping standards for the A-4 district shall be the same as those for the A-2 district (Section 84-38.1402). (Ord. 2018-06 § 20).

SECTION XXI. Article 84-80.14 is added to the County Ordinance Code, to read:

Article 84-80.14
Rooster Keeping

84-80.1402 Standards. Rooster keeping standards for the A-20 district shall be the same as those for the A-2 district (Section 84-38.1402). (Ord. 2018-06 § 21).

SECTION XXII. EFFECTIVE DATE. This ordinance becomes effective 30 days after passage, and within 15 days after passage shall be published once with the names of supervisors voting for or against it in the Contra Costa Times, a newspaper published in this County.

PASSED on May 1 2018, by the following vote:

AYES: Gioia, Andersen, Burgis, Mitchoff, Glover
NOES: None
ABSENT: None
ABSTAIN: None

ATTEST: DAVID J. TWA,
Clerk of the Board of Supervisors
and County Administrator

Board Chair Karen Mitchoff

By: Deputy Clerk, June McHuen

KCK:
H:\Client Matters\2018\DCD\Ordinance No. 2018-06 Urban Farm Animals.wpd

ORDINANCE NO. 2018-11

URBAN FARM ANIMAL EXCLUSION COMBINING DISTRICT

The Contra Costa County Board of Supervisors ordains as follows (omitting the parenthetical footnotes from the official text of the enacted or amended provisions of the County Ordinance Code):

SECTION I. SUMMARY. This ordinance adds Chapter 84-79 to the County Ordinance Code to establish the Urban Farm Animal Exclusion (-UE) Combining District. The ordinance prohibits urban farm animal raising and keeping in specified residential zoning districts in Bethel Island, Byron, Diablo, Discovery Bay, and Knightsen.

SECTION II. Chapter 84-79 is added to the County Ordinance Code, to read:

Chapter 84-79
URBAN FARM ANIMAL EXCLUSION (-UE) COMBINING DISTRICT

Article 84-79.2
General

84-79.202 Urban farm animal exclusion (-UE) combining district. All land within a land use district combined with an urban farm animal exclusion (-UE) combining district is subject to the additional regulations set forth in this chapter. (Ord. 2018-11 § 2).

84-79.204 Applicability. The -UE district applies to all property in any of the following zoning districts located in the following communities:

(a) Zoning districts.

(1) Single-family residential districts (R-6, R-7, R-10, R-12, R-15, R-20, R-40, R-65, and R-100).

(2) Planned unit (P-1) districts for which single-family residential uses are approved.

(3) Two-family residential (D-1) districts.

(b) Communities.

(1) Bethel Island.

(2) Byron.

(3) Diablo.

(4) Discovery Bay.

(5) Knightsen. (Ord. 2018-11 § 2).

84-79.206 Priority. If there is any conflict between the regulations of this chapter and those of the underlying zoning district, the requirements of this chapter govern. (Ord. 2018-11 § 2).

84-79.208 Definitions. For the purposes of this chapter, the following words and phrases have the following meanings:

(a) "Apiary" has the meaning set forth in Section 82-50.204.

(b) "Urban farm animal raising and keeping" has the meaning set forth in Section 82-50.204. (Ord. 2018-11 § 2).

Article 84-79.4
Uses

84-79.402 Permitted uses.

(a) Except as otherwise provided in Section 84-79.404, all uses authorized in the underlying zoning district are permitted in a -UE district.

(b) Urban farm animal raising and keeping is permitted in a -UE district where the underlying zoning district is a single-family residential district with an R-20, R-40, R-65, or R-100 designation. (Ord. 2018-11 § 2).

84-79.404 Prohibited uses.

(a) Keeping or maintaining an apiary is prohibited in a -UE district.

(b) Urban farm animal raising and keeping is prohibited in a -UE district where the underlying zoning district is a listed single-family residential district (R-6, R-7, R-10, R-12, R-15), a planned unit (P-1) district for which single-family residential uses are approved, or a two-family residential (D-1) district. (Ord. 2018-11 § 2).

SECTION III. EFFECTIVE DATE. This ordinance becomes effective 30 days after passage, and within 15 days after passage shall be published once with the names of supervisors voting for or against it in the Contra Costa Times, a newspaper published in this County.

PASSED on May 1 2018, by the following vote:

AYES: Gioia, Andersen, Burgis, Mitchoff, Glover
NOES: None
ABSENT: None
ABSTAIN: None

ATTEST: DAVID J. TWA,
Clerk of the Board of Supervisors
and County Administrator

Board Chair Karen Mitchoff

By: Deputy June McHuen

KCK:
H:\Client Matters\2018\DCD\Ordinance No. 2018-11 Urban Farm Animal Exclusion Combi...

ORDINANCE NO. **2018 - 12**
(Re-Zoning Land in the

D.4

East County Area)

New Zoning
The Contra Costa County Board of Supervisors ordains as follows:

SECTION I: Pages **E-26, F-27, F-28, G-28, H-28, J-26, M-28m, M-28, M-29, N-28, N-29, P-27, P-28, P-29, Q-27, Q-28m, R-17, S-17** of the County's 2005 Zoning Map (Ord. No. 2005-03) is amended by re-zoning the land in the above area shown shaded on the map(s) attached hereto and incorporated herein (see also Department of Conservation and Development File No. **RZ18-3241** .)

FROM: Land Use District

D-1	**(Two Family Residential)**
R-6, R-10, R-20, R-40	**(Single Family Residential)**
R-6 -FH, R-40 -FH	**(Single Family Residential -Flood Hazard Combining District)**
P-1	**(Planned Unit)**
P-1 -FH	**(Planned Unit -Flood Hazard Combining District)**

TO: Land Use District

D-1 -UE	**(Two Family Residential -Urban Farm Animal Exclusion Combining District)**
R-6 -UE, R-10 -UE, R-20 -UE, R-40 -UE }	**(Single Family Residential -Urban Farm Animal Exclusion Combining District)**
R-6 -FH -UE, R-40 -FH -UE }	**(Single Family Residential -Flood Hazard Combining District -Urban Farm Animal Exclusion Combining District)**
P-1 -UE	**(Planned Unit -Urban Farm Animal Exclusion Combining District)**
P-1 -FH -UE	**(Planned Unit -Flood Hazard Combining District -Urban Farm Animal Exclusion Combining District)**

and the Department of Conservation and Development Director shall change the Zoning Map accordingly, pursuant to Ordinance Code Sec. 84.2.002.

SECTION II. EFFECTIVE DATE. This ordinance becomes effective 30 days after passage, and within 15 days of passage shall be published once with the names of supervisors voting for and against it in the East Bay Times, a newspaper published in this County.

PASSED on May 1 2018 by the following vote:

Supervisor	Aye	No	Absent	Abstain
1. J. Gioia	(X)	( )	( )	( )
2. C. Andersen	(X)	( )	( )	( )
3. D. Burgis	(X)	( )	( )	( )
4. K. Mitchoff	(X)	( )	( )	( )
5. F.D. Glover	(X)	( )	( )	( )

ATTEST: David Twa, County Administrator
and Clerk of the Board of Supervisors

Karen Mitchoff
Board Chair, Karen Mitchoff

By _____, Dep.

ORDINANCE NO. **2018 - 12**

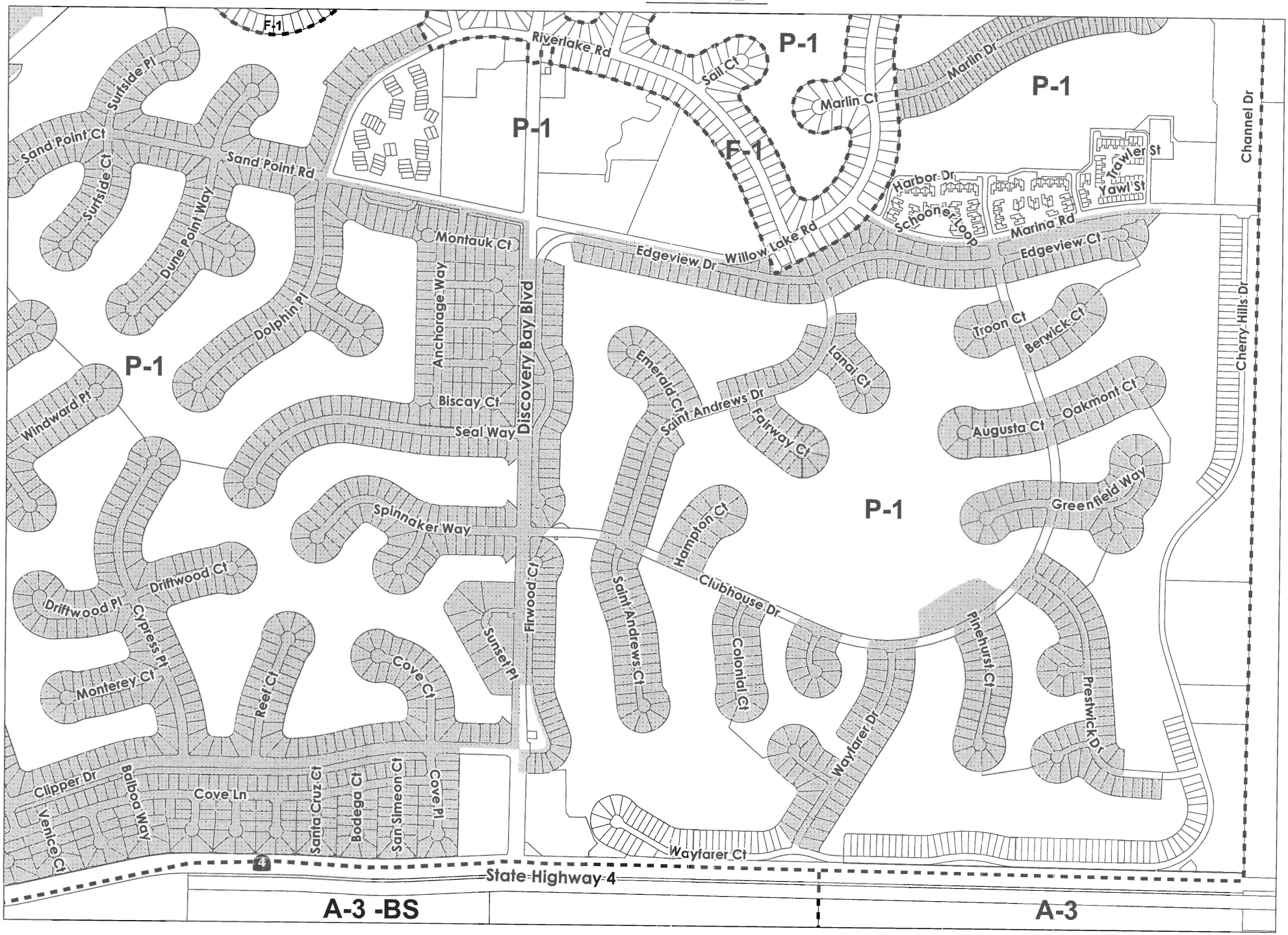
ORDINANCE NO. 2018 - 12

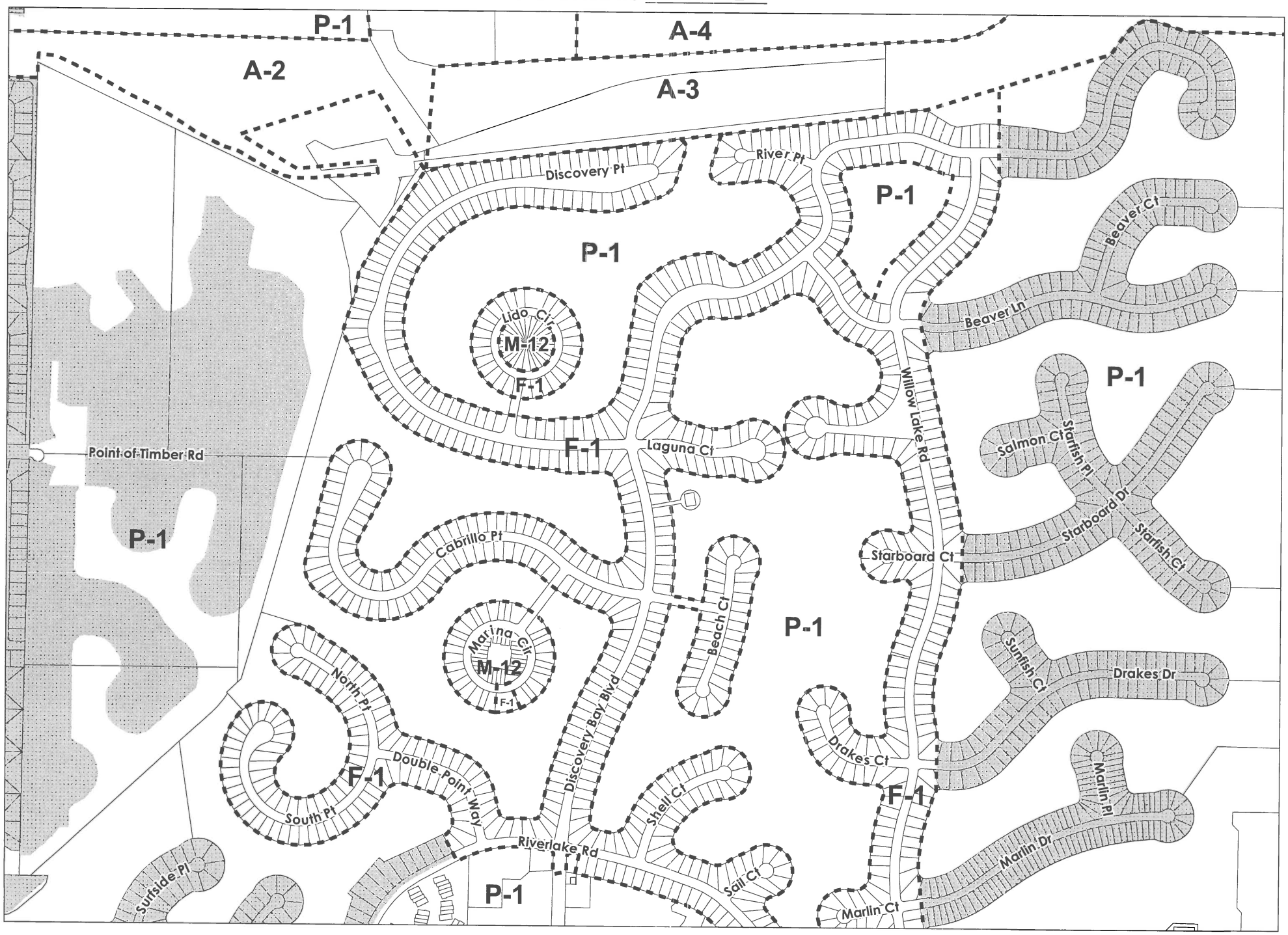
ORDINANCE NO. 2018 - 12

ORDINANCE NO. 2018 - 12

RZ18-3241 - Urban Farm Animal Exclusion combining district

Pages N-28, P-27 and P-28 of the County's 2005 Zoning Map

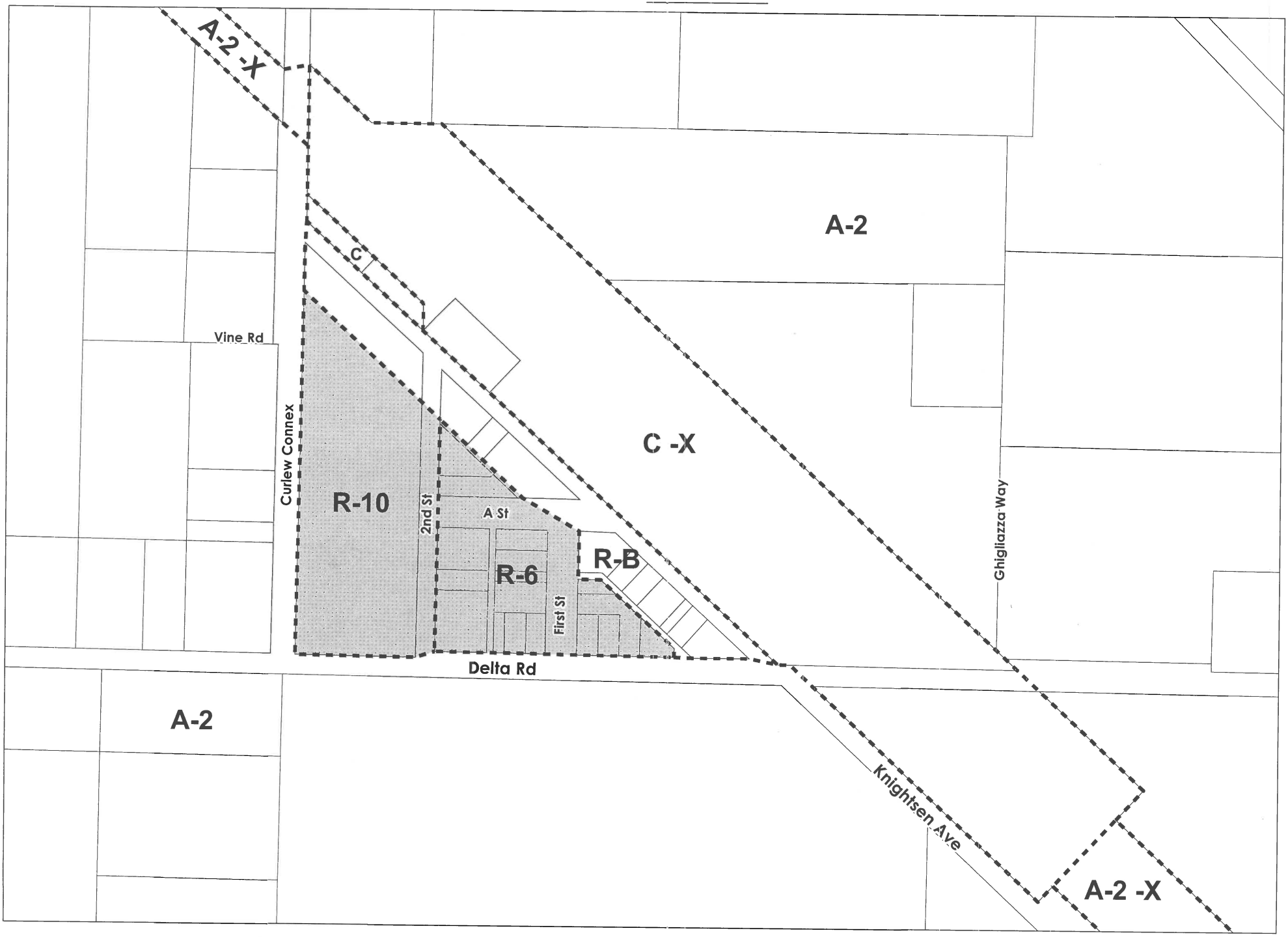

F-1
Riverlake Rd
Sail Ct
P-1
Marlin Ct
Marlin Dr
P-1
P-1
F-1
Trawler St
Yawl St
Channel Dr
Harbor Dr
Schooner Loop
Marina Rd
Edgeview Ct
Edgeview Dr
Willow Lake Rd
Surfside Pl
Sand Point Ct
Surfside Ct
Sand Point Rd
Dune Point Way
Dolphin Pl
Montauk Ct
Anchorage Way
Discovery Bay Blvd
Biscay Ct
Seal Way
P-1
Windward Pt
Emerald Ct
Saint Andrews Dr
Fairway Ct
Lanai Ct
Troon Ct
Berwick Ct
Cherry Hills Dr
Augusta Ct
Oakmont Ct
Greenfield Way
P-1
Spinnaker Way
Hampton Ct
Clubhouse Dr
Saint Andrews Ct
Colonial Ct
Pinehurst Ct
Prestwick Dr
Wayfarer Dr
Wayfarer Ct
Driftwood Ct
Driftwood Pl
Cypress Pl
Firwood Ct
Sunset Pl
Cove Ct
Reef Ct
Monterey Ct
Clipper Dr
Balboa Way
Cove Ln
Santa Cruz Ct
Bodega Ct
San Simeon Ct
Cove Pl
Venice Ct
State Highway 4
A-3 -BS
A-3


P-1
A-4
A-2
A-3
Discovery Pt
River Pt
P-1
P-1
Beaver Ct
Beaver Ln
Lido Cir
M-12
F-1
P-1
Willow Lake Rd
Salmon Ct
Starfish Pl
Starboard Dr
Starfish Ct
F-1
Laguna Ct
Point of Timber Rd
P-1
Cabrillo Pt
Starboard Ct
Beach Ct
P-1
Marina Cir
M-12
F-1
Sunfish Ct
Drakes Dr
North Pt
Double Point Way
Discovery Bay Blvd
Drakes Ct
F-1
F-1
South Pt
Shell Ct
Marlin Pl
Riverlake Rd
Marlin Dr
Sail Ct
Surfside Pl
P-1
Marlin Ct

ORDINANCE NO. 2018 - 12

A-4
Mystic Ct
Westport Cir
Outrigger Way
Pyramid Way
Key West Way
Monticello Way
Boca Raton Way
Brookhaven Cir
Pinehollow Cir
Livingston Ct
Merritt Ct
Pardee Ct
Rainbow Ct
Natoma Ct
Harbor Haven Way
Bay Harbor Way
Pescadero Cir
Davenport Cir
Freeport Ct
Shearwater Cir
P-1
Bixler Rd
Balfour Rd
Fallman Blvd
N Lakefront Loop
A-40
Oroville Ct
Tahoe Ct
New Melones Cir
A-3
A-2
Almanor Dr
Yellowstone Cir
S Lakefront Loop
Fern Ridge Cir
Green Castle Cir
Gold Creek Cir
Crystal Springs Cir
Arcadia Cir
Seneca Cir
Heron Dr
A-3
A-2

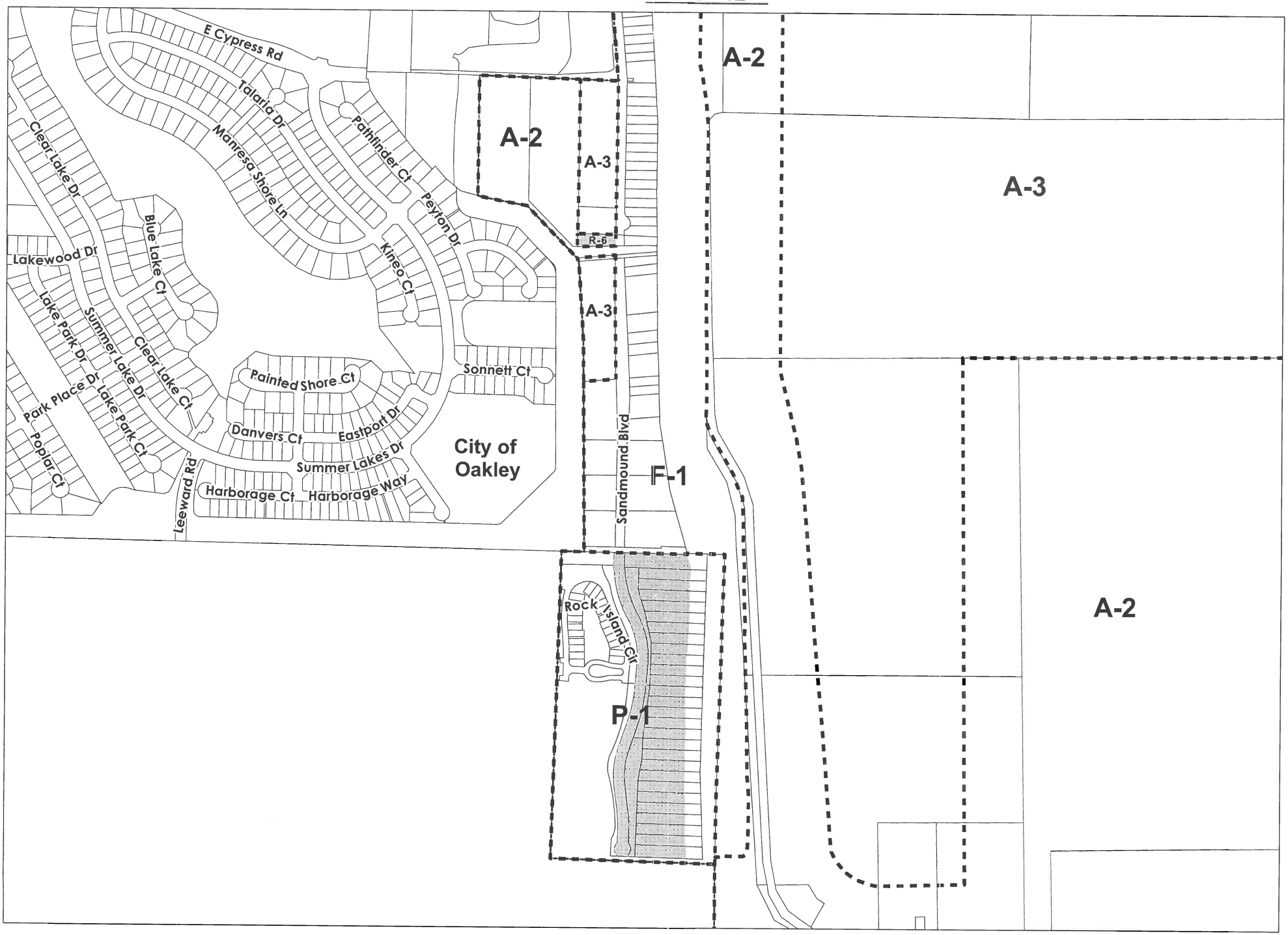
ORDINANCE NO. 2018 - 12



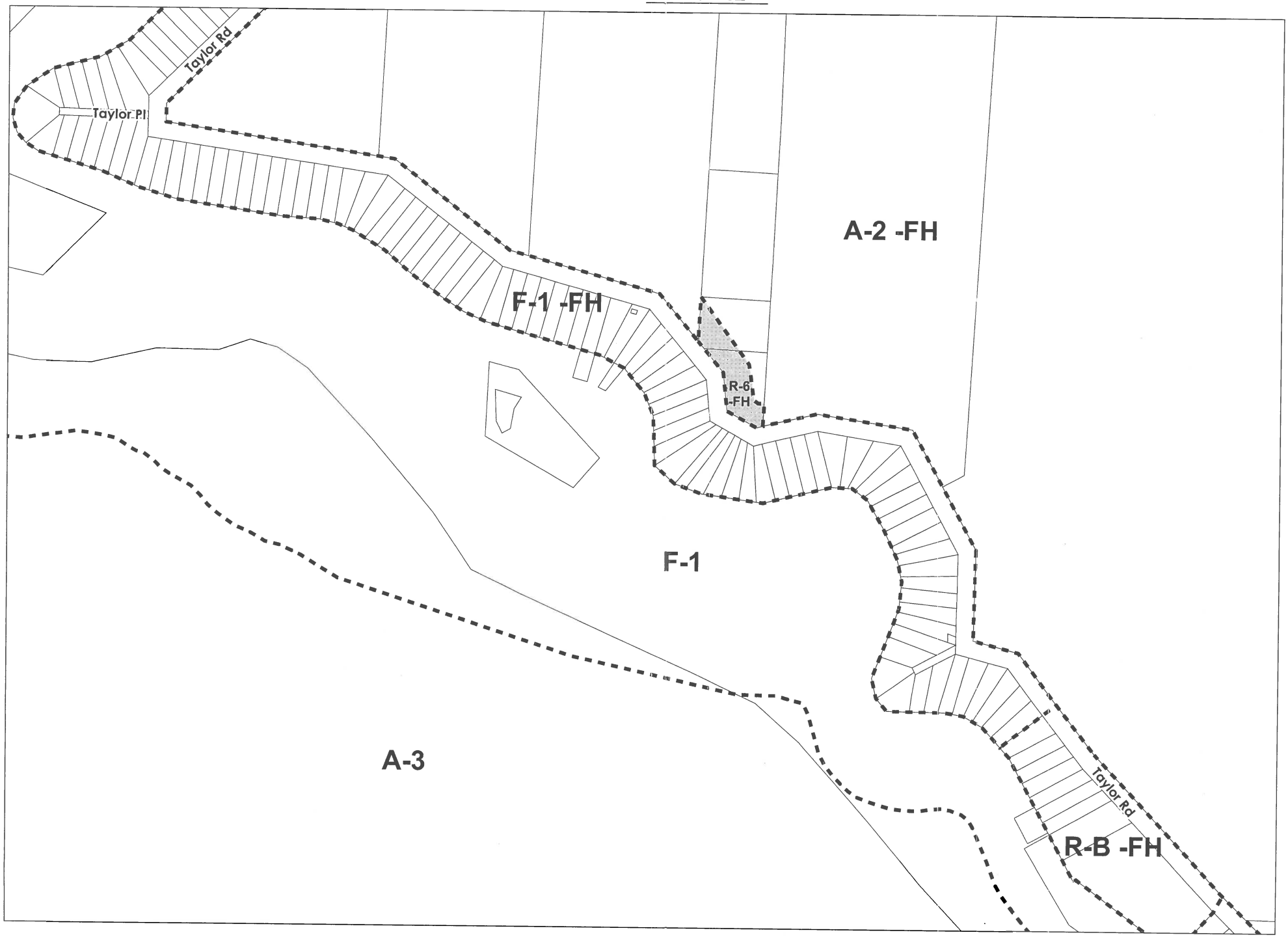
RZ18-3241 - Urban Farm Animal Exclusion combining district

Page J-26 of the County's 2005 Zoning Map

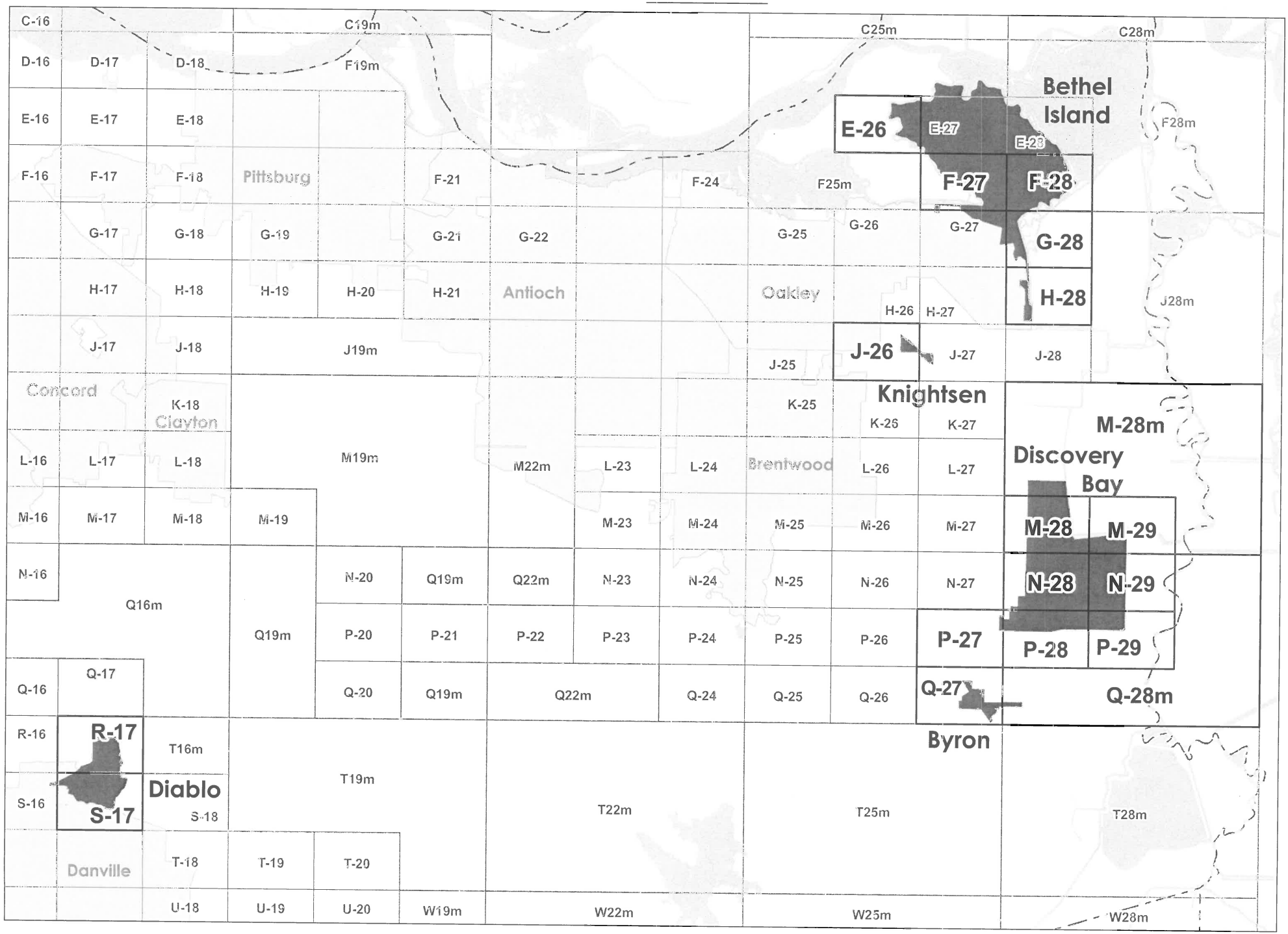
ORDINANCE NO. 2018 - 12



ORDINANCE NO. 2018 - 12


Taylor Rd
Taylor Pl
A-2 -FH
F-1 -FH
R-6
-FH
F-1
A-3
Taylor Rd
R-B -FH

ORDINANCE NO. 2018 - 12



RZ18-3241 - Urban Farm Animal Exclusion combining district **Index of the County's 2005 Zoning Map** Map Pages Amended Communites excluded from Farm Animal Ordinance

D.4

From: andrea@urbanbeeimpact.com [mailto:andrea@urbanbeeimpact.com]
Sent: Friday, April 27, 2018 7:09 AM
To: Clerk of the Board <ClerkOfTheBoard@cob.cccounty.us>
Subject: To BOS Re:The Urban Farm Animal Ordinance

Re: The Urban Farm Animal Ordinance and beekeeping.

To The Contra Costa Board of Supervisors,

On May 1st 2018 you will be deciding on the adoption of the Urban Farm Animals Ordinance. I wrote you a letter in March asking you to please consider the impact of allowing hobbyist beehives in residential neighborhoods.

I know that you did not receive many letters from concerned citizens, but I truly believe that not many residents are aware of the negative impact of allowing 4 hives next to their property as small as 6000 sqft. It seems like 2 hives would have been enough, but all it took was for the hobbyist beekeeper group to ask you for 4. You seemed easily influenced and did not consider that 2 hives is usually enough for any hobbyist to collect honey.

There is a proliferation of hobbyist beekeepers in the Bay Area. Many residents who live near hobbyist beehives are experiencing a large amount of honey bees coming into their property and also the bee droppings of several thousand bees flying over homes making it impossible to enjoy outdoor living. Also, take into consideration people with life threatening allergies to stings.

I ask all of the Board to answer this question: If a beekeeper decides to bring 4 hives next door to your home and it ends up impacting your quality of life, by what enforceable means will you resolve your complaint?

I will leave you with this thought. I spoke with a professional beekeeper who has a large bee farm in an agricultural area far away from residential areas. She said, "People do not move into residential neighborhoods to have to deal with large amounts of hobbyist's bees or to be woken up every day by roosters or smell farm animals."

We count on our public officials to make good informed decision to protect the quality of life of all citizens.

Sincerely,

Andrea DiNapoli
UrbanBeeImpact.com

RECEIVED
APR 30 2018
CLERK BOARD OF SUPERVISORS
CONTRA COSTA CO.

April 25, 2018

County Administration Building
651 Pine St., Room 106
Marrtinez, CA 94553

Dear Board of Supervisors,

I am writing in regards to the Alamo Summit project. I am hoping that this home can be reduced in width. I appreciate the general character, lower profile and variations in roof height. Lower profile generally means less impact on ridge lines. However, it really is ridiculously wide. I would think an important qualification for development of this site would be planting of native oaks in front of this home to further break up visibility and make it look more at home in the landscape.

I see preserving the character and rugged natural beauty of these massive hills of great importance to everyone. No one wants to see massive homes dominating the landscape. I really believe that these hills belong to everyone and are part of what makes this area of the bay special.

Sincerely,

Jody S. Culver
6633 Crow Canyon Rd.
Castro Valley, CA 94552

From: KENNETH HOFFMAN [mailto:hoffmankenneth@sbcglobal.net]
Sent: Thursday, April 26, 2018 5:25 PM
To: Jami Napier <Jami.Napier@cob.cccounty.us>
Subject: Alamo Summit Project Appeal to Board of Supervisors, File # DP 15-3039

Jami, Please provide to the Board of Supervisors regarding the Alamo Summit

Project appeal to be heard in May 1. Please put this first, on top of the accompanying more detailed memo being provided separately. Thank you.

Outline: The Request to CHANGE- not just defer- the Conditions of Approval

Endangers the Residents of Ridgewood Road

Existing Conditions

1) Ridgewood Road is not safe for construction traffic

Private road, not built to County standards. Only way in and out for residents and emergency vehicles.

Sections of road are only 16 feet wide, sharp curves, steep drop-offs and steep uphill embankments.

2) County determined construction traffic "significantly" increases safety hazards.

3) County required mitigation measures for safety in Conditions of Approval.

4) NO construction, and NO construction traffic, until road improvements completed (Condition 26)

5) Improvements include, resurfacing, guard rails, and WIDENING of road to 20 feet and SLOPE supports of concrete piers.

6) Construction of PAVED roadway link from Castle Crest Road along ridge to Ridgewood Road to be built BEFORE road improvements are done. To be used as needed on a temporary basis to provide access for Ridgewood residents and emergency vehicles while road improvements take place. (Condition 25)

7) Special conditions for emergency vehicles. Recognizing that for emergency vehicles in Alamo to travel to edge of Walnut Creek, go up Castle Crest, and travel along ridge to Ridgewood Road adds significant response time.

In addition to improvements to Ridgewood Road to prevent road failure and blockage of emergency vehicles and in addition to paved linked road to be used as alternative only as needed during road improvement construction:

a) Limits on duration of road closure during road improvement construction period (Condition 25)

b) Even if road closed for improvements, road TO BE MAINTAINED BY DEVELOPER AS PASSABLE BY

EMERGENCY VEHICLES (Condition 25)

c) Any closure for emergency vehicles requires PRIOR approval by Public Works and PRIOR notice to emergency response agencies (Condition 25)

Developer's Proposed Changes

1) Developer seeks to construct almost 14,000 sq. ft. residence, construct access roads connecting new residence to Castle Crest, and to install utilities, without FIRST doing road improvements, a clear CHANGE from Conditions requiring road improvements be done first. (Such a change in Conditions should require new review under the California Environmental Quality Act.)

2) Developer offers to repair Ridgewood Road as damage occurs. But, closures could be of indefinite duration and could occur multiple times. If slope failure occurs, could be days, weeks, or longer. Not passable for emergency vehicles. Emergency vehicles blocked indefinitely, with no prior notice or warning. Violates all Conditions intended to guarantee access for emergency vehicles.

3) Developer declines to build paved link road. Instead, proposes gravel road for construction vehicles. Thus, no safe and reliable access for emergency vehicles or for residents in an emergency if Ridgewood Road blocked.

DANGEROUS violation of Conditions of Approval.

Conclusion: Delays cost lives. If the road is blocked, delay of ambulance can cost lives. If fire, can become major blaze by time fire engines arrive. If fire, residents can be trapped

Therefore, enforce the EXISTING Conditions of Approval without change. Require road improvements and paved link road before project construction may commence. To do otherwise puts residents at risk.

Kenneth D. Hoffman, President,

on behalf of Upper Ridgewood Homeowners Association residents

Note: This is an outline. Information provided is documented in longer memo provided separately.

From: KENNETH HOFFMAN
Sent: Thursday, April 26, 2018 5:33 PM
To: Jami Napier <Jami.Napier@cob.cccounty.us>
Subject: Fw: Alamo Summit Project, File No. DP15-3039

Jami, Here is the second longer memo, to be placed after the outline sent to you earlier today, to be provided to the Board of Supervisors for the hearing on May 1 regarding the Alamo Summit Project appeal. Thanks. Ken Hoffman

Sent: Sunday, April 15, 2018 8:35 PM
From: KENNETH HOFFMAN
To: John Oborne <john.oborne@dcd.cccounty.us>
Sent: Monday, February 12, 2018 1:57 PM
Subject: Fw: Alamo Summit Project, File No. 15-3039

John, Please include this e-mail in the materials for the Planning Commission hearing on February 14. It represents an effort to focus matters raised in prior materials on the specific issue currently before the Planning Commission. Thanks.

Why deferring improvements to Ridgewood Road is dangerous.

The County staff has correctly analyzed this issue. The County identified construction traffic for this project as adding " significantly" to existing safety hazards. (See 1989 FEIR and Supplemental EIR, IIIA, Transportation, page 50.)

Thus, before any project construction takes place, Ridgewod Road must be improved. (Condition of Approval 26)

Improvements include "resurfacing; widening to a minimum width of 20 feet; and installation of guard rails and slope reinforcing concrete piers..." Supplemental EIR at page 52.

(Note, the road has existing pavement width with sections as narrow as 16 feet, has several sharp curves, sections with narrow shoulders, and a number of steep drop-offs and steep uphill embankments. Supplemental EIR, page 48.)

The Developer proposes deferring the Ridgewood Road improvements, using the road for construction equipment to build the roughly 14, 000 sq. ft. residence, and repairing the road as necessary as damage to the road occurs during the residence construction. (As an aside, defer improvements until when, the building of a second residence, the building of a third residence, the building of internal roads? When does safety matter?)

This proposal of the Developer simply misses the point.

To begin with, building such an almost 14,000 sq. ft. residence on three lots is the same as building approximately
four residences of 3500 sq. ft., much closer to a norm in Alamo. It will require a substantial amount of trucks to carry the concrete for the pad alone, not to mention the residence construction itself. Plus, how much grading equipment? How many trucks to move thousands of cubic yards of dirt?

It ignores all the construction traffic necessary to build infrastructure for the new residence, such as roads to the residence. The Developer wants to construct access roads connecting to Castle Crest for the new residence, Salemo Lane and Valenza Lane, again using the unimproved Ridgewood Road for construction traffic.

The proposal also ignores the construction traffic for other infrastructure such as utilities, including water lines and electric and gas lines, and either sewer lines or a cess pool. Again, construction traffic that uses an unimproved Ridgewood Road.

There will be an extremely high likelihood of road damage to Ridgewood Road from this heavy volume of construction traffic.

Repairs for road damage take time, during which Ridgewood Road would almost certainly be blocked or closed.

SLOPE FAILURE is a real possibility. See HSI Engineering Report at p. 1

" Heavy trucks such as concrete trucks and semi-trucks cause the SAME pavement damage as about 9,000 passenger vehicles." HSI Engineering Report, page 7, emphasis added.

If there is a slope failure or other road blockages, how long would Ridgewood be closed... days, weeks, months?

In the meantime, the residents are trapped. Emergency vehicles cannot get in or out. The 19 households on Upper Ridgewood Road are all endangered.

The only alternative is the so- called link road between Ridgewood and Castle Crest along the ridge line.

But how long does it take an emergency vehicle from Alamo to travel to the edge of Walnut Creek, make its way up the steep Castle Crest, endeavor to cross over the ridge on the link road, and finally reach Ridgewood.?

An additional 20 minutes, an additional 30 minutes, more? If someone has a heart attack, this may be the difference between life and death.

If there is a fire, this is the difference between a small kitchen fire and a major conflagration. How do the residents quickly and safely escape?

Furthermore, this assumes there is even a safe link road on which to travel. The Developer does not wish to pave a safe and secure link road as required by Condition of Approval 25, but just to have compacted gravel for the link road and use it for construction access purposes along the ridge from Ridgewood to the proposed residence.

Could emergency vehicles safely navigate this gravel construction road? Could residents of Ridgewood in passenger vehicles safely navigate this gravel construction road? Is it safe to travel on during the night? Is it safe during a storm? But it may be needed during the night or during a storm by residents of Ridgewood and emergency vehicles.

The Developer's proposal ignores the purpose of the Conditions of Approval

The Ridgewood Road improvements are designed to avoid road closures and to keep the road intact while it is used by project construction traffic.The link road is not intended for routine use when project construction takes place, but to be used while Ridgewood Road improvements take place. The link road is not to be used in lieu of road improvements.

Condition 25 sates "To provide a temporary means of alternative access for upper Ridgewood Road residents during construction of improvements" to Ridgewood Road... "a paved roadway link through the project site to Castle Crest Road shall be provided for temporary use as needed by upper Ridgewood Road residents during the lower Ridgewood Road construction period."

Strict notice requirements are placed on closure of Ridgewood Road. (Condition 25) Sudden emergency closures do not appear to be anticipated.

Further, even if Ridgewood Road is closed after the required notice, Ridgewood is still to be maintained by the Developer as "passable" for emergency vehicles.(Condition 25) Any exception to emergency vehicles being able to use Ridgewood Road requires prior approval by Public Works and notice to emergency response agencies. (Condition 25)

From: Paul Kimelman]
Sent: Thursday, April 26, 2018 6:09 PM
To: Stacey Boyd <Stacey.Boyd@cob.cccounty.us>
Subject: Castle Crest project on agenda for May 1

Hello Ms Boyd. I would like to register my (and my wife's) opposition to the appeal for Alamo Summit - item D3 I believe. The safeguards in place are very important to me and my neighbors, and we strongly oppose weakening them.
I live on Castle Crest Rd in Alamo - 110 Castle Crest - so, I have a specific interest and would be impacted by the Alamo Summit project.

Thanks and Regards, Paul

Paul Kimelman

Thus, it is absolutely clear that use of the link road is not intended to be a substitute for the required improvements to Ridgewood Road. Rather, the link road is to be used, as necessary, while Ridgewood Road is improved, which improvements are meant to avoid damage to the road and avoid having to close the road during project construction itself, (except for short periods of a 3 to 4 minutes, after Ridgewood has been improved, as construction trucks with wide loads use the road. Supplemental EIR, page 52.)

The request by the Developer to defer the improvements to Ridgewood and to defer establishing a safe paved link road simply ignores all of the foregoing, putting the residents of Upper Ridgewood in potential physical harm every time there is a road failure due to project construction traffic.

Note, as specified in prior memos attached to the Staff Report, the Catch 22 of using Ridgewood Road for construction traffic to build the link road before Ridgewood Road itself is improved must be addressed. If construction traffic to pave the link road caused a slope failure or blockage of Ridgewood Road this could be catastrophic. Again, no safe paved link road in place for residents of Ridgewood to use and no safe timely access for emergency vehicles.

Public Works must assess Ridgewood Road before the link road construction traffic uses Ridgewood and determine how best to proceed safely with the link road construction. Only the paving of the link road, with smaller, lighter vehicles, should be allowed. No work on the project itself may take place until after Ridgewood Road has been improved. No debris should be hauled back down Ridgewood Road from the link road paving until after the paved link road is completed and the improvements to Ridgewood Road are completed.

In addition, the Developer must maintain Ridgewood Road while the link road is constructed. During link road construction, or if the construction traffic for he link road causes a road failure on Ridgewood Road, this must be immediately repaired and rectified, and should be the responsibility of the Developer. (This is consistent with the Developer's duty to maintain Ridgewood Road as passable for emergency vehicles as specified in Condition 25)

In short, the County itself has determined that Ridgewood Road is unsafe for use by construction traffic without first putting in a paved link road and making the required Ridgewood Road improvements.

For the County to ignore its own findings and conclusions would make the County itself responsible for any
resulting injuries or damages.

The County should adhere to its original determinations and the recommendations of its own staff, and require the Developer to follow established and necessary safety requirements before any project or construction may proceed.

Thank you for your attention to this matter.

Kenneth Hoffman
President, Upper Ridgewood HOA

Contra Costa County

To: Board of Supervisors

From: Karen Mitchoff, District IV Supervisor

Date: May 1, 2018

Subject: OPTIONS FOR REPRESENTATION ON THE COUNTYWIDE REDEVELOPMENT SUCCCESSOR AGENCY OVERSIGHT BOARD

RECOMMENDATION(S):
CONSIDER options for Board of Supervisors representation (Seat 1) on the Countywide Redevelopment Successor Oversight Board.

FISCAL IMPACT:
The Countywide Oversight Board has no direct impact on the General Fund. Members of the Oversight Board do not receive compensation.

BACKGROUND:
The California State Legislature enacted Assembly Bill x1 26 to dissolve redevelopment agencies formed under the Community Redevelopment Law (Health and Safety Code Section 33000 et seq.); and on February 1, 2012, the redevelopment agencies in 17 jurisdictions in Contra Costa County were dissolved. Each of these jurisdictions declared that they would act as successor agency for their dissolved Redevelopment Agencies. Oversight Boards for each of these 17 Successor Agencies were established in accordance with the Dissolution Act.

Beginning July 1, 2018, there will be only one oversight board in Contra Costa County. The purpose of this County Oversight Board is to oversee all redevelopment successor agencies in the County. This new

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes: See Addendum

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Maureen Toms (925) 674-7878

cc: CAO, DCD

BACKGROUND: (CONT'D)

oversight board will be staffed by the County Auditor-Controller with assistance from the Contra Costa County Department of Conservation (DCD). The Countywide oversight board is appointed as follows:

(1) One member may be appointed by the county board of supervisors.
(2) One member may be appointed by the city selection committee established pursuant to Section 50270 of the Government Code. In a city and county, the mayor may appoint one member.
(3) One member may be appointed by the independent special district selection committee established pursuant to Section 56332 of the Government Code, for the types of special districts that are eligible to receive property tax revenues pursuant to Health and Safety Code Section 34188.
(4) One member may be appointed by the county superintendent of education to represent schools if the superintendent is elected. If the county superintendent of education is appointed, then the appointment made pursuant to this paragraph shall be made by the county board of education.
(5) One member may be appointed by the Chancellor of the California Community Colleges to represent community college districts in the county.
(6) One member of the public may be appointed by the county board of supervisors.
(7) One member may be appointed by the recognized employee organization representing the largest number of successor agency employees in the county.

If any Oversight Board member positions have not been filled by July 15, 2018, the Governor may appoint people to those positions. Below is the current status of the Oversight Board composition:

Seat	To Represent:	Primary	Alternate (if any)
1	Board of Supervisors	TBD	
2	Mayor's Conference	Peter Murray	Laura Hoffmeister
3	Special Districts	TBD	
4	Superintendent of Schools	TBD	
5	Community College Districts	Vicki Gordon	
6	County Public Member (BOS)	Jack Weir	William Swenson
7	Employee Representative	TBD	

Before July 15, the Board of Supervisors should make the appointment for Seat 1 on the oversight board. The statute does not define the seat term. The Board's general policy has been to establish seat terms at four years when no other term has been specified. However, Board of Supervisors member appointments are, in some cases, considered for reassignment annually. Therefore, a seat term of up to four years, at the Board's discretion, would be appropriate. To fill Seat 1, the Board may consider appointing:

- A member of the Board of Supervisors
- Another county elected official who resides or works in Contra Costa County and is willing to serve
- A County staffperson
- A member of the public who resides in Contra Costa Costa

The duties of the Countywide Redevelopment Successor Oversight Board are summarized briefly below:

- Approve new repayment terms for outstanding loans where the terms have not been specified
- Approve refunding of outstanding bonds or other debt of the former redevelopment agency by successor agencies in order to provide for savings or to finance debt service spikes
- Approve creation of reserves as required by indentures, trust indentures, or similar documents governing the issuance of outstanding redevelopment agency bonds
- Approve merger of project areas
- Continuing the acceptance of federal or state grants, or other forms of financial assistance from either public or private sources, where assistance is conditioned upon the provision of matching funds, by the successor entity as successor to the former redevelopment agency, in an amount greater than 5 percent
- Approve compensation agreements between entities that wish to retain assets for future use, and the other taxing entities, to provide payments to them in proportion to their shares of the base property tax
- Approve establishment of the Recognized Obligation Payment Schedule or "ROPS"
- Oversee successor agencies' actions to wind down their affairs

CLERK'S ADDENDUM

The Board appointed Supervisor Glover to Seat 1 on the Countywide Redevelopment Oversight Board.

Contra Costa County

To: Board of Supervisors

From: TRANSPORTATION, WATER & INFRASTRUCTURE COMMITTEE

Date: May 1, 2018

Subject: Approval of the Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

RECOMMENDATION(S):
APPROVE the Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan, AUTHORIZE staff to pursue funding opportunities for implementation.

FISCAL IMPACT:
None to the General Fund. A Contra Costa Transportation Authority – Transportation for Livable Communities (Measure J) grant and Subregional Transportation Needs (Measure J) funds funded development of the Plan. Staff time for recommended activities is covered under existing budgets (50% Road Fund and 50% Measure J Fund).

BACKGROUND:
On 4/9/18, staff provided an update to the Transportation, Water and Infrastructure Committee (TWIC) with a recommendation that the Committee provide comment and direct staff as appropriate including 1) bringing the Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan to the full Board of Supervisors for approval, and 2) pursue funding opportunities for implementation, as directed by the Committee.

☑ APPROVE ☐ OTHER

☐ RECOMMENDATION OF CNTY ADMINISTRATOR ☑ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Jamar Stamps (925) 674-7832

cc: Monish Sen, PWD, Jerry Fahy, PWD

BACKGROUND: (CONT'D)

On 12/7/15, staff provided an update to the TWIC indicating additional analysis was required to complete the I-680/Treat Boulevard Bike/Pedestrian Plan. Estimated cost of additional work was $20,705, eventually funded by Measure J Subregional Transportation Needs funds.

Project Area

The approximately ½-mile study segment (Exhibit A) encompasses Treat Boulevard from the North Main Street intersection (City of Walnut Creek), through the I-680 over-crossing and Contra Costa Centre BART Station Transit Oriented Development ("TOD"), to the Jones Road/Iron Horse Trail Bridge (County).

Background

The Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan ("Plan" or "Study") was undertaken to address challenges and barriers to bicycling and walking within the ½- mile Study segment by developing concepts that emphasize a better safety for bicyclists and pedestrians.
The Contra Costa Transportation Authority ("CCTA") Measure J – Transportation for Livable Communities Grant program (2014) and Measure J Subregional Transportation Needs (2017) funded the Study.

Study development was in collaboration with the City of Walnut Creek, with participation from interested agencies like Caltrans, CCTA, TRANSPAC and transit service providers. Alta + Planning & Design ("consultant"), with assistance from sub-consultant DKS Associates, developed technical work for the Plan. County staff and the consultant team also gained valuable public input through multiple meetings and community workshops held between 2014 and 2017.
Overall, six Corridor Concepts (1A, 1B, 2, 3, 4, 4A) and five focused-analysis Off-Ramp Alternatives (A, B, C, D, E) were considered. The "Preferred Project" is Corridor Concept 4A combined with Off-Ramp Alternative C (i.e. "Concept 4A/Alternative C").

Summary: Preferred Project Analysis (Concept 4A/Alternative C)

-Preferred Project design based on agency staff and public input and technical analysis.

-Provides better multi-modal balance while maintaining optimum corridor performance, minimizes pedestrian discomfort, and avoids Caltrans design exceptions.

-Includes geometric modifications to the Oak Road and I-680 Off-Ramp intersections to improve pedestrian and bicycle crossings.

Tables 1, 2 and 3 (Exhibit B) show traffic data from key locations along the Study Corridor in "existing" and "future" year scenarios. These locations would undertake the most dramatic improvements under the Preferred Project. Though comment was received during the process that removal of lanes could cause congestion impacts or shift a bottleneck, the analysis shows each key location performs optimally under the Preferred Project. Currently, Treat Boulevard from Buskirk Avenue to Jones Road is four lanes. After Jones Road, through-traffic lanes reduce from four to three. This creates congestion with vehicles needing to merge into the eastbound through lanes. The Preferred Project would create lane uniformity in the Buskirk Avenue to Jones Road segment, which will smooth traffic throughput and improve overall corridor performance in terms of delay and level of service.

In the "No Build" scenario, the Study Corridor will inevitably experience higher future traffic volumes

due to typical increases in background traffic. Implementing the Preferred Project has nominal impact to overall corridor performance (Exhibit B, Table 4), and in fact improves performance at key points in the Study corridor while providing better multi-modal balance.

Next Steps

Estimated Project Cost – $2.5 million

Staff will provide updates to the Board, through the Transportation, Water, and Infrastructure Committee, at key milestones during implementation.

Secure Funding: Staff will pursue grants and other eligible sources to fund activities identified below.

Preliminary Design: Preliminary design will include detailed plans, including relatively accurate locations, dimensions, materials, and features, which will assist in developing a corresponding refined preliminary cost estimate. The preliminary plans would be the basis for environmental documents for the project. Following the preliminary design County staff may conduct additional community outreach.

Environmental Studies and Documentation: Environmental studies and findings are required to comply with the California Environmental Quality Act ("CEQA"). If using federal funds, additional documents would be required to address the National Environmental Policy Act ("NEPA"). The environmental studies must review and address a broad range of potential environmental issues.

Permits: The County will obtain the necessary permits and agreements for the project to proceed, such as an Encroachment Permit from Caltrans.

Construction Documents: The preliminary plans will be refined into final design plans that contain construction drawings, specifications, and cost estimates.

Right-of-Way Acquisition: If necessary, Real Estate Services will work with property owners to acquire easement or other type of temporary or permanent land rights to allow project implementation.

Bidding and Contracting: Contract bid documents will be prepared and the project will be advertised for public bid. The County will analyze bids and contract with the most qualified contractor.

Construction: The contactor will construct the project with County oversight.

CONSEQUENCE OF NEGATIVE ACTION:

The pedestrian and bicycle gap along the Treat Boulevard Corridor between North Main Street in the City of Walnut Creek, through the I-680 over-crossing, to the Iron Horse Trail will continue to exist. Goals and policies of the General Plan and other policies will not be implemented relative to this project.

CLERK'S ADDENDUM

Speakers: Bruce Ohlson, Delta Pedalers Bicycle Club

ATTACHMENTS

Exhibit A – Project Study Area Map

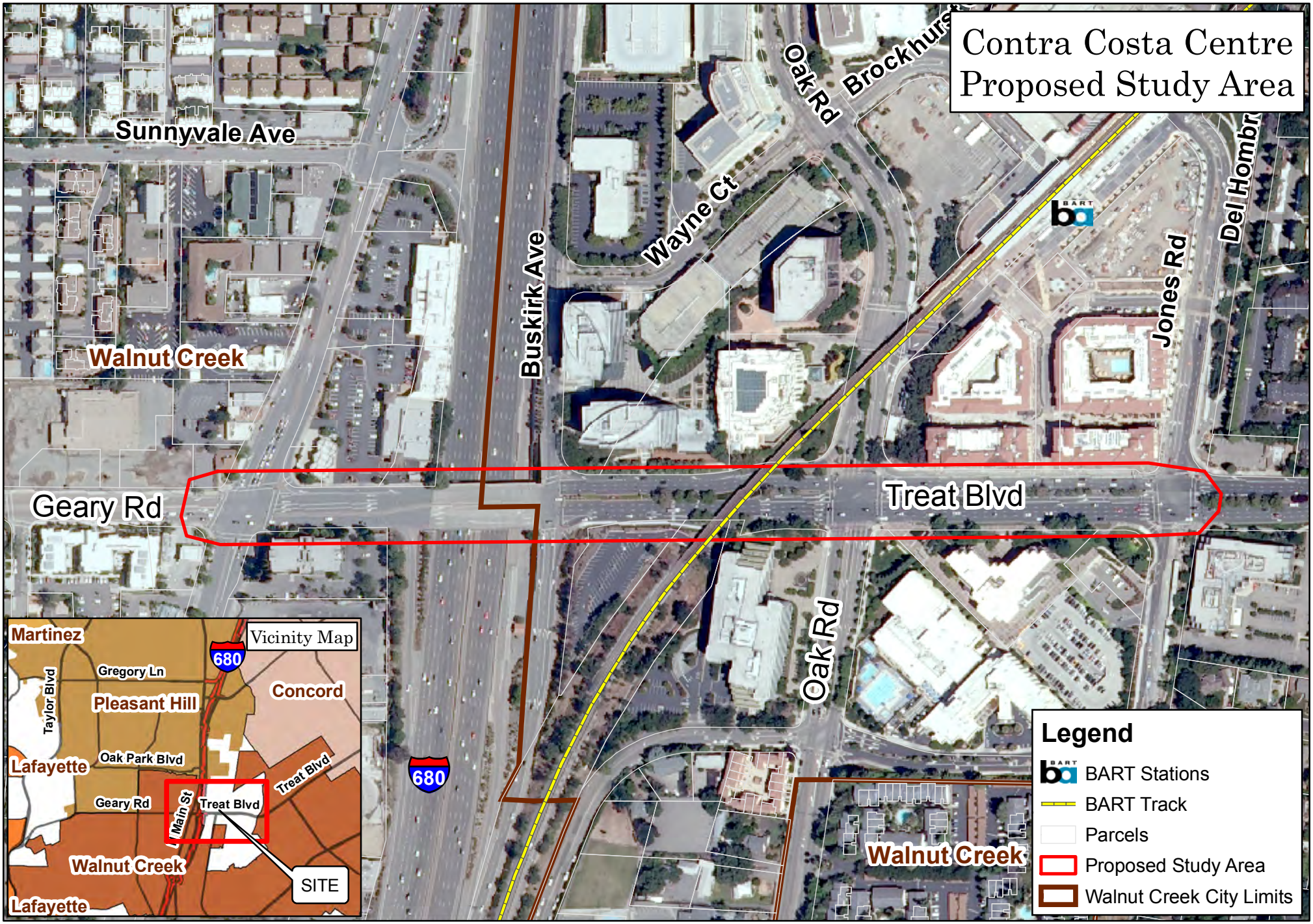
Exhibit B – Traffic Data Tables

Exhibit C - DRAFT FINAL_TreatBikePedPlan

Exhibit D - Revised Concept 4 Analysis (3/6/17)

Exhibit E - Alternatives Traffic Analysis Report (7/22/15)

Contra Costa Centre Proposed Study Area



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Map created 11/3/2011
by Contra Costa County Department Conservation and Development
Community Development Division--GIS Group
651 Pine Street, 4th Floor North Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

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Table 1

Treat Boulevard/Northbound I-680 Off-Ramp[1]							
	(2014) Northbound I-680 Off-Ramp/Treat Boulevard						
	Peak Hour	Existing No Build			Alternative 4C		
		Ramp Queue Length (ft.)	Delay (sec)	LOS	Ramp Queue Length (ft.)	Delay (sec)	LOS
	A.M.	0	30.3	C	687	44.4	D
	P.M.	0	17.5	B	510	41.6	D
	(2040) Northbound I-680 Off-Ramp/Treat Boulevard						
	Peak Hour	Future No Build			Alternative 4C		
		Ramp Queue Length (ft.)	Delay (sec)	LOS	Ramp Queue Length (ft.)	Delay (sec)	LOS
	A.M.	0	31.4	C	1036	61.2	E
	P.M.	0	19.9	B	604	40.2	D

Table 2

Buskirk Avenue to Jones Road Segment (Eastbound)[2]							
	(2014) Oak Road/Treat Boulevard – Eastbound Through						
	Peak Hour	Existing No Build			Existing + Proposed		
		Lane Configuration	Delay (sec)	LOS	Lane Configuration	Delay (sec)	LOS
	A.M.		46.8	D		51.9	D
	P.M.		11.6	B		54.8	D
	(2040) Oak Road/Treat Boulevard – Eastbound Through						
	Peak Hour	Future No Build			Future + Proposed		
		Lane Configuration	Delay (sec)	LOS	Lane Configuration	Delay (sec)	LOS*
	A.M.		70.4	E		74.6	E
	P.M.		51.6	D		29.6	C

[1] DKS Traffic Analysis of Revised Concept 4 (10/9/2017)
[2] DKS Feasibility Study and Evaluation Traffic Analysis of Revised Concept 4 (3/6/2017)

Table 3

Buskirk Avenue to Jones Road Segment (Eastbound)	(2014) Jones Road/Treat Boulevard – Eastbound Through						
	Peak Hour	Existing No Build			Existing + Proposed		
		Lane Configuration	Delay (sec)	LOS	Lane Configuration	Delay (sec)	LOS
	A.M.		35.8	D		17.0	B
	P.M.		44.0	D		34.1	C
	(2040) Jones Road/Treat Boulevard – Eastbound Through						
	Peak Hour	Future No Build			Future + Proposed		
		Lane Configuration	Delay (sec)	LOS	Lane Configuration	Delay (sec)	LOS
	A.M.		86.8	F		34.4	C
	P.M.		162.0	F		144.3	F

Table 4

Existing vs. Preferred Project[3]							
Approach	Peak Hour	Total Delay/Vehicle (sec/veh)		Average Speed (mph)		Arterial Level of Service ("LOS")	
		Existing	Preferred Project	Existing	Preferred Project	Existing	Preferred Project
Westbound	A.M.	22	20	15	15	D	D
	P.M.	23	19	13	15	E	E
Eastbound	A.M.	36	36	9	9	F	F
	P.M.	32	27	10	11	E	E

[3] DKS Alternatives Traffic Analysis Report (7/22/2015)

Contra Costa County Department of Conservation and Development

Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

OCTOBER 2017

alta
PLANNING + DESIGN

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Separately available: full Traffic Analysis Report with modeling output and traffic count data tables (DKS Associates)

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Summary

The Contra Costa Centre Transit Village is a Transit Oriented Development ("TOD") in unincorporated Walnut Creek, clustered around the Pleasant Hill BART station. It is characterized by mixed commercial, office and residential land uses. Pedestrians and cyclists access the area principally via the Iron Horse Trail or a narrow (5') sidewalk along the north side of the I-680 overcrossing bridge.

Treat Boulevard creates challenges for the users of transit as the wide roadways (up to nine lanes) and intersections become barriers for pedestrians to cross. Without bicycle infrastructure, the first/last mile for transit users becomes even more constrained.

The Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan ("Plan" or "Study") was undertaken to address challenges and barriers to bicycling and walking within the ½- mile Study segment by developing concepts that emphasize a higher level of comfort for bicyclists and pedestrians.

The Contra Costa Transportation Authority ("CCTA") Measure J – Transportation for Livable Communities Grant program (2014) and Subregional Transportation Needs (2017) funded the Study.

Study development was in collaboration with the City of Walnut Creek, with participation from interested agencies like Caltrans, CCTA, TRANSPAC and transit service providers. Alta + Planning & Design, with assistance from sub-consultant DKS Associates, developed technical work for the plan. County staff and the consultant team also gained valuable public input through multiple meetings and community workshops held between 2014 and 2017.

Overall, six Corridor Concepts (1A, 1B, 2, 3, 4, 4A) and five focused-analysis Off-Ramp Alternatives (A, B, C, D, E) were considered. The "Preferred Project" is Corridor Concept 4A combined with Off-Ramp Alternative C (i.e. "Concept 4A/Alternative C").

Preferred Project Highlights – Concept 4A/Alternative C

- Preferred Project design based on agency staff and public input and technical analysis.
- Includes geometric modifications to the Oak Road and I-680 Off-Ramp intersections to improve pedestrian and bicycle crossings.
- Provides better multi-modal balance while maintaining optimum corridor performance, minimizes pedestrian discomfort, and avoids Caltrans design exceptions.

In the "No Build" scenario, the Study Corridor will inevitably experience higher future traffic volumes due to typical increases in background traffic. Implementing the Preferred Project has nominal impact to overall corridor performance, and in fact improves performance at key points in the Study corridor while providing better multi-modal balance.

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1. Introduction

The Contra Costa Centre Transit Village is a Transit Oriented Development (TOD) in unincorporated Walnut Creek, characterized by mixed commercial and office land uses. Bicycle parking at the BART station is plentiful and heavily utilized. Despite these trip generators, the I-680 overcrossing has a narrow (5') sidewalk on the north side only, and no bicycle facilities. Other than the regional Iron Horse Trail, there are no bicycle facilities along or across the corridor.

This study intends to assess active transportation improvement options, recommend a phased approach to implementation, and provide concept plans and cost estimates for funding programming.

Figure 1-1 shows a vicinity map of the study corridor.

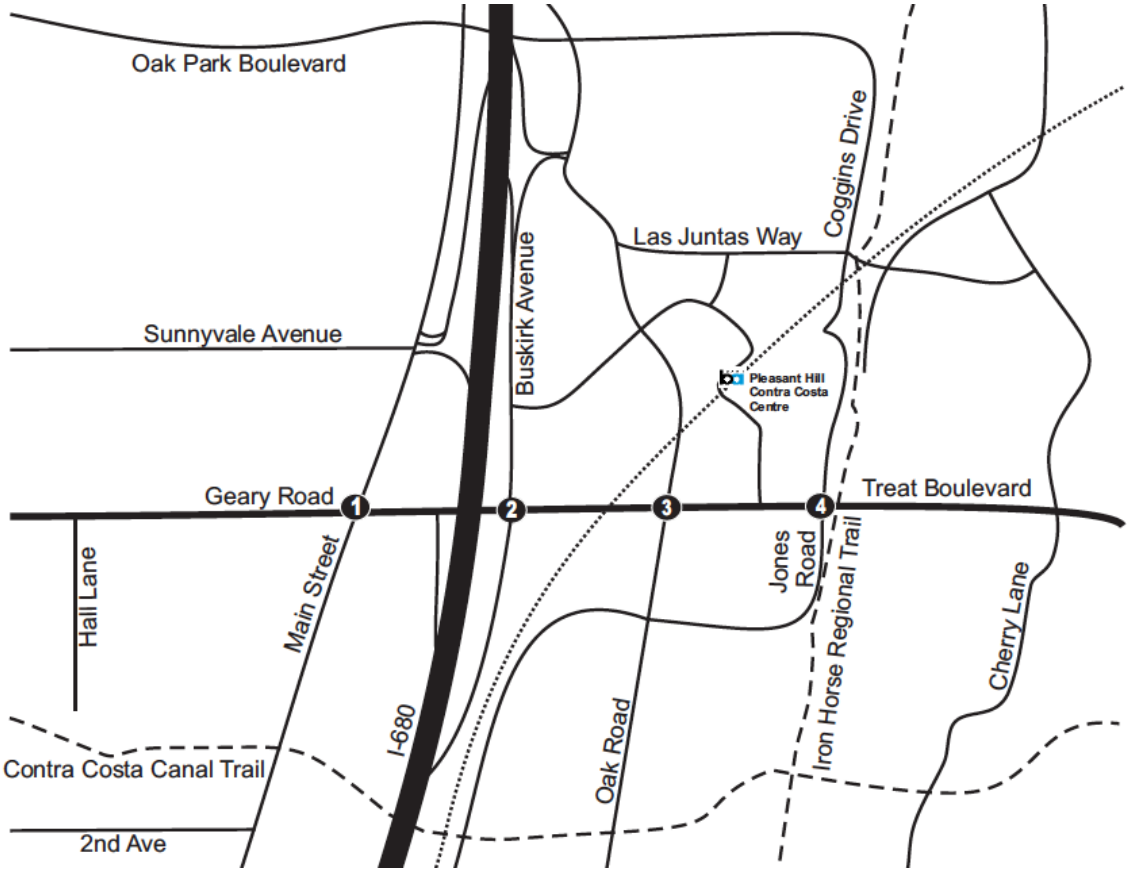


Figure 1-1: Project Locality

This project includes the following intersections:

1. Treat Boulevard/Geary Road and N. Main Street
2. Treat Boulevard and Buskirk Avenue/I-680 northbound ramps
3. Treat Boulevard and Oak Road
4. Treat Boulevard and Jones Road/Iron Horse Trail

2. Plan Development Process

Plan Initiation

The Plan was funded with a $75,000 grant from Contra Costa Measure J (2004) Transportation for Livable Communities (TLC) program, administered through the Contra Costa Transportation Authority (CCTA).

In April 2014, the consultant team met with Contra Costa County at a "kick-off' meeting to review the overall scope, data needs, schedule, vision and goals of the Plan. The Team collected necessary geographic, design and vehicle, bicycle and pedestrian data for analysis.

Outreach

A Technical Advisory Committee (TAC) including staff from Contra Costa County, Walnut Creek, and Caltrans was convened three times (see Appendix A for a list of TAC members). In addition to the TAC, meetings were held with the following stakeholders:

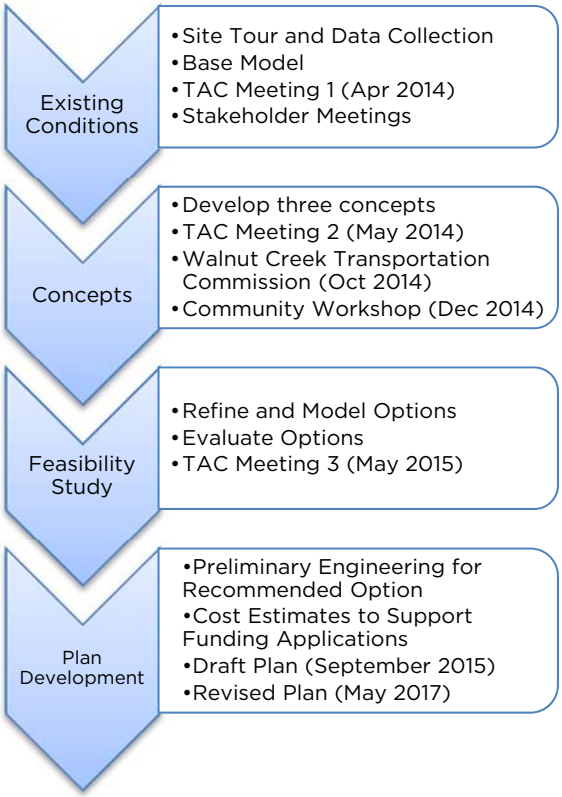


Figure 2-1: Plan Process

- 7/27/14 Lamorinda Development
- 12/12/14 Contra Costa Centre property management
- 2/20/15 Bike East Bay

Design Alternatives

The summer and fall of 2014 were dedicated to the analysis of existing plans, GIS data, field research, traffic analysis and the development of three design concepts. The design concepts, described in further detail below, were evaluated and reviewed by the TAC and the Walnut Creek Transportation Commission.

Recommended Concept

In May 2015, the TAC met to review the recommended concept. Principal topics included highway network planning, freeway access constraints, design details, and traffic modeling. Based on TAC input and a multi-criteria analysis Concept 4 was selected as the recommended alternative, offering balance between bicycle and pedestrian improvements with motorist level of service and cost effectiveness.

A Draft Plan was released in September 2015. Based on public comments on the draft document, a revised version of the Concept 4 design was developed in 2016, and additional traffic analysis was conducted. This current plan identifies Revised Concept 4 as the recommended alternative.

3. Planning Context

Previous plans in the area identify proposed pedestrian and bicycle improvements, policies, and priorities for Treat Boulevard and the nearby area. A brief description of each related plan is listed below.

3.1. City of Walnut Creek Bicycle Master Plan (2011)

According to this plan, the City of Walnut Creek allows bicyclists to use sidewalks along heavily travelled arterials, including Treat Boulevard. Various segments of Treat Boulevard within the city limits are designated as Class III bicycle routes, although sharing a lane with high volumes of traffic on a 35 mph roadway is not a condition that will suit most people.

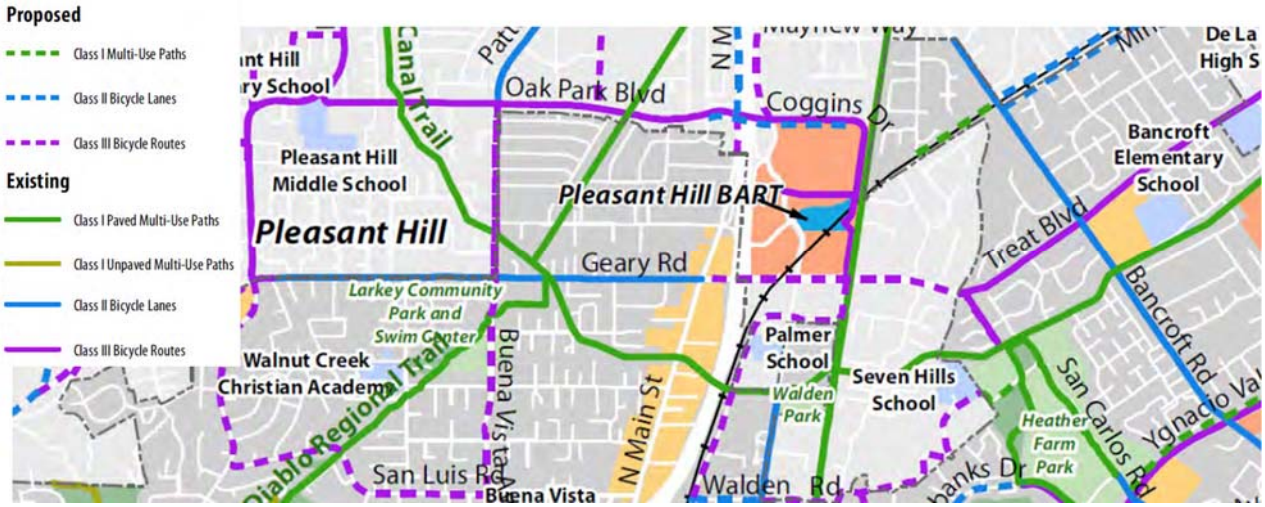


Figure 3-1: Extract of Walnut Creek Bicycle Master Plan showing Treat Boulevard as a proposed Class III

3.2. Contra Costa Bicycle and Pedestrian Plan (2009)

The Contra Costa Bicycle and Pedestrian Plan names "Routes to transit" as one of three types of pedestrian priority locations. The Pleasant Hill BART station is mentioned as a priority location along with the other BART stations in Contra Costa County. No specific improvements are prescribed for the Treat Boulevard study corridor.

The Contra Costa Bicycle and Pedestrian Plan identifies Treat Boulevard as a part of the Countywide Bicycle Network (CBN) but does not propose a specific treatment.

3.3. Pleasant Hill BART Station Area Specific Plan (1998)

The Pleasant Hill BART Station Area Specific Plan states that a circulation system for bicycles and pedestrians will be provided to support travel between parking areas, transit stops, buildings, the Iron Horse Trail, and the Bart Station.

The Pleasant Hill BART Station Area Specific Plan cites the following bicycle and pedestrian objectives for transportation and circulation:

- **Transportation and Circulation Objective #5** Provide for safe and convenient pedestrian and bicycle movement between the BART Station, Station Area parking, local transit boarding areas, and major facilities in the Station Area and between the Station Area and nearby residential and commercial areas."
- **Urban Design Objective #8** Develop areas intensively used by pedestrians at a human scale with adjoining uses which will visually and functionally enliven the area.

The Specific Plan design concepts identify Treat Boulevard as the major entranceway to the Station Area and encourage a pedestrian-friendly environment:

- Emphasize Treat Boulevard as the major entranceway to the Station Area and visually identify this role by the placement of the pedestrian overpass at Oak Road and the pedestrian/bicycle overpass at Jones Road, and the provision of elevated public plazas or pedestrian corridors in the vicinity of the northeast and southeast corners of the intersection (Subareas 12 and 15). Provide sufficient public outdoor space to accommodate the pedestrian activities focused at this location as a result of adjoining office development, BART parking and local transit stop.
- Create a pedestrian-friendly street-level environment by discouraging blank building walls and encouraging windows, doors, and other building facade features.

The Specific Plan identifies policies for bicycle and pedestrian circulation that relate to Treat Boulevard. The policies are shown in Table 3-1.

Table 3-1: Pleasant Hill BART Station Area Specific Plan Policies

Policy	*Description*	*Status*
Policy 1	A pedestrian overpass shall be provided at the intersection of Treat Boulevard and Oak Road.	No longer supported and has been removed from Plan
Policy 2	A pedestrian and bicycle overpass should be provided at Jones Road for the Iron Horse Trail.	Complete
Policy 3	If feasible, development on Area 12 should provide for a continuous pedestrian-way from the north end of the pedestrian overpass at Oak Road to the BART Station.	Complete
Policy 7	Undertake a community design program for both pedestrian and bicycle overcrossings as soon as feasible given availability of funding and reasonably defined site geometrics.	Complete

4. Existing Conditions

A site tour was held with the TAC on May 19, 2014. The consultant team also performed several additional field reviews through the month of May.

4.1. Design Assumptions

During the site tour meeting, the design assumptions were confirmed as follows:

- Lane widths shall be no less than 11' or 10.5' for turn lanes
- Medians can be narrowed
- All proposals are to remain within the public right of way

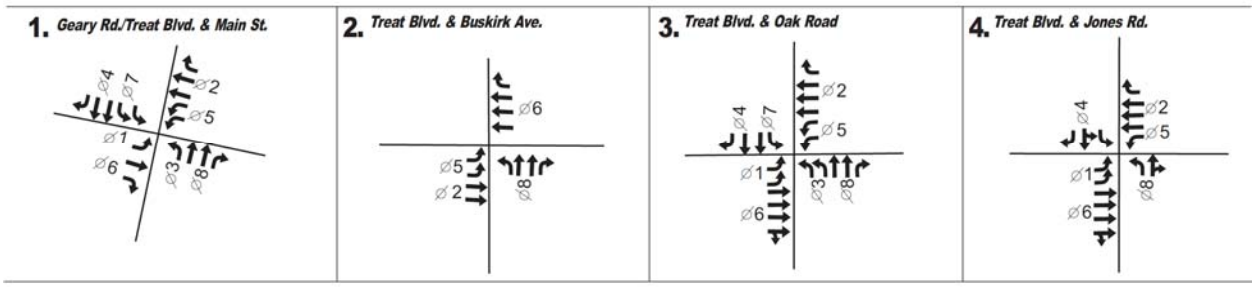
4.2. General Traffic Conditions

The corridor has a 35 mph speed limit. The roadway has excess capacity during off-peak hours as it is sized based on level of service and demand during peak hours.

There are nine lanes in some locations (Figure 4-1), presenting a long distance for pedestrians to cross the street. Reducing this distance, providing longer walk times, or reducing wait times for pedestrians can improve the pedestrian experience. Lane widths within the study area are typically 12' but vary from 11' to 17'.

Long cycle lengths provide higher motor vehicle capacity for the main movements, but delays for other movements and for pedestrians can cause frustration. Long cycle lengths also lead to risk taking such as red-light running.

Figure 4-1: Existing Conditions Lane Configurations and Signal Phasing



Yield controlled channelized right turns are present at all westbound intersections and eastbound at Jones Road. Northbound Buskirk Avenue and southbound Oak Road also have channelized right turns. Dedicated receiving lanes for continuous free flow are present at westbound right turn at Main Street, the southbound right turn at Oak Road, and the northbound right turn at Buskirk Avenue. Although channelized right turns are advantageous for automobile traffic, they present a less comfortable and safe environment for pedestrians and cyclists, who must cross faster moving right turning traffic that frequently does not expect to conflict with pedestrians.

Appendix B presents a more detailed description of existing conditions by location along the corridor, along with traffic count and base model data.

4.3. Land Use and Urban Design

The land uses on Treat Boulevard include office, retail, hotel, and mixed-use residential. The Walgreens shopping center on the northeast corner of Treat Boulevard and North Main Street is not slated for expansion, although the parking lot may be reconfigured to connect to BevMo, a beverage retail establishment directly north.

The Pleasant Hill BART Station Area Plan identifies urban design objectives for building height, form and mass, public spaces, pedestrian circulation, landscaping, signage, building design, and defensible space. Buildings on Treat Boulevard have a minimum three-story height and setback of 20 feet from the street.

The most recent mixed-use development on the north side of Treat Boulevard, between Jones Road and Oak Road, has continuous sidewalks, pedestrian lighting, benches, and trees. A Starbucks on the easternmost corner provides outdoor seating. A parking lane separates pedestrians from the traffic on Treat Boulevard. The light colored concrete on the parking strip and extended right-turn lane is a de-facto space for bicycling.

Photo 1 The north side of Treat Boulevard between Jones Road and Oak Road has continuous building frontage and a pedestrian-friendly public realm.

The south side of the block between Jones Road and Oak Road is reminiscent of typical suburban design. The office buildings are set back approximately 50 feet away from the street. Unlike the north side, which has a continuous building frontage along the sidewalk, the south building's V-shape sets the entrance to the building back even further. The sidewalk is separated from the traffic by a landscape strip and occasional trees.

Photo 2 The south side of Treat Boulevard has a meandering 6' wide sidewalk

This style is consistent along the majority of the study corridor, with and without the landscape strip, with sidewalk widths varying between 4-8 feet. Along the Embassy Suites frontage on the north side of Treat Boulevard between Oak Road and Buskirk Avenue, there is an 8' wide sidewalk separated from traffic by an 8' wide landscape strip. Trees line both sides of the sidewalk, providing a shade canopy during the summer.

Photo 3 The north side of Treat Boulevard has a tree-lined 8' wide sidewalk

4.4. User Analysis

A field review of the study corridor was conducted in July 2014 during peak hours to observe pedestrian, driver, and bicyclist behavior. The fieldwork included interviews with pedestrians.

The majority of pedestrians were observed walking on the north side of the study corridor. When asked about their experience walking on Treat Boulevard, pedestrians noted that the walk across the I-680 overbridge is "unpleasant" and "always seems to take longer than it should." Another pedestrian noted that the signals along Treat Boulevard are "really slow," and can take "double the time if you have to cross two ways."

The pedestrian phases were timed during field observations. Pedestrians waited up to 120 seconds before receiving a walk indication. At the Treat Boulevard and Oak Road intersection, pedestrians were observed crossing the street during the do-not-walk phase. These pedestrians would cross to the center median, and then wait for the walk signal, presumably to get a head start (Figure 4-2). This suggests that the signal phasing may be too long to accommodate pedestrian commuters, particularly those traveling to catch a BART train.

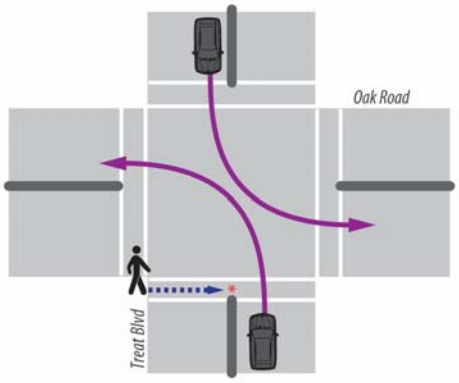


Figure 4-2: Some pedestrians cross to the median on a Do Not Walk signal to get a head start on the next ped phase

The pedestrian plaza between the Embassy Suites Hotel and Vodafone Building north of Treat Boulevard (Figure 4-3) serves as a common path for pedestrians and bicyclists traveling to and from the BART Station.

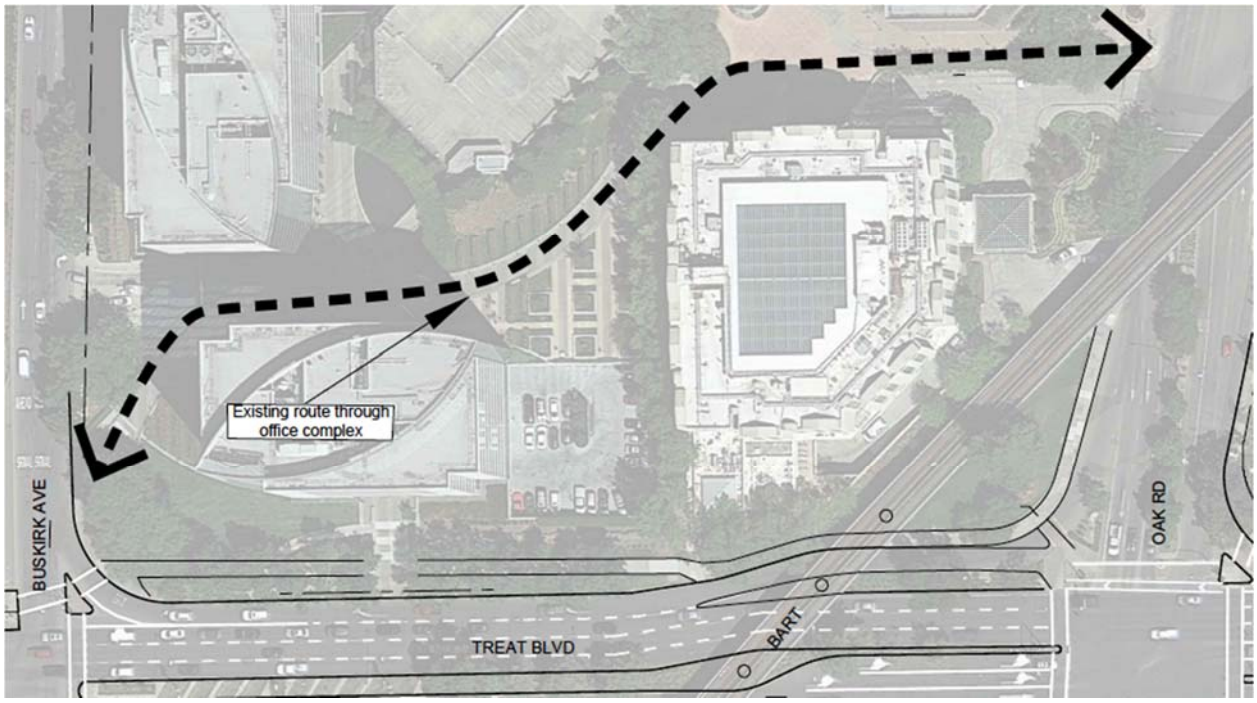


Figure 4-3: Plaza route

Few people were observed bicycling on Treat Boulevard, choosing instead to ride on the sidewalk. On the I-680 overbridge, the majority of riders used the narrow (5') north sidewalk. In some instances, the bicyclist or pedestrian would step into the street to pass a group.

Drivers were observed failing to yield to pedestrians in channelized right turn lane crosswalks, particularly at the northeast corner of Treat Boulevard and Oak Road. Some drivers blocked pedestrian movement by pausing in crosswalks while waiting in a traffic queue.

4.5. Collisions

Recent collision data was requested through Contra Costa County and collected from the Statewide Integrated Traffic Records System (SWITRS). Violation type was recorded for 13 of the 16 total collisions (Table 4-1). Automobile Right of Way was the most common violation for a bicycle/vehicle collision, and Pedestrian Right of Way was the most common violation for a pedestrian/vehicle collision.

The cluster of collisions at Jones Road shown in Figure 4-4 may precede the construction of the Iron Horse Trail overbridge.

The next most frequent location is around Buskirk Avenue, where three bicycle collisions have been reported.

Table 4-1: Bicycle and Pedestrian Collisions Crash Type

Violation	Bicycle	Pedestrian
Automobile Right of Way	2	1
Improper Turning	2	0
Other Hazardous Violation	1	0
Other Improper Driving	0	1
Pedestrian Right of Way	0	3
Unsafe Lane Change	1	0
Unsafe Starting or Backing	2	0
Total	8	5

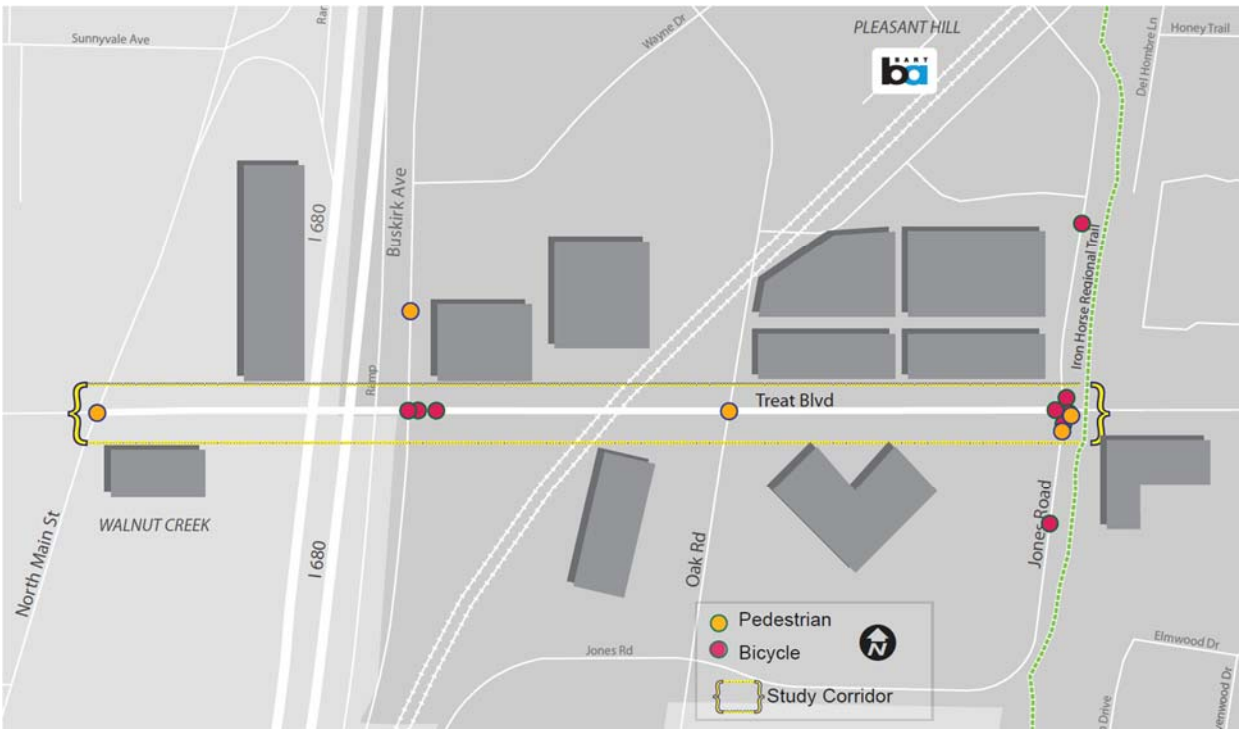


Figure 4-4: Reported Collisions Map

5.Alternative Concepts

5.1. Concept Overview

Three concepts were initially developed for the Treat Boulevard Bicycle and Pedestrian Plan. For Concept 1, a lower cost, lower impact version of 1A was also considered.

Concept 4 was developed after conducting traffic modeling and outreach.

Following the release of the public draft plan, Concept 4A was developed, along with alternatives 4B-4E.

Principal elements of each concept are given in Table 5-1; more details and plan view graphics are provided in Appendix D. An evaluation of the concepts is provided in section 0 of this document.

Table 5-1 Concept Comparisons

Concept	*Location*	*Main Street to Buskirk Avenue*	*Buskirk Avenue to Oak Road*	*Oak Road to Jones Road*
Concept 1A (short term)	North side / Westbound	Bike lane	Sharrows	Sharrows
	South side / Eastbound	Bike lane	Sharrows	Sharrows
Concept 1B	North side / Westbound	Buffered bike lane	Buffered bike lane	Buffered bike lane
	South side / Eastbound	Buffered bike lane	Buffered bike lane	Buffered bike lane
Concept 2	North side / Westbound	Two way shared path	Two way shared path	Buffered bike lane
	South side / Eastbound	Bike lane	Buffered bike lane	Buffered bike lane
Concept 3	North side / Westbound	Two way shared path	Two way shared path	Cycle track
	South side / Eastbound	Sidewalk	Sidewalk	Sidewalk
Concept 4	North side / Westbound	Two way shared path	Two way shared path	Sharrows
	South side / Eastbound	Sidewalk	No change	No change
Concept 4A	North side/ Westbound	Bike lane	Two way shared path and bike lane	Bike lane
	South side/ Eastbound	Buffered bike lane	Buffered bike lane	Buffered bike lane

5.2. Pedestrian Improvements

All concepts, with the exception of 1A, propose pedestrian enhancements at crosswalks along the study corridor. These improvements include:

- Enhancing the existing crosswalks at channelized free right turns along the study corridor with high visibility continental or ladder striping, “sharks-teeth” yield markings and signs
- Reconstructing the channelization island at Treat Boulevard and Buskirk Avenue to meet Americans with Disabilities Act (ADA) standards.

A sample graphic showing a channelized right turn lane with “shark’s teeth” yield markings, high visibility ladder style crosswalk, and tactile ground surface indicators on the ADA standard curb ramps is shown in Figure 5-1. For those concepts where bicycle lanes are provided, this graphic indicates how a bike lane would be configured where the turn lane is an “add-lane.” The bike lane is straight and motorists must merge across the path of bicyclists.

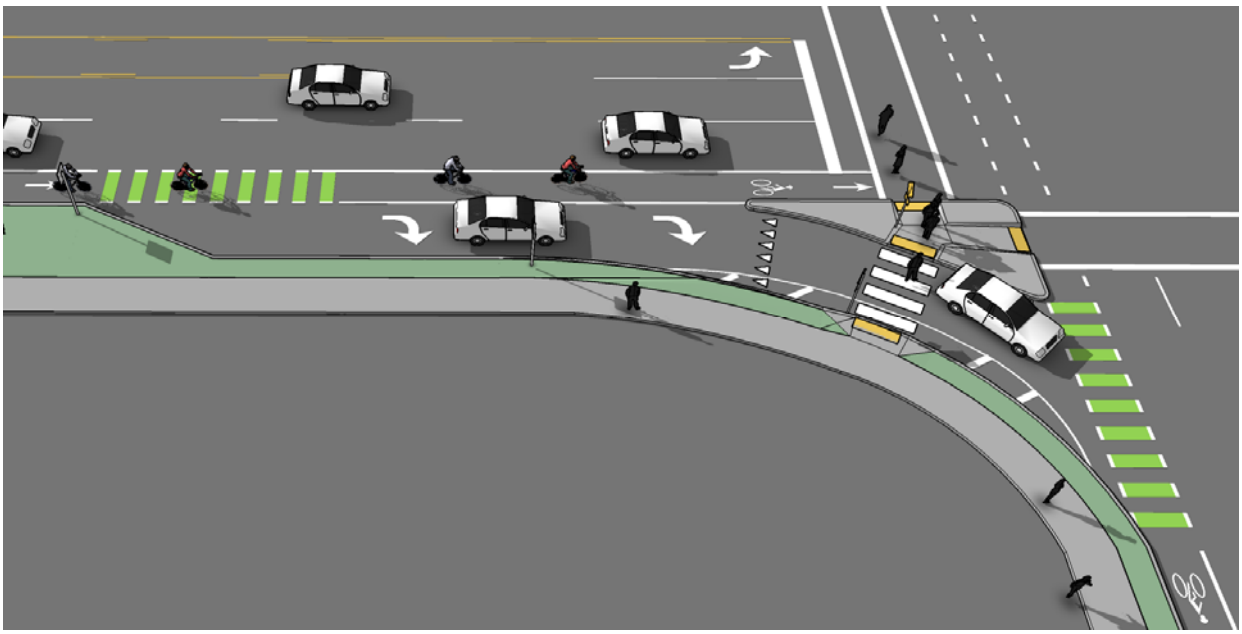


Figure 5-1: Conceptual provisions for pedestrians and bicyclists at a channelized right turn lane

5.3. Concept 1A: Standard Bicycle Lanes

Concept 1A proposes bike lanes on Treat Boulevard between Main Street and Buskirk Avenue by narrowing travel lanes to the County specified minimum 11' width. East of Buskirk Avenue, bike lanes could only be accommodated if travel lanes were reduced to 10' width (below the County specified minimum). Accordingly, sharrows could be employed. While sharrows are permitted on roadways with 35 mph speed limits, they are not an ideal solution as few people will "take the lane" with motorists traveling at that speed. Green paint would be provided at the bike lane entrances and at conflict points to make the bike lanes more visible to motorists.

Altogether, the Concept 1A enhancements would be easy to implement and less costly than the other alternatives; however, they would offer limited improvement to the bicycle and pedestrian experience on Treat Boulevard. Concept 1A does not remove any travel lanes and would have minimal impact on the driving experience or traffic movements. Concept 1A could be considered as an option for short-term improvements.

5.4. Concept 1B: Buffered Bike Lanes

Concept 1B proposes buffered bike lanes along the full extent of the study corridor. The buffer between the bike lane and adjacent motor vehicle lane offers bicyclists an increased sense of safety. Green paint at the bike lane entrances and the conflict zones make the bike lanes more visible to motorists. These enhancements can be done by converting the outside travel lanes into the buffered bike lanes.

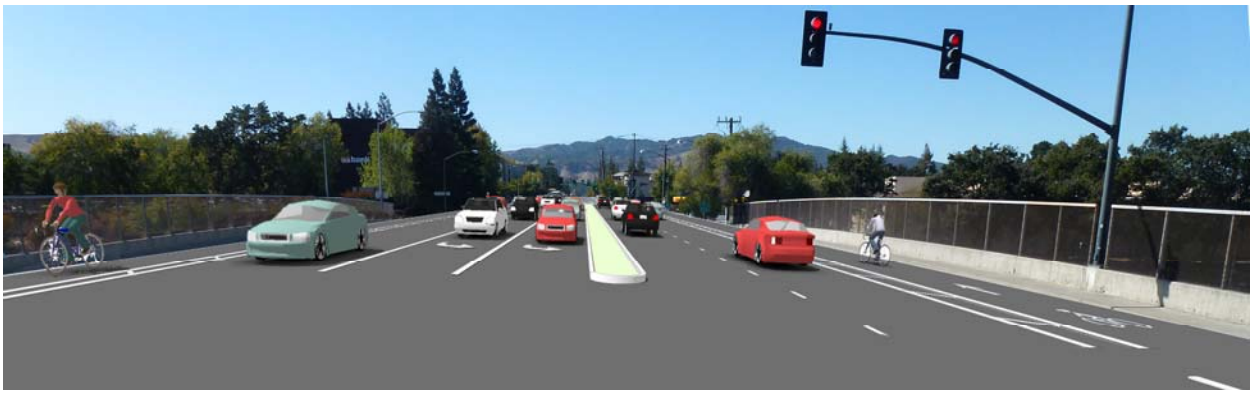


Figure 5-2: Concept 1B buffered bike lanes at I-680

Concept 1B would remove the outside eastbound and westbound travel lanes, remove the eastbound channelized right-turn lane at Treat Boulevard and Jones Road, and narrow the curb radius at the eastbound I-680 on-ramp between Main Street and Buskirk Avenue. Although removing the southbound channelized right turn at Oak Road reduces capacity, it also eliminates the weaving operation between Oak Road and the I-680 ramps, which improves traffic operation and safety along Treat Boulevard.

5.5. Concept 2: Shared Use Path and Buffered Bike Lanes

Concept 2 proposes converting the existing north side sidewalk into a shared use path between Main Street and Oak Road, adding buffered westbound bike lanes between Oak Road and

Jones Road, and adding eastbound buffered bike lanes for the full extent of the study area. The vertical curb provides an enhanced sense of safety for pedestrians and bicyclists.

Figure 5-3: Concept 2 shared use path (north side) and buffered bike lane (south side) at I-680

At Treat Boulevard and Oak Road, bicyclists would be partially separated from motor vehicles with curbs and islands to reduce the risk of collisions between bicyclists and right-turning vehicles. Channelized right turns at Oak Road and Jones Road would be removed.

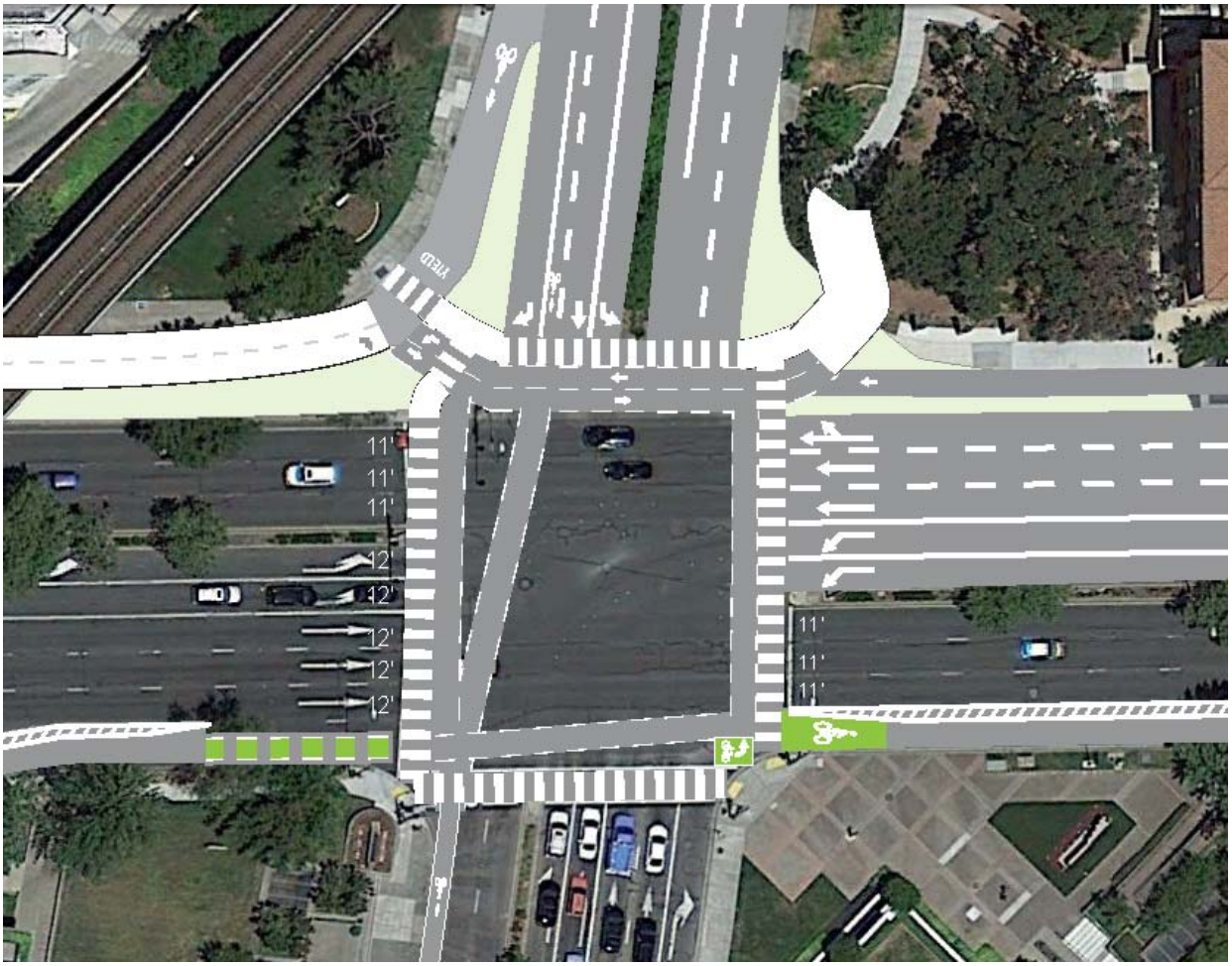


Figure 5-4: Concept 2 at Oak Road

Concept 2 can be implemented by narrowing lanes, and converting the outside eastbound lane between Buskirk Avenue and Jones Road into a buffered bike lane. Although capacity is reduced by removing the southbound channelized right turn at Oak Road, this also eliminates the weaving operation between Oak Road and the I-680 ramps, which improves traffic operation and safety along Treat Boulevard. The expansion of the north sidewalk into a two-way shared-use path, the construction of the protected intersection, and the removal of the channelized right turns would result in higher costs than Concept 1A and 1B.

5.6. Concept 3: Shared Use Path, Cycle Track and Sidewalk

Concept 3 proposes converting the existing north sidewalk into a shared use path between Main Street and Oak Road, and adding a westbound cycle track between Oak Road and Jones Road. The shared use path is used by both pedestrians and bicyclists. It provides bicyclists with a grade separation from motor vehicles and therefore a greater sense of safety. The cycle track would be a bike lane separated from the travel lanes by a row of parked cars. This physical separation from the travel lanes provides bicyclists with a greater sense of safety. The eastbound outside lane would have sharrows, which are a marginal but low cost solution on roadways with speed limits up to 35 mph (as with Treat Boulevard).

Concept 3 proposes removing channelized right turns at Oak Road and Jones Road, designating the sidewalk between Main Street and Buskirk Avenue as a 10-foot wide two-way shared-use path, adding a sidewalk to the south side between Main Street and Buskirk Avenue, and expanding the existing south sidewalk with a landscape strip between Buskirk Avenue and Oak Road. The south sidewalk would offer pedestrians an alternative walking option to the new shared-use path, where pedestrians would share the same space with bicyclists.

Figure 5-5: Concept 3 shared use path (north side) and sidewalk (south side) at I-680

Concept 3 can be done by narrowing lanes, removing channelized right turns, and converting the right-turn lane between Oak Road and Jones Road into the cycle track. Although capacity is reduced by removing the southbound channelized right turn at Oak Road, this also removes the weaving operation between Oak Road and the I-680 ramps, which improves traffic operation and safety along Treat Boulevard. This design results in some impact to the intersection level of service (LOS) and results in more overall network delay and higher travel times due to the removal of one eastbound and one westbound travel lane. Concept 3 has a small delay impact at Oak Road during the morning peak hour and Main Street during the

afternoon peak hour. The expansion of the north sidewalk into a two-way shared-use path, the removal of the channelized right turns, and the construction of the south side sidewalk would result in higher costs than Concept 1A and 1B.

5.7. Concept 4: Shared Use Path and Sidewalk

This study originally was to include development of up to three concepts. Through an iterative development process and with stakeholder input, selected elements of the original three concepts were combined into Concept 4. While this concept does not provide as substantial an improvement for bicyclists and pedestrians as might be achieved with some elements not carried forward from the other concepts, it is a compromise predicated on the assumption that all travel lanes must be retained and must be at least 11' wide. Plans are provided for this concept in Appendix D.

5.7.1. Main Street to Buskirk Avenue

The concepts that included traffic lane removals are not supported by the traffic modeling, but lane *width* reductions enable the installation of paths on both sides of the bridge:

- On the north side, the existing sidewalk would be replaced with a 12' wide shared use path. Minor improvements would be made to reduce potential conflicts at the Walgreens driveways.
- On the south side, Treat Boulevard has enough space for either an on-street eastbound bike lane or a new southern sidewalk facility without removing travel lanes. Concept 4 includes a south side sidewalk to improve pedestrian connectivity, because eastbound bicyclists will be able to use the north side shared-use path or the curbside traffic lanes.

Figure 5-6: Concept 4 shared use path (north side) and sidewalk (south side) at I-680 (as per Concept 3)

5.7.2. Buskirk Avenue to Oak Road

All travel lanes remain in Concept 4 due to the heavy traffic volume at Buskirk Avenue turning right towards northbound I-680. As such, the cycle track element was not included.

5.7.3. Oak Road to Jones Road

Neither bike lanes, sharrows nor cycle tracks were chosen for this section of Treat Boulevard for the following reasons:

- Eastbound bike lanes cannot be accommodated without removal of a traffic lane or reduction of lane widths below the County's minimum to 10'. Modeling indicates an unacceptable impact on motorist level of service. Furthermore, Treat Blvd is currently not a hospitable route for bicycling east of Jones Road and there is low demand relative to the rest of the corridor; therefore, this portion of the route is likely to attract only more confident "vehicular" bicyclists.
- Eastbound sharrows were not chosen for this section because the volume and speed of traffic would not provide a comfortable environment for bicyclists. Instead, bicyclists should be encouraged to use the shared-use path on the north side of the road.
- Westbound sharrows were chosen for this section to accommodate and direct bicyclists either westbound onto the shared-use path or northbound toward the BART station once they reach the Oak Street and Treat Boulevard intersection. The sharrows will be located on the dedicated westbound right-turn lane, which will have lower traffic volumes and provide a more comfortable environment for people on bikes.
- The landing points for the Iron Horse Trail overcrossing are approximately 500 feet north and south of the intersection.

Implementation of a separate bikeway along Treat Boulevard in this block may be possible in the long-term, depending on the motor traffic volume and wider network changes that may occur.

5.8. Concept 4A: Enhanced Bike Lanes and Shared Use Path

Concept 4A was developed based on public comments, and balances bicycle and pedestrian improvements with motorist level of service and cost effectiveness. Improvements along the corridor include:

- From Main Street to Buskirk Avenue, buffered bicycle lanes with green markings at conflict points are provided by narrowing existing lanes
- From Buskirk Avenue to Oak Road, buffered green bicycle lanes are provided in addition to a new shared use path on the north side
- From Oak Road to Jones Road, a bicycle lane is provided on the north side while a buffered bicycle lane is provided on the south side; both directions have green markings at conflict points

Because of right-turn conflicts and traffic delays caused by Concept 4A, four alternative concepts were evaluated for the I-680 offramp intersection at Treat Boulevard and Buskirk Road.

Alternative 4B

Alternative concept 4B closes the free right turn lane from the I-680 onramp onto Treat Boulevard by creating a curb extension. This eliminates a conflict point with motor vehicles merging across the bike lane. The I-680 approach is reconfigured to accommodate one left-turn lane, two through lanes, and one right-turn lane within the existing travelway.

The elimination of the free right-turn lane created substantial traffic delay, and as a result Alternative 4B was excluded from some analyses as a nonviable option. Subsequent alternatives 4C, 4D, and 4E were developed in an attempt to reduce this traffic delay.

Alternative 4C

In addition to the modifications described in Alternative 4B, Alternative 4C changes the right-hand through lane to a through/right-turn lane. The resulting approach includes one left-turn lane, one through lane, one through/right-turn lane, and one right-turn lane.

This improves traffic conditions slightly, but reduces pedestrian comfort by adding a lane of cars that will be turning across the crosswalk.

Alternative 4D

In addition to the modifications described in Alternative 4B, Alternative 4D adds a second right-turn lane by removing shoulders and narrowing all lanes to 11 feet. The resulting approach includes one left-turn lane, two through lanes, and two right-turn lanes.

This improves traffic conditions, but reduces pedestrian comfort with two lanes of traffic turning across the crosswalk. It would also create a longer crosswalk across the I-680 ramp, increasing pedestrian exposure, and require either a Caltrans design exception or a ramp widening.

Alternative 4E

In addition to the modifications described in Alternative 4C, Alternative 4E adds a second right-turn lane by removing shoulders and narrowing all lanes to 11 feet. The resulting approach includes one left-turn lane, one through lane, one through/right-turn lane, and two right-turn lanes.

This improves traffic conditions, but reduces pedestrian comfort with three lanes of traffic turning across the crosswalk. It would also create a longer crosswalk across the I-680 ramp, increasing pedestrian exposure, and require either a Caltrans design exception or a ramp widening.

6. Concept Evaluation

6.1. Traffic Analysis for All Concepts

This section includes a summary of the separate detailed traffic report. When looking at the average intersection LOS, the design concepts result in little impact for the current year (2014) traffic volumes (Table 6-1) or for the future year (2040) traffic volumes (Table 6-2). Concept 1A was not analyzed because it does not involve any changes to the number of lanes or intersection layouts. Alternatives to Concept 4A are shown in Table 6-3 (current year) and Table 6-4 (future year).

Table 6-1: All Concepts - Intersection LOS Comparison for Current Year (2014)

Intersection	Peak	Existing		Concept 1B		Concept 2		Concept 3		Concept 4		Concept 4A	
	Hour	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Main Street*	A.M.	55.7	E	60.0	E	60.1	E	60.1	E	60.1	E	53.1	D
	P.M.	42.9	D	41.1	D	42.2	D	42.2	D	42.2	D	42.9	D
I-680 NB and Buskirk Ave	A.M.	30.3	C	32.9	C	30.3	C	30.3	C	30.3	C	34.7	C
	P.M.	17.5	B	17.7	B	17.4	B	17.4	B	17.4	B	19.5	B
Oak Road	A.M.	46.8	D	55.5	E	53.6	D	53.6	D	49.3	D	49.2	D
	P.M.	19.3	B	39.4	D	40.1	D	40.1	D	34.1	C	36.8	D
Jones Road*	A.M.	37.6	D	28.8	C	29.8	C	29.8	C	29.9	C	32.8	C
	P.M.	49.8	D	37.7	D	38.2	D	38.2	D	37.9	D	48.3	D

Table 6-2: All Concepts - Intersection LOS Comparison for Future Year

Intersection	Peak	No Build		Concept 1B		Concept 2		Concept 3		Concept 4		Concept 4A	
	Hour	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Main Street*	A.M.	83.1	F	86.0	F	83.3	F	83.3	F	83.3	F	60.1	E
	P.M.	67.9	E	67.4	E	75.9	E	75.9	E	75.9	E	60.0	E
I-680 NB and Buskirk Ave	A.M.	31.4	C	36.4	D	30.5	C	30.5	C	30.5	C	36.5	D
	P.M.	19.9	B	24.9	C	13.7	B	13.7	B	13.8	B	26.1	C
Oak Road	A.M.	63.8	E	63.3	E	67.3	E	67.3	E	67.5 (67.6) [61.9][1]	E	53.8	D
	P.M.	46.3	D	48.9	D	45.5	D	45.5	D	36.7 (29.3) [30.5][1]	D	42.7	D
Jones Road*	A.M.	61.9	E	61.9	E	49.6	D	49.6	D	49.6	D	59.7	E
	P.M.	211.9	F	212.4	F	212.1	F	212.1	F	212.1	F	143.9	F

[1] *Free right turn removal at Oak Road Mitigation 1, (Mitigation 2), and [Mitigation 3]*

Table 6-3: Concept Alternatives 4A-4E – Intersection LOS Comparison for Current Year (2014)

Intersection	Peak Hour	Existing		Concept 4A		Concept 4B		Concept 4C		Concept 4D		Concept 4E	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
I-680 NB and Buskirk Ave	A.M.	30.3	D	34.7	C	112.9	F[1]	44.4	D[2]	43.1	D	-	-
	P.M.	17.5	C	19.5	B	62.1	E[1]	41.6	D[2]	41.3	D	-	-

[1]This alternative failed, and was therefore not included in future year analyses
[2]HCM 2000 analysis due to HCM 2010 limitations.

Table 6-4: Concept Alternatives 4A-4E – Intersection LOS Comparison for Future Year

Intersection	Peak Hour	No Build		Concept 4A		Concept 4B		Concept 4C		Concept 4D		Concept 4E	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
I-680 NB and Buskirk Ave	A.M.	31.4	C	36.5	D	-	-	61.2	E[1]	88.3	F	46.9	D*
	P.M.	19.9	B	26.1	C	-	-	40.2	D[1]	52.6	D	31.7	C*

[1]HCM 2000 analysis due to HCM 2010 limitations.

6.2. Multi-Criteria Analysis

All concepts were evaluated for future conditions based on a list of criteria described below. For each concept, the reallocation of the eastbound curbside lane to a bike lane has been omitted as the traffic impact was estimated to be unacceptable. The evaluation criteria are described below; the scores can be seen in Table 6-5 on the next page.

- Bicycle Experience: the perceived safety and convenience of traveling the corridor by bike.
- Pedestrian Experience: the perceived safety and convenience of traveling the corridor by foot.
- Driving Experience: the comfort and convenience of traveling the corridor by automobile.
- Ease of Implementation: the amount of planning, design and construction required to implement the concept.
- Cost: the amount of funding required to implement the concept.
- Traffic Impacts (level of service): defined in the separate Traffic Report and relates to the amount of delay in travel speeds along the corridor and at intersections.

Concept 4 scores highest – a balance between bicycle and pedestrian improvements with motorist level of service and cost effectiveness.

Table 6-5: Concept Evaluation

Criterion	No Build	Concept 1A	Concept 1B	Concept 2	Concept 3	Concept 4	Concept 4A
	No change	Limited Bike Lanes	Buffered Bike Lanes	Shared Use Path and Buffered Bike Lanes	Shared Use Path, Cycle Track and South side Sidewalk	Shared Use Path and South side Sidewalk	Enhanced Bike Lanes and Shared Use Path
Bicycle Experience	0	1	2	3	2	2	2
Pedestrian Experience	0	0	1	2	3	3	1
Driving Experience	0	0	2	2	2	2	2
Ease of Implementation	3	3	2	0	-1	0	1
Cost	-1	-1	-2	-3	-3	-3	-2
Traffic Impacts (level of service)	-1	0	-2	-2	-1	0	0
Total Score	**1**	**2**	**3**	**2**	**2**	**4**	**4**

Table 6-6 Scoring Levels

Very Significant Negative	Significant Negative	Minor Negative	Neutral	Minor Positive	Significant Positive	Very Significant Positive
-3	-2	-1	0	1	2	3

Table 6-7: Concept Alternatives Evaluation

Criterion	No Build	Concept 4A	Concept 4B	Concept 4C	Concept 4D	Concept 4E
	No change	Enhanced bike lanes and shared use path	Eliminates free right-turn lane	Adds right-turn option to #3 lane	Adds second right-turn lane	Adds second right-turn lane and right-turn option to #3 lane
I-680 Approach Configuration						
Bicycle Experience	0	2	3	3	3	3
Pedestrian Experience	0	1	3	2	2	1
Driving Experience	0	2	2	2	2	2
Ease of Implementation	3	1	-1	-1	-2	-2
Cost	-1	-2	-3	-3	-3	-3
Traffic Impacts (level of service)	-1	0	-3	-2	-2	-1
Total Score	**1**	**4**	**1**	**1**	**0**	**0**

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Appendix A: Study Participants

Client

Jamar Stamps	Planner, Contra Costa County Department of Conservation and Development

Technical Advisory Committee

Jeremy Lochiro	City of Walnut Creek
Angela Villar	Engineer, Contra Costa County Public Works
Coire Reilly	Contra Costa County Health Services Department
Anh Phan Nguyen	Caltrans
Denise Seib	Contra Costa Centre Association
Laura Case	Contra Costa County Board of Supervisors Office
John Vallor	Contra Costa County MAC
Brad Beck	Contra Costa County Transportation Authority

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Brett Hondorp, AICP	Principal-In-Charge
John Lieswyn, PTP, MET	Consultant Team Project Manager
Alexandra Sweet	Senior Planner

DKS

Thomas Krakow, P.E.	Principal-In-Charge
David Mahama, P.E.	Project Manager
Maria Tribelhorn, E.I.T	Assistant Transportation Engineer

Others

IDAX	Data Collection
Quality Counts, LLC	Data Collection

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Appendix B: Existing Conditions by Location

North Main Street

Both the westbound left turn/U-turn and westbound right turn movements are heavy at this intersection. Due to the high turning volumes and high left lane utilization, the queue from westbound traffic turning into N. Main Street backs to the I-680 ramps during the A.M. peak hour. The westbound left turn bays are not adequate for the forming left turn queues and vehicles sometimes queue in the through lanes, creating potential for rear-end collisions and congestion.

The southbound left turn volumes are high at N. Main Street during both the morning and afternoon peak periods. Queues spill back beyond the turn bays during both time periods.

Currently N. Main Street operates in coordination with Ygnacio Valley Road (coordinated north-south), rather than in coordination with the Treat Boulevard corridor, which may contribute to the formation of westbound queues. East-west coordination could be considered as a potential alternative for this location. Ygnacio Valley Road is about 3 miles south of the Treat Boulevard/N. Main Street intersection. There are four traffic signals on N. Main Street between Ygnacio Valley Road and Treat Boulevard. Additionally, Ygnacio Valley Road, N. Main Street and Treat Boulevard have interchanges with the I-680 freeway.

Photo 4 View of westbound Treat Boulevard approaching N. Main Street. Existing bicyclist use of sidewalk in conflict with Walgreens driveway turning movements.

Photo 5 View of Treat Boulevard and N. Main Street. Right-turn slip lane creates two points of potential conflict between motorists and pedestrians.

The City of Walnut Creek will be paving North Main Street from Treat Boulevard northward in 2015 and from Treat Boulevard southward in 2016. Minor configuration and/or striping changes may be accommodated at that time.

I-680 Overcrossing

The bridge that crosses over I-680 between N. Main Street and I-680 Northbound off-ramp has no sidewalk on the south side and a narrow (5' to 8') sidewalk on the north side. Despite the fact the sidewalk is not wide enough to comfortably accommodate two pedestrians walking side-by-side, it is also shared by cyclists due to the roadway traffic conditions and lack of separate bicycle facilities. The I-680 overcrossing has three westbound through lanes and two eastbound through lanes and two eastbound left-turn lanes. The bridge carries over 20,000 vehicles per day in each direction, for a total average daily traffic of about 40,000 motor vehicles.

The bridge has wide shoulders in both directions, but particularly in the westbound direction, which presents an opportunity to increase the pedestrian and bicycle space. This could be accomplished through one or a combination of the following: lane adjustment, addition of a sidewalk on the south side of the bridge, widening of the existing sidewalk, and/or addition of bicycle lanes or a cycle track. The construction of a shared path on one side would provide service to both pedestrians and bi-directional travel for cyclists on one side of the road. The path provides excellent service to non-automobile modes, but requires 15' of space including path, shoulder, and traffic buffer.

Photo 6 View east along the existing 5' wide sidewalk on the I-680 overcrossing. Pedestrians are observed walking in the traffic lane to overtake one another.

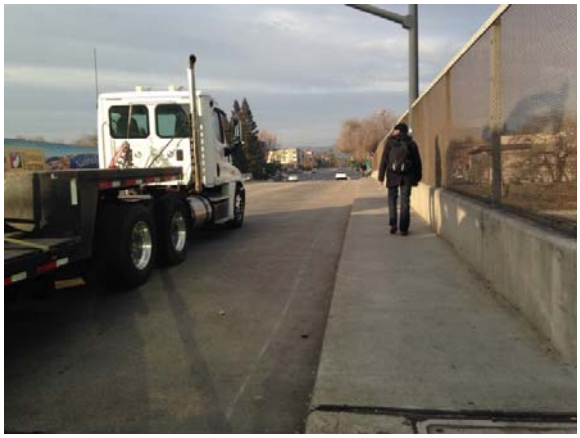

Photo 7 View west along the sidewalk on the overcrossing. A pedestrian commented that the walk on the overcrossing "is unpleasant and always seems to take longer than it should."

I-680 Ramps/Buskirk Avenue

The I-680 northbound ramps at Buskirk Avenue present a challenge to pedestrians wishing to cross the intersection. The northbound right turn traffic onto Treat Boulevard is heavy and due to channelization does not always yield to pedestrians and bicycles.

During the morning peak period, the northbound left turn queues occasionally exceed the left turn lane storage capacity. During the evening peak period, the eastbound Treat Boulevard traffic turning left onto the I-680 ramp was observed to exceed the left turn storage.

Photo 8 View west of the I-680 overcrossing sidewalk from Buskirk Avenue. Current 5' wide sidewalk is insufficient for two-way pedestrian use. Bicyclists were observed using this facility to travel east and west instead of using the roadway.

Photo 9 View west of the I-680 overcrossing, south side from Buskirk Avenue. No sidewalk or bike lane exists along this side of the overcrossing.

Photo 10 North crosswalk of Buskirk Avenue typifies some of the existing curb ramps with uneven surfaces difficult to traverse for those with mobility impairments.

Photo 11 The northbound I-680 offramp has heavy right turn volumes at peak times

Treat Boulevard between Oak Road and the I-680 Ramps/Buskirk Avenue

Westbound

The southbound right turn lane at Oak Road has its own receiving lane westbound, which immediately becomes a right turn only onto Buskirk Avenue and the I-680 NB on ramp. This layout causes weaving conflicts on westbound Treat Boulevard due to the high demand for northbound I-680. Further exacerbating this issue, the BART support columns separate the lanes of travel and limit visibility for traffic merging from the right lane.

These conditions contribute to the formation of a westbound queue during the afternoon peak hour. Weaving conflicts demand driver attention, often taking away driver awareness of pedestrians and bike riders. Due to this lack of attention, bike riders are currently safest riding in the middle of the lane rather than at the edge of the lane, which is ideally where a bicycle lane would be located. As indicated by low bicycle volumes on this segment (three westbound during the P.M. peak hour), few cyclists brave this environment. Weaving traffic and high right lane utilization through this segment cause traffic to spill back to Oak Road, reducing the number of vehicles that can travel westbound through the Oak Road and Jones Road intersections during a green light, effectively "wasting" green time at these intersections.

Photo 12 View of westbound Treat Boulevard from Oak Road. Traffic from Oak Road merges into the right lane for I-680 northbound.

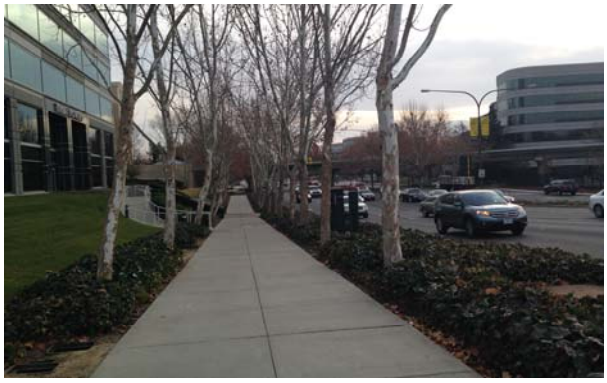

Photo 13 View looking east on the north side of Treat Boulevard. The 8' wide treelined sidewalk is also used by bicyclists traveling both directions.

Eastbound

The eastbound segment on Treat Boulevard between the I-680 ramps and Oak Road is also characterized by high weaving volumes during the morning and afternoon peak periods. Heavy traffic from the I-680 northbound ramp merge into the eastbound lanes where weaving conflicts arise between motorists turning at Oak Road or Jones Road. The BART support columns separate the lanes and limit visibility, exacerbating this issue.

Photo 14 View east towards Oak Road on the south side of Treat Boulevard.

Oak Road

Oak Road is commonly used for pedestrian access to the BART station. About 90 pedestrians cross Treat Boulevard at Oak Road during the morning peak hour. Because the cycle length is long (160 seconds in the morning), some pedestrians cross illegally against the light by finding gaps in queued traffic or between platoons of cars. During the morning peak period, the westbound left turn and northbound left turn queues occasionally exceed the left turn lane storage capacity.

Photo 15 View north along Oak Road. Cyclists accessing BART use the shared path on the west side of Oak Road, cross at Coggins Drive to the east side of Oak Road to continue north to BART or cross Oak Road and continue up the path on the east side of Oak Road.

Photo 16 View west on the east side of Oak Road, showing northbound free right turn lane and splitter island: cars speed around the corner, or block the crosswalk while waiting to merge.

Photo 17 At the intersection of Oak Road and Treat Boulevard, pedestrians have up to a two-minute wait time to cross the street. One pedestrian commented on the length of the crosswalk and time required to cross. Several pedestrians were observed walking down the Treat Boulevard median.

Photo 18 Pedestrians can wait in the middle of the roadway if they started crossing late in the phase and did not make it across before the end of the phase. While the pushbutton is in reach of wheelchair users, the relatively narrow median and lack of protection from turning vehicles makes it an intimidating place to wait.

Treat Boulevard between Jones Road and Oak Road

Westbound

During the P.M. peak period, about 70 vehicles complete the westbound right turn movement from Treat Boulevard to Oak Road. There is an existing free right turn for this movement. This volume could be accommodated without the existing free right turn.

The pace speed during periods ranges between 21 – 35 mph in both directions.

Photo 19 Bicyclists are likely to be currently utilizing the lighter colored concrete strip to the right of the dashed lane line

Eastbound

East of Jones Road the number of eastbound through lanes drops from four to three, and based on field observations it appears most through vehicles avoid the rightmost lane for this reason. With fewer destinations and the limited bicycling facilities east of Jones Road, this segment is a lower priority for bikeway improvements.

Photo 20 Treat Boulevard looking east toward Jones Road. A non-compliant MUTCD sign tells drivers to "observe pedestrian right of way."

Jones Road

Few pedestrians and bicyclists are observed using the Treat Boulevard crosswalk at Jones Road, perhaps electing to use the Iron Horse Trail overcrossing. Westbound Treat Boulevard traffic making a left turn into Jones Road occasionally exceeds the left turn storage capacity during the morning and evening peak period.

Appendix C: Concept 4A and 4B Traffic Study and Alternative Concepts 4C, 4D, and 4E Memorandum

The following traffic study and analysis memo was prepared for this plan by DKS, and is reproduced here in its entirety.

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DATE: October 9, 2017[1]

TO: Brett Hondorp, AICP, Alta

FROM: David Mahama, PE, DKS

CC: Erin Vaca, DKS

SUBJECT: Contra Costa County I-680 / Treat Blvd Bicycle and Pedestrian Plan – Feasibility Study and Evaluation Traffic Analysis of Concepts 4a and 4b #14070-001

Introduction

With the goal of providing more livable communities, Contra Costa County Department of Conservation and Development has decided to complete the I-680/Treat Boulevard Bicycle and Pedestrian Plan. To finish the bicycle and pedestrian transportation network, Contra Costa County has targeted Treat Boulevard between Main Street and Jones Road to provide safe and convenient access from the Iron Horse Trail to businesses and restaurants on Main Street, focusing especially on the I-680 interchange. The Transportation for Livable Communities (TLC) program is the funding source for this project, which is managed by the Contra Costa Transportation Authority (CCTA).

This project includes the following intersections:

- Treat Boulevard/Geary Road and Main Street
- Treat Boulevard and Buskirk Avenue/I-680 northbound ramps
- Treat Boulevard and Oak Road
- Treat Boulevard and Jones Road/Iron Horse Trail

The field observations on this corridor indicate that there are high vehicle turning volumes that conflict with pedestrians, high weaving volumes that create a challenging environment for cyclists, and that the current infrastructure could be improved to better serve pedestrians and cyclists.

The performance of the four study intersections was evaluated for AM and PM peak periods for the current year (2014) traffic conditions and future year (2040) traffic conditions. Four initial study concepts (Concept 1B, Concept 2, Concept 3, and Concept 4), geometric improvements as well as traffic signal timing improvements were evaluated to determine the performance of the network. Once the initial alternatives were evaluated by the stakeholders, a final concept (Concept 4a) was developed.

[1] This document has been revised from the version dated March 6, 2017 to reflect standardized naming conventions for the design alternatives.

This report presents a traffic impact evaluation for the Concept 4a pedestrian and bicycle related improvements to the transportation environment along Treat Boulevard. This final design is a modified version of Concept 4 and can be found in Appendix A. This revision includes the elimination of the free southbound right turn lane at the Treat Boulevard/Oak Road intersection, which is expected to eliminate traffic weaving along the segment of Treat Boulevard between Oak Road and Buskirk Avenue in the westbound direction.

Current Year Analysis (2014)

For the current year (2014 volumes), overall network performance is not largely impacted as compared to the existing condition for the revised concept. Individual intersection level of service (LOS) was analyzed to assess the potential impacts of the revised concept. A queuing analysis was also included for traffic movements of concern and Table 1 presents the results of the analysis. As shown in Table 1, intersection delay is high in general under existing conditions. LOS generally remains the same, except at Oak Road, which deteriorates. The biggest impact occurs at the Treat Boulevard/Oak Road intersection in the P.M. This is due to the reconfiguration of the southbound movement – the free right is removed as well as one of the through lanes.

The queuing analysis shows little to no impact at the Treat Boulevard/Main Street intersection. At the Treat Boulevard/Oak Road intersection, southbound through queues are expected to increase in the A.M. and in the P.M. This is due to the reconfiguration of the southbound approach. It should be noted that the southbound right turning vehicles are expected to experience shorter queue lengths. This is due to the additional right turn lane. Furthermore, queuing is expected to increase for the westbound right turn at the Treat Boulevard/I-680 ramps/Buskirk Avenue intersection during the P.M. peak hour.

For the proposed alternatives the signal timing parameters were optimized to benefit the overall performance of the Treat Boulevard corridor in the westbound and eastbound directions. Optimization of the corridor is expected to result in improved performance of the Treat Boulevard/Jones Road intersection but decreased efficiency of the Treat Boulevard/Oak Road intersection.

Lastly, a variation of the Concept 4a was assessed. The variation includes the removal of one eastbound lane between the Treat Boulevard/I-680 ramps/Buskirk Avenue and Treat Boulevard/Oak Road intersections and modifying the two intersections described as follows: 1) Eliminate the northbound free right-turn at the Treat Boulevard/I-680 ramps/Buskirk Avenue intersection. 2) Remove the eastbound right turn lane at the Treat Boulevard/Oak Road intersection, which will result in converting the curbside through lane to a shared through-right lane. The traffic analysis results of this Alternative 4b are shown in Table 1. Because the Treat Boulevard/I-680 ramps/Buskirk Avenue intersection is expected to operate unacceptably in the A.M., the alternative was excluded from future considerations. Furthermore, the expected queues for the northbound right turning vehicles was shown to extend back on the ramp all the way to NB I-680 in the A.M. and extend almost all the way to the freeway in the P.M.

Future Year Analysis (2040)

Individual intersection delay and LOS were analyzed to assess the potential impacts of the revised concept for the future year (2040). A queuing analysis was also completed for movements of concern. Table 2 presents the findings for this analysis. As shown, intersection delay is high in general for the future year.

In general, the removal of the free right turn (Concept 4a) has a negative impact on delay and queuing at Oak Road during the morning and evening peak periods. Since the improvement involves the removal of the SB free right turn as well as a removal of one of the through lanes, SB through movements are subject to much queueing, especially in the A.M.

For the future year alternatives, the signal timings were optimized to benefit the overall performance of the Treat Boulevard corridor in the westbound and eastbound directions. This optimization results in higher delays for side street and left turn movements, as indicated by the high delay at Treat Boulevard/Jones Road during the p.m. peak hour. Although performance degrades slightly with the free right turn removal at Oak Road, the high weaving volumes observed between Oak Road and the I-680 ramps are mitigated. Removing the inefficient and unsafe weaving behavior on this segment reduces the potential negative impact of the improvements at the corridor level.

Conclusion

Implementation of Concept 4a is expected to result in some increased delay and queuing for motorists at specific intersections on Treat Boulevard. The alternative Concept 4b has been shown to be ineffective as it leads to unacceptable LOS levels even with 2014 volume levels. Therefore, this alternative was not considered in future analysis. The reconfiguration of the southbound approach at the Treat Boulevard/Oak Road intersection is expected to result in increased delay and queuing. This is to be expected as one of the southbound through lanes is removed, the free southbound right turn is removed and replaced with two southbound right turn lanes. As a result, the southbound through queue is expected to increase and vehicles in this movement experience higher delays. It should be noted that the removal of free right-turn is expected to achieve the goal of eliminating the potentially dangerous weaving along Treat Boulevard between Oak Road and Buskirk. Furthermore, the queues for the southbound right turning vehicles are expected to decrease. When compared to the benefits for other transportation modes, the increased delay for motorists is relatively small.

Table 1: Intersection LOS Comparison for Current Year (2014)

Intersection	*Peak Hour*	*Existing*				*Concept 4a*				*Concept 4b*			
		Control Delay (s)	*LOS*	*Movmt. of Interest*	*Queue Length (ft)*	*Control Delay (s)*	*LOS*	*Movmt. of Interest*	*Queue Length (ft)*	*Control Delay (s)*	*LOS*	*Movmt. of Interest*	*Queue Length (ft)*
Treat Boulevard and Main Street*	A.M.	55.7	E	WBLT	356	53.1	D	WBLT	378	Not Applicable			
				WBRT	0			WBRT	0				
	P.M.	42.9	D	WBLT	174	42.9	D	WBLT	160				
				WBRT	890			WBRT	0				
Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue	A.M.	30.3	C	WBRT	126	34.7	C	WBRT	130	112.9	F	WBRT	640
				NBRT	0			NBRT	0			NBRT	1446
	P.M.	17.5	B	WBRT	169	19.5	B	WBRT	638	62.1	E	WBRT	638
				NBRT	0			NBRT	0			NBRT	1308
Treat Boulevard and Oak Road	A.M.	46.8	D	SBRT	140	49.2	D	SBRT	68	49.7	D	SBRT	69
				SBTH	295			SBTH	681			SBTH	731
	P.M.	19.3	B	SBRT	382	36.8	D	SBRT	161	41.6	D	SBRT	163
				SBTH	127			SBTH	323			SBTH	323
Treat Boulevard and Jones Road*	A.M.	37.6	D	No movement of interest		32.8	C	No movement of interest		Not Applicable			
	P.M.	49.8	D			48.3	D						

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.
Queue Length = 95th Percentile Queue Length

Table 2: Intersection LOS Comparison for Future Year (2040)

Intersection	*Peak Hour*	*Concept 4a*			
		Control Delay (s)	*LOS*	*Movmt. of Interest*	*Queue Length (ft)*
Treat Boulevard and Main Street*	A.M.	60.1	E	WBLT	410
				WBRT	0
	P.M.	60.0	E	WBLT	410
				WBRT	0
Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue	A.M.	36.5	D	WBRT	131
				NBRT	0
	P.M.	26.1	C	WBRT	193
				NBRT	0
Treat Boulevard and Oak Road	A.M.	53.8	D	SBRT	82
				SBTH	706
	P.M.	42.7	D	SBRT	189
				SBTH	557
Treat Boulevard and Jones Road*	A.M.	59.7	E	No movement of interest	
	P.M.	143.9	F		

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.
Queue Length = 95th Percentile Queue Length

STUDY PARTICIPANTS

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MEMORANDUM

DATE: October 9, 2017[1]
TO: Laurentiu Dusciuc, PE, Alta
FROM: David Mahama, PE, DKS
Erin Vaca, TE, DKS
SUBJECT: Contra Costa County I-680 / Treat Boulevard Bicycle and Pedestrian Plan Feasibility: Traffic Analysis of Alternative 2 and Alternative 3 of Revised Concept 4

INTRODUCTION AND BACKGROUND ON CONCEPTS 4A AND 4B

Previous analysis of Concepts 4a and 4b for this project was documented in a memorandum dated March 6, 2017 (revised October 9, 2017). This previously completed analysis assessed the Concept 4a which involved the removal of one eastbound lane between the Treat Boulevard/I-680 ramps/Buskirk Avenue and Treat Boulevard/Oak Road intersections and modifications of the two intersections. Under this alternative, the Treat Boulevard/I-680 ramps/Buskirk Avenue intersection was modified to eliminate the northbound free right turn lane.

Under existing (2014) traffic conditions, Concept 4b was shown to result in excessively long queues and unacceptable delay during the AM peak hour as shown below in **Table 1**. Because the Treat Boulevard/I-680 ramps/Buskirk Avenue intersection would be expected to operate unacceptably in the A.M., this alternative was excluded from future consideration. Furthermore, the expected queues for the northbound right turning vehicles were expected to extend back on the ramp all the way to NB I-680 in the A.M. and extend almost all the way to the freeway in the P.M.

CONCEPTS 4C AND 4D

Despite the results described above, interest remained in Concept 4a because of the potential safety benefits to bicyclists of eliminating the free right turn lane at the Treat Boulevard/I-680 ramps/Buskirk Avenue intersection. Two additional variations were developed which retained the removal of the free right turn lane but supplemented the capacity of the northbound right turn movement. Under Concept 4c, the northbound approach of the intersection consists of one left turn lane, one through lane, one shared through-right lane, and a right turn lane. Under

[1] This document has been revised from the version dated September 12, 2017 to reflect standardized naming conventions for the design alternatives.

Table 1. Concepts 4a and 4b under Current Year (2014) Traffic for Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue Intersection

Peak Hour	Existing				Alternative 4a				Alternative 4b			
	Control Delay (s)	LOS	Movmt. of Interest	Queue Length (ft)	Control Delay (s)	LOS	Movmt. of Interest	Queue Length (ft)	Control Delay (s)	LOS	Movmt. of Interest	Queue Length (ft)
A.M.	30.3	C	WBRT	126	34.7	C	WBRT	130	112.9	F	WBRT	640
			NBRT	0			NBRT	0			NBRT	1446
P.M.	17.5	B	WBRT	169	19.5	B	WBRT	638	62.1	E	WBRT	638
			NBRT	0			NBRT	0			NBRT	1308

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.
Queue Length = 95th Percentile Queue Length

Concept 4d, the cross section includes one left turn lane, two through lanes, and two right turn lanes. Diagrams of these designs can be found in Appendix A.

This memorandum documents the analysis of these two alternatives with respect to overall performance, delay, and queuing at the Treat Boulevard/I-680 ramps/Buskirk Avenue intersection. A modified version of Concept 4d, Concept 4e, is presented as the best option for this intersection.

Analysis of Concepts 4c and 4d under Future Year (2040) Traffic

While Concepts 4c and 4d perform adequately under existing traffic conditions (see Table 2), neither would operate acceptably under future traffic conditions (see Table 3). As shown in Table 3, both alternatives show a high level of delay and a 95th percentile northbound right turn queue in excess of 1000 feet during the AM peak hour. As stated previously, this length queue will reach back to the I-680 freeway.

A modification to the proposed alternatives was tested whereby the second through lane in Concept 4d was changed to a shared through-right lane. This modification is termed Concept 4e. The triple right turn lanes can be accommodated by three receiving lanes on Treat Boulevard. With this modification, the intersection would operate at an acceptable LOS with the northbound right turn queue under 600 feet, a length contained within the ramp north of the split to the weigh station.

DKS

Table 1: Concepts 4c and 4d under Current Year (2014) Traffic for Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue Intersection

Peak Hour	Concept 4c				Concept 4d			
	Control Delay (s)	LOS	Movmt. of Interest	Queue Length (ft)	Control Delay (s)	LOS	Movmt. of Interest	Queue Length (ft)
A.M.	44.4	D*	WBRT	633	43.1	D	WBRT	698
			NBRT	687			NBRT	611
P.M.	41.6	D*	WBRT	218	41.3	D	WBRT	495
			NBRT	510			NBRT	484

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.
Queue Length = 95th Percentile Queue Length

Table 3: Concepts 4c - 4e under Future Year (2040) Traffic for Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue Intersection

Peak Hour	Concept 4c				Concept 4d				Concept 4e			
	Control Delay (s)	LOS	Movmt. of Interest	Queue Length (ft)	Control Delay (s)	LOS	Movmt. of Interest	Queue Length (ft)	Control Delay (s)	LOS	Movmt. of Interest	Queue Length (ft)
A.M.	61.2	E*	WBRT	735	88.3	F	WBRT	332	46.9	D*	WBRT	332
			NBRT	1036			NBRT	1002			NBRT	536
P.M.	40.2	D*	WBRT	853	52.6	D	WBRT	459	31.7	C*	WBRT	401
			NBRT	604			NBRT	534			NBRT	323

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.
Queue Length = 95th Percentile Queue Length

Conclusion

By 2040, Conecepts 4c and 4d are expected to result in unacceptable operating conditions at the intersection of Treat Boulevard and I-680 off ramp/Buskirk Avenue during the AM peak hour. Instead, Concept 4e with two dedicated right turn lanes and one shared through-right lane presents a reasonable tradeoff between vehicle delay and improved conditions for bicyclists and is the recommended option for this intersection. Implementing this alternative will likely require some modifications to the median and shifts in striping on Treat Boulevard in order to create comfortable dimensions for motorists using the three receiving lanes. If desired, the shared through-right lane can operate on an as-needed basis during the AM peak hour with implementation of a *variable lane assignment control sign* installed at the intersection. Alternatively, the shared through-right movement may be allowed at all times with appropriate lane legends and striping.

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Appendix D: Additional Traffic Data

The following traffic data and motor traffic level of service modeling is summarized from the separate Traffic Technical Memorandum.

Traffic Data

Data was collected as follows:

- Turning movement counts for all users collected with a 24-hour video count during a sunny, dry day on Tuesday May 13, 2014 along Treat Boulevard at North Main Street, Buskirk Avenue, Oak Road and Jones Road
- Weekday and weekend motor traffic counts collected with pneumatic tube counters placed on Treat Boulevard between the Jones Road and Oak Road intersections over the seven-day period between May 31 to June 5, 2014

Based on the tube counts, approximately 48,000 vehicles per average weekday use Treat Boulevard (both directions). Figure C-1 presents the peak period turning movement counts for the four study intersections. Full datasets are available in the separate traffic analysis report.

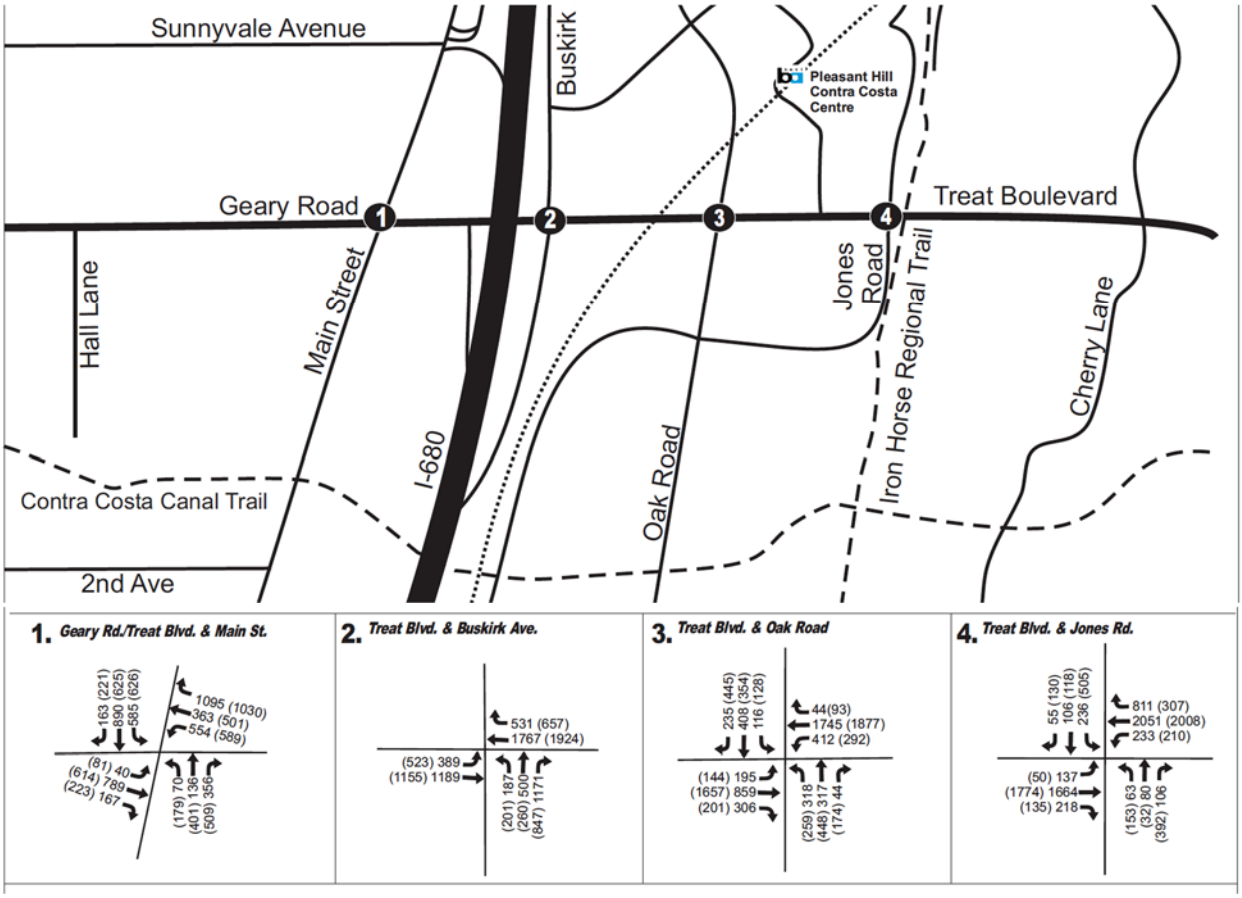


Figure C-1: AM (PM) peak period turning movement counts

Table C-6-8 and Table C-6-9 summarize the morning and afternoon peak period pedestrian and bicycle counts for the study intersections.

Table C-6-8: Existing Pedestrian Count Summary

ID	Intersection	Peak Period (1-hour counts)	South Crosswalk	North Crosswalk	East Crosswalk	West Crosswalk	Total
1	Treat Blvd/ Main St	A.M.	5	27	4	8	44
		P.M.	7	36	4	17	64
2	Treat Blvd/ Buskirk Ave	A.M.	--	51	2	--	53
		P.M.	1 --	44	0	1 --	46
3	Treat Blvd/ Oak Rd	A.M.	6	29	84	6	125
		P.M.	26	23	46	27	122
4	Treat Blvd/ Jones Rd	A.M.	18	10	13	20	61
		P.M.	23	13	17	19	72

Notes:
-- Crosswalk does not exist
1-- Crosswalk does not exist but one pedestrian crossed illegally
n/a – Data not available

Table C-6-9: Existing Bicycle Count Summary

ID	Intersection	Peak Period (1-hour counts)	Southbound	Northbound	Eastbound	Westbound	Total
1	Treat Blvd/ Main St	A.M.	1	0	2	2	5
		P.M.	1	1	3	0	5
2	Treat Blvd/ Buskirk Ave	A.M.	--	0	0	1	1
		P.M.	--	0	0	3	3
3	Treat Blvd/ Oak Rd	A.M.	0	2	0	1	3
		P.M.	0	2	1	0	3
4	Treat Blvd/ Jones Rd	A.M.	0	0	0	2	2
		P.M.	2	1	0	13	16

Notes:
-- Direction does not exist at intersection

Motorist Traffic Level of Service Model

This data was used to build an existing conditions traffic model that evaluates motorist level of service (LOS), which will be one of the metrics used to evaluate potential improvements. The corridor measures of effectiveness are presented in Table C-6-10. The intersection average control delay and corresponding LOS grade values are presented in Table C-6-11. For context, the length of the study segment is 0.43 miles. Under 35 mph free flow conditions with no stops for traffic signals, it would take about 45 seconds to traverse the segment.

Table C-6-10: Measures of Effectiveness from Existing Conditions Synchro Model

Roadway	Approach	Peak Hour	Total Delay/ Vehicle (sec/veh)	Stops/ Vehicle	Total Travel Time (hr)	Average[1] Speed (mph)	CO Emissions (kg)	NOx Emissions (kg)	Arterial LOS
Treat Boulevard	Westbound	A.M.	22	0.43	103	15	9.27	1.80	D
		P.M.	23	0.43	91	13	8.07	1.57	E
	Eastbound	A.M.	36	0.53	99	9	8.16	1.59	F
		P.M.	32	0.55	95	10	8.18	1.59	E

Notes: Total Delay/Vehicle (sec/veh) = The control delay plus the queue delay experienced per vehicle.
Travel Time (hr) = The total time taken for all vehicles to travel through the corridor.
CO Emissions (kg) = The amount of Carbon Monoxide emissions by all vehicles traveling along the corridor in a period of one hour.
NOx Emissions (kg) = The amount of Nitrogen Monoxide emissions by all vehicles traveling along the corridor in a period of one hour.
[1]Average speed accounts for traffic signal delay at the study intersections and queuing delay.

Table C-6-11: Intersection Average Level of Service from Existing Conditions Synchro Model

Intersection	Peak Hour	Control Delay (s)	LOS
Treat Boulevard and Main Street*	A.M.	55.7	E
	P.M.	42.9	D
Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue	A.M.	30.3	C
	P.M.	17.5	B
Treat Boulevard and Oak Road	A.M.	46.8	D
	P.M.	19.3	B
Treat Boulevard and Jones Road*	A.M.	37.6	D
	P.M.	49.8	D

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.

LOS "D" is defined in the HCM as "approaching unstable/tolerable delay: drivers may have to wait through more than one red signal. Queues may develop but dissipate rapidly". With all intersections modeled to be operating at LOS "D" or better (with the exception of Main Street, which is "E" in the morning peak), there is some excess capacity before excessive delay conditions would be expected to develop. However, the County has advised that with predicted future volumes in mind, no reduction in the number of lanes will be considered in this corridor.

Multi-Modal Level of Service Model

Multi-modal level of service (MMLOS) for Treat Boulevard in the current condition has been calculated for motorized and non-motorized modes of traffic using ARTPLAN 2012, the arterial street component of the LOSPLAN software suite. The underlying analysis methods are based on HCM 2010 procedures, which are the first attempt to quantify the inter-relationship of modes. These procedures are currently being revised to better account for a wider range of user types and environments.

The HCM MMLOS methods are based on user perceptions of various conditions as assessed through video labs. The model omits consideration of the variety in bicyclist types and impacts of various crossing facilities. Bicycle LOS is gauged based on the average effective width of the outside through lane, motorized vehicle volumes, motorized vehicle speeds, heavy vehicle (truck) volumes, and pavement condition. Pedestrian LOS is gauged based on the existence of a sidewalk, lateral separation of pedestrians from motorized vehicles, motorized vehicle volumes, and motorized vehicle speeds. For all modes, a letter grade of "A" indicates superior LOS. LOS results for autos are not comparable to LOS as calculated by other traffic analysis / simulation methods.

A summary of the results is provided in Table C-6-12. It should be noted that it is not necessary to have a dedicated bicycle facility for a roadway to be assigned a LOS grade, because a bicyclist may ride anywhere except where explicitly prohibited. These grades do not necessarily reflect what all people may consider acceptable, rather they are a relative grade based on the method's video lab participant perceptions of conditions. While a grade of "D" may be acceptable to some confident bicyclists, it is not likely that most members of the general public would consider sharing a traffic lane with motorists along Treat Boulevard.

In comparing the bicycle and pedestrian grades for various segments and peak periods, the values are intuitive in that the segment between Main Street and Buskirk Avenue has fewer provisions for these modes. The better bicycle grades for the eastbound direction during the afternoon peak are due to the lower eastbound traffic volumes at that time of day.

Table C-6-12: Multi-Modal Level of Service – Base Condition

Segment	Direction	Peak Hour	Auto	Bike	Ped
Main Street to Buskirk Avenue	EB	PM	D	D	D
	WB	AM	D	E	D
Buskirk Avenue to Oak Road	EB	PM	D	C	C
	WB	AM	D	D	C
Oak Road to Jones Road	EB	PM	D	C	C
	WB	AM	D	D	C

Appendix E: Concept Plans and Features

The following pages of this appendix contain:

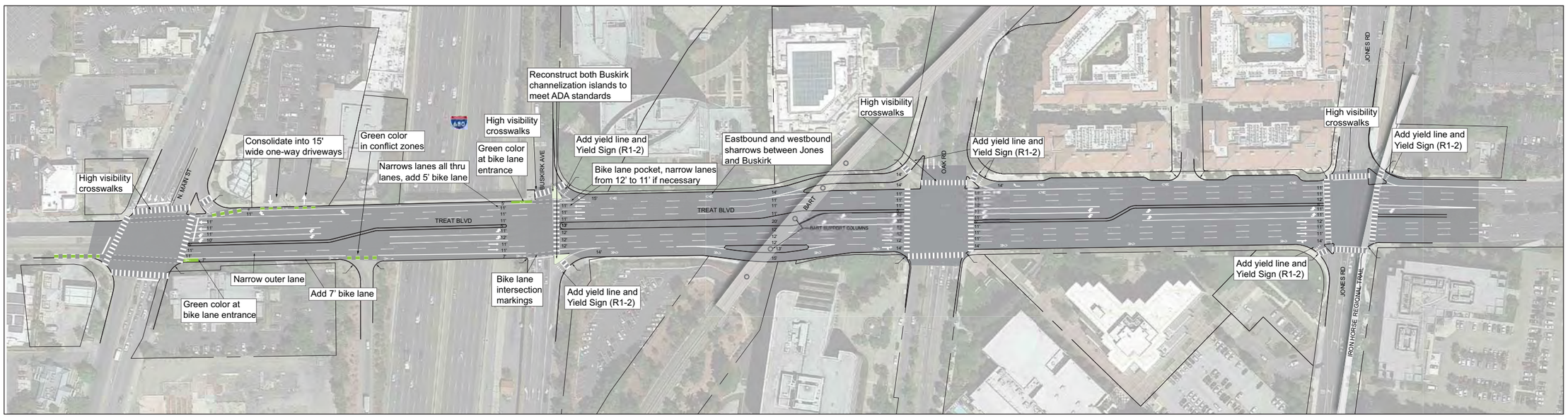
- Table describing the principal features of each concept
- Concept 1A, 1B, 2, and 3 sketch plans, visual simulations and cross sections
- Concept 4 Preliminary CAD plans
- Concept 4A and I-680 Off-Ramp Alternatives 4B, 4C, 4D, and 4E
- Concept 4A/Alternative 4C (Preferred Project)
- Design Renderings (Preferred Project)

Table B-6-13 Treat Boulevard Detailed Concept Descriptions

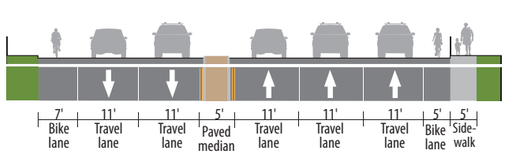
Mode	***Concept 1A: Bike Lanes***	***Concept 1B: Buffered Bike Lanes***	***Concept 2: Shared Use Path and Buffered Bike Lanes***	***Concept 3: Shared Use Path, Cycle Track and Southside Sidewalk***	***Concept 4: Shared Use Path and Southside Sidewalk***	***Concept 4A: Enhanced Bike Lanes and Shared Use Path***
Main Street to Buskirk Avenue						
Bicycle	o Add 5-foot WB bike lane o Add 7-foot EB bike lane	o Add WB buffered bike lane o Add EB buffered bike lane	o Expand north side sidewalk to 12-foot two-way shared-use path	o Expand north side sidewalk to 12-foot two-way shared-use path o Add sharrows to EB outer lane	o Expand north side sidewalk to 12-foot two-way shared-use path	o Add 5 foot WB bike lane o Add 5 foot EB buffered bike lane with 2 foot striped buffer
Pedestrian	o No change	o No change	o Expand north side sidewalk to 12-foot two-way shared-use path	o Expand north side sidewalk to 12-foot two-way shared-use path o Add 7-foot sidewalk on south side	o Expand north side sidewalk to 12-foot two-way shared-use path o Add 7-foot sidewalk on south side	o No changes
Automobile	o Narrow WB lanes (keep all lanes) o Narrow outer eastbound lane (keep all lanes) o Convert Walgreens driveways into two 15-foot one-way driveways	o Remove outside WB lane (two WB lanes) o Narrow outer EB lane (keep all lanes) o Convert Walgreens driveways into two 15-foot one-way driveways	o Narrow WB lanes (keep all lanes) o Narrow outer EB lane (keep all lanes) o Convert Walgreens driveways into two 15-foot one-way driveways	o Narrow WB lanes (keep all lanes) o Narrow outer EB lane (keep all lanes) o Convert Walgreens driveways into two 15-foot one-way driveways	o Narrow WB lanes (keep all lanes) o Narrow outer EB lane (keep all lanes) o Convert Walgreens driveways into two 15-foot one-way driveways	o Narrow all lanes
Buskirk Avenue to Oak Road						
Bicycle	o Update pedestrian islands to meet ADA standards	o Add WB buffered bike lane o Add EB buffered bike lane	o Expand north side sidewalk to 8-10-foot two-way shared-use path o Add EB buffered bike lane o Create protected intersection separating bikes from turning vehicles at Oak Road	o Expand north side sidewalk to 8-10-foot two-way shared-use path o Add sharrows to EB outer lane	o Expand north side sidewalk to 8-10-foot two-way shared-use path	o Add WB bike lane o Add EB bike lane (buffered beginning near BART overcrossing)
Pedestrian	o No change	o No change	o Expand north side sidewalk to 8-10-foot two-way shared-use path	o Expand north side sidewalk to 8-10-foot two-way shared-use path	o Expand north side sidewalk to 8-10-foot two-way shared-use path	o Designate existing north side sidewalk as shared path o Update pedestrian islands to meet ADA standards
Automobile	o No change	o Remove SB right channelized right turn lane and convert to buffered bike lane (Treat Blvd / Oak Rd) o Convert curbside travel lanes to buffered bike lanes	o Remove SB right channelized right turn lane convert WB outer lane to two-way shared-use path from Oak Road to BART overpass o Remove EB outer travel lane and convert to buffered bike lane o Convert third WB travel lane to right-turn pocket	o Remove SB channelized right turn o Convert WB outer lane to two-way shared-use path from Oak Road to BART overpass o Narrow EB outer lane to accommodate expanded sidewalk o Convert third WB travel lane to right-turn pocket	o Remove northwest corner channelized right turn lane o Convert WB outer lane to two-way shared-use path from Oak Road to BART overpass o Remove northeast corner channelized right turn lane	o Remove SB right channelized right turn lane convert WB outer lane to two-way shared-use path from Oak Road to BART overpass

Mode	***Concept 1A: Bike Lanes***	***Concept 1B: Buffered Bike Lanes***	***Concept 2: Shared Use Path and Buffered Bike Lanes***	***Concept 3: Shared Use Path, Cycle Track and Southside Sidewalk***	***Concept 4: Shared Use Path and Southside Sidewalk***	***Concept 4A: Enhanced Bike Lanes and Shared Use Path***
Oak Road to Jones Road						
Bicycle	o No change	o Add WB buffered bike lane o Add EB buffered bike lane	o Add WB buffered bike lane o Add EB buffered bike lane	o Add WB cycle track (protected bike lane) o Add EB sharrows	o Add WB sharrows	o Add WB bike lane o Add EB buffered bike lane
Pedestrian	o No change	o No change	o No change	o No change	o No change	o No change
Automobile	o No change	o Convert WB right turn lane into buffered bike lane o Convert outer EB lane into buffered bike lane o Remove WB channelized right turn at Treat Blvd / Jones Rd intersection	o Convert WB right turn lane into buffered bike lane o Convert outer EB lane into buffered bike lane o Remove WB channelized right turn at Treat Blvd / Jones Rd intersection	o Convert WB right turn lane into cycle track o Move parking to create “floating” parking lane o Remove WB channelized right turn at Treat Blvd / Jones Rd intersection	o No change	o Convert outer EB lane into buffered bike lane o Remove WB channelized right turn at Treat Blvd / Jones Rd intersection

Concept 1A



Concept 1A Treat Blvd: Main to Buskirk



Treat Boulevard - Concept 1A: Short Term Improvement Option

SCALE 1"=100'

1 INCH

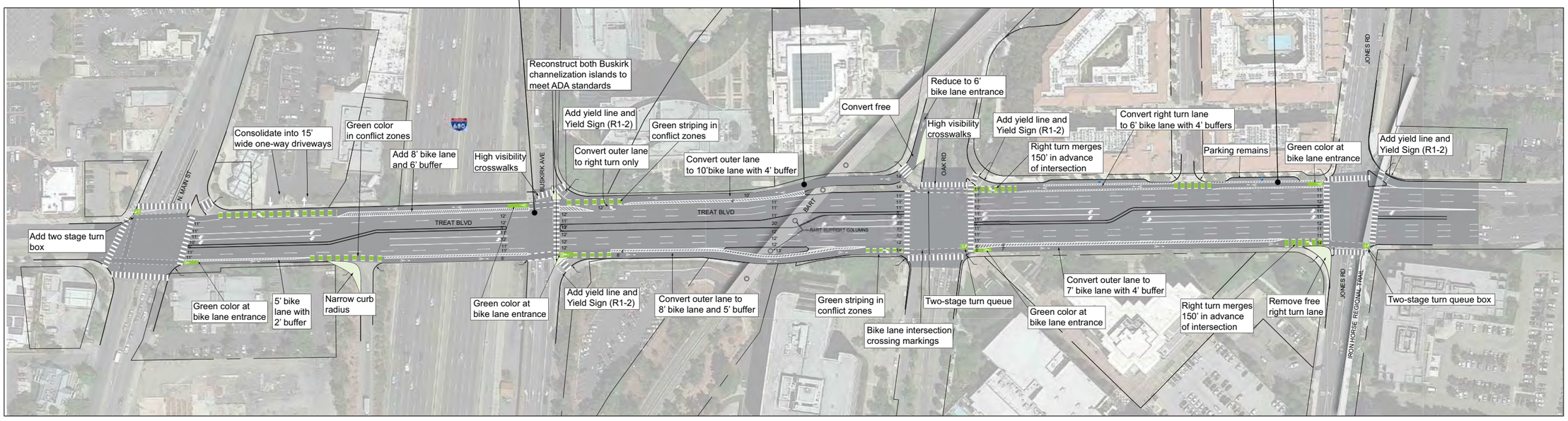
0 100' 200'

Concept 1B

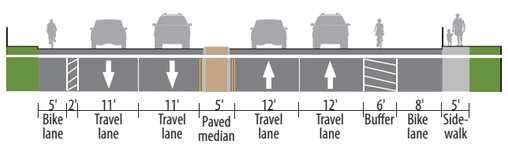
View west along Treat Blvd near Buskirk Ave

View west along Treat Blvd near the BART overpass

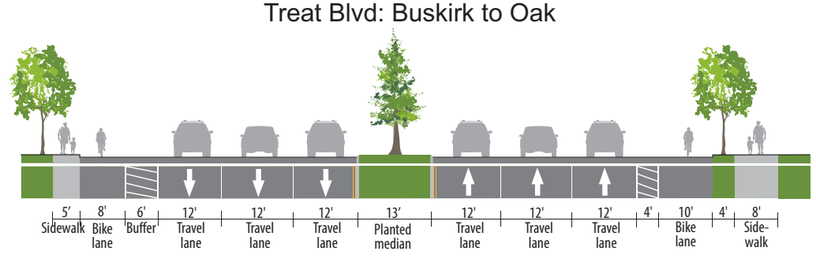
View west along Treat Blvd near Jones Rd



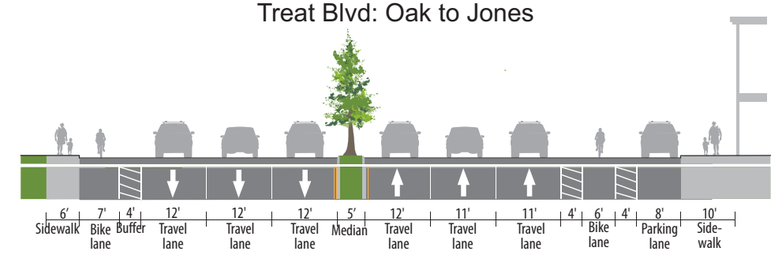
Treat Blvd: Main to Buskirk



Treat Blvd: Buskirk to Oak



Treat Blvd: Oak to Jones



Treat Boulevard - Concept 1B: Buffered Bike Lanes

SCALE 1"=100'

1 INCH

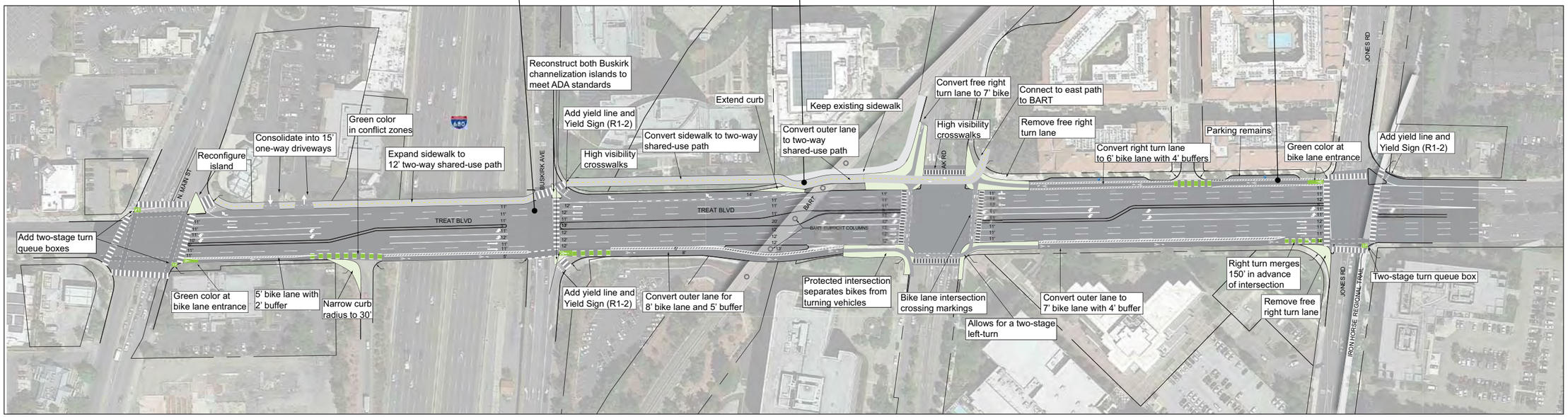
0 100' 200'

Concept 2

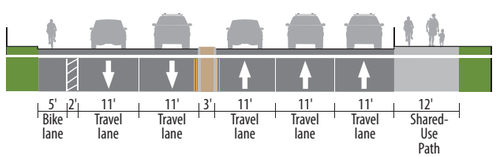
View west along Treat Blvd near Buskirk Ave

View west along Treat Blvd near the BART overpass

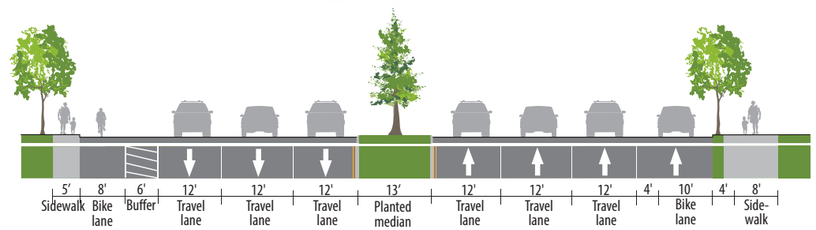
View west along Treat Blvd near Jones Rd



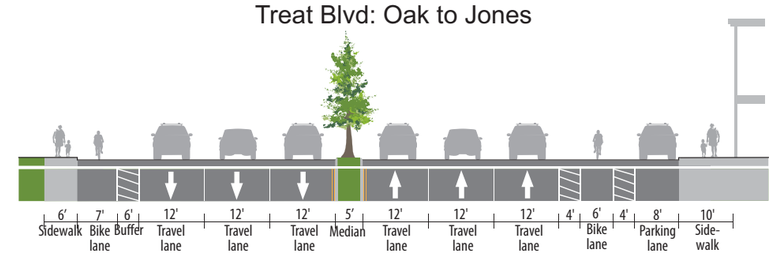
Treat Blvd: Main to Buskirk



Treat Blvd: Buskirk to Oak



Treat Blvd: Oak to Jones



Treat Boulevard - Concept 2: Shared Use Path and Buffered Bike Lanes

SCALE 1"=100'

1 INCH

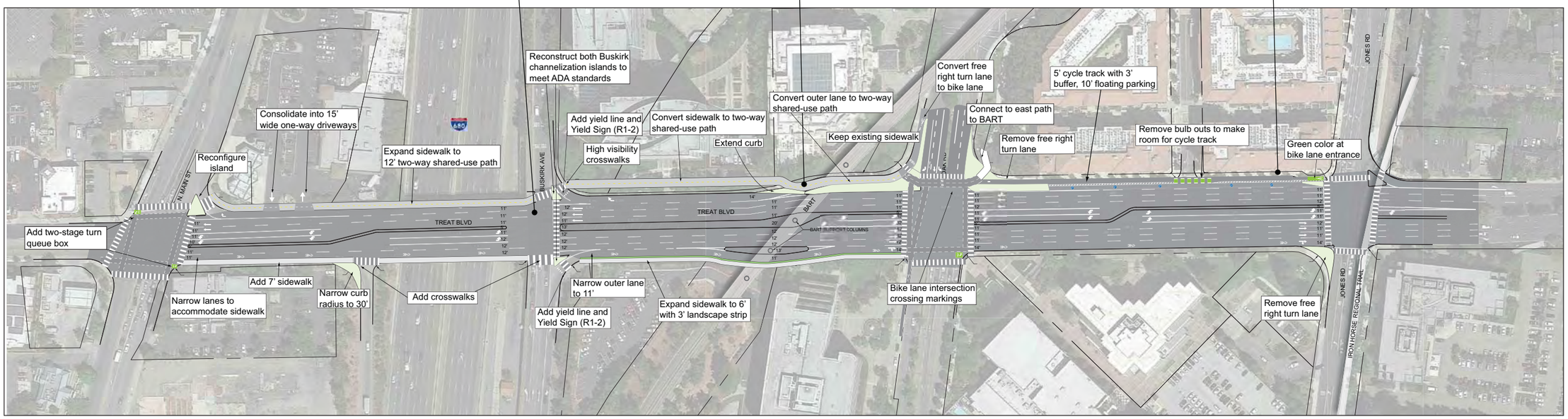
0 100' 200'

Concept 3

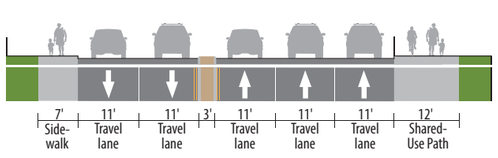
View west along Treat Blvd near Buskirk Ave

View west along Treat Blvd near the BART overpass

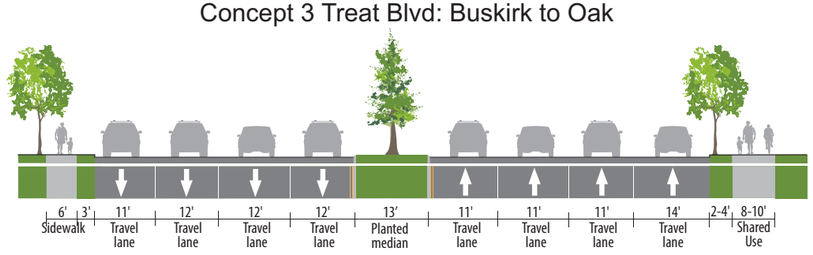
View west along Treat Blvd near Jones Rd



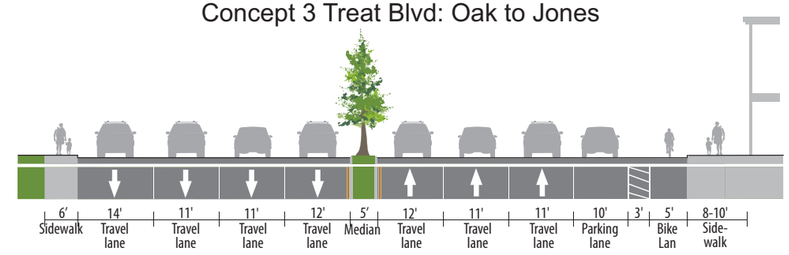
Treat Blvd: Main to Buskirk (remix)



Concept 3 Treat Blvd: Buskirk to Oak



Concept 3 Treat Blvd: Oak to Jones



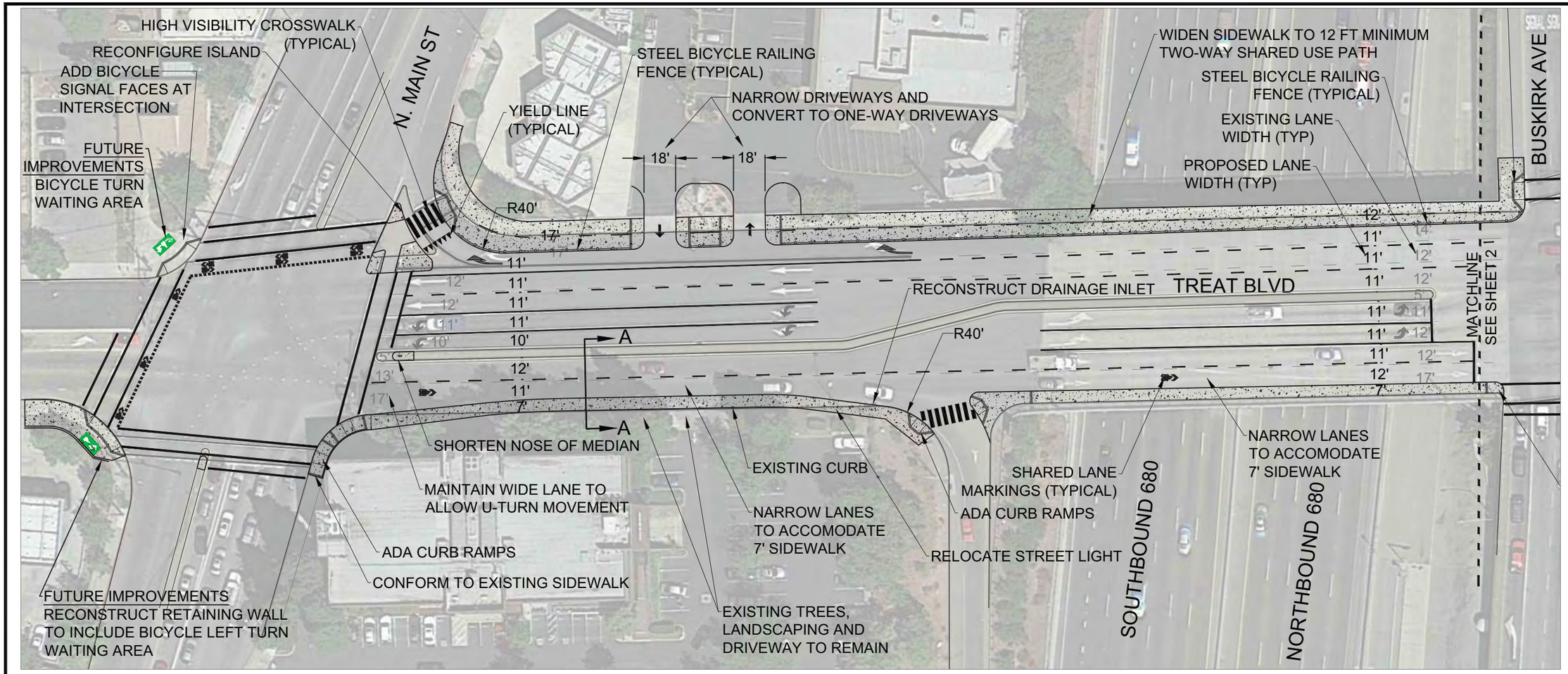
Treat Boulevard - Concept 3: Shared Use Path, Cycle Track and Sidewalk

SCALE 1"=100'

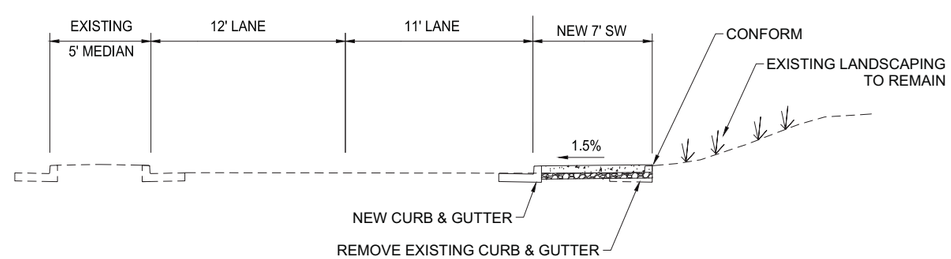
1 INCH

0 100' 200'

Concept 4



0 15' 30' 60' 90'



SECTION A-A

NTS

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DESIGNED:	JL
DRAWN:	LD
REVIEWED:	JL
PROJECT NO.:	2014-122

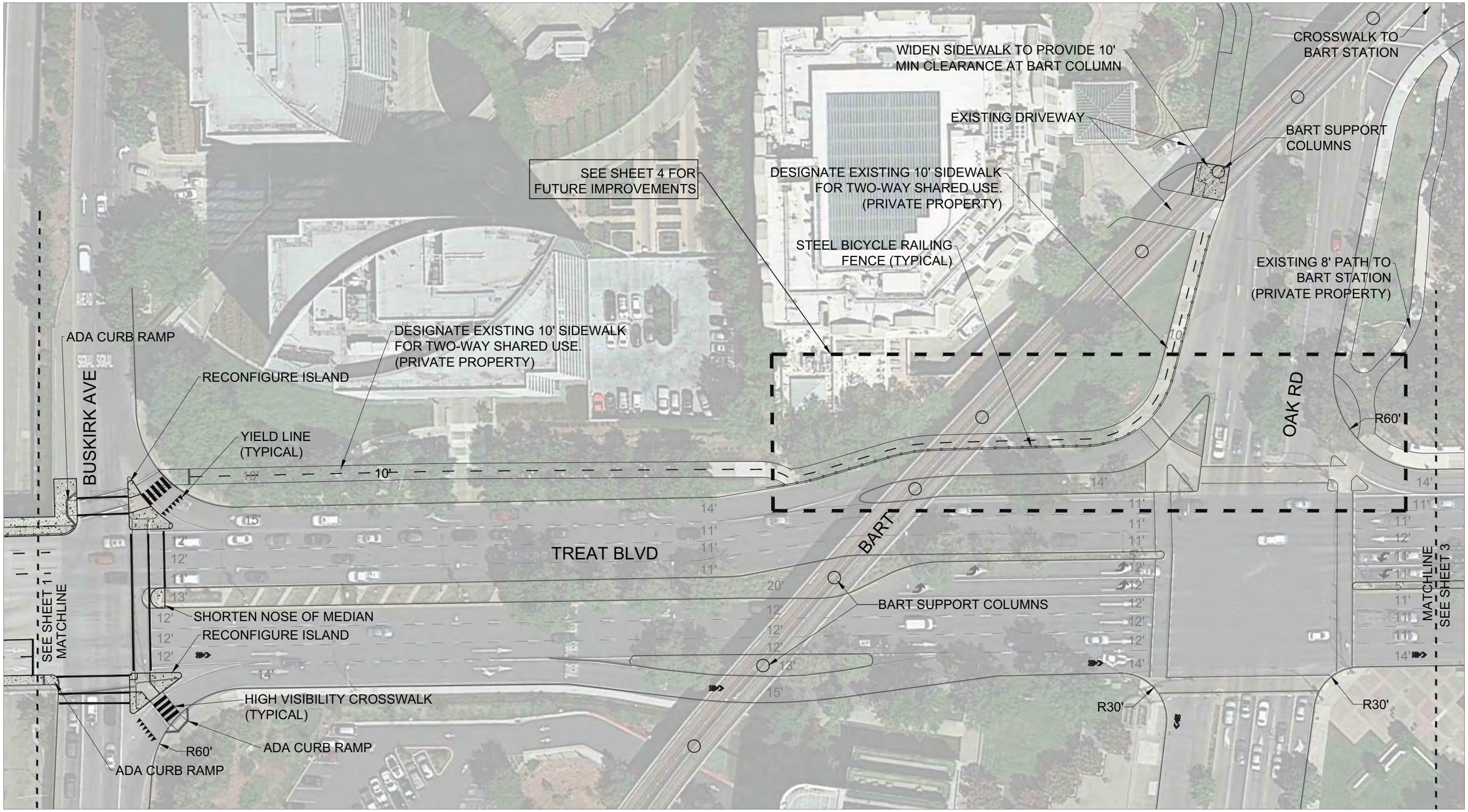
TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN
PROJECT NUMBER C49472

Concept 4 - PHASE 1

SHEET 1 OF 4

SCALE: AS SHOWN

DATE: JUNE 4, 2015



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DESIGNED:	JL
DRAWN:	LD
REVIEWED:	JL
PROJECT NO.:	2014-122

TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN
PROJECT NUMBER C49472
Concept 4 - PHASE 1

SHEET 2 OF 4

SCALE: AS SHOWN

DATE: JUNE 4, 2015

0 15' 30' 60' 90'

N

DESIGNED:	JL
DRAWN:	LD
REVIEWED:	JL
PROJECT NO.:	2014-122

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TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN
PROJECT NUMBER C49472
Concept 4 - PHASE 1

SHEET 3 OF 4

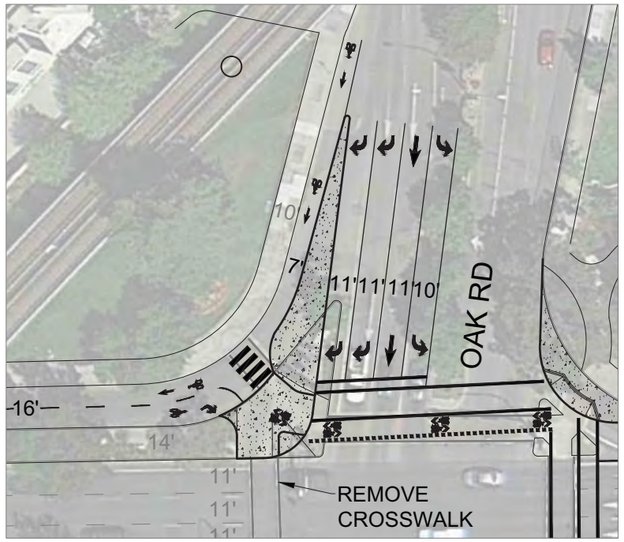
SCALE: AS SHOWN

DATE: JUNE 4, 2015

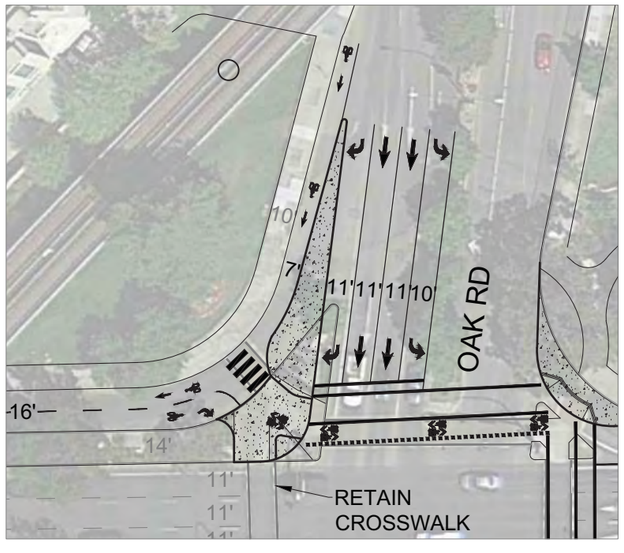
POTENTIAL VARIATIONS (REFER TO SECTION 7 OF THE PLAN):

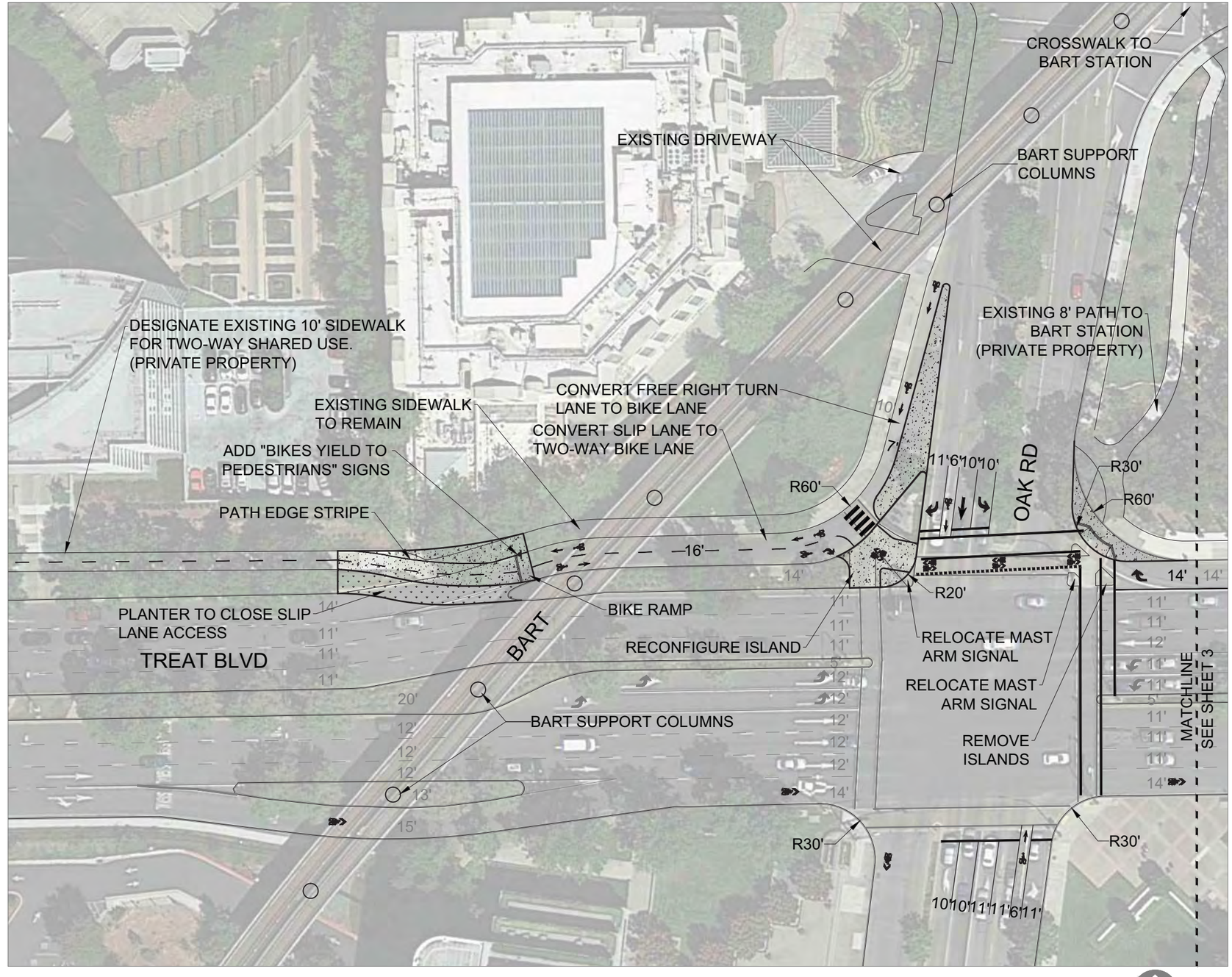
MITIGATION 1:
- SIGNAL TIMING ADJUSTMENTS ONLY (NO GEOMETRIC CHANGES)

MITIGATION 2:
- 1 SOUTHBOUND LEFT TURN LANE
- 1 SOUTHBOUND THROUGH LANE
- 2 SOUTHBOUND RIGHT TURN LANES
- REMOVAL OF WEST CROSSWALK
- NO BIKE LANE POCKET



MITIGATION 3:
- 1 SOUTHBOUND LEFT TURN LANE
- 2 SOUTHBOUND THROUGH LANES
- 1 SOUTHBOUND RIGHT TURN LANE
- RETAIN WEST CROSSWALK
- NO BIKE LANE POCKET
- SOUTHBOUND RIGHT / EASTBOUND LEFT OVERLAP





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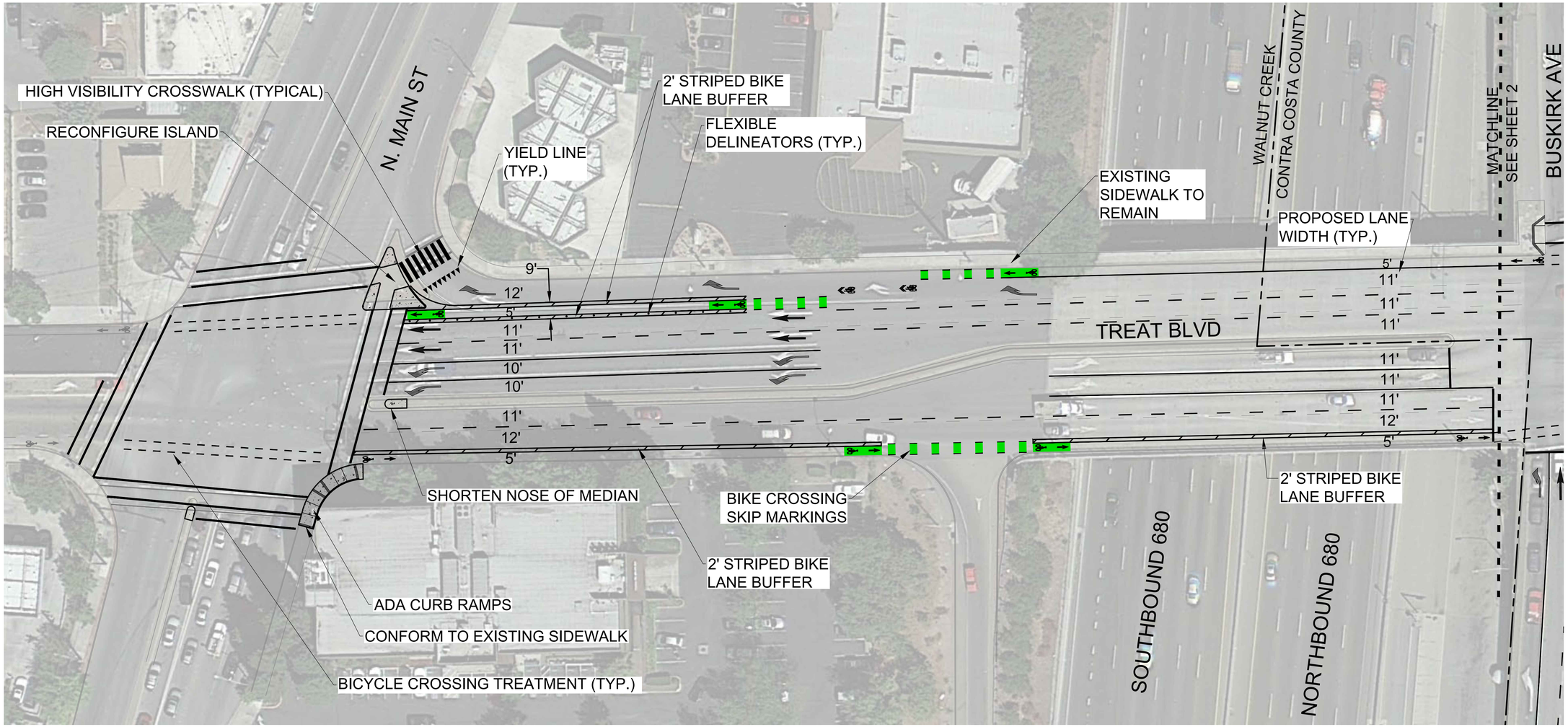
DRAWN:	LD
REVIEWED:	JL
PROJECT NO.:	2014-122

TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN
PROJECT NUMBER C49472
Concept 4 - FUTURE IMPROVEMENTS

SCALE: AS SHOWN | DATE: AUGUST 14, 2015

SHEET 4 OF 4

Concept 4A



0 15' 30' 60' 90'

DESIGNED:	LD	TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN PROJECT NUMBER C49472 Concept 4A	SHEET 1 OF 3
DRAWN:	JP		
REVIEWED:	BH		
PROJECT NO.:	2016-355		
		SCALE: AS SHOWN	DATE: JULY, 2017

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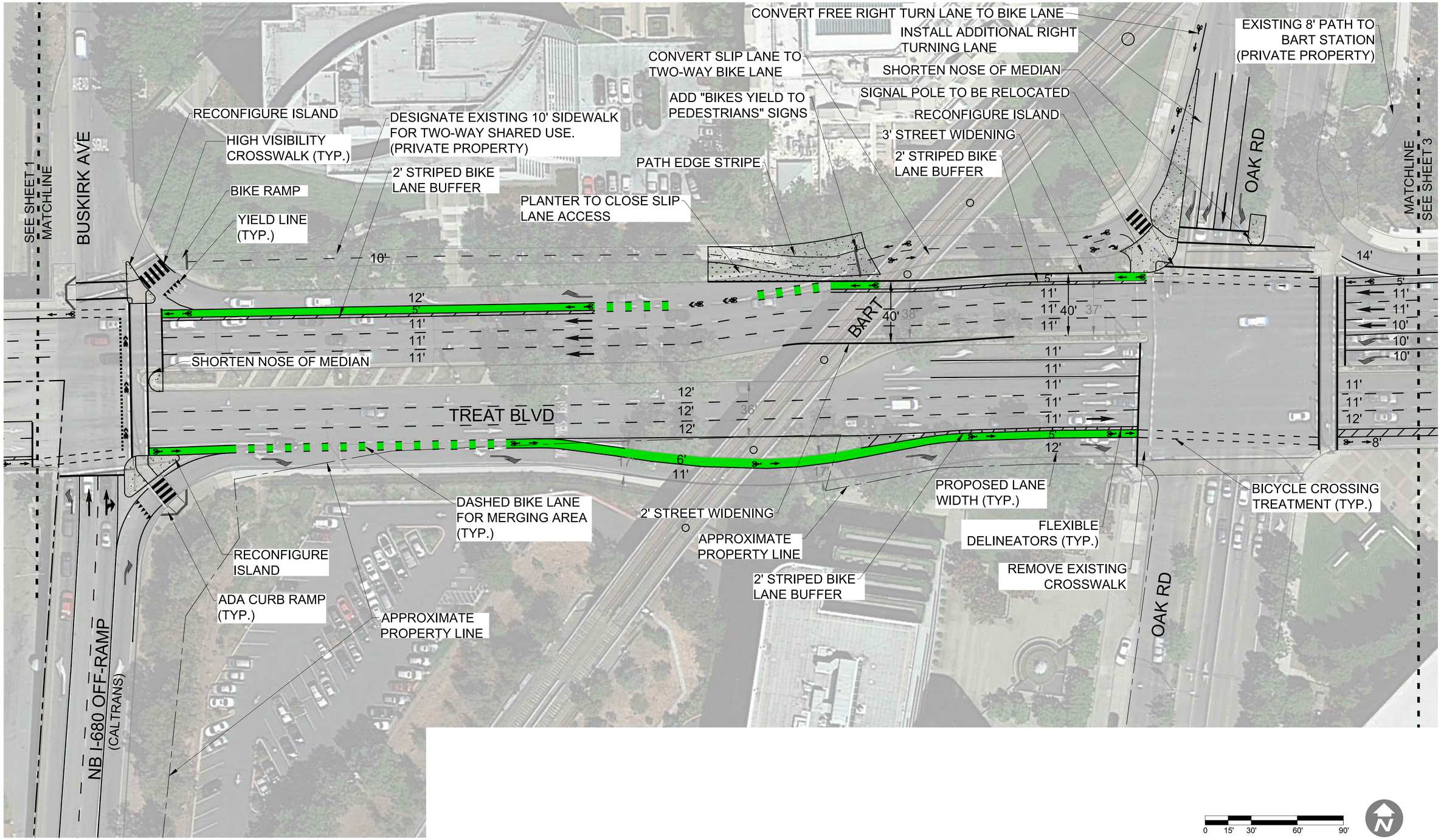

DESIGNED:	LD
DRAWN:	JP
REVIEWED:	BH
PROJECT NO.:	2016-355

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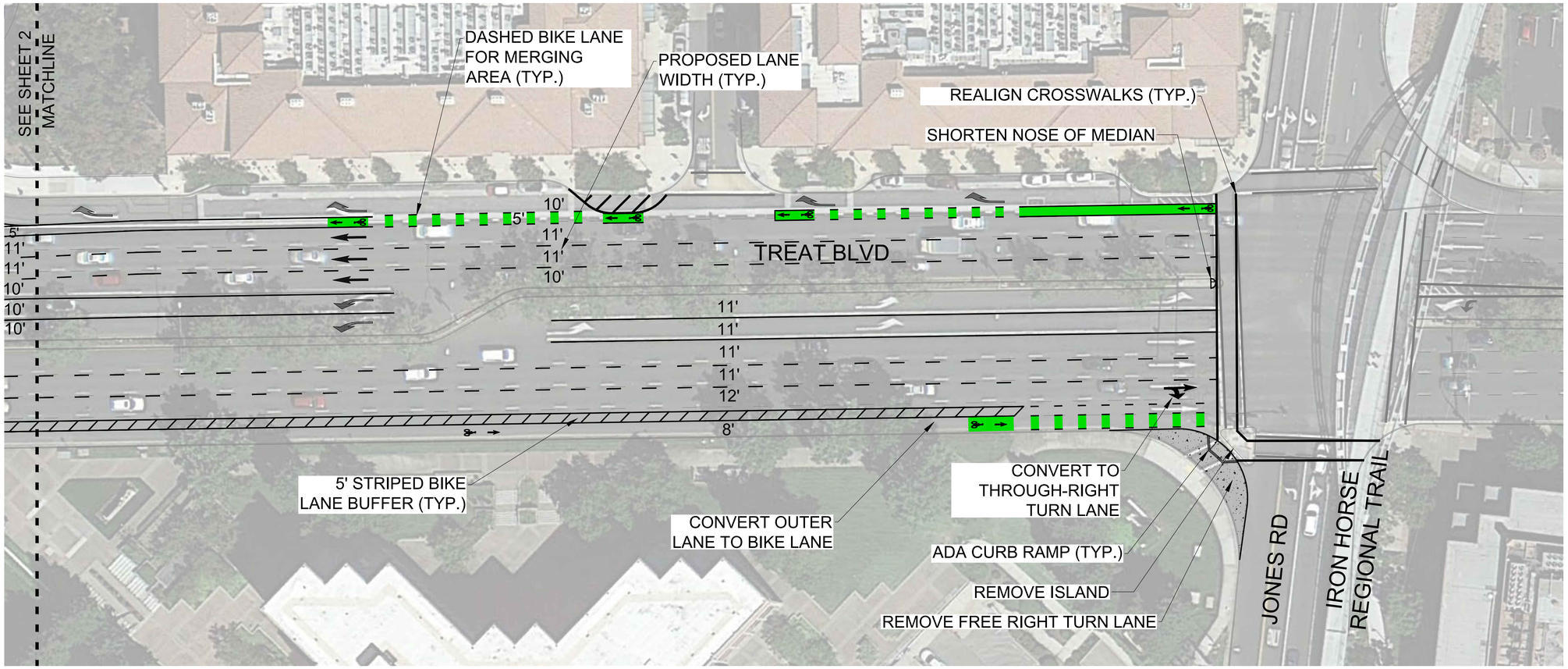
TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN
PROJECT NUMBER C49472

Concept 4A

SHEET 2 OF 3

SCALE: AS SHOWN

DATE: JULY, 2017



0 15' 30' 60' 90'

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DESIGNED:	LD
DRAWN:	JP
REVIEWED:	BH
PROJECT NO.:	2016-355

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TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN
PROJECT NUMBER C49472
Concept 4A

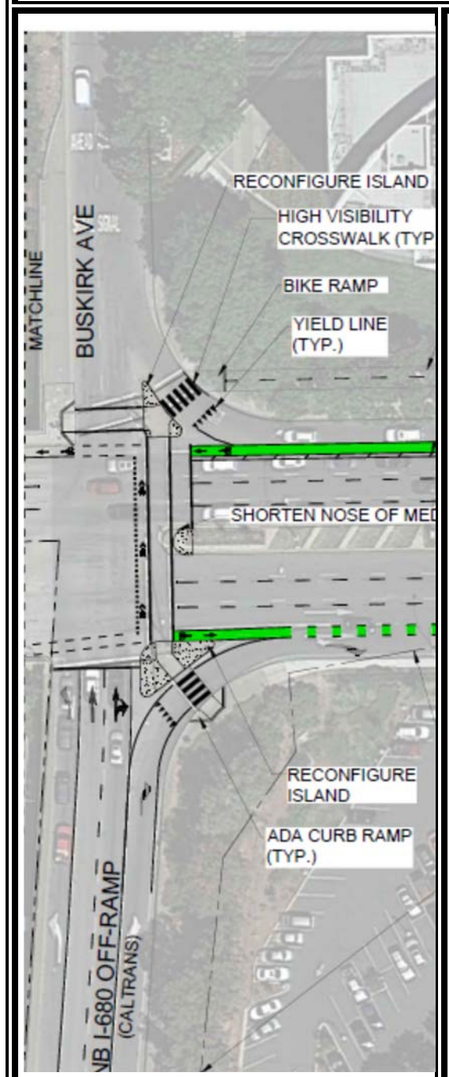
SHEET 3 OF 3

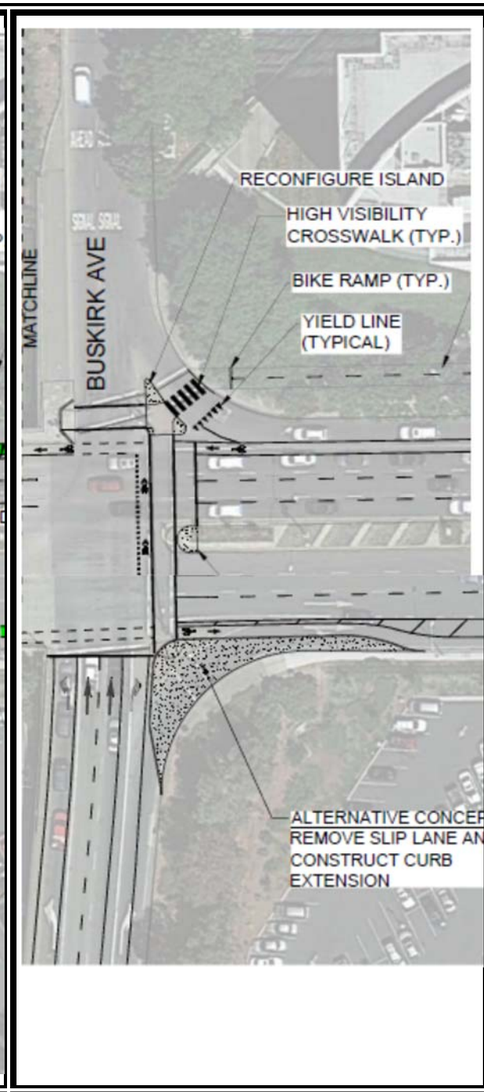
SCALE: AS SHOWN

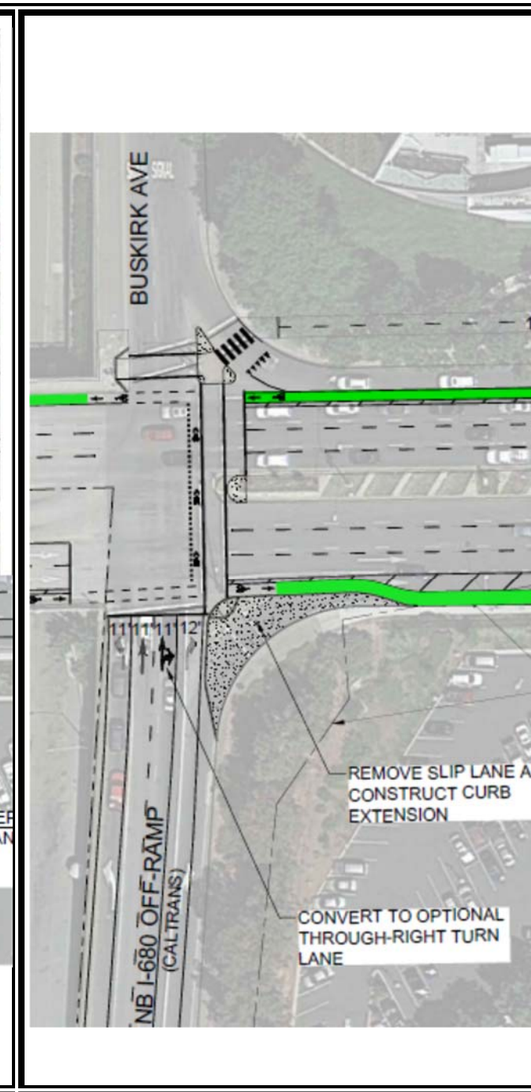
DATE: JULY, 2017

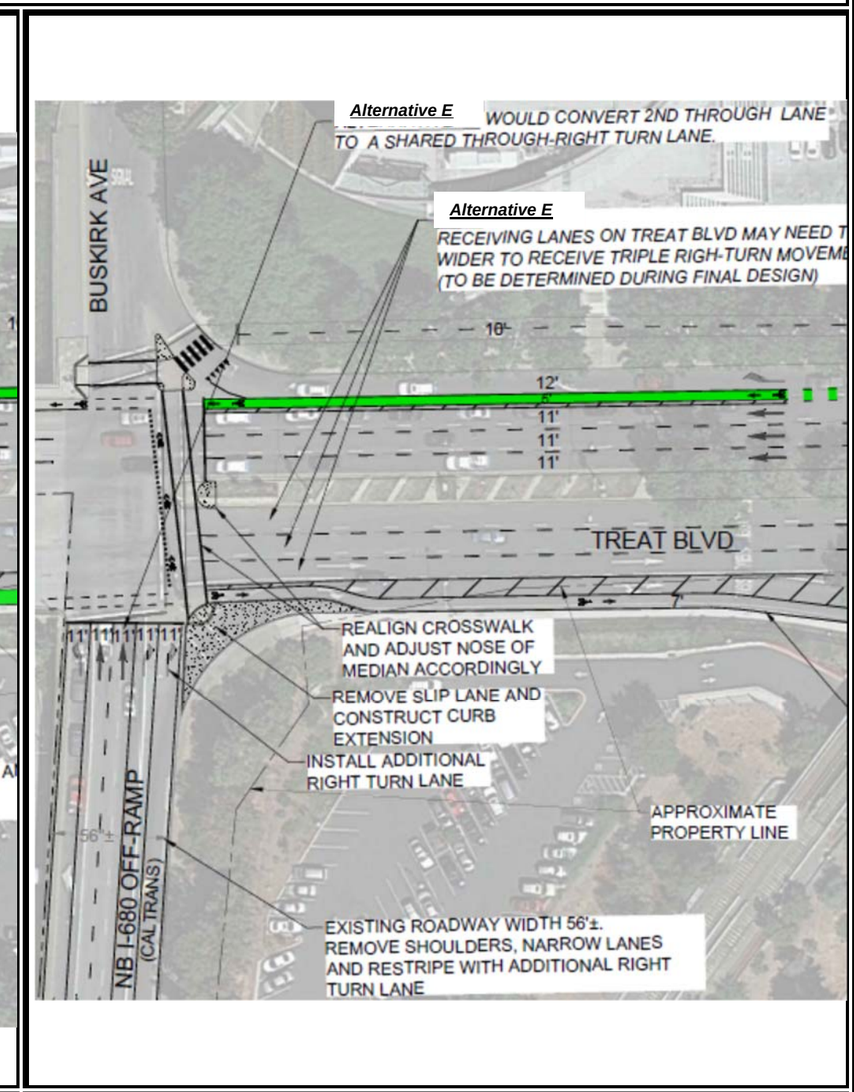
I-680 Off-Ramp Alternatives

Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan
I-680 Off-Ramp Alternatives





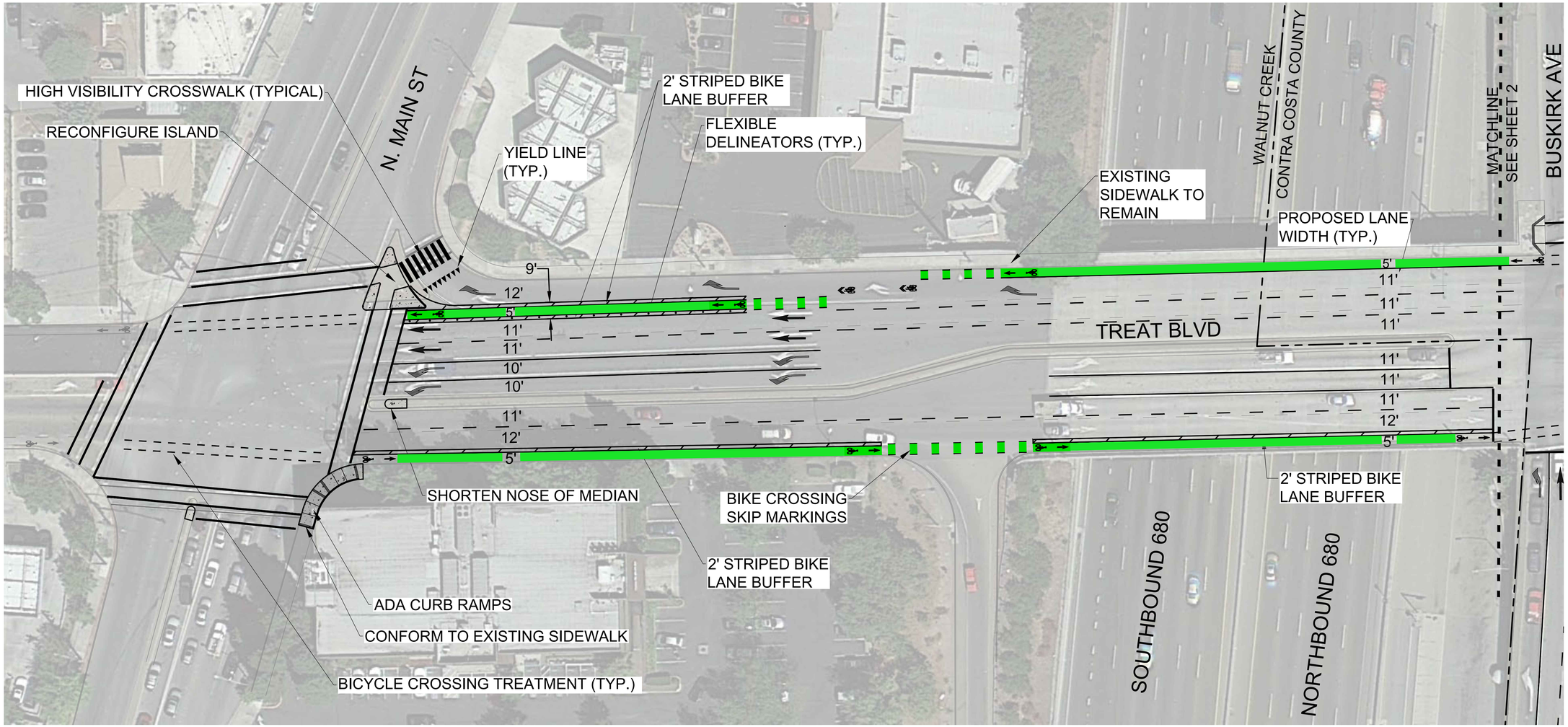




Alternative A	Alternative B	Alternative C	Alternative D and Alternative E	
1 L, 1 T, 1 T/R, 1 R	1 L, 2 T, 1 R	1 L, 1 T, 1 T/R, 1 R	1 L, 2 T, 2 R (Con. D)	1 L, 1 T/R, 2 R (Con. E)

Lane Configurations: L = Left, T = Through, R = Right

Concept 4A/Alternative 4C (Preferred Project)



0 15' 30' 60' 90'

DESIGNED:	LD	TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN PROJECT NUMBER C49472 Concept 4A	SHEET 1 OF 3
DRAWN:	JP		
REVIEWED:	BH		
PROJECT NO.:	2016-355		
		SCALE: AS SHOWN	DATE: JULY, 2017

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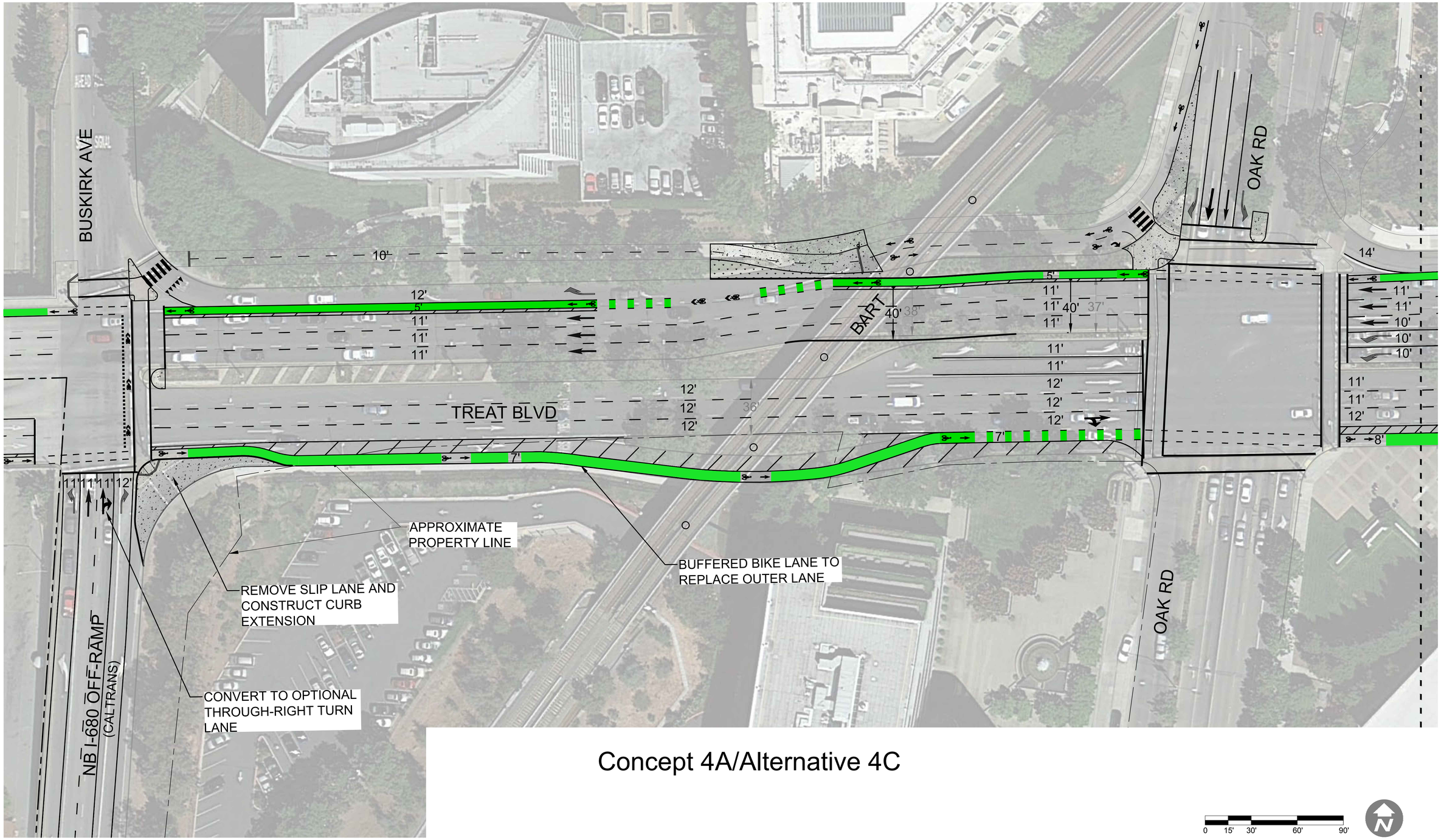

Concept 4A/Alternative 4C

0 15' 30' 60' 90'

DESIGNED: LD	TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN PROJECT NUMBER C49472 Concept 4A/Alternative 4C		SHEET 2B
DRAWN: JP			
REVIEWED: BH			
PROJECT NO.: 2016-355			
	SCALE: AS SHOWN	DATE: JULY, 2017	

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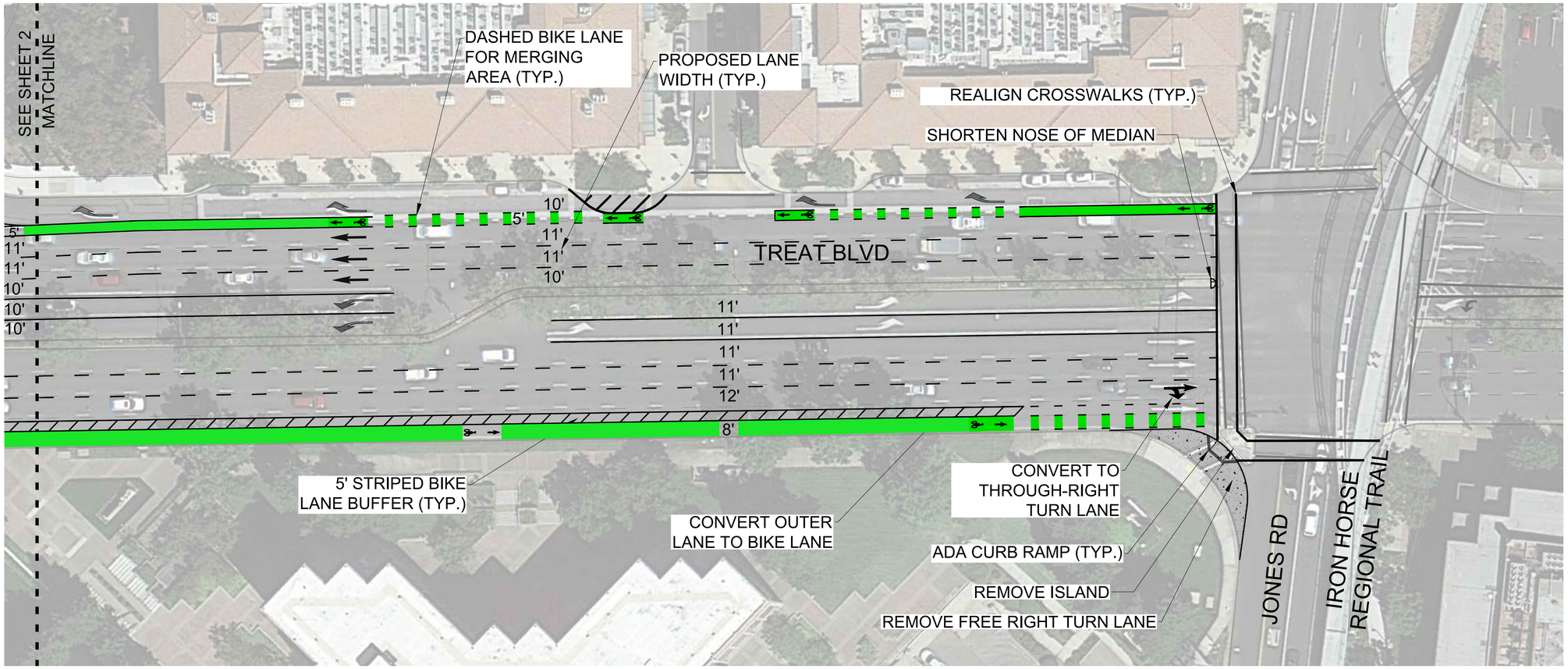

0 15' 30' 60' 90'

N

DESIGNED:	LD
DRAWN:	JP
REVIEWED:	BH
PROJECT NO.:	2016-355

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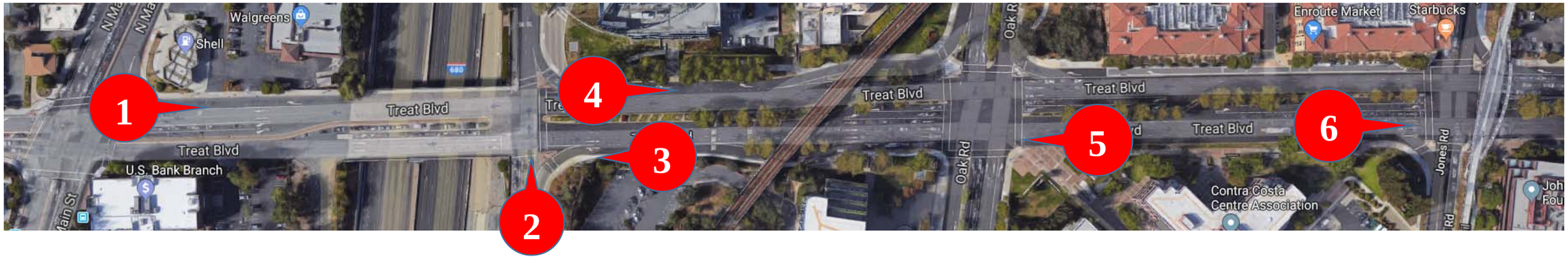
TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN
PROJECT NUMBER C49472
Concept 4A

SHEET 3 OF 3

SCALE: AS SHOWN

DATE: JULY, 2017

Design Renderings (Preferred Project)



1. Treat Boulevard/North Main Street Intersection (view looking east)
2. Treat Boulevard/Buskirk Ave Intersection (view looking north)
3. Treat Boulevard/Buskirk Avenue Intersection (view looking west)
4. Treat Boulevard (view looking east toward Oak Road Intersection)
5. Treat Boulevard/Oak Road Intersection (view looking west)
6. Treat Boulevard/Jones Road Intersection (view looking east)

Treat Boulevard/North Main Street Intersection (view looking east) 1	Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

Treat Boulevard/North Main Street Intersection (view looking east) 1	Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

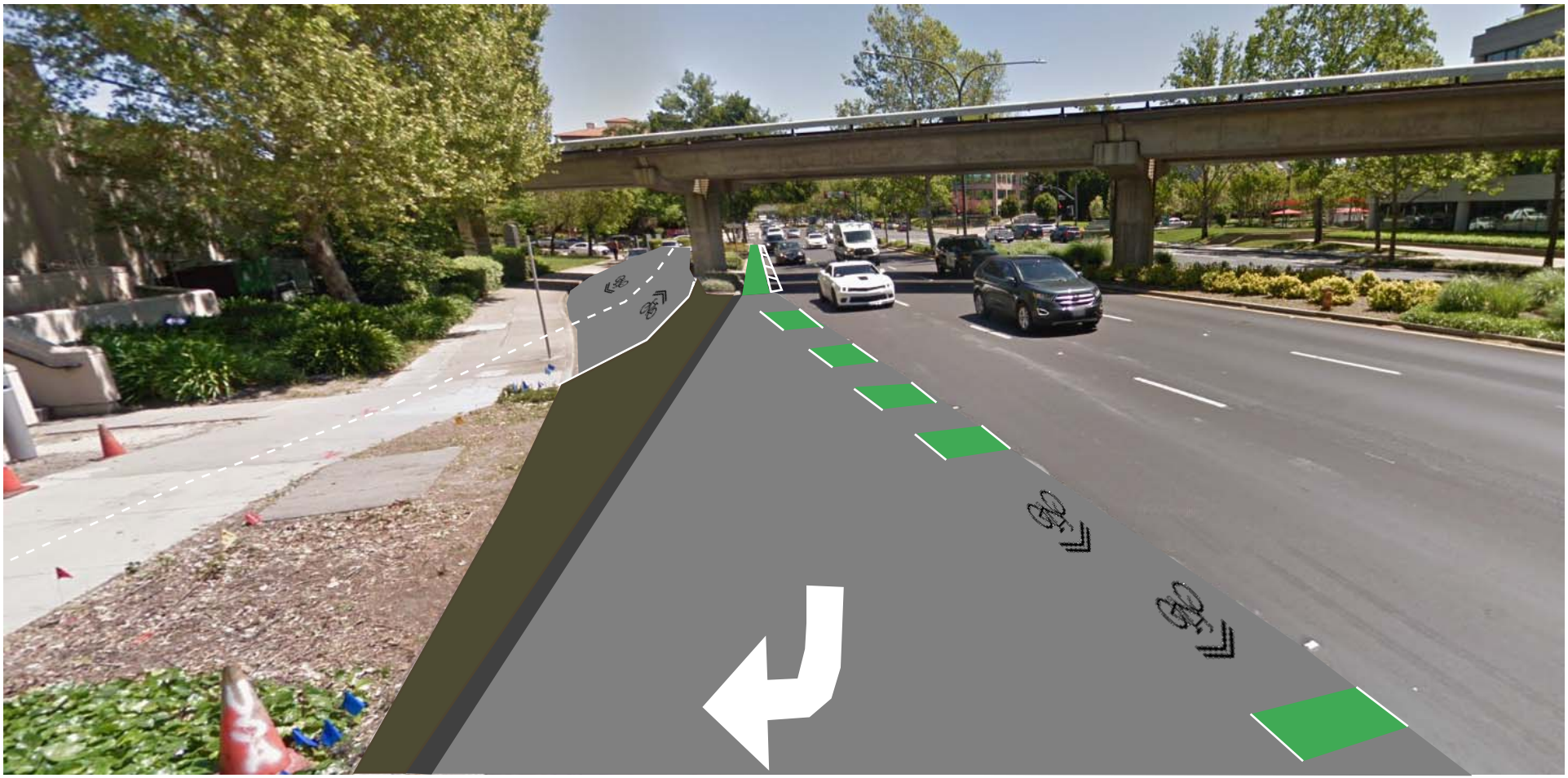
Treat Boulevard/Buskirk Ave Intersection (view looking north) 2	Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

Treat Boulevard/Buskirk Ave Intersection (view looking north) 2	Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

Treat Boulevard/Buskirk Avenue Intersection (view looking west) 3	Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

Treat Boulevard/Buskirk Avenue Intersection (view looking west) 3	Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

Treat Boulevard (view looking east toward Oak Road Intersection) 4	Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan



Treat Boulevard (view looking east toward Oak Road Intersection) 4	Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

Treat Boulevard/Oak Road Intersection (view looking west) 5	Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

Treat Boulevard/Oak Road Intersection (view looking west) 5	Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

Treat Boulevard/Jones Road Intersection (view looking east) 6	Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

Treat Boulevard/Jones Road Intersection (view looking east) 6	Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

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Appendix F: Concept 4A/Alternative C Cost Estimate

NO.	Description	Quantity	Unit	Unit Cost	Cost
1	Mobilization & Demobilization	1	LS	$143,000	$143,000
2	Traffic Control	1	LS	$85,000	$85,000
3	Water Pollution Control	1	LS	$21,000	$21,000
4	Remove Concrete	11900	SF	$10	$119,000
5	Remove Curb	1600	LF	$20	$32,000
6	Remove Asphalt Concrete	23200	SF	$6	$139,200
7	Remove Striping	1	LS	$28,000	$28,000
8	Miscellaneous Demo	1	LS	$15,000	$15,000
9	Adjust Utilities to Grade	45	LS	$800	$36,000
10	Steel Railing Fence	900	LF	$90	$81,000
11	Drainage Inlet and Pipe Connection	8	EA	$8,000	$64,000
12	Asphalt Concrete Pavement	5750	SF	$12	$69,000
13	Concrete (Sidewalk, Median, Curb Ramp)	22400	SF	$15	$336,000
14	Concrete Curb	1000	LF	$25	$25,000
15	Curb and Gutter	1870	LF	$55	$102,850
16	Retaining Wall	330	SF	$90	$29,700
17	Landscape and Irrigation	1	LS	$10,000	$10,000
18	Green Pavement Marking	10760	SF	$15	$161,400
19	Signage and Striping	1	LS	$90,000	$90,000
20	Signal Improvements	1	LS	$170,000	$170,000
				Sub Total	**$1,757,150**
				Contingency (25%)	$439,288
				Design & Env. (15%)	$263,573
				TOTAL *(In 2017 $)*	**$2,460,010**

ABBR.	Unit
LF	Linear Foot
LS	Lump Sum
SF	Square Foot

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DATE: March 6, 2017

TO: Brett Hondorp, AICP, Alta

FROM: David Mahama, PE, DKS

CC: Tal Stainer, DKS

SUBJECT: Contra Costa County I-680 / Treat Blvd Bicycle and Pedestrian Plan – Feasibility Study and Evaluation Traffic Analysis of Revised Concept 4 #14070-001

Introduction

With the goal of providing more livable communities, Contra Costa County Department of Conservation and Development has decided to complete the I-680/Treat Boulevard Bicycle and Pedestrian Plan. To finish the bicycle and pedestrian transportation network, Contra Costa County has targeted Treat Boulevard between Main Street and Jones Road to provide safe and convenient access from the Iron Horse Trail to businesses and restaurants on Main Street, focusing especially on the I-680 interchange. The Transportation for Livable Communities (TLC) program is the funding source for this project, which is managed by the Contra Costa Transportation Authority (CCTA).

This project includes the following intersections:

- Treat Boulevard/Geary Road and Main Street
- Treat Boulevard and Buskirk Avenue/I-680 northbound ramps
- Treat Boulevard and Oak Road
- Treat Boulevard and Jones Road/Iron Horse Trail

The field observations on this corridor indicate that there are high vehicle turning volumes that conflict with pedestrians, high weaving volumes that create a challenging environment for cyclists, and that the current infrastructure could be improved to better serve pedestrians and cyclists.

The performance of the four study intersections was evaluated for AM and PM peak periods for the current year (2014) traffic conditions and future year (2040) traffic conditions. Four initial study concept (Concept 1B, Concept 2, Concept 3, and Concept 4) geometric improvements as well as traffic signal timing improvements were evaluated to determine the performance of the network. Once the initial alternatives were evaluated by the stakeholders, a final concept (Revised Concept 4) was developed.

This report presents a traffic impact evaluation for the Revised Concept 4 pedestrian and bicycle related improvements to the transportation environment along Treat Boulevard. This final design is a modified version of Concept 4 and can be found in Appendix A. This revision includes the elimination of the free southbound right turn lane at the Treat

Boulevard/Oak Road intersection, which is expected to eliminate traffic weaving along the segment of Treat Boulevard between Oak Road and Buskirk Avenue in the westbound direction.

Current Year Analysis (2014)

For the current year (2014 volumes), overall network performance is not largely impacted as compared to the existing condition for the revised concept. Individual intersection level of service (LOS) was analyzed to assess the potential impacts of the revised concept. A queuing analysis was also included for traffic movements of concern and Table 1 presents the results of the analysis. As shown in Table 1, intersection delay is high in general under existing conditions. LOS generally remains the same, except at Oak Road, which deteriorates. The biggest impact occurs at the Treat Boulevard/Oak Road intersection in the P.M. This is due to the reconfiguration of the southbound movement – the free right is removed as well as one of the through lanes.

The queuing analysis shows little to no impact at the Treat Boulevard/Main Street intersection. At the Treat Boulevard/Oak Road intersection, southbound through queues are expected to increase in the A.M. and in the P.M. This is due to the reconfiguration of the southbound approach. It should be noted that the southbound right turning vehicles are expected to experience shorter queue lengths. This is due to the additional right turn lane. Furthermore, queuing is expected to increase for the westbound right turn at the Treat Boulevard/I-680 ramps/Buskirk Avenue intersection during the P.M. peak hour.

For the proposed alternatives the signal timing parameters were optimized to benefit the overall performance of the Treat Boulevard corridor in the westbound and eastbound directions. Optimization of the corridor is expected to result in improved performance of the Treat Boulevard/Jones Road intersection but decreased efficiency of the Treat Boulevard/Oak Road intersection.

Lastly, an alternate variation of the Revised Concept 4 was assessed. The variation includes the removal of one eastbound lane between the Treat Boulevard/I-680 ramps/Buskirk Avenue and Treat Boulevard/Oak Road intersections and modifying the two intersections described as follows: 1) Eliminate the northbound free right-turn at the Treat Boulevard/I-680 ramps/Buskirk Avenue intersection. 2) Remove the eastbound right turn lane at the Treat Boulevard/Oak Road intersection, which will result in converting the curbside through lane to a shared through-right lane. The traffic analysis results of this alternative are shown in Table 1. Because the Treat Boulevard/I-680 ramps/Buskirk Avenue intersection is expected to operate unacceptably in the A.M., the alternative was excluded from future considerations. Furthermore, the expected queues for the northbound right turning vehicles was shown to extend back on the ramp all the way to NB I-680 in the A.M. and extend almost all the way to the freeway in the P.M.

Table 1: Intersection LOS Comparison for Current Year (2014)

Intersection	*Peak Hour*	*Existing*				*Revised Concept 4*				*Revised Concept 4 - Alternative*			
		Control Delay (s)	*LOS*	*Movmt. of Interest*	*Queue Length (ft)*	*Control Delay (s)*	*LOS*	*Movmt. of Interest*	*Queue Length (ft)*	*Control Delay (s)*	*LOS*	*Movmt. of Interest*	*Queue Length (ft)*
Treat Boulevard and Main Street*	A.M.	55.7	E	WBLT	356	53.1	D	WBLT	378	Not Applicable			
				WBRT	0			WBRT	0				
	P.M.	42.9	D	WBLT	174	42.9	D	WBLT	160				
				WBRT	890			WBRT	0				
Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue	A.M.	30.3	C	WBRT	126	34.7	C	WBRT	130	112.9	F	WBRT	640
				NBRT	0			NBRT	0			NBRT	1446
	P.M.	17.5	B	WBRT	169	19.5	B	WBRT	638	62.1	E	WBRT	638
				NBRT	0			NBRT	0			NBRT	1308
Treat Boulevard and Oak Road	A.M.	46.8	D	SBRT	140	49.2	D	SBRT	68	49.7	D	SBRT	69
				SBTH	295			SBTH	681			SBTH	731
	P.M.	19.3	B	SBRT	382	36.8	D	SBRT	161	41.6	D	SBRT	163
				SBTH	127			SBTH	323			SBTH	323
Treat Boulevard and Jones Road*	A.M.	37.6	D	No movement of interest		32.8	C	No movement of interest		Not Applicable			
	P.M.	49.8	D			48.3	D						

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.
Queue Length = 95th Percentile Queue Length

Future Year Analysis (2040)

Individual intersection delay and LOS were analyzed to assess the potential impacts of the revised concept for the future year (2040). A queuing analysis was also completed for movements of concern. Table 2, on the next page, presents the findings for this analysis. As shown, intersection delay is high in general for the future year.

In general, the removal of the free right turn (revised concept 4) has a negative impact on delay and queuing at Oak Road during the morning and evening peak periods. Since the improvement involves the removal of the SB free right turn as well as a removal of one of the through lanes, SB through movements are subject to much queueing, especially in the A.M.

For the future year alternatives, the signal timings were optimized to benefit the overall performance of the Treat Boulevard corridor in the westbound and eastbound directions. This optimization results in higher delays for side street and left turn movements, as indicated by the high delay at Treat Boulevard/Jones Road during the p.m. peak hour. Although performance degrades slightly with the free right turn removal at Oak Road, the high weaving volumes observed between Oak Road and the I-680 ramps are mitigated. Removing the inefficient and unsafe weaving behavior on this segment reduces the potential negative impact of the improvements at the corridor level.

Table 2: Intersection LOS Comparison for Future Year (2040)

Intersection	*Peak Hour*	*Revised Concept 4*			
		Control Delay (s)	*LOS*	*Movmt. of Interest*	*Queue Length (ft)*
Treat Boulevard and Main Street*	A.M.	60.1	E	WBLT	410
				WBRT	0
	P.M.	60.0	E	WBLT	410
				WBRT	0
Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue	A.M.	36.5	D	WBRT	131
				NBRT	0
	P.M.	26.1	C	WBRT	193
				NBRT	0
Treat Boulevard and Oak Road	A.M.	53.8	D	SBRT	82
				SBTH	706
	P.M.	42.7	D	SBRT	189
				SBTH	557
Treat Boulevard and Jones Road*	A.M.	59.7	E	No movement of interest	
	P.M.	143.9	F		

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.
Queue Length = 95th Percentile Queue Length

Conclusion

Implementation of Revised Concept 4 is expected to result in some increased delay and queuing for motorists at specific intersections on Treat Boulevard. The alternative concept has been shown to be ineffective as it leads to unacceptable LOS levels even with 2014 volume levels. Therefore, these were not considered in future analysis. The reconfiguration of the southbound approach at the Treat Boulevard/Oak Road intersection is expected to result in increased delay and queuing. This is to be expected as one of the southbound through lanes is removed, the free southbound right turn is removed and replaced with two southbound right turn lanes. As a result, the southbound through queue is expected to increase and vehicles in this movement experience higher delays. It should be noted that the removal of free right-turn is expected to achieve the goal of eliminating the potentially dangerous weaving along Treat Boulevard between Oak Road and Buskirk. Furthermore, the queues for the southbound right turning vehicles are expected to decrease. When compared to the benefits for other transportation modes, the increased delay for motorists is relatively small.

STUDY PARTICIPANTS

Client

Jamar Stamps	Planner, Contra Costa County Department of Conservation and Development

Technical Advisory Committee

Jeremy Lochiro	City of Walnut Creek
Angela Villar	Engineer, Contra Costa County Public Works
Coire Reilly	Contra Costa County Health Services Department
Anh Phan Nguyen	Caltrans
Denise Seib	Contra Costa Centre Association
Laura Case	Contra Costa County Board of Supervisors Office
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Alta Planning + Design

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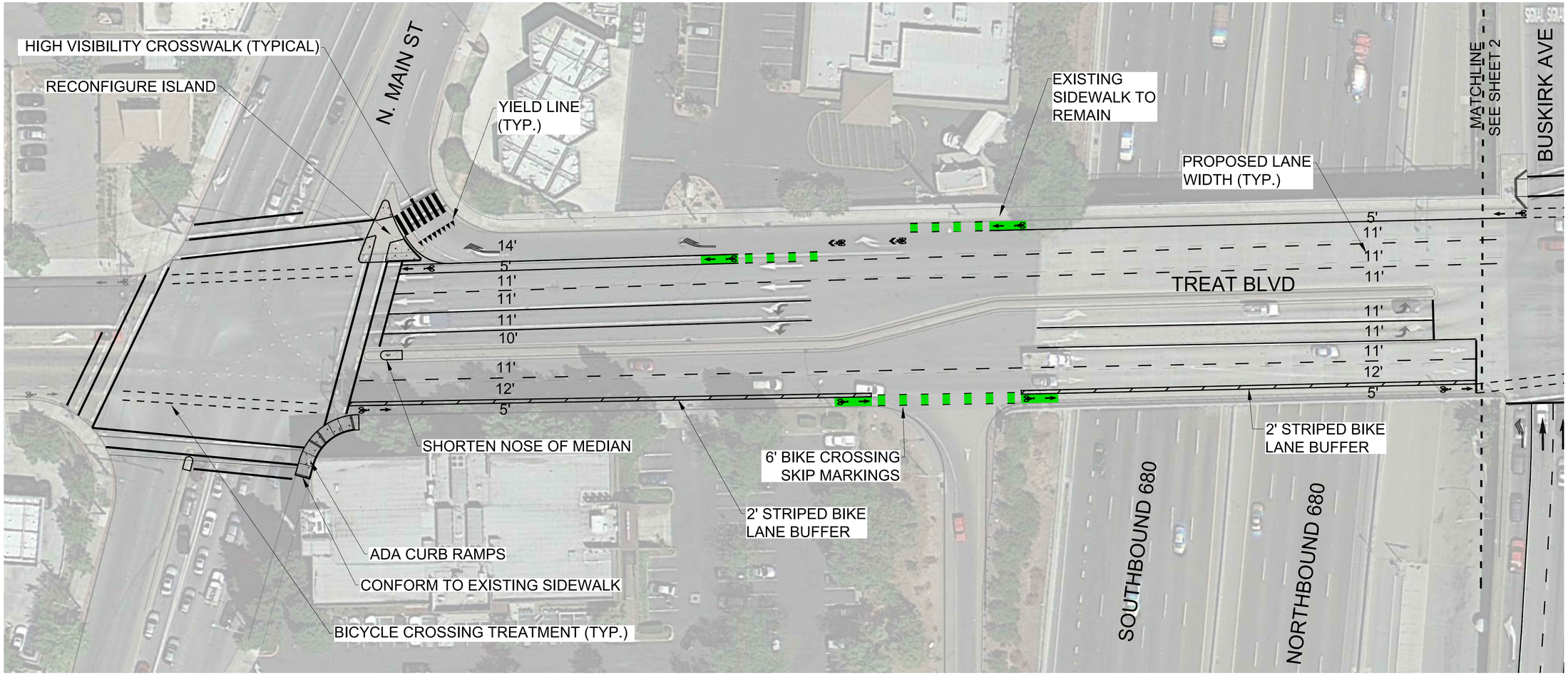
David Mahama, P.E.	Project Manager
Tal Sztainer, E.I.T	Associate Transportation Engineer

Others

IDAX	Data Collection
Quality Counts, LLC	Data Collection

Appendix A – Revised Concept 4 Plans



0 15' 30' 60' 90'

DESIGNED:	LD	TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN PROJECT NUMBER C49472 Concept 4 - PHASE 1	SHEET 1 OF 3
DRAWN:	JP		
REVIEWED:	BH		
PROJECT NO.:	2016-355		
		SCALE: AS SHOWN	DATE: JANUARY, 2017

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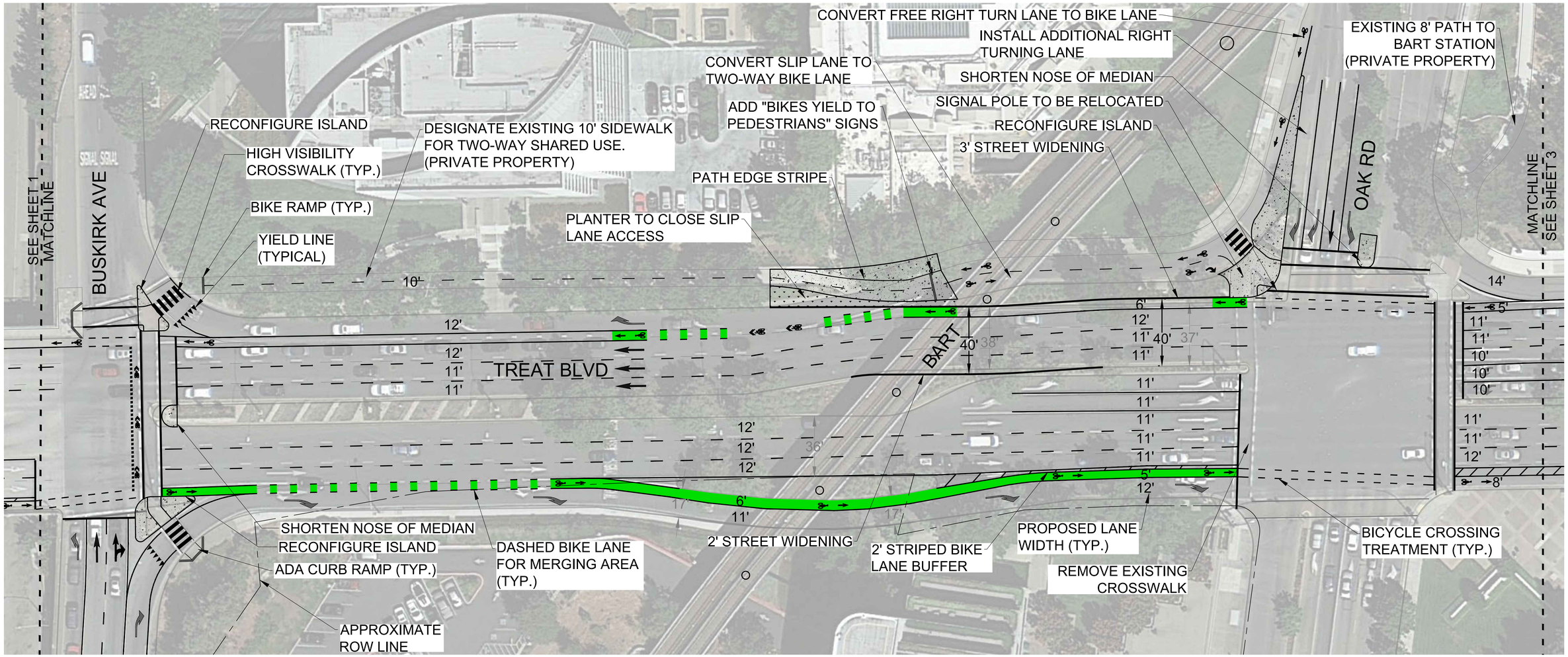

ALTERNATIVE CONCEPT

0 15' 30' 60' 90'

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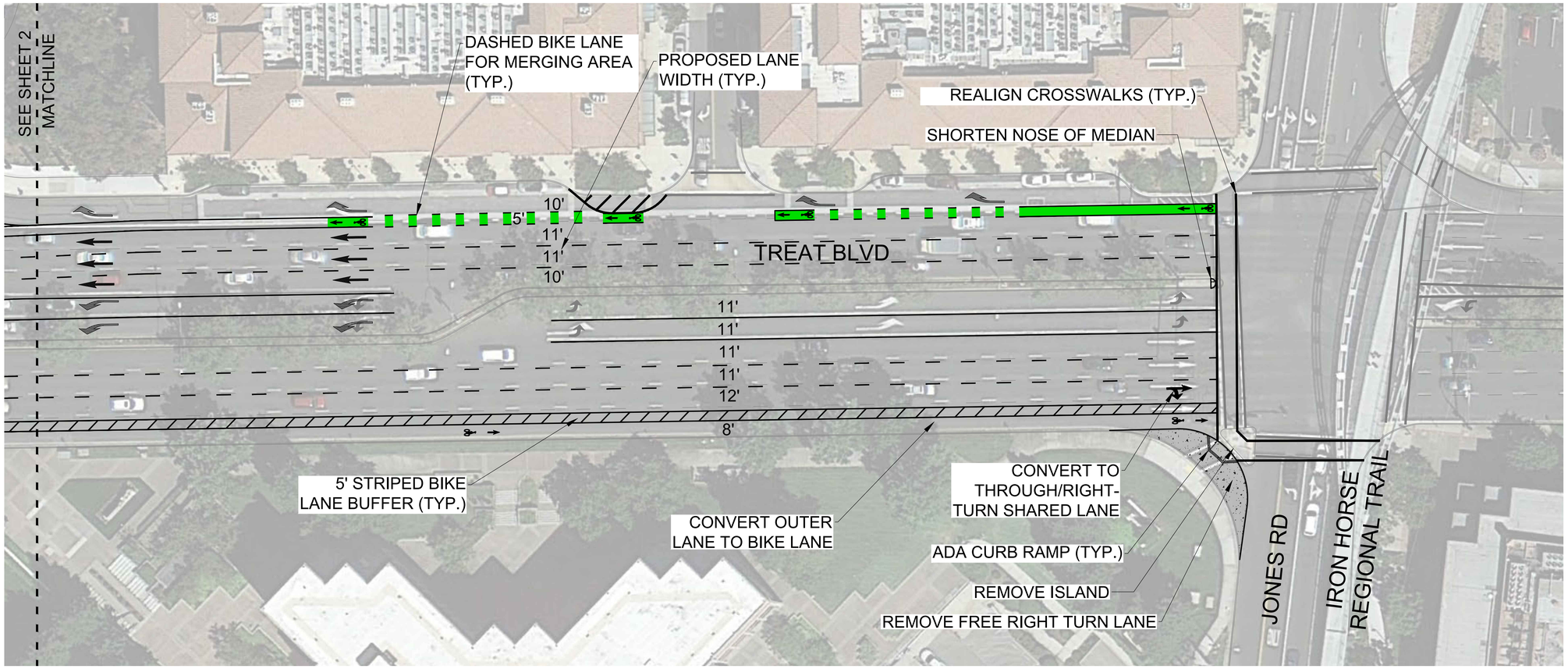
REVIEWED:	BH
PROJECT NO.:	2016-355

TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN
PROJECT NUMBER C49472
Concept 4 - PHASE 1

SHEET 2 OF 3

SCALE: AS SHOWN | DATE: JANUARY, 2017



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REVIEWED:	BH
PROJECT NO.:	2016-355

TREAT BOULEVARD BICYCLE AND PEDESTRIAN PLAN
PROJECT NUMBER C49472
Concept 4 - PHASE 1

SHEET 3 OF 3

SCALE: AS SHOWN

DATE: JANUARY, 2017

Appendix B – Current Year Synchro Reports

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

7/30/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	646	149	514	290	792	56	103	328	532	885	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	12	16	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3332		3236	3505	1776	1736	3539	1729	3286	3421	1494
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3332		3236	3505	1776	1736	3539	1729	3286	3421	1494
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	34	818	189	535	302	825	59	108	345	585	973	142
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	243	0	0	71
Lane Group Flow (vph)	34	993	0	535	302	825	59	108	102	585	973	71
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	5.3	41.7		24.9	61.3	140.0	6.4	27.6	27.6	23.8	49.0	49.0
Effective Green, g (s)	5.3	41.7		24.9	61.3	140.0	6.4	27.6	27.6	23.8	49.0	49.0
Actuated g/C Ratio	0.04	0.30		0.18	0.44	1.00	0.05	0.20	0.20	0.17	0.35	0.35
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	63	992		575	1534	1776	79	697	340	558	1197	522
v/s Ratio Prot	0.02	c0.30		c0.17	0.09		0.03	0.03		c0.18	c0.28	
v/s Ratio Perm						0.46			0.06			0.05
v/c Ratio	0.54	1.00		0.93	0.20	0.46	0.75	0.15	0.30	1.05	0.81	0.14
Uniform Delay, d1	66.2	49.1		56.7	24.2	0.0	66.0	46.5	47.9	58.1	41.3	31.1
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	4.4	28.8		22.1	0.2	0.9	31.4	0.5	2.2	51.4	6.1	0.5
Delay (s)	70.5	78.0		78.8	24.4	0.9	97.4	47.0	50.2	109.5	47.4	31.6
Level of Service	E	E		E	C	A	F	D	D	F	D	C
Approach Delay (s)		77.7			30.2			55.0			67.5	
Approach LOS		E			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	55.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	975	0	0	1402	516	143	474	913	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	1845	1918	0	0	1881	1918	1759	1881	1937			
Adj Flow Rate, veh/h	452	1134	0	0	1508	0	164	545	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	503	2798	0	0	3049	968	287	613	282			
Arrive On Green	0.15	0.77	0.00	0.00	0.59	0.00	0.17	0.17	0.00			
Sat Flow, veh/h	3408	3741	0	0	5305	1631	1675	3574	1647			
Grp Volume(v), veh/h	452	1134	0	0	1508	0	164	545	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1712	1631	1675	1787	1647			
Q Serve(g_s), s	19.7	15.9	0.0	0.0	25.5	0.0	13.6	22.5	0.0			
Cycle Q Clear(g_c), s	19.7	15.9	0.0	0.0	25.5	0.0	13.6	22.5	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	503	2798	0	0	3049	968	287	613	282			
V/C Ratio(X)	0.90	0.41	0.00	0.00	0.49	0.00	0.57	0.89	0.00			
Avail Cap(c_a), veh/h	654	2798	0	0	3049	968	386	823	379			
HCM Platoon Ratio	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	0.00	0.00	0.64	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	63.3	5.9	0.0	0.0	17.7	0.0	57.5	61.2	0.0			
Incr Delay (d2), s/veh	11.1	0.4	0.0	0.0	0.4	0.0	0.7	7.7	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			
%ile BackOfQ(50%),veh/ln	10.1	8.0	0.0	0.0	12.1	0.0	6.3	11.8	0.0			
LnGrp Delay(d),s/veh	74.4	6.4	0.0	0.0	18.0	0.0	58.2	68.9	0.0			
LnGrp LOS	E	A			B		E	E				
Approach Vol, veh/h		1586			1508			709				
Approach Delay, s/veh		25.7			18.0			66.4				
Approach LOS		C			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		121.0			26.3	94.7		30.1
Change Period (Y+Rc), s		5.0			4.0	5.0		4.2
Max Green Setting (Gmax), s		116.0			29.0	83.0		34.8
Max Q Clear Time (g_c+I1), s		17.9			21.7	27.5		24.5
Green Ext Time (p_c), s		91.6			0.6	53.3		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	1446	269	430	1500	46	211	251	31	108	433	207
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		1.00	1.00		0.88	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	1866	1900	1900	1881	1900	1881	1881	1792	1827	1863	1918
Adj Flow Rate, veh/h	197	1643	306	489	1705	0	245	292	36	127	509	0
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	3
Cap, veh/h	244	2133	397	542	2437	766	294	867	327	148	861	397
Arrive On Green	0.07	0.39	0.39	0.15	0.47	0.00	0.08	0.24	0.24	0.09	0.24	0.00
Sat Flow, veh/h	3442	5456	1016	3510	5136	1615	3476	3574	1348	1740	3539	1631
Grp Volume(v), veh/h	197	1449	500	489	1705	0	245	292	36	127	509	0
Grp Sat Flow(s),veh/h/ln	1721	1604	1659	1755	1712	1615	1738	1787	1348	1740	1770	1631
Q Serve(g_s), s	8.4	39.3	39.3	20.5	39.1	0.0	10.4	10.1	3.1	10.8	19.0	0.0
Cycle Q Clear(g_c), s	8.4	39.3	39.3	20.5	39.1	0.0	10.4	10.1	3.1	10.8	19.0	0.0
Prop In Lane	1.00		0.61	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	244	1882	649	542	2437	766	294	867	327	148	861	397
V/C Ratio(X)	0.81	0.77	0.77	0.90	0.70	0.00	0.83	0.34	0.11	0.86	0.59	0.00
Avail Cap(c_a), veh/h	299	1882	649	680	2437	766	441	955	360	198	899	414
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)	0.84	0.84	0.84	0.56	0.56	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	68.5	39.7	39.7	62.2	30.9	0.0	67.5	46.8	44.1	67.5	50.0	0.0
Incr Delay (d2), s/veh	10.9	2.6	7.3	7.1	1.0	0.0	5.2	0.1	0.1	19.0	2.4	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	4.4	17.9	19.4	10.5	18.7	0.0	5.2	5.0	1.2	6.0	9.6	0.0
LnGrp Delay(d),s/veh	79.4	42.4	47.0	69.3	31.9	0.0	72.7	46.8	44.2	86.5	52.5	0.0
LnGrp LOS	E	D	D	E	C		E	D	D	F	D	
Approach Vol, veh/h		2146			2194			573			636	
Approach Delay, s/veh		46.8			40.2			57.7			59.3	
Approach LOS		D			D			E			E	

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	27.1	74.9	16.6	41.4	14.6	87.4	16.8	41.3
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	29.0	55.0	19.0	38.0	13.0	71.0	17.0	40.0
Max Q Clear Time (g_c+I1), s	22.5	41.3	12.4	21.0	10.4	41.1	12.8	12.1
Green Ext Time (p_c), s	0.6	13.7	0.3	7.5	0.2	29.8	0.1	9.7

Intersection Summary	
HCM 2010 Ctrl Delay	46.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	1380	141	240	1985	593	44	43	106	234	78	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.99		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6278		1745	5136	1544	1745	1638		1641	1693	1450
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6278		1745	5136	1544	1745	1638		1641	1693	1450
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	77	1663	170	286	2363	706	53	52	128	279	93	45
RTOR Reduction (vph)	0	8	0	0	0	135	0	64	0	0	0	39
Lane Group Flow (vph)	77	1825	0	286	2363	571	53	116	0	184	188	6
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	8.3	67.1		34.8	93.6	93.6	15.6	15.6		22.5	22.5	22.5
Effective Green, g (s)	8.3	67.1		34.8	93.6	93.6	15.6	15.6		22.5	22.5	22.5
Actuated g/C Ratio	0.05	0.42		0.22	0.58	0.58	0.10	0.10		0.14	0.14	0.14
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	167	2632		379	3004	903	170	159		230	238	203
v/s Ratio Prot	0.02	0.29		c0.16	c0.46		0.03	c0.07		c0.11	0.11	
v/s Ratio Perm						0.37						0.00
v/c Ratio	0.46	0.69		0.75	0.79	0.63	0.31	0.73		0.80	0.79	0.03
Uniform Delay, d1	73.7	38.0		58.6	25.5	21.9	67.2	70.1		66.6	66.5	59.3
Progression Factor	0.89	0.88		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	1.0		7.4	2.2	3.4	0.4	13.2		16.9	14.8	0.0
Delay (s)	66.1	34.5		66.0	27.7	25.2	67.6	83.3		83.4	81.2	59.4
Level of Service	E	C		E	C	C	E	F		F	F	E
Approach Delay (s)		35.8			30.4			79.8			79.8	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	34	1007	535	302	825	59	108	345	585	973	142
v/c Ratio	0.39	1.04	0.93	0.20	0.46	0.62	0.14	0.57	1.09	0.77	0.23
Control Delay	76.0	87.0	80.4	25.7	0.9	91.7	45.2	11.9	100.4	45.0	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.0	87.0	80.4	25.7	0.9	91.7	45.2	11.9	100.4	45.0	10.1
Queue Length 50th (ft)	31	~514	250	92	0	53	42	31	~208	422	20
Queue Length 95th (ft)	59	#512	#356	131	0	#116	70	127	#295	510	69
Internal Link Dist (ft)		1359		306			1086			1080	
Turn Bay Length (ft)	68		243			225		102	196		90
Base Capacity (vph)	179	968	577	1535	1776	99	758	608	539	1256	617
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	1.04	0.93	0.20	0.46	0.60	0.14	0.57	1.09	0.77	0.23

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	452	1134	1508	555	164	545	1049
v/c Ratio	0.85	0.40	0.51	0.61	0.56	0.84	0.65
Control Delay	81.0	7.4	10.4	11.5	66.6	75.3	2.0
Queue Delay	0.0	0.5	0.1	0.3	0.0	0.0	0.0
Total Delay	81.0	7.9	10.5	11.8	66.6	75.3	2.0
Queue Length 50th (ft)	239	195	111	95	158	292	0
Queue Length 95th (ft)	281	246	130	126	222	334	0
Internal Link Dist (ft)		258	655			1047	
Turn Bay Length (ft)	220				267		437
Base Capacity (vph)	616	2845	2976	910	351	777	1616
Starvation Cap Reductn	0	1132	424	68	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.66	0.59	0.66	0.47	0.70	0.65

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	197	1949	489	1705	52	245	292	36	127	509	244
v/c Ratio	0.72	0.82	0.88	0.74	0.07	0.74	0.34	0.09	0.80	0.60	0.46
Control Delay	89.3	44.0	88.0	13.1	0.5	84.1	51.2	0.5	104.3	57.6	20.6
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.3	44.0	88.0	13.3	0.5	84.1	51.2	0.5	104.3	57.6	20.6
Queue Length 50th (ft)	93	531	225	506	3	130	135	0	131	252	70
Queue Length 95th (ft)	140	586	287	62	m0	168	170	0	#203	295	140
Internal Link Dist (ft)		655		700			1075			548	
Turn Bay Length (ft)	164		235			264		202			125
Base Capacity (vph)	285	2389	613	2303	756	397	893	410	178	845	526
Starvation Cap Reductn	0	0	0	94	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.82	0.80	0.77	0.07	0.62	0.33	0.09	0.71	0.60	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	77	1833	286	2363	706	53	180	184	188	45
v/c Ratio	0.46	0.69	0.75	0.79	0.68	0.31	0.81	0.80	0.79	0.15
Control Delay	71.1	36.1	71.8	29.9	17.3	69.7	67.7	90.0	88.3	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.1	36.1	71.8	29.9	17.3	69.7	67.7	90.0	88.3	1.1
Queue Length 50th (ft)	43	233	284	670	268	53	115	198	203	0
Queue Length 95th (ft)	m55	345	352	847	459	87	172	257	261	0
Internal Link Dist (ft)		700		1282			449		751	
Turn Bay Length (ft)	341		175			295		228		
Base Capacity (vph)	178	2640	379	3005	1038	381	413	369	380	410
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.69	0.75	0.79	0.68	0.14	0.44	0.50	0.49	0.11

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

7/30/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	481	89	234	370	944	153	429	465	684	330	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	12	16	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	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	1.00
Frt	1.00	0.98		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3335		3204	3574	1787	1805	3610	1761	3351	3490	1505
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3335		3204	3574	1787	1805	3610	1761	3351	3490	1505
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	79	512	95	275	435	1111	176	493	534	735	355	243
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	244	0	0	130
Lane Group Flow (vph)	79	596	0	275	435	1111	176	493	290	735	355	113
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	10.7	33.1		18.2	40.6	140.0	18.6	27.9	27.9	38.8	52.1	52.1
Effective Green, g (s)	10.7	33.1		18.2	40.6	140.0	18.6	27.9	27.9	38.8	52.1	52.1
Actuated g/C Ratio	0.08	0.24		0.13	0.29	1.00	0.13	0.20	0.20	0.28	0.37	0.37
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	133	788		416	1036	1787	239	719	350	928	1298	560
v/s Ratio Prot	0.05	c0.18		0.09	0.12		0.10	0.14		c0.22	0.10	
v/s Ratio Perm						c0.62			c0.16			0.08
v/c Ratio	0.59	0.76		0.66	0.42	0.62	0.74	0.69	0.83	0.79	0.27	0.20
Uniform Delay, d1	62.5	49.7		58.0	40.2	0.0	58.3	52.0	53.7	46.9	30.7	29.8
Progression Factor	1.00	1.00		1.38	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	5.5		3.9	0.7	1.5	11.2	5.3	19.7	4.7	0.5	0.8
Delay (s)	67.2	55.1		83.7	38.9	1.5	69.5	57.2	73.5	51.5	31.2	30.6
Level of Service	E	E		F	D	A	E	E	E	D	C	C
Approach Delay (s)		56.5			22.8			66.2			42.3	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	42.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	508	1045	0	0	1414	632	160	274	854	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	1845	1956	0	0	1881	1956	1881	1881	1956			
Adj Flow Rate, veh/h	540	1112	0	0	1488	0	167	285	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	594	2998	0	0	3074	995	208	416	193			
Arrive On Green	0.17	0.81	0.00	0.00	1.00	0.00	0.12	0.12	0.00			
Sat Flow, veh/h	3408	3815	0	0	5305	1663	1792	3574	1663			
Grp Volume(v), veh/h	540	1112	0	0	1488	0	167	285	0			
Grp Sat Flow(s),veh/h/ln	1704	1859	0	0	1712	1663	1792	1787	1663			
Q Serve(g_s), s	18.5	9.8	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Cycle Q Clear(g_c), s	18.5	9.8	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	594	2998	0	0	3074	995	208	416	193			
V/C Ratio(X)	0.91	0.37	0.00	0.00	0.48	0.00	0.80	0.69	0.00			
Avail Cap(c_a), veh/h	630	2998	0	0	3074	995	524	1045	486			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.58	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	48.2	3.2	0.0	0.0	0.0	0.0	51.3	50.5	0.0			
Incr Delay (d2), s/veh	16.1	0.4	0.0	0.0	0.3	0.0	2.7	0.8	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			
%ile BackOfQ(50%),veh/ln	10.0	5.1	0.0	0.0	0.1	0.0	5.5	4.6	0.0			
LnGrp Delay(d),s/veh	64.3	3.5	0.0	0.0	0.3	0.0	54.0	51.3	0.0			
LnGrp LOS	E	A			A		D	D				
Approach Vol, veh/h		1652			1488			452				
Approach Delay, s/veh		23.4			0.3			52.3				
Approach LOS		C			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		122.0			24.7	97.2		18.0
Change Period (Y+Rc), s		5.0			4.0	5.0		4.2
Max Green Setting (Gmax), s		96.0			22.0	70.0		34.8
Max Q Clear Time (g_c+I1), s		11.8			20.5	2.0		12.8
Green Ext Time (p_c), s		78.8			0.2	64.4		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	17.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	1620	134	152	1394	70	239	425	163	120	226	413
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		1.00	1.00		0.93	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	1883	1900	1881	1881	1976	1900	1863	1881	1845	1827	1937
Adj Flow Rate, veh/h	161	1800	149	157	1437	0	260	462	177	138	260	0
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	0	0	2	1	3	4	2
Cap, veh/h	217	2622	217	213	2189	716	326	887	374	166	876	416
Arrive On Green	0.13	0.86	0.86	0.12	0.85	0.00	0.09	0.25	0.25	0.09	0.25	0.00
Sat Flow, veh/h	3442	6125	507	3476	5136	1680	3510	3539	1491	1757	3471	1647
Grp Volume(v), veh/h	161	1427	522	157	1437	0	260	462	177	138	260	0
Grp Sat Flow(s),veh/h/ln	1721	1619	1774	1738	1712	1680	1755	1770	1491	1757	1736	1647
Q Serve(g_s), s	5.2	11.8	11.8	5.0	10.8	0.0	8.3	12.9	11.6	8.9	7.0	0.0
Cycle Q Clear(g_c), s	5.2	11.8	11.8	5.0	10.8	0.0	8.3	12.9	11.6	8.9	7.0	0.0
Prop In Lane	1.00		0.29	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	217	2080	760	213	2189	716	326	887	374	166	876	416
V/C Ratio(X)	0.74	0.69	0.69	0.74	0.66	0.00	0.80	0.52	0.47	0.83	0.30	0.00
Avail Cap(c_a), veh/h	299	2080	760	302	2189	716	611	1108	467	397	1268	602
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.60	0.60	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.3	5.6	5.6	49.6	5.7	0.0	51.1	37.1	36.6	51.1	34.7	0.0
Incr Delay (d2), s/veh	5.6	1.7	4.5	1.6	0.9	0.0	1.7	0.2	0.3	4.0	0.7	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	2.6	5.2	6.3	2.4	4.8	0.0	4.1	6.3	4.8	4.5	3.4	0.0
LnGrp Delay(d),s/veh	54.9	7.3	10.1	51.2	6.6	0.0	52.8	37.3	37.0	55.2	35.4	0.0
LnGrp LOS	D	A	B	D	A		D	D	D	E	D	
Approach Vol, veh/h		2110			1594			899			398	
Approach Delay, s/veh		11.6			11.0			41.7			42.3	
Approach LOS		B			B			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	11.0	55.2	14.7	34.0	11.3	55.0	14.9	33.8
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	10.0	49.0	20.0	42.0	10.0	49.0	26.0	36.0
Max Q Clear Time (g_c+I1), s	7.0	13.8	10.3	9.0	7.2	12.8	10.9	14.9
Green Ext Time (p_c), s	0.1	35.0	0.3	6.7	0.1	36.0	0.1	5.9

Intersection Summary	
HCM 2010 Ctrl Delay	19.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1774	82	122	1476	269	112	28	369	299	46	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	3385	6407		1728	5136	1500	1745	1581		1641	1671	1457
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	3385	6407		1728	5136	1500	1745	1581		1641	1671	1457
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	53	1993	92	133	1604	292	132	33	434	507	78	105
RTOR Reduction (vph)	0	4	0	0	0	120	0	142	0	0	0	83
Lane Group Flow (vph)	53	2081	0	133	1604	172	132	325	0	289	296	22
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	5.7	45.7		13.6	53.6	53.6	31.4	31.4		29.3	29.3	29.3
Effective Green, g (s)	5.7	45.7		13.6	53.6	53.6	31.4	31.4		29.3	29.3	29.3
Actuated g/C Ratio	0.04	0.33		0.10	0.38	0.38	0.22	0.22		0.21	0.21	0.21
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	137	2091		167	1966	574	391	354		343	349	304
v/s Ratio Prot	0.02	c0.32		c0.08	0.31		0.08	c0.21		0.18	c0.18	
v/s Ratio Perm						0.11						0.02
v/c Ratio	0.39	1.00		0.80	0.82	0.30	0.34	0.92		0.84	0.85	0.07
Uniform Delay, d1	65.4	47.0		61.8	38.8	30.1	45.6	53.0		53.1	53.2	44.4
Progression Factor	1.47	0.58		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	15.3		21.2	3.9	1.3	0.2	27.4		16.3	16.5	0.0
Delay (s)	96.8	42.7		83.1	42.6	31.4	45.8	80.5		69.4	69.7	44.5
Level of Service	F	D		F	D	C	D	F		E	E	D
Approach Delay (s)		44.0			43.7			72.8			65.7	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	49.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	79	607	275	435	1111	176	493	534	735	355	243
v/c Ratio	0.59	0.76	0.66	0.42	0.62	0.74	0.68	0.90	0.79	0.27	0.35
Control Delay	79.8	54.8	86.5	38.9	7.0	75.9	57.4	41.9	36.2	34.1	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.8	54.8	86.5	38.9	7.0	75.9	57.4	41.9	36.2	34.1	9.4
Queue Length 50th (ft)	71	265	126	138	128	156	221	224	197	118	21
Queue Length 95th (ft)	124	317	174	114	890	222	273	#395	#409	190	102
Internal Link Dist (ft)		1359		309			1086			1080	
Turn Bay Length (ft)	68		243			225		102	196		90
Base Capacity (vph)	199	902	572	1178	1787	309	722	596	927	1300	690
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.67	0.48	0.37	0.62	0.57	0.68	0.90	0.79	0.27	0.35

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	540	1112	1488	665	167	285	890
v/c Ratio	0.76	0.36	0.51	0.68	0.75	0.61	0.54
Control Delay	56.2	6.2	13.3	12.0	77.9	62.7	1.3
Queue Delay	0.0	0.3	0.0	0.4	0.0	0.0	0.0
Total Delay	56.2	6.4	13.3	12.4	77.9	62.7	1.3
Queue Length 50th (ft)	261	166	158	133	149	131	0
Queue Length 95th (ft)	m270	m244	181	169	218	170	0
Internal Link Dist (ft)		255	655			1047	
Turn Bay Length (ft)	220				267		437
Base Capacity (vph)	710	3066	2911	981	428	888	1652
Starvation Cap Reductn	0	1144	0	61	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.58	0.51	0.72	0.39	0.32	0.54

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	161	1949	157	1437	72	260	462	177	138	260	475
v/c Ratio	0.64	0.77	0.68	0.74	0.10	0.71	0.45	0.32	0.73	0.26	0.78
Control Delay	71.8	40.4	91.4	29.3	5.1	71.4	42.3	6.6	80.5	38.1	38.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.8	40.4	91.4	29.3	5.1	71.4	42.3	6.6	80.5	38.1	38.9
Queue Length 50th (ft)	72	462	77	182	3	120	180	0	123	94	268
Queue Length 95th (ft)	107	540	m99	275	m16	163	236	57	181	127	382
Internal Link Dist (ft)		655		700			1075			548	
Turn Bay Length (ft)	164		235			264		202			125
Base Capacity (vph)	257	2524	243	1936	707	483	1021	557	314	1060	624
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.77	0.65	0.74	0.10	0.54	0.45	0.32	0.44	0.25	0.76

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	53	2085	133	1604	292	132	467	289	296	105
v/c Ratio	0.32	1.00	0.79	0.80	0.42	0.34	0.94	0.84	0.85	0.26
Control Delay	97.9	46.6	92.2	43.9	14.6	46.9	60.1	73.9	74.3	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	97.9	46.6	92.2	43.9	14.6	46.9	60.1	73.9	74.3	5.7
Queue Length 50th (ft)	26	~645	119	506	62	98	267	266	273	0
Queue Length 95th (ft)	m36	#756	#214	#693	162	150	#403	215	221	0
Internal Link Dist (ft)		700		1282			449		751	
Turn Bay Length (ft)	341		175			295		228		
Base Capacity (vph)	241	2093	186	1996	700	440	535	421	429	467
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	1.00	0.72	0.80	0.42	0.30	0.87	0.69	0.69	0.22

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

2/7/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	646	149	514	290	792	56	103	328	532	885	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	14	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3333		3236	3388	1671	1736	3539	1730	3286	3421	1496
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3333		3236	3388	1671	1736	3539	1730	3286	3421	1496
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	34	818	189	535	302	825	59	108	345	585	973	142
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	220	0	0	71
Lane Group Flow (vph)	34	993	0	535	302	825	59	108	125	585	973	71
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	5.3	43.6		23.0	61.3	140.0	7.1	25.6	25.6	25.8	48.3	48.3
Effective Green, g (s)	5.3	43.6		23.0	61.3	140.0	7.1	25.6	25.6	25.8	48.3	48.3
Actuated g/C Ratio	0.04	0.31		0.16	0.44	1.00	0.05	0.18	0.18	0.18	0.34	0.34
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	63	1037		531	1483	1671	88	647	316	605	1180	516
v/s Ratio Prot	0.02	c0.30		c0.17	0.09		0.03	0.03		c0.18	c0.28	
v/s Ratio Perm						0.49			0.07			0.05
v/c Ratio	0.54	0.96		1.01	0.20	0.49	0.67	0.17	0.40	0.97	0.82	0.14
Uniform Delay, d1	66.2	47.3		58.5	24.3	0.0	65.3	48.2	50.4	56.7	42.0	31.5
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	4.4	19.1		40.9	0.2	1.0	18.2	0.6	3.7	28.2	6.6	0.6
Delay (s)	70.5	66.4		99.4	24.5	1.0	83.5	48.8	54.1	84.8	48.6	32.1
Level of Service	E	E		F	C	A	F	D	D	F	D	C
Approach Delay (s)		66.5			37.0			56.4			59.7	
Approach LOS		E			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	53.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	975	0	0	1402	516	143	474	913	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	1845	1845	0	0	1881	1845	1759	1881	1937			
Adj Flow Rate, veh/h	452	1134	0	0	1508	0	164	545	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	500	2519	0	0	2810	858	293	625	288			
Arrive On Green	0.15	0.72	0.00	0.00	0.55	0.00	0.17	0.17	0.00			
Sat Flow, veh/h	3408	3597	0	0	5305	1568	1675	3574	1647			
Grp Volume(v), veh/h	452	1134	0	0	1508	0	164	545	0			
Grp Sat Flow(s),veh/h/ln	1704	1752	0	0	1712	1568	1675	1787	1647			
Q Serve(g_s), s	20.9	21.5	0.0	0.0	30.1	0.0	14.3	23.7	0.0			
Cycle Q Clear(g_c), s	20.9	21.5	0.0	0.0	30.1	0.0	14.3	23.7	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	500	2519	0	0	2810	858	293	625	288			
V/C Ratio(X)	0.90	0.45	0.00	0.00	0.54	0.00	0.56	0.87	0.00			
Avail Cap(c_a), veh/h	639	2519	0	0	2810	858	371	791	364			
HCM Platoon Ratio	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	0.00	0.00	0.57	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	67.2	9.4	0.0	0.0	23.2	0.0	60.4	64.2	0.0			
Incr Delay (d2), s/veh	12.3	0.6	0.0	0.0	0.4	0.0	0.6	7.4	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			
%ile BackOfQ(-26165%),veh/ln	10.7	10.6	0.0	0.0	14.4	0.0	6.7	12.4	0.0			
LnGrp Delay(d),s/veh	79.4	9.9	0.0	0.0	23.7	0.0	61.0	71.6	0.0			
LnGrp LOS	E	A			C		E	E				
Approach Vol, veh/h		1586			1508			709				
Approach Delay, s/veh		29.7			23.7			69.2				
Approach LOS		C			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		120.0			27.5	92.5		32.6
Change Period (Y+Rc), s		5.0			4.0	5.0		4.6
Max Green Setting (Gmax), s		115.0			30.0	81.0		35.4
Max Q Clear Time (g_c+I1), s		23.5			22.9	32.1		25.7
Green Ext Time (p_c), s		85.8			0.6	47.2		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	34.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	1446	269	430	1500	46	211	251	31	108	433	207
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		1.00	1.00		0.90	1.00		0.91
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	1863	1881	1900	1881	1900	1881	1881	1792	1827	1863	1918
Adj Flow Rate, veh/h	197	1643	306	489	1705	0	245	292	36	127	509	244
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	1	1	2
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	1	0	1	4	1	1	6	4	2	3
Cap, veh/h	239	1843	566	982	3006	945	261	1009	387	147	532	947
Arrive On Green	0.07	0.36	0.36	0.28	0.59	0.00	0.08	0.28	0.28	0.08	0.29	0.29
Sat Flow, veh/h	3442	5085	1561	3510	5136	1615	3476	3574	1370	1740	1863	2617
Grp Volume(v), veh/h	197	1643	306	489	1705	0	245	292	36	127	509	244
Grp Sat Flow(s),veh/h/ln	1721	1695	1561	1755	1712	1615	1738	1787	1370	1740	1863	1308
Q Serve(g_s), s	9.0	48.7	24.9	18.7	33.0	0.0	11.2	10.2	2.2	11.5	43.0	10.2
Cycle Q Clear(g_c), s	9.0	48.7	24.9	18.7	33.0	0.0	11.2	10.2	2.2	11.5	43.0	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	239	1843	566	982	3006	945	261	1009	387	147	532	947
V/C Ratio(X)	0.83	0.89	0.54	0.50	0.57	0.00	0.94	0.29	0.09	0.86	0.96	0.26
Avail Cap(c_a), veh/h	258	1843	566	982	3006	945	261	1009	387	174	536	951
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)	0.82	0.82	0.82	0.58	0.58	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	73.5	48.0	40.4	48.2	20.6	0.0	73.6	44.9	21.3	72.3	56.2	35.2
Incr Delay (d2), s/veh	15.4	5.9	3.0	0.1	0.5	0.0	39.2	0.1	0.0	27.1	29.2	0.5
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(-26165%),veh/ln	4.8	23.8	11.2	9.0	15.6	0.0	6.8	5.1	0.8	6.6	26.4	3.8
LnGrp Delay(d),s/veh	88.9	53.9	43.5	48.3	21.1	0.0	112.8	44.9	21.4	99.4	85.4	35.7
LnGrp LOS	F	D	D	D	C		F	D	C	F	F	D
Approach Vol, veh/h		2146			2194			573			880	
Approach Delay, s/veh		55.6			27.1			72.5			73.6	
Approach LOS		E			C			E			E	

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	51.1	64.0	17.0	50.7	15.1	100.0	17.5	50.2
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	25.0	* 58	12.0	* 46	12.0	71.0	16.0	42.0
Max Q Clear Time (g_c+I1), s	20.7	50.7	13.2	45.0	11.0	35.0	13.5	12.2
Green Ext Time (p_c), s	2.0	7.0	0.0	0.7	0.1	31.2	0.0	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	49.2
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	1380	141	240	1985	593	44	43	106	234	78	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.91		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.99		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	4817		1745	5136	1552	1745	1639		1641	1693	1454
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	4817		1745	5136	1552	1745	1639		1641	1693	1454
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	77	1663	170	286	2363	706	53	52	128	279	93	45
RTOR Reduction (vph)	0	5	0	0	0	126	0	65	0	0	0	39
Lane Group Flow (vph)	77	1828	0	286	2363	580	53	115	0	184	188	6
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	6.0	74.5		27.0	95.5	95.5	15.9	15.9		22.6	22.6	22.6
Effective Green, g (s)	6.0	74.5		27.0	95.5	95.5	15.9	15.9		22.6	22.6	22.6
Actuated g/C Ratio	0.04	0.47		0.17	0.60	0.60	0.10	0.10		0.14	0.14	0.14
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	120	2242		294	3065	926	173	162		231	239	205
v/s Ratio Prot	0.02	c0.38		c0.16	0.46		0.03	c0.07		c0.11	0.11	
v/s Ratio Perm						0.37						0.00
v/c Ratio	0.64	0.82		0.97	0.77	0.63	0.31	0.71		0.80	0.79	0.03
Uniform Delay, d1	75.9	36.8		66.1	24.1	20.8	66.9	69.8		66.5	66.4	59.3
Progression Factor	0.77	0.36		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.4	1.8		44.6	1.9	3.2	0.4	11.5		16.1	14.5	0.0
Delay (s)	62.7	15.1		110.7	26.0	24.0	67.3	81.4		82.6	80.8	59.3
Level of Service	E	B		F	C	C	E	F		F	F	E
Approach Delay (s)		17.0			32.8			78.2			79.3	
Approach LOS		B			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: N. Main St. & Treat Blvd

2/7/2017

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	34	1007	535	302	825	59	108	345	585	973	142
v/c Ratio	0.39	0.99	1.01	0.20	0.49	0.57	0.15	0.61	1.00	0.79	0.23
Control Delay	76.0	74.3	98.4	25.9	1.0	85.6	46.9	17.2	76.0	46.1	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.0	74.3	98.4	25.9	1.0	85.6	46.9	17.2	76.0	46.1	10.4
Queue Length 50th (ft)	31	474	~256	92	0	53	43	59	183	427	20
Queue Length 95th (ft)	59	473	#378	132	0	103	71	165	#304	516	70
Internal Link Dist (ft)		1359		306			1086			1080	
Turn Bay Length (ft)	68		243			225		102	196		90
Base Capacity (vph)	215	1014	531	1484	1671	111	707	561	586	1238	611
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.99	1.01	0.20	0.49	0.53	0.15	0.61	1.00	0.79	0.23

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
2: NB I-680 Off Ramp/Buskirk Ave & Treat Blvd

2/7/2017

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	452	1134	1508	555	164	545	1049
v/c Ratio	0.85	0.44	0.53	0.68	0.56	0.84	0.65
Control Delay	81.0	8.1	5.9	7.7	66.4	74.9	2.0
Queue Delay	0.0	0.5	0.1	0.2	0.0	0.0	0.0
Total Delay	81.0	8.6	6.0	7.9	66.4	74.9	2.1
Queue Length 50th (ft)	239	206	115	96	158	292	0
Queue Length 95th (ft)	281	265	m139	m130	221	332	0
Internal Link Dist (ft)		258	655			1047	
Turn Bay Length (ft)	220			330	267		437
Base Capacity (vph)	616	2567	2836	822	357	790	1616
Starvation Cap Reductn	0	900	314	23	0	0	0
Spillback Cap Reductn	0	55	0	0	0	0	26
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.68	0.60	0.69	0.46	0.69	0.66

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues
3: Oak Rd/Oak Rd. & Treat Blvd

2/7/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	197	1643	306	489	1705	52	245	292	36	127	509	244
v/c Ratio	0.80	0.92	0.44	0.96	0.80	0.07	0.98	0.30	0.08	0.83	0.95	0.21
Control Delay	95.4	53.3	11.4	68.7	19.5	0.5	123.1	47.7	0.4	109.1	84.0	15.0
Queue Delay	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.4	53.5	11.4	68.7	19.6	0.5	123.1	47.7	0.4	109.1	84.0	15.0
Queue Length 50th (ft)	98	602	42	265	516	1	134	130	0	132	525	46
Queue Length 95th (ft)	#159	648	78	#361	145	m2	#212	166	0	#215	#681	68
Internal Link Dist (ft)		655			700			1075			548	
Turn Bay Length (ft)	164			235		600	264		202			200
Base Capacity (vph)	248	1782	693	510	2131	751	251	969	450	167	535	1179
Starvation Cap Reductn	0	8	0	0	59	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.93	0.44	0.96	0.82	0.07	0.98	0.30	0.08	0.76	0.95	0.21

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	77	1833	286	2363	706	53	180	184	188	45
v/c Ratio	0.64	0.82	0.97	0.77	0.67	0.31	0.79	0.80	0.79	0.14
Control Delay	71.1	16.9	110.8	28.0	16.5	69.5	65.2	89.4	87.9	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.1	16.9	110.8	28.0	16.5	69.5	65.2	89.4	87.9	1.0
Queue Length 50th (ft)	43	138	302	645	267	53	113	198	203	0
Queue Length 95th (ft)	m50	#438	#442	799	444	87	171	256	261	0
Internal Link Dist (ft)		700		1282			449		751	
Turn Bay Length (ft)	341		175			295		228		
Base Capacity (vph)	120	2248	294	3066	1051	403	434	410	423	455
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.82	0.97	0.77	0.67	0.13	0.41	0.45	0.44	0.10

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	975	0	0	1402	516	143	474	913	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	1845	1845	0	0	1881	1845	1759	1881	1937			
Adj Flow Rate, veh/h	452	1134	0	0	1508	0	164	545	1049			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	447	1336	0	0	1156	353	936	1997	919			
Arrive On Green	0.13	0.38	0.00	0.00	0.22	0.00	0.56	0.56	0.56			
Sat Flow, veh/h	3408	3597	0	0	5305	1568	1675	3574	1645			
Grp Volume(v), veh/h	452	1134	0	0	1508	0	164	545	1049			
Grp Sat Flow(s),veh/h/ln	1704	1752	0	0	1712	1568	1675	1787	1645			
Q Serve(g_s), s	21.0	47.4	0.0	0.0	36.0	0.0	7.7	12.7	89.4			
Cycle Q Clear(g_c), s	21.0	47.4	0.0	0.0	36.0	0.0	7.7	12.7	89.4			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	447	1336	0	0	1156	353	936	1997	919			
V/C Ratio(X)	1.01	0.85	0.00	0.00	1.31	0.00	0.18	0.27	1.14			
Avail Cap(c_a), veh/h	447	1336	0	0	1156	353	936	1997	919			
HCM Platoon Ratio	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	0.00	0.00	0.60	0.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	69.5	45.3	0.0	0.0	62.0	0.0	17.3	18.4	35.3			
Incr Delay (d2), s/veh	45.2	6.9	0.0	0.0	141.1	0.0	0.0	0.0	76.7			
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(-26165%),veh/ln	12.7	24.1	0.0	0.0	32.1	0.0	3.6	6.3	59.9			
LnGrp Delay(d),s/veh	114.7	52.1	0.0	0.0	203.1	0.0	17.3	18.4	112.0			
LnGrp LOS	F	D			F		B	B	F			
Approach Vol, veh/h		1586			1508			1758				
Approach Delay, s/veh		70.0			203.1			74.2				
Approach LOS		E			F			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		66.0			25.0	41.0		94.0
Change Period (Y+Rc), s		5.0			4.0	5.0		4.6
Max Green Setting (Gmax), s		61.0			21.0	36.0		89.4
Max Q Clear Time (g_c+I1), s		49.4			23.0	38.0		91.4
Green Ext Time (p_c), s		11.5			0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	112.9
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	1446	269	430	1500	46	211	251	31	108	433	207
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		1.00	1.00		0.89	1.00		0.90
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	1866	1900	1900	1881	1900	1881	1881	1792	1827	1863	1918
Adj Flow Rate, veh/h	197	1643	306	489	1705	0	245	292	36	127	509	244
Adj No. of Lanes	2	3	0	2	3	1	2	2	1	1	1	2
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	3
Cap, veh/h	241	1722	318	1000	3222	1013	261	905	343	147	489	681
Arrive On Green	0.07	0.40	0.40	0.28	0.63	0.00	0.08	0.25	0.25	0.08	0.26	0.26
Sat Flow, veh/h	3442	4304	796	3510	5136	1615	3476	3574	1354	1740	1863	2594
Grp Volume(v), veh/h	197	1293	656	489	1705	0	245	292	36	127	509	244
Grp Sat Flow(s),veh/h/ln	1721	1698	1704	1755	1712	1615	1738	1787	1354	1740	1863	1297
Q Serve(g_s), s	9.0	59.1	60.0	18.5	29.6	0.0	11.2	10.6	2.4	11.5	42.0	12.2
Cycle Q Clear(g_c), s	9.0	59.1	60.0	18.5	29.6	0.0	11.2	10.6	2.4	11.5	42.0	12.2
Prop In Lane	1.00		0.47	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	241	1358	682	1000	3222	1013	261	905	343	147	489	681
V/C Ratio(X)	0.82	0.95	0.96	0.49	0.53	0.00	0.94	0.32	0.11	0.86	1.04	0.36
Avail Cap(c_a), veh/h	301	1358	682	1000	3222	1013	261	905	343	163	489	681
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)	0.09	0.09	0.09	0.55	0.55	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	73.4	46.5	46.8	47.5	16.6	0.0	73.6	48.6	24.6	72.3	59.0	48.0
Incr Delay (d2), s/veh	1.4	2.2	4.7	0.1	0.3	0.0	39.2	0.1	0.0	30.8	51.8	1.2
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(-26165%),veh/ln	4.3	28.1	29.1	9.0	14.0	0.0	6.8	5.3	0.9	6.8	28.6	4.5
LnGrp Delay(d),s/veh	74.7	48.7	51.5	47.6	17.0	0.0	112.8	48.7	24.6	103.1	110.8	49.2
LnGrp LOS	E	D	D	D	B		F	D	C	F	F	D
Approach Vol, veh/h		2146			2194			573			880	
Approach Delay, s/veh		51.9			23.8			74.6			92.6	
Approach LOS		D			C			E			F	

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	51.6	70.0	16.0	47.0	15.2	106.4	17.5	45.5
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	23.0	* 64	12.0	42.0	14.0	73.0	15.0	39.0
Max Q Clear Time (g_c+I1), s	20.5	62.0	13.2	44.0	11.0	31.6	13.5	12.6
Green Ext Time (p_c), s	0.5	2.0	0.0	0.0	0.2	35.2	0.0	12.9

Intersection Summary	
HCM 2010 Ctrl Delay	49.7
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	452	1134	1508	555	164	545	1049
v/c Ratio	1.05	0.88	1.35	1.09	0.18	0.27	1.14
Control Delay	121.5	55.1	200.5	81.4	18.0	18.8	109.5
Queue Delay	0.0	17.7	0.0	0.0	0.0	0.0	0.0
Total Delay	121.5	72.8	200.5	81.4	18.0	18.8	109.5
Queue Length 50th (ft)	~263	579	~739	~420	82	152	~1261
Queue Length 95th (ft)	#352	632	m#832	m#640	120	181	#1446
Internal Link Dist (ft)		258	655			1047	
Turn Bay Length (ft)	220			330	267		437
Base Capacity (vph)	431	1291	1116	509	902	1996	918
Starvation Cap Reductn	0	108	0	0	0	0	0
Spillback Cap Reductn	0	181	0	0	0	0	1
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	1.02	1.35	1.09	0.18	0.27	1.14

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	197	1949	489	1705	52	245	292	36	127	509	244
v/c Ratio	0.72	1.01	1.04	0.77	0.07	0.98	0.33	0.09	0.85	1.04	0.27
Control Delay	80.5	46.2	92.7	16.7	0.9	123.1	50.7	0.4	113.7	107.6	16.7
Queue Delay	0.0	10.4	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.5	56.7	92.7	17.2	0.9	123.1	50.7	0.4	113.7	107.6	16.7
Queue Length 50th (ft)	106	~689	~291	581	6	134	133	0	133	~573	37
Queue Length 95th (ft)	m108	m638	#400	96	m0	#212	171	0	#226	#731	69
Internal Link Dist (ft)		655		700			1075			548	
Turn Bay Length (ft)	164		235		600	264		202			200
Base Capacity (vph)	290	1933	469	2211	757	251	888	422	157	489	900
Starvation Cap Reductn	0	59	0	181	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	1.04	1.04	0.84	0.07	0.98	0.33	0.09	0.81	1.04	0.27

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

2/7/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	481	89	234	370	944	153	429	465	684	330	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	14	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	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	1.00
Frt	1.00	0.98		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3336		3204	3455	1682	1805	3610	1762	3351	3490	1508
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3336		3204	3455	1682	1805	3610	1762	3351	3490	1508
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	79	512	95	275	435	1111	176	493	534	735	355	243
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	199	0	0	134
Lane Group Flow (vph)	79	596	0	275	435	1111	176	493	335	735	355	109
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	10.7	32.8		17.6	39.7	140.0	18.6	35.0	35.0	32.6	53.0	53.0
Effective Green, g (s)	10.7	32.8		17.6	39.7	140.0	18.6	35.0	35.0	32.6	53.0	53.0
Actuated g/C Ratio	0.08	0.23		0.13	0.28	1.00	0.13	0.25	0.25	0.23	0.38	0.38
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	133	781		402	979	1682	239	902	440	780	1321	570
v/s Ratio Prot	0.05	c0.18		0.09	0.13		0.10	0.14		c0.22	0.10	
v/s Ratio Perm						c0.66			c0.19			0.07
v/c Ratio	0.59	0.76		0.68	0.44	0.66	0.74	0.55	0.76	0.94	0.27	0.19
Uniform Delay, d1	62.5	50.0		58.5	41.1	0.0	58.3	45.6	48.6	52.8	30.1	29.2
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	4.7	5.7		5.2	0.9	2.1	11.2	2.4	11.8	19.5	0.5	0.7
Delay (s)	67.2	55.7		63.7	42.0	2.1	69.5	48.0	60.4	72.2	30.6	29.9
Level of Service	E	E		E	D	A	E	D	E	E	C	C
Approach Delay (s)		57.0			20.9			56.7			53.4	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	42.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	508	1045	0	0	1414	632	160	274	854	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	1845	1881	0	0	1881	1881	1881	1881	1956			
Adj Flow Rate, veh/h	540	1112	0	0	1488	0	167	285	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	1090	2953	0	0	2439	760	204	407	189			
Arrive On Green	0.32	0.83	0.00	0.00	0.16	0.00	0.11	0.11	0.00			
Sat Flow, veh/h	3408	3668	0	0	5305	1599	1792	3574	1663			
Grp Volume(v), veh/h	540	1112	0	0	1488	0	167	285	0			
Grp Sat Flow(s),veh/h/ln	1704	1787	0	0	1712	1599	1792	1787	1663			
Q Serve(g_s), s	20.5	12.6	0.0	0.0	43.2	0.0	14.6	12.3	0.0			
Cycle Q Clear(g_c), s	20.5	12.6	0.0	0.0	43.2	0.0	14.6	12.3	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	1090	2953	0	0	2439	760	204	407	189			
V/C Ratio(X)	0.50	0.38	0.00	0.00	0.61	0.00	0.82	0.70	0.00			
Avail Cap(c_a), veh/h	1090	2953	0	0	2439	760	394	786	366			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.74	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	44.0	3.5	0.0	0.0	53.6	0.0	69.3	68.2	0.0			
Incr Delay (d2), s/veh	0.1	0.4	0.0	0.0	0.8	0.0	3.1	0.8	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			
%ile BackOfQ(-26165%),veh/ln	9.7	6.3	0.0	0.0	20.7	0.0	7.4	6.1	0.0			
LnGrp Delay(d),s/veh	44.1	3.9	0.0	0.0	54.5	0.0	72.3	69.1	0.0			
LnGrp LOS	D	A			D		E	E				
Approach Vol, veh/h		1652			1488			452				
Approach Delay, s/veh		17.0			54.5			70.3				
Approach LOS		B			D			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		137.2			56.2	81.0		22.8
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		115.2			35.2	* 76		35.2
Max Q Clear Time (g_c+I1), s		14.6			22.5	45.2		16.6
Green Ext Time (p_c), s		37.1			10.3	24.5		1.3

Intersection Summary	
HCM 2010 Ctrl Delay	39.2
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	1620	134	152	1394	70	239	425	163	120	226	413
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		1.00	1.00		0.93	1.00		0.94
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	1881	1900	1881	1881	1900	1900	1863	1881	1845	1827	1937
Adj Flow Rate, veh/h	161	1800	149	157	1437	0	260	462	177	138	260	475
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	1	1	2
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	0	1	1	0	0	2	1	3	4	2
Cap, veh/h	206	2247	685	201	2302	724	315	847	356	159	427	810
Arrive On Green	0.04	0.29	0.29	0.12	0.90	0.00	0.09	0.24	0.24	0.09	0.23	0.23
Sat Flow, veh/h	3442	5136	1567	3476	5136	1615	3510	3539	1487	1757	1827	2727
Grp Volume(v), veh/h	161	1800	149	157	1437	0	260	462	177	138	260	475
Grp Sat Flow(s),veh/h/ln	1721	1712	1567	1738	1712	1615	1755	1770	1487	1757	1827	1363
Q Serve(g_s), s	7.4	51.8	11.5	7.0	10.5	0.0	11.6	18.3	12.8	12.4	20.3	16.4
Cycle Q Clear(g_c), s	7.4	51.8	11.5	7.0	10.5	0.0	11.6	18.3	12.8	12.4	20.3	16.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	206	2247	685	201	2302	724	315	847	356	159	427	810
V/C Ratio(X)	0.78	0.80	0.22	0.78	0.62	0.00	0.82	0.55	0.50	0.87	0.61	0.59
Avail Cap(c_a), veh/h	280	2247	685	261	2302	724	395	847	356	231	468	872
HCM Platoon Ratio	0.67	0.67	0.67	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.89	0.73	0.73	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	75.8	50.1	35.9	69.7	5.1	0.0	71.6	53.3	31.7	71.8	54.8	24.3
Incr Delay (d2), s/veh	8.6	2.8	0.6	5.8	0.9	0.0	9.0	0.4	0.4	15.5	5.2	2.5
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(-26165%),veh/ln	3.8	25.1	5.1	3.5	4.7	0.0	6.1	9.0	5.3	6.7	10.9	6.5
LnGrp Delay(d),s/veh	84.4	52.9	36.5	75.6	6.1	0.0	80.6	53.7	32.1	87.4	60.0	26.8
LnGrp LOS	F	D	D	E	A		F	D	C	F	E	C
Approach Vol, veh/h		2110			1594			899			873	
Approach Delay, s/veh		54.1			12.9			57.2			46.2	
Approach LOS		D			B			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	15.3	76.0	19.4	42.4	13.6	77.7	18.5	43.3
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	12.0	* 70	18.0	* 41	13.0	69.0	21.0	38.0
Max Q Clear Time (g_c+I1), s	9.0	53.8	13.6	22.3	9.4	12.5	14.4	20.3
Green Ext Time (p_c), s	0.3	15.3	0.7	8.4	0.1	37.8	0.1	2.8

Intersection Summary	
HCM 2010 Ctrl Delay	41.4
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1774	82	122	1476	269	112	28	369	299	46	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.91		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	3385	4914		1728	5136	1505	1745	1577		1641	1671	1456
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	3385	4914		1728	5136	1505	1745	1577		1641	1671	1456
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	53	1993	92	133	1604	292	132	33	434	507	78	105
RTOR Reduction (vph)	0	2	0	0	0	108	0	263	0	0	0	85
Lane Group Flow (vph)	53	2083	0	133	1604	184	132	204	0	289	296	20
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	12.0	69.4		16.7	74.1	74.1	23.4	23.4		30.5	30.5	30.5
Effective Green, g (s)	12.0	69.4		16.7	74.1	74.1	23.4	23.4		30.5	30.5	30.5
Actuated g/C Ratio	0.08	0.43		0.10	0.46	0.46	0.15	0.15		0.19	0.19	0.19
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	253	2131		180	2378	697	255	230		312	318	277
v/s Ratio Prot	0.02	c0.42		c0.08	0.31		0.08	c0.13		0.18	c0.18	
v/s Ratio Perm						0.12						0.01
v/c Ratio	0.21	0.98		0.74	0.67	0.26	0.52	0.89		0.93	0.93	0.07
Uniform Delay, d1	69.5	44.5		69.5	33.5	26.3	63.1	67.0		63.6	63.7	53.1
Progression Factor	0.69	0.51		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	11.2		12.8	1.6	0.9	0.7	30.2		31.7	32.5	0.0
Delay (s)	48.2	33.7		82.3	35.1	27.2	63.8	97.2		95.4	96.3	53.2
Level of Service	D	C		F	D	C	E	F		F	F	D
Approach Delay (s)		34.1			37.0			89.9			89.3	
Approach LOS		C			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	48.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	108.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: N. Main St. & Treat Blvd

2/7/2017

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	79	607	275	435	1111	176	493	534	735	355	243
v/c Ratio	0.59	0.77	0.68	0.44	0.66	0.74	0.55	0.84	0.94	0.27	0.35
Control Delay	79.8	55.3	67.4	42.2	2.1	75.9	48.3	37.2	53.4	33.1	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.8	55.3	67.4	42.2	2.1	75.9	48.3	37.2	53.4	33.1	8.2
Queue Length 50th (ft)	71	265	124	169	0	156	206	250	197	118	16
Queue Length 95th (ft)	124	321	160	203	0	222	255	377	#436	182	90
Internal Link Dist (ft)		1359		309			1086			1080	
Turn Bay Length (ft)	68		243			225		102	196		90
Base Capacity (vph)	199	916	457	1046	1682	309	902	639	779	1321	704
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.66	0.60	0.42	0.66	0.57	0.55	0.84	0.94	0.27	0.35

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	540	1112	1488	665	167	285	890
v/c Ratio	0.75	0.39	0.53	0.75	0.78	0.64	0.54
Control Delay	65.6	4.8	11.1	14.8	90.9	72.8	1.3
Queue Delay	0.0	0.4	0.2	1.5	0.0	0.0	0.0
Total Delay	65.6	5.3	11.3	16.3	90.9	72.8	1.3
Queue Length 50th (ft)	274	141	156	133	172	152	0
Queue Length 95th (ft)	343	216	241	638	247	194	0
Internal Link Dist (ft)		255	655			1047	
Turn Bay Length (ft)	220			330	267		437
Base Capacity (vph)	722	2817	2832	882	380	786	1652
Starvation Cap Reductn	0	1082	515	86	0	0	0
Spillback Cap Reductn	0	5	0	0	0	0	2
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.64	0.64	0.84	0.44	0.36	0.54

Intersection Summary

Queues
3: Oak Rd/Oak Rd. & Treat Blvd

2/7/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	161	1800	149	157	1437	72	260	462	177	138	260	475
v/c Ratio	0.65	0.80	0.20	0.63	0.67	0.10	0.78	0.52	0.35	0.78	0.56	0.43
Control Delay	83.6	39.2	8.0	48.3	8.8	0.2	86.3	54.4	8.5	97.5	56.9	22.8
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.6	39.5	8.0	48.3	8.8	0.2	86.3	54.4	8.5	97.5	56.9	22.8
Queue Length 50th (ft)	87	497	20	84	73	0	138	221	2	143	238	128
Queue Length 95th (ft)	130	541	65	121	83	m0	188	286	67	210	323	161
Internal Link Dist (ft)		655			700			1075			548	
Turn Bay Length (ft)	164			235		600	264		202			125
Base Capacity (vph)	269	2238	759	251	2160	703	380	887	503	222	468	1115
Starvation Cap Reductn	0	101	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	19	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.84	0.20	0.63	0.67	0.10	0.68	0.52	0.35	0.62	0.56	0.43

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	53	2085	133	1604	292	132	467	289	296	105
v/c Ratio	0.19	0.98	0.74	0.67	0.36	0.52	0.95	0.93	0.93	0.28
Control Delay	47.6	36.6	92.4	37.6	11.6	68.7	51.2	97.8	98.6	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.6	36.6	92.4	37.6	11.6	68.7	51.2	97.8	98.6	7.1
Queue Length 50th (ft)	28	~875	137	514	58	127	183	312	321	0
Queue Length 95th (ft)	m38	#1091	207	608	145	181	283	262	267	0
Internal Link Dist (ft)		700		1282			449		751	
Turn Bay Length (ft)	341		175			295		228		
Base Capacity (vph)	317	2135	302	2406	811	338	554	328	334	389
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.98	0.44	0.67	0.36	0.39	0.84	0.88	0.89	0.27

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	508	1045	0	0	1414	632	160	274	854	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	1845	1881	0	0	1881	1881	1881	1881	1956			
Adj Flow Rate, veh/h	540	1112	0	0	1488	0	167	285	890			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	1064	2300	0	0	1541	480	833	1662	773			
Arrive On Green	0.31	0.64	0.00	0.00	0.20	0.00	0.47	0.47	0.47			
Sat Flow, veh/h	3408	3668	0	0	5305	1599	1792	3574	1662			
Grp Volume(v), veh/h	540	1112	0	0	1488	0	167	285	890			
Grp Sat Flow(s),veh/h/ln	1704	1787	0	0	1712	1599	1792	1787	1662			
Q Serve(g_s), s	20.7	25.8	0.0	0.0	46.0	0.0	8.8	7.4	74.4			
Cycle Q Clear(g_c), s	20.7	25.8	0.0	0.0	46.0	0.0	8.8	7.4	74.4			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	1064	2300	0	0	1541	480	833	1662	773			
V/C Ratio(X)	0.51	0.48	0.00	0.00	0.97	0.00	0.20	0.17	1.15			
Avail Cap(c_a), veh/h	1064	2300	0	0	1541	480	833	1662	773			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.67	0.67	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.74	0.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	45.0	14.8	0.0	0.0	63.1	0.0	25.3	24.9	42.8			
Incr Delay (d2), s/veh	0.2	0.7	0.0	0.0	13.1	0.0	0.0	0.0	82.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(-26165%),veh/ln	9.8	12.9	0.0	0.0	23.6	0.0	4.4	3.6	51.9			
LnGrp Delay(d),s/veh	45.1	15.5	0.0	0.0	76.2	0.0	25.3	24.9	125.6			
LnGrp LOS	D	B			E		C	C	F			
Approach Vol, veh/h		1652			1488			1342				
Approach Delay, s/veh		25.2			76.2			91.8				
Approach LOS		C			E			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		108.2			55.2	53.0		79.0
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		76.0			24.0	* 48		74.4
Max Q Clear Time (g_c+I1), s		27.8			22.7	48.0		76.4
Green Ext Time (p_c), s		27.4			0.6	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	62.1
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	1620	134	152	1394	70	239	425	163	120	226	413
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		1.00	1.00		0.93	1.00		0.94
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	1883	1900	1881	1881	1900	1900	1863	1881	1845	1827	1937
Adj Flow Rate, veh/h	161	1800	149	157	1437	0	260	462	177	138	260	475
Adj No. of Lanes	2	3	0	2	3	1	2	2	1	1	1	2
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	0	0	2	1	3	4	2
Cap, veh/h	206	2172	179	200	2364	743	313	845	355	159	427	810
Arrive On Green	0.04	0.30	0.30	0.11	0.92	0.00	0.09	0.24	0.24	0.09	0.23	0.23
Sat Flow, veh/h	3442	4826	398	3476	5136	1615	3510	3539	1487	1757	1827	2727
Grp Volume(v), veh/h	161	1276	673	157	1437	0	260	462	177	138	260	475
Grp Sat Flow(s),veh/h/ln	1721	1713	1798	1738	1712	1615	1755	1770	1487	1757	1827	1363
Q Serve(g_s), s	7.4	55.5	55.8	7.0	8.1	0.0	11.7	18.3	13.0	12.4	20.3	16.8
Cycle Q Clear(g_c), s	7.4	55.5	55.8	7.0	8.1	0.0	11.7	18.3	13.0	12.4	20.3	16.8
Prop In Lane	1.00		0.22	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	206	1542	809	200	2364	743	313	845	355	159	427	810
V/C Ratio(X)	0.78	0.83	0.83	0.79	0.61	0.00	0.83	0.55	0.50	0.87	0.61	0.59
Avail Cap(c_a), veh/h	280	1542	809	239	2364	743	373	845	355	220	468	872
HCM Platoon Ratio	0.67	0.67	0.67	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.36	0.36	0.36	0.73	0.73	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	75.8	50.1	50.2	69.8	3.8	0.0	71.7	53.3	33.0	71.8	54.8	25.4
Incr Delay (d2), s/veh	3.7	2.0	3.8	8.2	0.9	0.0	10.8	0.4	0.4	18.2	5.2	2.5
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(-26165%),veh/ln	3.6	26.8	28.6	3.6	3.6	0.0	6.1	9.0	5.4	6.8	10.9	6.6
LnGrp Delay(d),s/veh	79.5	52.1	54.0	78.1	4.6	0.0	82.5	53.7	33.4	90.1	60.0	27.9
LnGrp LOS	E	D	D	E	A		F	D	C	F	E	C
Approach Vol, veh/h		2110			1594			899			873	
Approach Delay, s/veh		54.8			11.9			58.1			47.3	
Approach LOS		D			B			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	15.2	78.0	19.3	42.4	13.6	79.6	18.5	43.2
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	11.0	* 72	17.0	* 41	13.0	70.0	20.0	38.0
Max Q Clear Time (g_c+I1), s	9.0	57.8	13.7	22.3	9.4	10.1	14.4	20.3
Green Ext Time (p_c), s	0.2	13.5	0.6	8.4	0.1	39.3	0.1	2.8

Intersection Summary	
HCM 2010 Ctrl Delay	41.6
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	540	1112	1488	665	167	285	890
v/c Ratio	1.10	0.68	1.00	0.95	0.21	0.17	1.12
Control Delay	130.4	35.1	61.5	31.2	26.2	25.2	108.7
Queue Delay	0.0	1.7	0.0	10.5	0.0	0.0	0.1
Total Delay	130.4	36.8	61.5	41.7	26.2	25.2	108.7
Queue Length 50th (ft)	~327	467	567	145	102	90	~1043
Queue Length 95th (ft)	#449	548	#678	#264	155	122	#1308
Internal Link Dist (ft)		255	655			1047	
Turn Bay Length (ft)	220			330	267		437
Base Capacity (vph)	492	1641	1489	702	803	1661	793
Starvation Cap Reductn	0	340	0	40	0	0	0
Spillback Cap Reductn	0	43	0	0	0	0	10
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.85	1.00	1.00	0.21	0.17	1.14

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
3: Oak Rd/Oak Rd. & Treat Blvd

2/7/2017

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	161	1949	157	1437	72	260	462	177	138	260	475
v/c Ratio	0.65	0.86	0.68	0.66	0.10	0.80	0.52	0.36	0.79	0.56	0.45
Control Delay	83.5	40.0	52.7	8.4	0.2	88.7	54.7	11.8	99.4	56.9	22.5
Queue Delay	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.5	41.4	52.7	8.4	0.2	88.7	54.7	11.8	99.4	56.9	22.5
Queue Length 50th (ft)	85	585	85	70	0	138	221	16	143	238	128
Queue Length 95th (ft)	m105	m617	125	79	m0	189	286	85	211	323	163
Internal Link Dist (ft)		655		700			1075			548	
Turn Bay Length (ft)	164		235		600	264		202			125
Base Capacity (vph)	269	2256	230	2172	707	359	883	488	211	468	1081
Starvation Cap Reductn	0	149	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.93	0.68	0.66	0.10	0.72	0.52	0.36	0.65	0.56	0.44

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Appendix C – Future Year Synchro Reports

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

2/7/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	789	167	554	363	1095	70	136	356	585	890	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	14	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3342		3236	3388	1671	1736	3539	1730	3286	3421	1496
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3342		3236	3388	1671	1736	3539	1730	3286	3421	1496
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	51	999	211	577	378	1141	74	143	375	643	978	179
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	256	0	0	82
Lane Group Flow (vph)	51	1198	0	577	378	1141	74	143	119	643	978	97
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	7.7	48.0		24.8	65.1	140.0	7.9	17.2	17.2	28.0	41.3	41.3
Effective Green, g (s)	7.7	48.0		24.8	65.1	140.0	7.9	17.2	17.2	28.0	41.3	41.3
Actuated g/C Ratio	0.06	0.34		0.18	0.46	1.00	0.06	0.12	0.12	0.20	0.29	0.29
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	92	1145		573	1575	1671	97	434	212	657	1009	441
v/s Ratio Prot	0.03	c0.36		c0.18	0.11		0.04	0.04		c0.20	c0.29	
v/s Ratio Perm						0.68			0.07			0.06
v/c Ratio	0.55	1.05		1.01	0.24	0.68	0.76	0.33	0.56	0.98	0.97	0.22
Uniform Delay, d1	64.5	46.0		57.6	22.6	0.0	65.1	56.1	57.8	55.7	48.7	37.2
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	4.1	39.4		39.3	0.2	2.3	29.2	2.0	10.3	29.4	21.8	1.1
Delay (s)	68.5	85.4		96.9	22.8	2.3	94.4	58.2	68.1	85.1	70.5	38.3
Level of Service	E	F		F	C	A	F	E	E	F	E	D
Approach Delay (s)		84.7			32.0			69.0			72.6	
Approach LOS		F			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	60.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	1189	0	0	1767	531	187	500	1171	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	1845	1845	0	0	1881	1845	1759	1881	1937			
Adj Flow Rate, veh/h	452	1383	0	0	1900	0	215	575	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	499	2444	0	0	2701	825	306	654	301			
Arrive On Green	0.15	0.70	0.00	0.00	0.53	0.00	0.18	0.18	0.00			
Sat Flow, veh/h	3408	3597	0	0	5305	1568	1675	3574	1647			
Grp Volume(v), veh/h	452	1383	0	0	1900	0	215	575	0			
Grp Sat Flow(s),veh/h/ln	1704	1752	0	0	1712	1568	1675	1787	1647			
Q Serve(g_s), s	20.9	31.6	0.0	0.0	44.5	0.0	19.2	25.1	0.0			
Cycle Q Clear(g_c), s	20.9	31.6	0.0	0.0	44.5	0.0	19.2	25.1	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	499	2444	0	0	2701	825	306	654	301			
V/C Ratio(X)	0.91	0.57	0.00	0.00	0.70	0.00	0.70	0.88	0.00			
Avail Cap(c_a), veh/h	618	2523	0	0	2701	825	369	786	362			
HCM Platoon Ratio	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	0.00	0.00	0.38	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	67.2	12.1	0.0	0.0	28.5	0.0	61.3	63.7	0.0			
Incr Delay (d2), s/veh	13.4	0.8	0.0	0.0	0.6	0.0	3.2	8.8	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			
%ile BackOfQ(-26165%),veh/ln	10.8	15.4	0.0	0.0	21.1	0.0	9.2	13.2	0.0			
LnGrp Delay(d),s/veh	80.6	12.9	0.0	0.0	29.1	0.0	64.4	72.4	0.0			
LnGrp LOS	F	B			C		E	E				
Approach Vol, veh/h		1835			1900			790				
Approach Delay, s/veh		29.6			29.1			70.3				
Approach LOS		C			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		116.6			27.4	89.1		33.9
Change Period (Y+Rc), s		5.0			4.0	5.0		4.6
Max Green Setting (Gmax), s		115.2			29.0	82.2		35.2
Max Q Clear Time (g_c+I1), s		33.6			22.9	46.5		27.1
Green Ext Time (p_c), s		78.0			0.5	35.4		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	36.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	1859	306	412	1745	44	318	317	44	116	408	235
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		1.00	1.00		0.89	1.00		0.90
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	1863	1881	1900	1881	1900	1881	1881	1792	1827	1863	1918
Adj Flow Rate, veh/h	222	2112	348	468	1983	0	370	369	51	136	480	276
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	1	1	2
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	1	0	1	4	1	1	6	4	2	3
Cap, veh/h	263	2066	636	1475	3915	1231	348	931	354	156	454	847
Arrive On Green	0.08	0.41	0.41	0.42	0.76	0.00	0.10	0.26	0.26	0.09	0.24	0.24
Sat Flow, veh/h	3442	5085	1565	3510	5136	1615	3476	3574	1359	1740	1863	2573
Grp Volume(v), veh/h	222	2112	348	468	1983	0	370	369	51	136	480	276
Grp Sat Flow(s),veh/h/ln	1721	1695	1565	1755	1712	1615	1738	1787	1359	1740	1863	1287
Q Serve(g_s), s	10.2	65.0	27.2	14.3	23.9	0.0	16.0	13.6	3.5	12.4	39.0	15.4
Cycle Q Clear(g_c), s	10.2	65.0	27.2	14.3	23.9	0.0	16.0	13.6	3.5	12.4	39.0	15.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	263	2066	636	1475	3915	1231	348	931	354	156	454	847
V/C Ratio(X)	0.84	1.02	0.55	0.32	0.51	0.00	1.06	0.40	0.14	0.87	1.06	0.33
Avail Cap(c_a), veh/h	280	2066	636	1475	3915	1231	348	931	354	174	454	847
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)	0.67	0.67	0.67	0.20	0.20	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	72.9	47.5	36.3	31.0	7.4	0.0	72.0	48.8	25.9	71.9	60.5	58.9
Incr Delay (d2), s/veh	13.8	22.1	2.3	0.0	0.1	0.0	66.4	0.1	0.1	30.7	58.2	0.8
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(-26165%),veh/ln	5.3	34.6	12.1	6.9	11.2	0.0	10.9	6.7	1.3	7.3	27.4	5.6
LnGrp Delay(d),s/veh	86.8	69.6	38.5	31.0	7.4	0.0	138.4	48.9	26.0	102.6	118.7	59.7
LnGrp LOS	F	F	D	C	A		F	D	C	F	F	E
Approach Vol, veh/h		2682			2451			790			892	
Approach Delay, s/veh		67.0			12.0			89.3			98.0	
Approach LOS		E			B			F			F	

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	74.0	71.0	21.0	44.0	16.2	128.7	18.3	46.7
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	21.0	* 65	16.0	* 39	13.0	73.0	16.0	39.0
Max Q Clear Time (g_c+I1), s	16.3	67.0	18.0	41.0	12.2	25.9	14.4	15.6
Green Ext Time (p_c), s	2.5	0.0	0.0	0.0	0.1	42.8	0.0	2.4

Intersection Summary	
HCM 2010 Ctrl Delay	53.8
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	1664	218	233	2051	811	63	80	106	236	106	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.91		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.98		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	4793		1745	5136	1552	1745	1673		1641	1705	1454
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	4793		1745	5136	1552	1745	1673		1641	1705	1454
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	165	2005	263	277	2442	965	76	96	128	281	126	65
RTOR Reduction (vph)	0	9	0	0	0	237	0	31	0	0	0	55
Lane Group Flow (vph)	165	2259	0	277	2442	728	76	193	0	200	207	10
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	18.0	73.6		21.0	76.6	76.6	21.8	21.8		23.6	23.6	23.6
Effective Green, g (s)	18.0	73.6		21.0	76.6	76.6	21.8	21.8		23.6	23.6	23.6
Actuated g/C Ratio	0.11	0.46		0.13	0.48	0.48	0.14	0.14		0.15	0.15	0.15
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	362	2204		229	2458	743	237	227		242	251	214
v/s Ratio Prot	0.05	0.47		c0.16	c0.48		0.04	c0.12		c0.12	0.12	
v/s Ratio Perm						0.47						0.01
v/c Ratio	0.46	1.02		1.21	0.99	0.98	0.32	0.85		0.83	0.82	0.04
Uniform Delay, d1	66.4	43.2		69.5	41.5	41.0	62.4	67.5		66.2	66.2	58.5
Progression Factor	0.88	0.35		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	17.5		127.8	16.7	28.6	0.3	23.7		19.2	18.5	0.0
Delay (s)	58.8	32.7		197.3	58.1	69.5	62.7	91.2		85.4	84.7	58.6
Level of Service	E	C		F	E	E	E	F		F	F	E
Approach Delay (s)		34.4			71.6			84.0			81.4	
Approach LOS		C			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	59.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	106.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: N. Main St. & Treat Blvd

2/7/2017

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	51	1210	577	378	1141	74	143	375	643	978	179
v/c Ratio	0.49	1.04	1.04	0.24	0.68	0.76	0.31	0.79	0.98	0.95	0.34
Control Delay	78.5	82.7	104.8	24.0	2.3	105.8	57.5	26.8	70.9	66.6	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.5	82.7	104.8	24.0	2.3	105.8	57.5	26.8	70.9	66.6	15.7
Queue Length 50th (ft)	46	~621	~291	110	0	68	63	70	226	460	41
Queue Length 95th (ft)	78	#596	#410	154	0	#154	98	#205	#277	#598	106
Internal Link Dist (ft)		1359		306			1086			1080	
Turn Bay Length (ft)	68		243			225		102	196		90
Base Capacity (vph)	263	1158	554	1575	1671	99	455	476	657	1027	531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	1.04	1.04	0.24	0.68	0.75	0.31	0.79	0.98	0.95	0.34

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	452	1383	1900	571	215	575	1346
v/c Ratio	0.87	0.54	0.71	0.72	0.70	0.85	0.83
Control Delay	75.7	9.8	9.9	9.3	72.7	74.5	5.2
Queue Delay	0.0	0.9	0.3	0.5	0.0	0.0	2.4
Total Delay	75.7	10.7	10.2	9.8	72.7	74.5	7.6
Queue Length 50th (ft)	173	294	184	114	212	308	0
Queue Length 95th (ft)	218	354	m256	m131	287	353	0
Internal Link Dist (ft)		258	655			1047	
Turn Bay Length (ft)	220				267		437
Base Capacity (vph)	578	2540	2685	794	355	786	1616
Starvation Cap Reductn	0	785	243	40	0	0	0
Spillback Cap Reductn	0	332	0	0	0	0	158
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.79	0.78	0.76	0.61	0.73	0.92

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	222	2112	348	468	1983	50	370	369	51	136	480	276
v/c Ratio	0.83	1.06	0.47	1.09	0.91	0.07	1.10	0.41	0.12	0.86	1.06	0.26
Control Delay	102.4	76.2	13.5	98.7	25.5	1.9	143.6	52.2	0.6	113.1	114.5	17.6
Queue Delay	0.0	18.3	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	102.4	94.5	13.5	98.7	26.2	1.9	143.6	52.2	0.6	113.1	114.5	17.6
Queue Length 50th (ft)	116	~885	68	~277	252	0	~226	173	0	142	~548	58
Queue Length 95th (ft)	m#163	#934	m112	m#283	m285	m2	#312	214	0	#236	#706	82
Internal Link Dist (ft)		655			700			1075			548	
Turn Bay Length (ft)	164			235		600	264		202			125
Base Capacity (vph)	269	1997	748	428	2191	769	335	891	423	167	454	1069
Starvation Cap Reductn	0	53	0	0	50	0	0	0	0	0	0	0
Spillback Cap Reductn	0	419	0	0	0	0	0	0	14	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	1.34	0.47	1.09	0.93	0.07	1.10	0.41	0.12	0.81	1.06	0.26

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	165	2268	277	2442	965	76	224	200	207	65
v/c Ratio	0.46	1.02	1.21	0.99	0.99	0.32	0.86	0.83	0.82	0.23
Control Delay	60.2	35.9	183.3	57.5	47.8	64.7	86.0	92.1	91.0	7.7
Queue Delay	0.0	30.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.2	66.2	183.3	57.5	47.8	64.7	86.0	92.1	91.0	7.7
Queue Length 50th (ft)	89	~957	~352	~954	691	72	196	216	224	0
Queue Length 95th (ft)	m89	m#973	#493	#1045	#922	115	263	280	288	23
Internal Link Dist (ft)		700		1282			449		751	
Turn Bay Length (ft)	341		175			295		228		
Base Capacity (vph)	362	2214	229	2458	978	284	302	307	319	339
Starvation Cap Reductn	0	176	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	1.11	1.21	0.99	0.99	0.27	0.74	0.65	0.65	0.19

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

2/7/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	614	223	589	501	1030	179	401	509	626	625	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	14	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98	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	1.00
Frt	1.00	0.96		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3276		3204	3455	1682	1805	3610	1761	3351	3490	1508
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3276		3204	3455	1682	1805	3610	1761	3351	3490	1508
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	86	653	237	693	589	1212	206	461	585	673	672	238
RTOR Reduction (vph)	0	26	0	0	0	0	0	0	314	0	0	112
Lane Group Flow (vph)	86	864	0	693	589	1212	206	461	271	673	672	126
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	11.3	37.0		31.0	56.7	140.0	19.9	22.0	22.0	28.0	34.1	34.1
Effective Green, g (s)	11.3	37.0		31.0	56.7	140.0	19.9	22.0	22.0	28.0	34.1	34.1
Actuated g/C Ratio	0.08	0.26		0.22	0.41	1.00	0.14	0.16	0.16	0.20	0.24	0.24
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	140	865		709	1399	1682	256	567	276	670	850	367
v/s Ratio Prot	0.05	c0.26		c0.22	0.17		0.11	0.13		c0.20	0.19	
v/s Ratio Perm						c0.72			c0.15			0.08
v/c Ratio	0.61	1.00		0.98	0.42	0.72	0.80	0.81	0.98	1.00	0.79	0.34
Uniform Delay, d1	62.2	51.5		54.2	29.9	0.0	58.2	57.0	58.8	56.0	49.6	43.7
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	5.5	30.1		28.0	0.6	2.7	16.6	12.1	49.4	35.9	7.4	2.5
Delay (s)	67.8	81.6		82.2	30.5	2.7	74.7	69.1	108.2	91.9	57.0	46.3
Level of Service	E	F		F	C	A	E	E	F	F	E	D
Approach Delay (s)		80.4			31.3			88.3			70.2	
Approach LOS		F			C			F			E	

Intersection Summary			
HCM 2000 Control Delay	60.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	523	1155	0	0	1924	657	201	260	847	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	1845	1881	0	0	1881	1881	1881	1881	1956			
Adj Flow Rate, veh/h	556	1229	0	0	2025	0	209	271	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	921	2874	0	0	2581	804	244	486	226			
Arrive On Green	0.27	0.80	0.00	0.00	0.67	0.00	0.14	0.14	0.00			
Sat Flow, veh/h	3408	3668	0	0	5305	1599	1792	3574	1663			
Grp Volume(v), veh/h	556	1229	0	0	2025	0	209	271	0			
Grp Sat Flow(s),veh/h/ln	1704	1787	0	0	1712	1599	1792	1787	1663			
Q Serve(g_s), s	22.8	16.4	0.0	0.0	44.0	0.0	18.3	11.3	0.0			
Cycle Q Clear(g_c), s	22.8	16.4	0.0	0.0	44.0	0.0	18.3	11.3	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	921	2874	0	0	2581	804	244	486	226			
V/C Ratio(X)	0.60	0.43	0.00	0.00	0.78	0.00	0.86	0.56	0.00			
Avail Cap(c_a), veh/h	921	2874	0	0	2581	804	392	782	364			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.51	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	50.9	4.7	0.0	0.0	20.5	0.0	67.6	64.6	0.0			
Incr Delay (d2), s/veh	0.8	0.5	0.0	0.0	1.3	0.0	5.8	0.4	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			
%ile BackOfQ(-26165%),veh/ln	10.8	8.2	0.0	0.0	20.8	0.0	9.4	5.6	0.0			
LnGrp Delay(d),s/veh	51.7	5.2	0.0	0.0	21.8	0.0	73.4	65.0	0.0			
LnGrp LOS	D	A			C		E	E				
Approach Vol, veh/h		1785			2025			480				
Approach Delay, s/veh		19.7			21.8			68.6				
Approach LOS		B			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		133.6			48.2	85.4		26.4
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		115.4			31.0	* 80		35.0
Max Q Clear Time (g_c+I1), s		18.4			24.8	46.0		20.3
Green Ext Time (p_c), s		44.4			5.3	31.9		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	26.1
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	144	1657	201	292	1877	93	259	448	174	128	354	445
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		1.00	1.00		0.93	1.00		0.94
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	1881	1900	1881	1881	1976	1900	1863	1881	1845	1827	1937
Adj Flow Rate, veh/h	160	1841	223	301	1935	0	282	487	189	147	407	511
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	1	1	2
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	0	1	1	0	0	2	1	3	4	2
Cap, veh/h	202	2118	646	343	2387	781	326	893	376	167	454	850
Arrive On Green	0.04	0.28	0.28	0.20	0.93	0.00	0.09	0.25	0.25	0.10	0.25	0.25
Sat Flow, veh/h	3442	5136	1565	3476	5136	1680	3510	3539	1492	1757	1827	2737
Grp Volume(v), veh/h	160	1841	223	301	1935	0	282	487	189	147	407	511
Grp Sat Flow(s),veh/h/ln	1721	1712	1565	1738	1712	1680	1755	1770	1492	1757	1827	1369
Q Serve(g_s), s	7.4	54.6	18.2	13.5	17.2	0.0	12.7	19.1	13.2	13.2	34.5	18.4
Cycle Q Clear(g_c), s	7.4	54.6	18.2	13.5	17.2	0.0	12.7	19.1	13.2	13.2	34.5	18.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	202	2118	646	343	2387	781	326	893	376	167	454	850
V/C Ratio(X)	0.79	0.87	0.35	0.88	0.81	0.00	0.87	0.55	0.50	0.88	0.90	0.60
Avail Cap(c_a), veh/h	215	2118	646	391	2387	781	351	893	376	198	468	872
HCM Platoon Ratio	0.67	0.67	0.67	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.87	0.09	0.09	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	75.9	53.8	40.6	63.3	3.6	0.0	71.6	51.9	29.8	71.5	58.1	26.3
Incr Delay (d2), s/veh	15.1	4.5	1.3	1.9	0.3	0.0	17.7	0.4	0.4	27.3	22.0	2.6
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(-26165%),veh/ln	4.0	26.8	8.1	6.5	6.8	0.0	6.9	9.4	5.5	7.7	20.2	7.3
LnGrp Delay(d),s/veh	91.0	58.3	41.9	65.2	3.9	0.0	89.3	52.3	30.2	98.8	80.1	28.9
LnGrp LOS	F	E	D	E	A		F	D	C	F	F	C
Approach Vol, veh/h		2224			2236			958			1065	
Approach Delay, s/veh		59.0			12.2			58.8			58.1	
Approach LOS		E			B			E			E	

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	21.8	72.0	19.8	44.8	13.4	80.4	19.2	45.4
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	18.0	* 66	16.0	* 41	10.0	74.0	18.0	39.0
Max Q Clear Time (g_c+I1), s	15.5	56.6	14.7	36.5	9.4	19.2	15.2	21.1
Green Ext Time (p_c), s	0.3	9.1	0.2	3.3	0.0	48.1	0.0	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	42.7
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1774	135	210	2008	307	153	32	392	505	118	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.91		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00
Satd. Flow (prot)	3385	5051		1728	5136	1503	1745	1579		1641	1681	1456
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00
Satd. Flow (perm)	3385	5051		1728	5136	1503	1745	1579		1641	1681	1456
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	56	1993	152	228	2183	334	180	38	461	856	200	220
RTOR Reduction (vph)	0	5	0	0	0	100	0	148	0	0	0	102
Lane Group Flow (vph)	56	2140	0	228	2183	234	180	351	0	522	534	118
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	12.8	54.0		17.0	58.2	58.2	26.0	26.0		43.0	43.0	43.0
Effective Green, g (s)	12.8	54.0		17.0	58.2	58.2	26.0	26.0		43.0	43.0	43.0
Actuated g/C Ratio	0.08	0.34		0.11	0.36	0.36	0.16	0.16		0.27	0.27	0.27
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	270	1704		183	1868	546	283	256		441	451	391
v/s Ratio Prot	0.02	c0.42		0.13	c0.43		0.10	c0.22		c0.32	0.32	
v/s Ratio Perm						0.16						0.08
v/c Ratio	0.21	1.26		1.25	1.17	0.43	0.64	1.37		1.18	1.18	0.30
Uniform Delay, d1	68.9	53.0		71.5	50.9	38.4	62.6	67.0		58.5	58.5	46.6
Progression Factor	0.64	0.55		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	117.8		147.9	82.1	2.5	3.4	189.5		103.6	103.4	0.2
Delay (s)	44.2	146.9		219.4	133.0	40.8	66.0	256.5		162.1	161.9	46.7
Level of Service	D	F		F	F	D	E	F		F	F	D
Approach Delay (s)		144.3			128.9			206.0			142.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	143.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	119.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: N. Main St. & Treat Blvd

2/7/2017

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	86	890	693	589	1212	206	461	585	673	672	238
v/c Ratio	0.61	1.00	0.98	0.42	0.72	0.80	0.81	0.99	1.00	0.79	0.50
Control Delay	80.1	78.6	82.6	31.6	2.7	80.8	69.3	55.7	74.8	57.9	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.1	78.6	82.6	31.6	2.7	80.8	69.3	55.7	74.8	57.9	21.7
Queue Length 50th (ft)	77	414	326	200	0	182	216	224	~227	307	68
Queue Length 95th (ft)	132	#564	#410	250	0	260	269	#433	#297	#410	159
Internal Link Dist (ft)		1359		309			1086			1080	
Turn Bay Length (ft)	68		243			225		102	196		90
Base Capacity (vph)	211	892	709	1400	1682	296	567	591	670	849	479
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	1.00	0.98	0.42	0.72	0.70	0.81	0.99	1.00	0.79	0.50

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	556	1229	2025	692	209	271	882
v/c Ratio	0.87	0.45	0.71	0.78	0.81	0.51	0.53
Control Delay	78.0	6.6	11.8	12.6	88.3	65.0	1.2
Queue Delay	0.0	0.5	0.3	0.6	0.0	0.0	0.0
Total Delay	78.0	7.1	12.1	13.2	88.3	65.0	1.3
Queue Length 50th (ft)	294	191	224	132	215	139	0
Queue Length 95th (ft)	#388	294	361	m193	294	176	0
Internal Link Dist (ft)		255	655			1047	
Turn Bay Length (ft)	220				267		437
Base Capacity (vph)	636	2731	2838	885	378	781	1652
Starvation Cap Reductn	0	966	270	38	0	0	0
Spillback Cap Reductn	0	34	0	0	0	0	16
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.70	0.79	0.82	0.55	0.35	0.54

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	160	1841	223	301	1935	96	282	487	189	147	407	511
v/c Ratio	0.78	0.88	0.31	0.83	0.86	0.12	0.86	0.56	0.37	0.85	0.88	0.49
Control Delay	102.4	45.6	12.3	34.3	9.1	0.0	95.4	55.6	8.1	107.2	78.3	25.6
Queue Delay	0.0	0.6	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	102.4	46.1	12.3	34.3	9.8	0.0	95.4	55.6	8.1	107.2	78.3	25.6
Queue Length 50th (ft)	89	655	49	153	100	0	152	237	0	152	411	151
Queue Length 95th (ft)	#146	563	103	m141	m76	m0	#226	299	65	#251	#557	189
Internal Link Dist (ft)		655			700			1075			548	
Turn Bay Length (ft)	164			235		600	264		202			125
Base Capacity (vph)	207	2081	727	364	2250	825	338	873	509	190	468	1060
Starvation Cap Reductn	0	53	0	0	101	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.91	0.31	0.83	0.90	0.12	0.83	0.56	0.37	0.77	0.87	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	56	2145	228	2183	334	180	499	522	534	220
v/c Ratio	0.19	1.26	1.25	1.15	0.51	0.64	1.24	1.18	1.18	0.45
Control Delay	43.4	145.6	202.9	119.5	24.1	73.8	159.2	152.9	151.7	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.4	145.6	202.9	119.5	24.1	73.8	159.2	152.9	151.7	20.7
Queue Length 50th (ft)	30	~1046	~295	~1032	148	178	~481	~687	~703	67
Queue Length 95th (ft)	m35	#1116	#475	#1119	253	250	#641	447	455	47
Internal Link Dist (ft)		700		1282			449		751	
Turn Bay Length (ft)	341		175			295		228		
Base Capacity (vph)	338	1709	183	1893	653	283	404	441	452	492
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	1.26	1.25	1.15	0.51	0.64	1.24	1.18	1.18	0.45

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Alternatives Traffic Analysis Report

Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

Prepared for

Contra Costa County Department of Conservation and Development

Prepared By

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July 22, 2015

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P:\P\14\14070-000 Contra Costa Treat Blvd Bicycle and Pedestrian Plan\Documents\Alternative Evaluation

1.0 SUMMARY

This report presents a traffic impact evaluation for four design scenarios meant to improve the transportation environment for pedestrians and bicycles along Treat Boulevard. The field observations on this corridor indicate that there are high vehicle turning volumes that conflict with pedestrians, high weaving volumes that create a challenging environment for cyclists, and that the current infrastructure could be improved to better serve these populations.

The performance of four study intersections was evaluated for AM and PM peak periods for the current year (2014) traffic conditions and future year (2040) traffic conditions. The study concept geometric improvements as well as traffic signal timing improvements were evaluated to determine the performance of the Existing Condition network (for current year analysis) and the Future No-Build network (for future year analysis) using Synchro. Impacts of supplemental alternatives were also analyzed.

The results, summarized in Table 1, indicate that the design alternatives result in little impact on Treat Boulevard for the current year traffic conditions. For future year traffic conditions, the design alternatives result in some impact to the intersection Level of Service (LOS) and the network performance, but these impacts are relatively small. The safety benefits for pedestrians and cyclists achieved by these improvements outweigh the small increase in delay for vehicles.

Table 1: Summary of Significant Impacts

Parameter	***Concept 1B***	***Concept 2***	***Concepts 3and 4***	***Supplemental 1B***
Current Year (2014)				
Arterial LOS	None	None	None	N/A
Intersection Impact	Congestion causes small delay increase at Main Street, Buskirk Avenue, LOS deterioration at Oak Road (LOS E)	Congestion causes small delay increase at Main Street, Oak Road	Congestion causes small delay increase at Main Street, Oak Road	Congestion impacts Jones Road (for 150s Cycle length)
Future Year (2040)				
Arterial LOS	None	None	None	N/A
Intersection Impact	Congestion causes small delay increase at Main Street, Buskirk Avenue, Oak Road	Congestion causes small delay increase at Main Street, Oak Road	Congestion causes small delay increase at Main Street, Oak Road	Congestion causes delay increase (for each supplemental alternative)

Note: The performance of Concept 1A was not analyzed because it will have little effect on network performance and it is a temporary/ short term improvement.

2.0 INTRODUCTION

2.1 Introduction

The Contra Costa Centre Transit Oriented Development (TOD) in Walnut Creek is characterized by mixed commercial and residential land use. This area contains the Pleasant Hill BART Station and is accessed by pedestrians and cyclists via the Iron Horse Trail or Geary Road, west of N. Main Street. Though nearly complete, this area is lacking adequate pedestrian and bicycle infrastructure connecting the area west of the Interstate-680 (I-680) overcrossing with Treat Boulevard destinations, such as the BART Station and the Iron Horse Trail.

This area represents a gap in the pedestrian and bicycle transportation network. In the study corridor there are as many as nine travel lanes and there is a lack of sidewalk connectivity and no sidewalk between Main Street and the I-680 northbound ramp/Buskirk Avenue. As a result of poor pedestrian infrastructure, pedestrians dart into Treat Boulevard to cross the street rather than using crosswalks. Cyclists and pedestrians conflict with heavy traffic entering and exiting I-680. No bicycle facilities exist on Treat Boulevard in this study area.

With the goal of providing more livable communities, Contra Costa County Department of Conservation and Development has decided to complete the I-680/Treat Boulevard Bicycle and Pedestrian Plan. To finish the bicycle and pedestrian transportation network, Contra Costa County has targeted Treat Boulevard between Main Street and Jones Road to provide more efficient access from the Iron Horse Trail to businesses and restaurants on Main Street, focusing especially on the I-680 interchange. The Transportation for Livable Communities (TLC) program is the funding source for this project, which is managed by the Contra Costa Transportation Authority (CCTA).

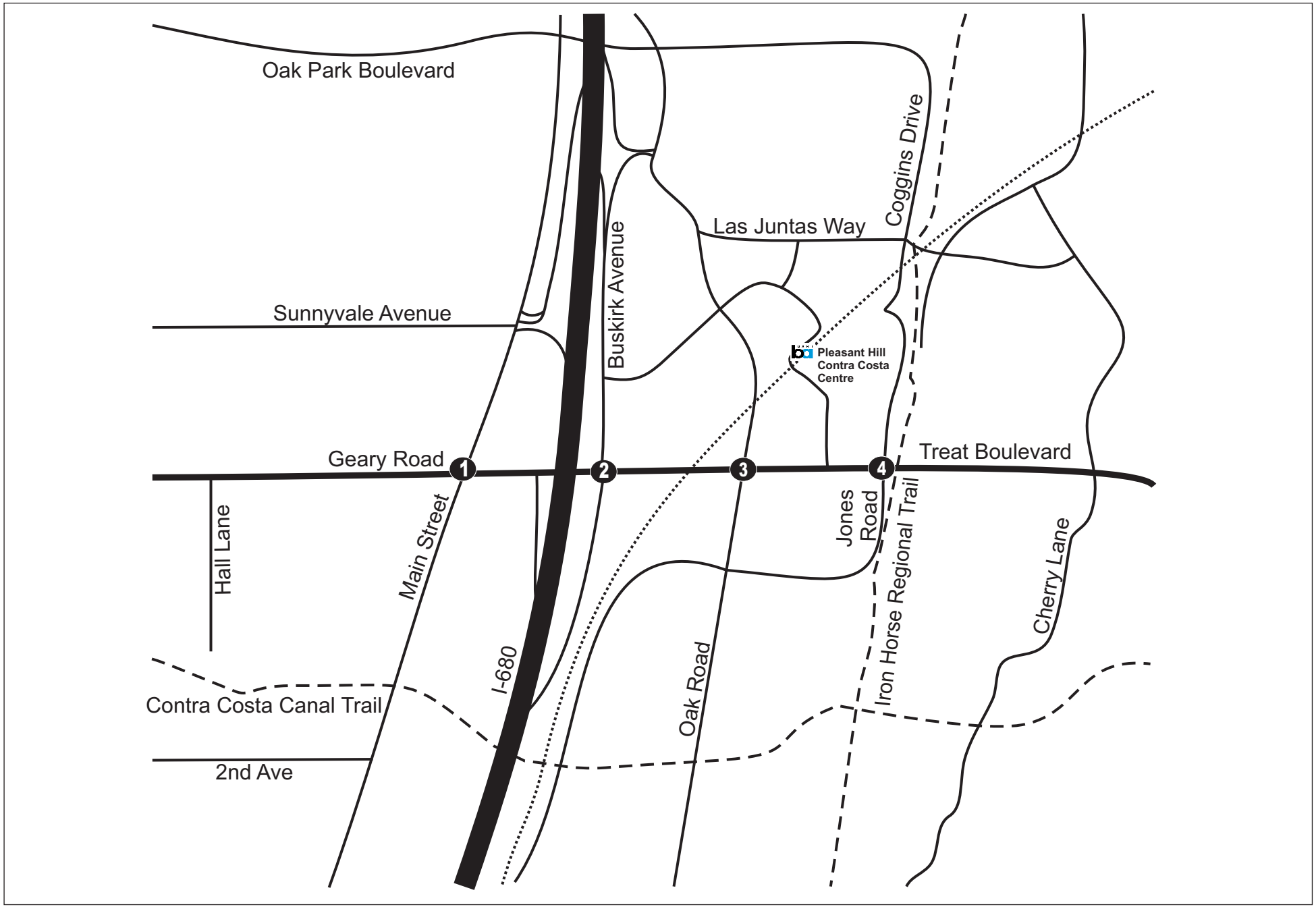
This project includes the following intersections:

- Treat Boulevard/Geary Road and Main Street
- Treat Boulevard and Buskirk Avenue/I-680 northbound ramps
- Treat Boulevard and Oak Road
- Treat Boulevard and Jones Road/Iron Horse Trail

Figure 1 shows a vicinity map of the study corridor.

As with any project that requires signal retiming and intersection reconfiguration, support of the city is important. The City of Walnut Creek is proactive about signal timing. Currently DKS is conducting a signal timing project as part of the Metropolitan Transportation Commission (MTC) Program for Arterial System Synchronization (PASS) on several corridors in Walnut Creek, including Main Street and Geary Road (Treat Boulevard west of Main Street). Another consultant is working on implementing a Traffic Responsive Signal Timing strategy along Treat Boulevard by June of 2015.

The existing conditions of the study corridor are described in the memorandum titled "Existing Traffic Conditions Report", attached in Appendix A.



LEGEND

00 - Study Intersection
—— - Street
– – – - Trail
· · · · · · - BART Line

DKS

NO SCALE

Figure 1

Walnut Creek Study Area Map

2.2 Improvement Concepts

To provide improved mobility and access for pedestrians and bicyclists, four concepts were developed, and are listed below. The goal of the roadway improvement concepts is to improve the environment for pedestrians and cyclists without significantly impacting the travel experience along the Treat Boulevard corridor for the automobile mode of transportation. These concepts were provided by Alta Planning ("Treat Boulevard Concepts – Modeling Guidance" Memorandum (November 5, 2014), attached in Appendix B), and described briefly below.

- Concept 1A: Minor Striping Enhancements
- Concept 1B: Buffered Bike Lanes
- Concept 2: Shared Use Path and Buffered Bike Lanes
- Concept 3: Shared Use Path, Cycle Track and Sidewalk
- Concept 4: Shared Use Path and Sidewalk

Concept 1A is a short-term minor modification to the existing lane configuration between Main Street and Buskirk Avenue. It provides for restriping of the lanes to accommodate on street bike lanes. It also includes high visibility crosswalks at each of the four study intersections. Special bike markings are also added to enhance visibility of the bike lanes at critical locations. Due to the limited effect of this alternative and its temporary nature, this alternative was not evaluated.

Concept 1B proposes the addition of a buffered bike lane westbound along Treat Boulevard from Jones Road to N. Main Street. This entails the conversion of the westbound shoulder area and right turn bay between Jones Road and Oak Road to the buffered bike lane. The outside westbound lane between Oak Road and N. Main Street would also be converted to the buffered bike lane. The southbound channelized right turn at Oak Road would be restricted to bicycle use only, eliminating the free right turn movement for vehicles.

In Concept 2, a shared use path and buffered bike lane would be added westbound along Treat Boulevard. This involves conversion of the westbound shoulder area and right turn bay between Jones Road and Oak Road to a buffered bike lane, with parking remaining intact along the outside of the segment. The shared use path would be built along the north sidewalk from Oak Road to N. Main Street, traveling through the north side of the Treat Boulevard/Oak Road intersection, and eliminating the southbound channelized right turn lane for vehicles.

In Concept 3, a shared use path and cycle track would be added westbound along Treat Boulevard. This involves conversion of the westbound shoulder area and right turn bay between Jones Road and Oak Road to a cycle track, with parking located between the bicycle facility and lanes of travel. The shared use path would be built along the north sidewalk from Oak Road to N. Main Street, traveling through the north side of the Treat Boulevard/Oak Road intersection, and eliminating the southbound channelized right turn lane for vehicles.

Concept 4, a shared use path would be added westbound along Treat Boulevard. Concept 4 focuses on providing for two way bicycle travel along the north side of Treat Boulevard and enhancing pedestrian travel on the south side. High visibility "ladder" type crosswalk striping, yield lines and signs would be provided at the channelized right-turns. All curb ramps would be replaced to meet America with Disabilities Act (ADA) standards. Removing the southbound channelized right-turn at Oak Road and Jones Road will eliminate the weaving of westbound motorists between Oak Road and the I-680 ramps. This is expected to improve traffic operation and safety. A focused analysis for Concept 4 is attached in Appendix E.

As instructed in the modeling guidance memorandum, only the improvements in the westbound direction were evaluated. Concept 1A, the short-term improvement scenario, was not modeled as the impact on vehicular traffic would be very small and would not be captured by the Synchro model.

This report presents a traffic analysis for Concepts 1B, 2, 3, and 4 for the weekday AM and PM peak periods for the current year (2014) and for a future year (2040). Measures of Effectiveness include traffic delays, the emission of harmful greenhouse gases, and automobile travel time along the study corridor.

3.0 ANALYSIS METHOD

This section describes the study intersections, study scenarios, methods used to evaluate concept performance, development of the model, and the impact criteria.

3.1 Study Intersections

The Treat Boulevard study segment extends from Main Street to Jones Road. The following intersections were selected for the project:

- Treat Boulevard/Geary Road and Main Street
- Treat Boulevard and Buskirk Avenue/I-680 northbound ramps
- Treat Boulevard and Oak Road
- Treat Boulevard and Jones Road

All four intersections are operated by the City of Walnut Creek. Buskirk Avenue, Oak Road, and Jones Road on Treat Boulevard run actuated-coordinated east-west during daytime hours. However, Main Street operates in coordination with Ygnacio Valley Road (coordinated north-south) during the day. Treat Boulevard/Geary Road/Main Street has a different cycle length than the three other study intersections during the AM peak period.

3.2 Study Scenarios

The traffic analysis was completed for the following three concepts. These concepts are described in more detail in the "Treat Boulevard Concepts – Modeling Guidance" Memorandum (November 5, 2014), attached in Appendix B.

- Concept 1B: Buffered Bike Lanes
- Concept 2: Shared Use Path and Buffered Bike Lanes
- Concept 3: Shared Use Path, Cycle Track and Sidewalk
- Concept 4: Shared Use Path and Sidewalk

Each concept was analyzed under both A.M. and P.M. peak hour conditions for the current year (2014) and the future year (2040).

Supplemental Scenarios

Three additional scenarios were tested in the Concept 1B AM network to investigate the expected traffic impact that may result in implementing additional traffic signal strategies to enhance pedestrian and cyclist traffic safety. Traffic signal timing strategies are listed as follows:

- Leading Pedestrian Interval (Treat Blvd/Oak Rd intersection only) – this timing element provides a leading walk symbol to pedestrians before concurrent vehicle phases receive green, allowing pedestrians to establish themselves in the roadway before vehicles begin to move. In this case, the timing allows pedestrians to reach the center of the first travel lane before the concurrent vehicle phase is called.
- 150s Cycle Length (Treat Blvd/Buskirk Ave, Treat Blvd/Oak Rd, Treat Blvd/Jones Rd) – The cycle length for these three intersections was reduced from 160s to 150s. The green time for the westbound and eastbound movement was reduced first and the side street green was reduced when necessary.
- Protected/concurrent phasing (Treat Blvd/Oak Rd intersection only) – Protected concurrent phasing was applied to the westbound right turn movement (which receives a green turn arrow along with the southbound left turn) and the northbound right turn movement (which receives a green arrow with the westbound left turn). In this case right turn on red was prohibited for these movements to provide safe crossing for pedestrians.

3.3 Level of Service (LOS) Analysis Methods and Parameters

LOS is a qualitative description of intersection operation that uses an A through F letter rating system related to travel delay and congestion. LOS A indicates free flow conditions with little or no delay, while LOS F indicates jammed conditions with excessive delays and long back-ups.

Signalized Intersections

Peak hour intersection conditions are reported as average control delay with corresponding levels of service. LOS ratings are qualitative descriptions of intersection operations and are reported using an A through F letter rating system to describe travel delay and congestion. The operating conditions at signalized intersections were evaluated using the 2000 and 2010 Highway Capacity Manual (HCM) Signalized intersections methods.

Arterials

Arterial roadway LOS was evaluated using the HCM 2000 Urban Street methods contained in the Synchro version 8 software analysis program.

3.4 Model Development

The Synchro model developed for the previous task was used as a base to develop the models for each concept for each scenario. To make the corridor more pedestrian and bicycle friendly, the following three signal timing elements were updated for each intersection for each scenario:

- The pedestrian walk time was increased to 7 seconds.
- The pedestrian clearance interval (flashing don't walk) was increased to provide sufficient time for pedestrians to clear the intersection. As the pedestrian crossing time is dependent on crosswalk length, the increase in the pedestrian clearance interval varied by crosswalk.
- The minimum green time was increased to provide sufficient green time for cyclists to clear the intersection before the onset of the yellow timing interval. As the bicycle crossing time is dependent on intersection width, the increase in minimum green time varied by intersection approach.

The Synchro networks were optimized for each concept for the current year. For the future year, the Synchro networks were optimized for each concept and the future no-build network.

3.5 Significant Impact Criteria

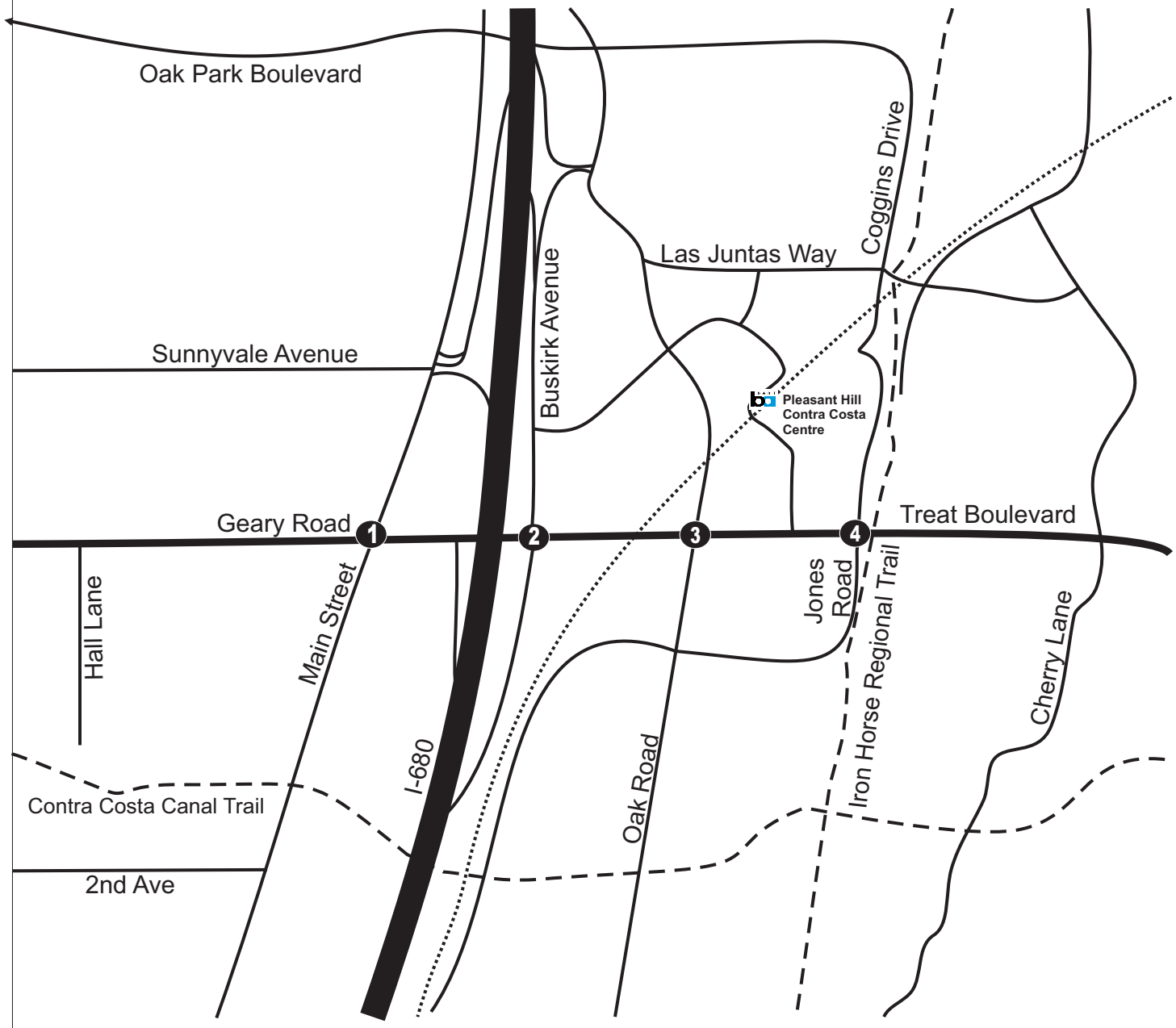
The traffic analysis relies on standards of significance established by the jurisdictions within the study area that are used to determine whether a project would result in a significant impact and to indicate a need for mitigation measures. To determine which intersections would be impacted by the Project, intersection delay estimates and LOS were used.

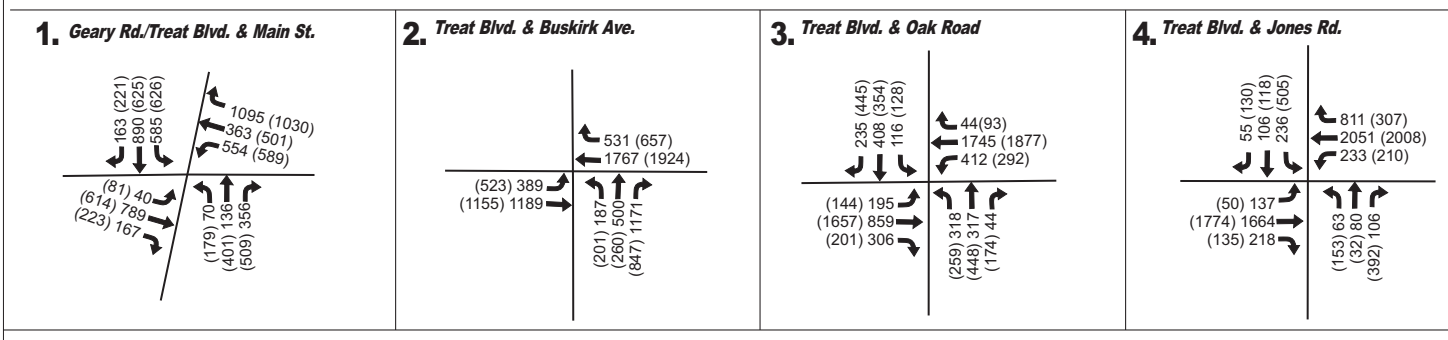
The City of Walnut Creek and the Contra Costa Transportation Authority (CCTA) Growth Management Program both use a standard of LOS D. The County General Plan uses a standard of low LOS E.

4.0 LONG TERM CUMULATIVE (2040) CONDITIONS

This section includes the traffic volume forecasts for 2040 conditions. Future year volumes were developed using the CCTA Travel Demand Model (TDM). This model assigns trips based on the projected population growth and land use. It also incorporates planned projects. The changes in segment volumes between the 2014 and 2040 CCTA TDM were applied to the existing volumes to attain future year segment volumes. These were then processed into turning movement volumes using the furness adjustment method. This task

was completed for both the AM and PM peak periods. Figure 2 shows the A.M. peak hour and P.M. peak hour vehicle turning movement counts for the four study intersections.





LEGEND

00 - Study Intersection

XX (YY) - AM (PM) Turning Movement Counts

P:\P\14\14070-000

DKS

Figure 2

Future Turn Movement Volumes

5.0 CONCEPT EVALUATION – CURRENT YEAR 2014

Each concept was evaluated using current year (2014) traffic volumes to provide a basis to assess the concept alternatives under future traffic conditions. The performance of each concept was evaluated against the performance of the existing geometry and traffic control system.

Table 2 summarizes the estimated measures of effectiveness (MOEs) from the Synchro models for each concept alternative for the current year traffic conditions. Appendix C contains the Synchro model output results for the Arterial Levels of Service and the MOEs for Treat Boulevard under each of the study scenarios. The MOEs include such corridor performance measures as average number of stops per vehicle, total delay, average speeds, travel time, and emissions. Total delay and number of stops are measured as an average per vehicle. However, the travel time is measured as the cumulative travel time experienced by all vehicles on the corridor. The performance of the proposed improvement concepts is compared with the performance of the existing layout of Treat Boulevard in Table 3.

It should be noted that the network offsets (the time green begins for the coordinated phase at each coordinated intersection) were optimized for the study concepts, which explains positive network impacts.

Table 2: System Measures of Effectiveness from Current Year (2014) Synchro Models

Roadway	*Approach*	*Peak Hour*	*Total Delay/ Vehicle (sec/veh)*	*Stops/ Vehicle*	*Total Travel Time (hr)*	*Average[1] Speed (mph)*	*CO Emissions (kg)*	*NOx Emissions (kg)*	*Arterial LOS*
Existing	Westbound	A.M.	22	0.43	103	15	9.27	1.80	D
		P.M.	23	0.43	91	13	8.07	1.57	E
	Eastbound	A.M.	36	0.53	99	9	8.16	1.59	F
		P.M.	32	0.55	95	10	8.18	1.59	E
Concept 1b*	Westbound	A.M.	20	0.47	99	15	9.3	1.81	D
		P.M.	18	0.39	79	15	7.3	1.42	E
	Eastbound	A.M.	35	0.49	95	10	7.83	1.52	F
		P.M.	27	0.48	85	11	7.4	1.44	E
Concept 2*	Westbound	A.M.	20	0.47	98	15	9.24	1.8	D
		P.M.	19	0.40	80	15	7.36	1.43	E
	Eastbound	A.M.	36	0.50	99	9	8.06	1.57	F
		P.M.	27	0.48	84	11	7.35	1.43	E
Concept 3*	Westbound	A.M.	20	0.47	98	15	9.24	1.8	D
		P.M.	19	0.40	80	15	7.36	1.43	E
	Eastbound	A.M.	36	0.50	99	9	8.06	1.57	F
		P.M.	27	0.48	84	11	7.35	1.43	E
Concept 4*	Westbound	A.M.	20	0.47	98	15	9.24	1.8	D
		P.M.	19	0.40	80	15	7.36	1.43	E
	Eastbound	A.M.	36	0.50	99	9	8.06	1.57	F
		P.M.	27	0.48	84	11	7.35	1.43	E

Notes: Total Delay/Vehicle (sec/veh) = The control delay plus the queue delay experienced per vehicle.
Travel Time (hr) = The total time taken for all vehicles to travel through the corridor.
CO Emissions (kg) = The amount of Carbon Monoxide emissions by all vehicles traveling along the corridor in a period of one hour.
NOx Emissions (kg) = The amount of Nitrogen Monoxide emissions by all vehicles traveling along the corridor in a period of one hour.
[1]Average speed accounts for traffic signal delay at the study intersections and queuing delay.
*Network optimized results.

5.1 Current Year Concept Outcomes

Overall network performance is not negatively impacted for the current year. The high weaving volumes observed between Oak Road and the I-680 ramps are mitigated with each of the study concepts. Although the removal of the southbound free right turn at Oak Road can affect individual intersection performance, removing the inefficient and unsafe weaving behavior on this segment seems to have a positive effect on the network performance.

Individual intersection LOS was also analyzed to assess the potential impacts of the concept alternatives. Table 4 presents the findings. As shown, intersection delay is high in general under existing conditions. Concept 1B results in some delay increase at Main Street, I-680/Buskirk, and Oak Road. Concepts 2 and 3 result in some delay increase at Main Street and Oak Road. LOS generally remains the same, except at Oak Road, which deteriorates, and Jones Road during the morning peak period, which improves to a C.

Optimization improves the overall performance of the corridor, indicating limited network impact from any of the proposed alternatives. Additionally, optimizing the corridor results in improved performance of the Treat Boulevard/Jones Road intersection but decreased efficiency of the Treat Boulevard/Oak Road intersection.

Each of the study concepts would result in an improved transportation network for pedestrians and cyclists. Although the study concepts result in some delay impact at individual intersections, this delay increase is relatively small, especially compared to the benefits for other transportation modes.

Table 3: System Measures of Effectiveness Scenario Comparison for Current Year (2014)

Roadway	*Approach*	*Peak Hour*	*Total Delay/ Vehicle (sec/veh)*	*Stops/ Vehicle*	*Total Travel Time (hr)*	*Average[1] Speed (mph)*	*CO Emissions (kg)*	*NOx Emissions (kg)*	*Arterial LOS*
B-A: Concept 1b (-) Existing	Westbound	A.M.	-2	0.04	-4	0	0.03	0.01	No Change
		P.M.	-5	-0.04	-12	2	-0.77	-0.15	No Change
	Eastbound	A.M.	-1	-0.04	-4	1	-0.33	-0.07	No Change
		P.M.	-5	-0.07	-10	1	-0.78	-0.15	No Change
C-A: Concept 2 (-) Existing	Westbound	A.M.	-2	0.04	-5	0	-0.03	0.00	No Change
		P.M.	-4	-0.03	-11	2	-0.71	-0.14	No Change
	Eastbound	A.M.	0	-0.03	0	0	-0.10	-0.02	No Change
		P.M.	-5	-0.07	-11	1	-0.83	-0.16	No Change
D-A: Concept 3 (-) Existing	Westbound	A.M.	-2	0.04	-5	0	-0.03	0.00	No Change
		P.M.	-4	-0.03	-11	2	-0.71	-0.14	No Change
	Eastbound	A.M.	0	-0.03	0	0	-0.10	-0.02	No Change
		P.M.	-5	-0.07	-11	1	-0.83	-0.16	No Change
E-A: Concept 4 (-) Existing	Westbound	A.M.	-2	0.04	-5	0	-0.03	0.00	No Change
		P.M.	-4	-0.03	-11	2	-0.71	-0.14	No Change
	Eastbound	A.M.	0	-0.03	0	0	-0.10	-0.02	No Change
		P.M.	-5	-0.07	-11	1	-0.83	-0.16	No Change

Table 4: Intersection LOS Comparison for Current Year (2014)

Intersection	*Peak Hour*	*Existing*		*Concept 1B*		*Concept 2*		*Concepts 3 & 4*	
		Control Delay (s)	*LOS*	*Control Delay (s)*	*LOS*	*Control Delay (s)*	*LOS*	*Control Delay (s)*	*LOS*
Treat Boulevard and Main Street*	A.M.	55.7	E	60.0	E	60.1	E	60.1	E
	P.M.	42.9	D	41.1	D	42.2	D	42.2	D
Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue	A.M.	30.3	C	32.9	C	30.3	C	30.3	C
	P.M.	17.5	B	17.7	B	17.4	B	17.4	B
Treat Boulevard and Oak Road	A.M.	46.8	D	55.5	E	53.6	D	53.6	D
	P.M.	19.3	B	39.4	D	40.1	D	40.1	D
Treat Boulevard and Jones Road*	A.M.	37.6	D	28.8	C	29.8	C	29.8	C
	P.M.	49.8	D	37.7	D	38.2	D	38.2	D

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.

The similarity in the results for Concepts 3 and 4 in Tables 2, 3, and 4 is because the two concepts are essentially the same in terms of the number of lanes and capacity along the segment of Treat Boulevard from N. Main Street to Jones Road. However, the two concepts differ with minor improvements listed as follows:

1. The segment of Treat Boulevard between N. Main Street and Buskirk Avenue has a side walk on the south side of the roadway, which Concept 3 does not have.
2. Concept 3 includes a Class II eastbound bicycle lane whereas Concept 4 has a Sharrow in lieu of the on street bike lane. But the number of eastbound travel lanes on Treat Boulevard is essentially the same in the eastbound direction.
3. The segment of Treat Boulevard between Buskirk Avenue and Jones Road has the same number of travel lanes in each of the eastbound and westbound directions.

Additionally, a focused analysis of Concept 4, the preferred alternative is attached in Appendix E.

5.2 Supplemental Alternative Evaluation

Three additional signal timing scenarios were tested in the Concept 1B AM network to investigate the expected traffic impact that may result in implementing additional traffic signal strategies to enhance pedestrian and cyclist traffic safety. These timing scenarios were described in more detail in section 3.2 in the Supplemental Scenarios subsection.

The supplemental analysis results are shown in Table 5 and are compared against the base 1B AM network. The leading pedestrian interval and protected/concurrent phasing alternatives were tested at the Oak Road intersection only. The 150s cycle length alternative was tested at the I-680/Buskirk Avenue, Oak Road, and Jones Road intersections.

As noted before, the HCM 2010 analysis was used as a basis for the I-680/Buskirk Avenue and Oak Road intersections and the HCM 2000 analysis was used for the Jones Road

intersection. However, limitations in the HCM 2010 methods prevented analysis for the leading pedestrian interval, and this alternative was analyzed using the HCM 2000 methods as indicated by an asterisk. The Base 1B Concept performance is shown for HCM 2010 and HCM 2000, also marked with an asterisk.

The leading pedestrian interval and protected/concurrent phasing do not appear to affect traffic. Decreasing the cycle length from 160s to 150s results in a negative impact at Jones Road but a slightly positive impact for the I-680/Buskirk Avenue and Oak Road intersections.

Table 5: Supplemental Analysis Intersection LOS for Current Year (2014)

Intersection	*Peak Hour*	*Base Concept 1B*		*Leading Pedestrian Interval*		*Cycle Length = 150s*		*Protected/ Concurrent Phasing*	
		Control Delay (s)	*LOS*	*Control Delay (s)*	*LOS*	*Control Delay (s)*	*LOS*	*Control Delay (s)*	*LOS*
Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue	A.M.	32.9	C			30.5	C		
Treat Boulevard and Oak Road	A.M.	55.5 (45.6*)	E (D*)	45.7*	D*	53.8	D	55.4	E
Treat Boulevard and Jones Road*	A.M.	28.8	C			47.5	D		

Notes: HCM 2010 unless specified by *.

*HCM 2000 analysis due to HCM 2010 limitations. Both HCM version results are shown for Base Concept 1B at Treat Boulevard and Oak Road because the HCM 2010 analysis could not be used for the Leading Pedestrian Interval evaluation.

6.0 CONCEPT EVALUATION – FUTURE YEAR 2040

The future year (2040) volumes were applied to the existing network geometry to develop the future No-Build alternative. Each concept was then evaluated under future year traffic conditions and compared to the future No-Build network performance. For the purpose of this analysis, all networks were optimized, including the No-Build alternative.

Table 6 summarizes the estimated measures of effectiveness (MOEs) from the Synchro models for each alternative for the future year. Appendix D contains the Synchro model output results for the Arterial LOS and the MOEs for each signal corridor. The MOEs include such corridor performance measures as average number of stops per vehicle, total delay, average speeds, travel time, and emissions. The network was optimized for each scenario.

Table 6: System Measures of Effectiveness from Future Year (2040) Synchro Models

Roadway	*Approach*	*Peak Hour*	*Total Delay/ Vehicle (sec/veh)*	*Stops/ Vehicle*	*Total Travel Time (hr)*	*Average[1] Speed (mph)*	*CO Emissions (kg)*	*NOx Emissions (kg)*	*Arterial LOS*
No Build	Westbound	A.M.	27	0.42	137	13	11.64	2.27	E
		P.M.	79	0.39	300	5	19.76	3.84	F
	Eastbound	A.M.	59	0.61	175	6	13.13	2.55	F
		P.M.	63	0.55	176	6	12.73	2.48	F
Concept 1b	Westbound	A.M.	28	0.44	139	12	11.84	2.3	E
		P.M.	80	0.39	305	5	19.99	3.89	F
	Eastbound	A.M.	62	0.61	182	6	13.47	2.62	F
		P.M.	69	0.57	188	6	13.43	2.61	F
Concept 2	Westbound	A.M.	34	0.47	158	11	13	2.53	E
		P.M.	84	0.43	319	5	20.91	4.07	F
	Eastbound	A.M.	43	0.50	136	8	10.58	2.06	F
		P.M.	62	0.55	172	6	12.5	2.43	F
Concept 3	Westbound	A.M.	34	0.47	158	11	13	2.53	E
		P.M.	84	0.43	319	5	20.91	4.07	F
	Eastbound	A.M.	43	0.50	136	8	10.58	2.06	F
		P.M.	62	0.55	172	6	12.5	2.43	F

Notes: Total Delay/Vehicle (sec/veh) = The control delay plus the queue delay experienced per vehicle.
Travel Time (hr) = The total time taken for all vehicles to travel through the corridor.
CO Emissions (kg) = The amount of Carbon Monoxide emissions by all vehicles traveling along the corridor in a period of one hour.
NOx Emissions (kg) = The amount of Nitrogen Monoxide emissions by all vehicles traveling along the corridor in a period of one hour.
[1]Average speed accounts for traffic signal delay at the study intersections and queuing delay.

6.1 Future Year Concept Outcomes

Future year volumes result in a high level of delay and travel time for the No-Build scenario, as indicated in Table 6. However, the high weaving volumes observed between Oak Road and the I-680 ramps are mitigated with each of these alternatives due to the removal of the free southbound right turn at Oak Road. Although performance degrades slightly for each of the study concepts, removing the inefficient and unsafe weaving behavior on this segment seems to reduce the potential negative impact of the improvements.

The performance of the proposed improvement concepts is compared with the performance of the existing layout of Treat Boulevard (year 2040) in Table 7. Concept 1B results in a small level of network performance degradation compared to the No-Build scenario. Concepts 2 and 3 also result in small network performance degradation in the westbound direction. However, these concepts result in improved operation in the eastbound direction,

which is the result of network optimization. The combined eastbound and westbound MOEs for these two concepts result in less delay and travel time than Concept 1B.

Individual intersection LOS was also analyzed. Table 8 presents the findings. As shown, intersection delay is high in general for the future year No Build scenario. Concept 1B results in some increased intersection delay, specifically small delay increases at Main Street, Buskirk Avenue, and Oak Road. Although concepts 2 and 3 do not encroach on automobile infrastructure near the Main Street intersection, they have a negative impact at Main Street during the PM peak period due to signal timing reallocation. Concepts 2 and 3 also have a small impact at Oak Road during the morning peak period. Overall high delay is related to future traffic volumes rather than the proposed study concepts.

Each of the study concepts would result in an improved transportation network for pedestrians and cyclists. Although the study concepts result in some network impact and some delay impact at individual intersections, this delay increase is relatively small, especially compared to the benefits for other transportation modes.

Table 7: Measures of Effectiveness Scenario Comparison for Future Year (2040)

Roadway	*Approach*	*Peak Hour*	*Total Delay/ Vehicle (sec/veh)*	*Stops/ Vehicle*	*Total Travel Time (hr)*	*Average[1] Speed (mph)*	*CO Emissions (kg)*	*NOx Emissions (kg)*	*Arterial LOS*
B-A: Concept 1b (-) No Build	Westbound	A.M.	1	0.02	2	-1	0.20	0.03	No Change
		P.M.	1	0.00	5	0	0.23	0.05	No Change
	Eastbound	A.M.	3	0.00	7	0	0.34	0.07	No Change
		P.M.	6	0.02	12	0	0.70	0.13	No Change
C-A: Concept 2 (-)No Build	Westbound	A.M.	7	0.05	21	-2	1.36	0.26	No Change
		P.M.	5	0.04	19	0	1.15	0.23	No Change
	Eastbound	A.M.	-16	-0.11	-39	2	-2.55	-0.49	No Change
		P.M.	-1	0.00	-4	0	-0.23	-0.05	No Change
D-A: Concept 3 (-) No Build	Westbound	A.M.	7	0.05	21	-2	1.36	0.26	No Change
		P.M.	5	0.04	19	0	1.15	0.23	No Change
	Eastbound	A.M.	-16	-0.11	-39	2	-2.55	-0.49	No Change
		P.M.	-1	0.00	-4	0	-0.23	-0.05	No Change

Note: The No-Build scenario reflects future volumes applied to the existing network geometry.

Table 8: Intersection LOS Comparison for Future Year

Intersection	*Peak Hour*	*No Build*		*Concept 1B*		*Concept 2*		*Concept 3*	
		Control Delay (s)	*LOS*	*Control Delay (s)*	*LOS*	*Control Delay (s)*	*LOS*	*Control Delay (s)*	*LOS*
Treat Boulevard and Main Street*	A.M.	83.1	F	86.0	F	83.3	F	83.3	F
	P.M.	67.9	E	67.4	E	75.9	E	75.9	E
Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue	A.M.	31.4	C	36.4	D	30.5	C	30.5	C
	P.M.	19.9	B	24.9	C	13.7	B	13.7	B
Treat Boulevard and Oak Road	A.M.	63.8	E	63.3	E	67.3	E	67.3	E
	P.M.	46.3	D	48.9	D	45.5	D	45.5	D
Treat Boulevard and Jones Road*	A.M.	61.9	E	61.9	E	49.6	D	49.6	D
	P.M.	211.9	F	212.4	F	212.1	F	212.1	F

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.

6.2 Supplemental Alternative Evaluation

Three additional scenarios were tested in the Concept 1B AM network to investigate the expected traffic impact that may result in implementing additional traffic signal strategies to enhance pedestrian and cyclist traffic safety. The supplemental analysis results are shown in

Table 9 and are compared against the Base 1B AM network. The leading pedestrian interval and protected/concurrent phasing alternatives were tested at the Oak Road intersection only. The 150s cycle length alternative was tested at the I-680/Buskirk Avenue, Oak Road, and Jones Road intersections.

As noted before, the HCM 2010 analysis was used as a basis for the I-680/Buskirk Avenue and Oak Road intersections and the HCM 2000 analysis was used for the Jones Road intersection. However, limitations in the HCM 2010 methods prevented analysis for the leading pedestrian interval, and this alternative was analyzed using the HCM 2000 methods as indicated by an asterisk. The Base 1B Concept performance is shown for HCM 2010 and HCM 2000, the HCM 2000 results also marked with an asterisk.

The leading pedestrian interval and protected/concurrent phasing do affect intersection performance, increasing delay somewhat. Decreasing the cycle length from 160s to 150s negatively impacts traffic at the Oak Road and Jones Road intersections.

Table 9: Supplemental Analysis Intersection LOS for Future Year (2040)

Intersection	*Peak Hour*	*Base Concept 1B*		*Leading Pedestrian Interval*		*Cycle Length = 150s*		*Protected/ Concurrent Phasing*	
		Control Delay (s)	*LOS*	*Control Delay (s)*	*LOS*	*Control Delay (s)*	*LOS*	*Control Delay (s)*	*LOS*
Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue	A.M.	36.4	D			35.7	D		
Treat Boulevard and Oak Road	A.M.	63.3/ (59.5*)	E (E*)	72*	E*	72.6	E	68.9	E
Treat Boulevard and Jones Road*	A.M.	61.9	E			76.5	E		

Notes: HCM 2010 unless specified by *.

*HCM 2000 analysis due to HCM 2010 limitations. Both HCM version results are shown for Base Concept 1B at Treat Boulevard and Oak Road because the HCM 2010 analysis could not be used for the Leading Pedestrian Interval evaluation.

7.0 CONCLUSIONS

The results indicate that the design alternatives result in relatively low impact on Treat Boulevard for the current year traffic conditions. However, reducing the cycle length from 160 seconds to 150 seconds is expected to impact the Treat Boulevard/Jones Road intersection in the supplemental 1B alternative scenario. Although capacity is reduced by removing the southbound free right turn at Oak Road, this also removes the weaving operation between Oak Road and the I-680 ramps, which appears to improve traffic operation as well as safety along Treat Boulevard.

For future year traffic conditions, the design alternatives result in some impact to the intersection LOS and the network performance. There is no significant impact on Arterial LOS, but Concepts 2, 3, and 4 have a small delay impact at Oak Road during the morning peak hour and Main Street during the afternoon peak hour. Concept 1B results in more overall network delay and higher travel times than Concept 2 and Concept 3, and also results in a small delay impact at Main Street, Buskirk Avenue, and Oak Road.

Concept 4, the preferred alternative is a modified version of Concept 3 and is split into Phase 1 and Phase 2. Phase 1 represents the near-term improvements while Phase 2 represents the long-term improvements options. Phase 2 includes the elimination of free right-turns at Treat Boulevard/Oak Road, which is expected to eliminate the weaving behavior along Treat Boulevard between Oak Road and Buskirk Avenue in the westbound direction.

Concept 4 would result in some increased delay and queuing for motorists at specific intersections on Treat Boulevard. As expected, Phase 2 results in more delay and queuing than Phase 1. However, implementation of Concept 4 also results in an improved transportation network for pedestrians and cyclists and Phase 2 specifically results in the reduction of potentially dangerous weaving along Treat Boulevard between Oak Road and

Buskirk. When compared to the benefits for other transportation modes, the increased delay for motorists is relatively small.

The study concepts achieve the project goal by providing high connectivity and safety for pedestrians and cyclists. Although the study concepts result in some network impact and some delay impact at individual intersections, this delay increase is relatively small when compared to the expected benefits for other non-motorized transportation modes.

8.0 RECOMMENDATIONS

Each of the study concepts result in a similar level of impact to the Treat Boulevard network. Concepts 1A and 1B keep bike lanes throughout the entire length of the study corridor along Treat Boulevard in the westbound direction, whereas Concepts 2 and 3 keep a bike pathway on the sidewalk in the segment between Oak Road and Main Street. However, Concepts 3 provides the highest degree of separation between automobiles and cyclists with the cycle track between Jones Road and Oak Road, and represents the safest and most comfortable option for pedestrians and cyclists. However, implementing the cycle track is not cost effective due to the expected usage of the facility. The landing for the Iron horse trail and the location of the Pleasant Hill BART Station are located on the north side of Treat Boulevard. It is therefore expected that majority of cyclists will access Treat Boulevard via Oak Road rather than use the segment of Treat Boulevard between Oak Road and Jones Road.

For these reasons DKS recommends implementation of Concept 4, which is cost effective than Concept 3.

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IDAX	Data Collection
Quality Counts, LLC	Data Collection

References

1. *Highway Capacity Manual, 2000, Transportation Research Board.*
2. *Highway Capacity Manual, 2010, Transportation Research Board.*

Appendix A – Existing Conditions Report

Existing Traffic Conditions Report

Contra Costa Centre I-680/Treat Boulevard Bicycle and Pedestrian Plan

Prepared for

Contra Costa County Department of Conservation and Development

Prepared By

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July 30, 2014

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P:\P\14\14070-000 Contra Costa Treat Blvd Bicycle and Pedestrian Plan\Documents\Existing Conditions Report

INTRODUCTION AND SUMMARY

Introduction

The Contra Costa Centre Transit Oriented Development (TOD) in Walnut Creek is characterized by mixed commercial and residential land use. This area contains the Pleasant Hill BART Station and is accessed by pedestrians and cyclists via the Iron Horse Trail or west of Main Street. Though nearly finished, this TOD is lacking safe pedestrian and bicycle infrastructure connecting the area west of the I-680 bridge overcrossing with Treat Boulevard destinations, such as the BART Station and the Iron Horse Trail.

This area represents a gap in the pedestrian and bicycle transportation network. In the study corridor there are as many as nine travel lanes. There is a lack of sidewalk connectivity and no sidewalk between Main Street and the I-680 northbound ramp (Buskirk Avenue). As a result of poor pedestrian infrastructure, pedestrians dart into Treat Boulevard to cross the street rather than using crosswalks. Cyclists and pedestrians conflict with heavy traffic entering and exiting I-680. No bicycle facilities exist within the study area.

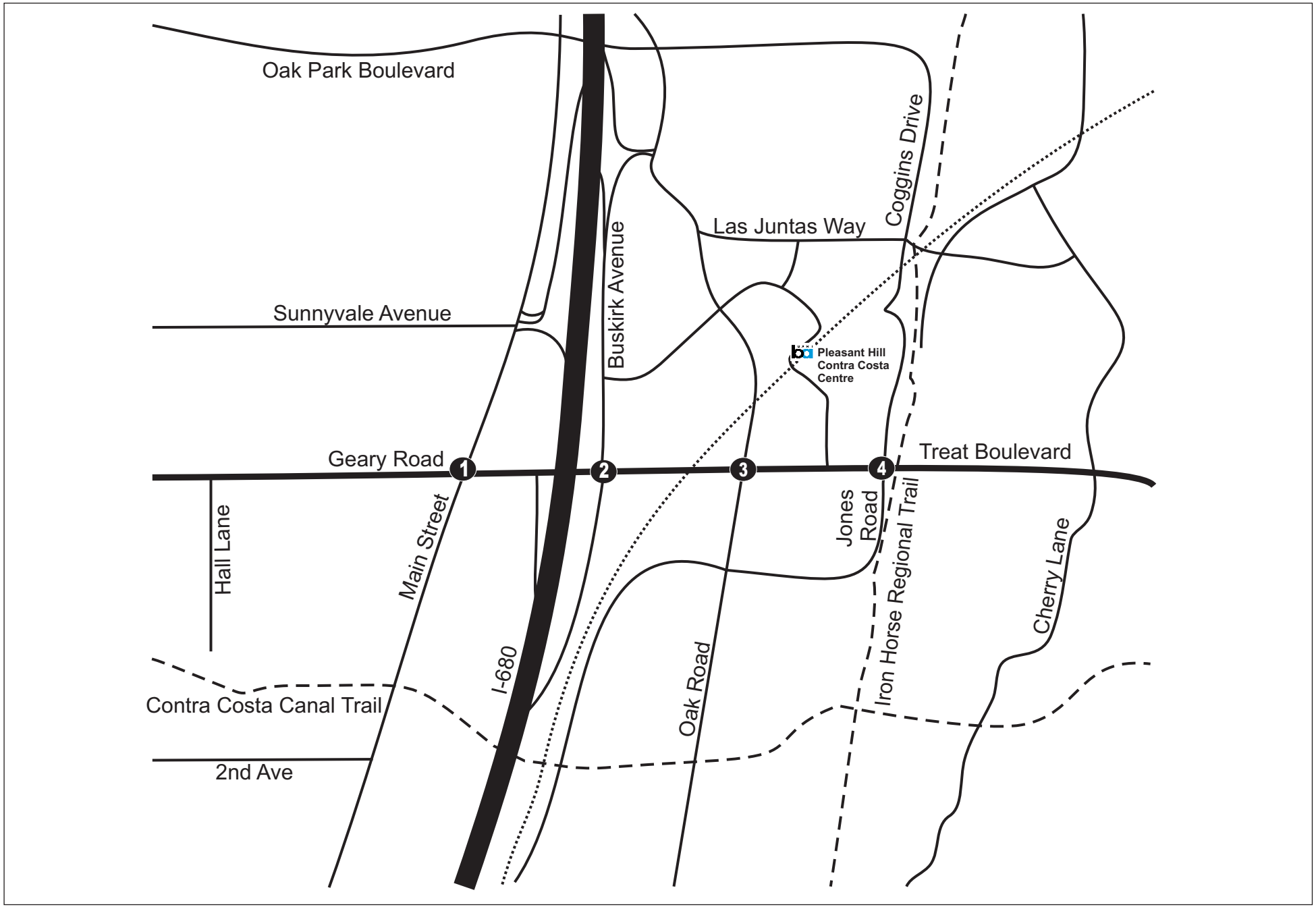
With the goal of providing more livable communities, Contra Costa County Department of Conservation and Development has decided to complete the Interstate-680/Treat Boulevard Bicycle and Pedestrian Plan. To finish the bicycle and pedestrian transportation network, Contra Costa County has targeted Treat Boulevard between Main Street and Jones Road to provide more efficient access from the Iron Horse Trail to businesses and restaurants on Main Street, focusing especially on the I-680 interchange. The Transportation for Livable Communities (TLC) program is the funding source for this project, which is managed by the Contra Costa Transportation Authority (CCTA).

This project includes the following intersections:

- Treat Boulevard/Geary Road and Main Street
- Treat Boulevard and Buskirk Avenue/I-680 northbound ramps
- Treat Boulevard and Oak Road
- Treat Boulevard and Jones Road/Iron Horse Trail

Figure 1 shows a vicinity map of the study corridor.

Prior to developing alternatives for an improved pedestrian and bicycle environment, it is necessary to establish current traffic conditions and system performance under existing traffic signal timing and corridor geometry. Accordingly, this report includes a description of existing conditions as measured in the field and also as estimated in Synchro models based on current signal timing parameters. Specifically this report discusses the existing conditions for the roadway network, the existing traffic volumes and patterns, observations of field conditions, and a discussion of the development of the simulation network for existing conditions.



LEGEND

00 - Study Intersection
—— - Street
– – – - Trail
· · · · · · - BART Line

DKS

NO SCALE

Figure 1

Walnut Creek Study Area Map

With the completion of the existing conditions, it will be possible to develop alternatives for improved pedestrian and bicycle environment in the study area. One focus will be to complete the sidewalk network. Another focus will be to evaluate from a traffic standpoint whether it is possible to make provisions for Class II (bike lanes) or Class IV (cycle track) bicycle facilities, using MLOS and queuing analysis. Intersection and lane configuration options will be developed and evaluated for the weekday A.M. peak and P.M. peak periods, focusing on traffic safety but without significantly increasing traffic congestion. Measures of effectiveness will include traffic delays, the emission of harmful greenhouse gases, and automobile travel time along the study corridor.

Summary

This report has compiled the following data for this project:

- Traffic signal timing sheets,
- Video turning movement counts for each study intersection for the A.M. and P.M. peak periods along Treat Boulevard. These counts include vehicles, pedestrians and bicyclists (See Appendix A),
- Weekday and weekend 24-hour traffic counts on Treat Boulevard for seven days by direction in 15-minute intervals (See Appendix A),
- Field review verifying lane configurations, speed limits, and turn lane storage lengths, and
- Field review that identifies intersections that are oversaturated, major driveways and unsignalized intersections that may affect arrival rates and patterns at signalized intersections, parking maneuvers, pedestrian activity, and other traffic patterns that may affect traffic operations along Treat Boulevard.

The compiled and collected data were used to develop Synchro models for the existing conditions. Locations where left-turn or right turn queue exceed the storage length of the turning lane are noted as appropriate, as well as locations that provide for challenging pedestrian and bicycle conditions.

The field observations indicate that there are high vehicle turning volumes that conflict with pedestrians, high weaving volumes that create a challenging environment for cyclists, and that the current infrastructure could be improved to better serve these populations. Based on the current geometry and traffic patterns, there may be opportunities to reallocate roadway space to encourage pedestrian and bicycle modes of travel through bike lanes, shared use paths, and/or widened sidewalks. This is true in the eastbound direction from the I-680 ramps/Buskirk intersection to Jones Road and in the westbound direction from Main Street to Jones Road, especially at the I-680 overcrossing.

This report presents findings and conclusions with respect to existing conditions and the potential for traffic signal timing improvements and geometric improvements to accommodate pedestrians and bicycles. It also serves as a baseline for assessing future roadway improvement concepts with existing roadway performance.

EXISTING CONDITIONS

Study Intersections

The Treat Boulevard study segment extends from Main Street to Jones Road. The following intersections were selected for the project:

- Treat Boulevard/Geary Road and Main Street
- Treat Boulevard and Buskirk Avenue/I-680 northbound ramps
- Treat Boulevard and Oak Road
- Treat Boulevard and Jones Road

All four intersections are operated by the City of Walnut Creek. Buskirk Avenue, Oak Road, and Jones Road on Treat Boulevard run actuated-coordinated east-west during daytime hours. However, Main Street operates in coordination with Ygnacio Valley Road (coordinated north-south) during the day. Treat Boulevard/Geary Road/Main Street has a different cycle length than the three other study intersections during the AM peak period.

Roadway Network

The Treat Boulevard study segment is characterized by the mixed land use of office, retail, and multi-family residential. Treat Boulevard serves as an important corridor in the study area because it serves as an east-west arterial and also provides access to the Pleasant Hill/Contra Costa Centre BART Station and I-680, which connects Lafayette to the south and Concord to the north. The I-680 northbound ramps intersect Treat Boulevard at Buskirk Avenue. The southbound off-ramps enter the network on Main Street, north of Treat Boulevard. Entrance ramps to I-680 southbound are accessed from eastbound Treat Boulevard and Main Street (north of Treat Boulevard).

In the study corridor there are as many as nine travel lanes in the east-west direction. The eastbound geometry varies from two to four through lanes with dual left turn pockets. In the westbound direction the geometry varies from two to three through lanes with a right turn pocket/lane and one or dual left turn pocket(s).

Sidewalks exist along both sides of Treat Boulevard except for the south side of the existing bridge overpass of I-680, but the existing sidewalks are narrow and in poor condition. No bicycle facilities exist along Treat Boulevard within the study area. There is a multi-purpose path (Iron Horse Trail) that crosses over Treat Boulevard at Jones Road with a bridge structure. The Contra Costa Canal Trail runs parallel to Treat Boulevard and intersects with the Iron Horse Trail south of Jones Road.

Traffic Volumes and Patterns

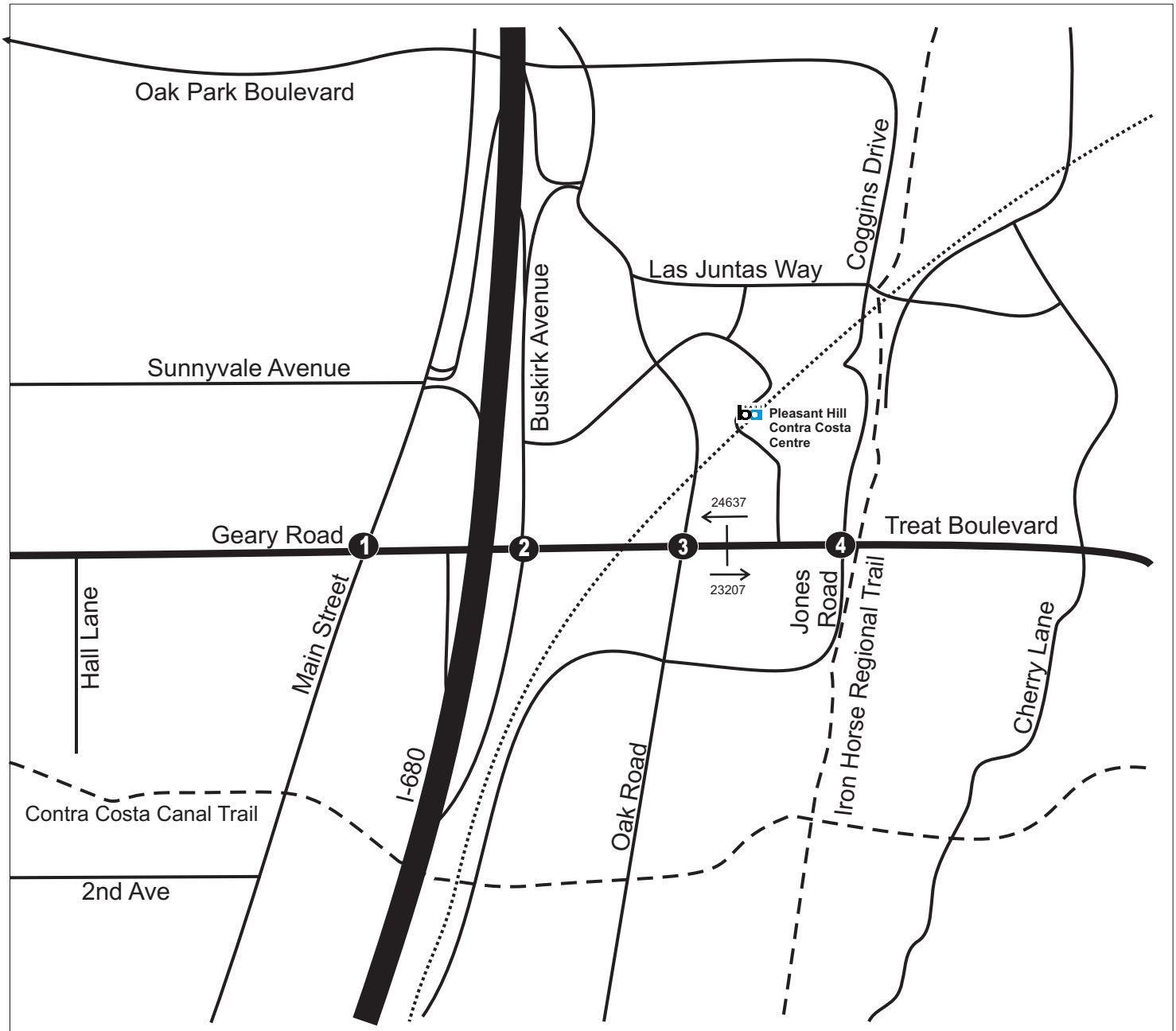
The traffic patterns are complex in this area due to the close spacing of intersections and the BART overcrossing columns that divide the travel lanes between Oak Road and the I-680 ramps. Visual observation during a field review indicates that a significant amount of traffic weaving occurs at this location.

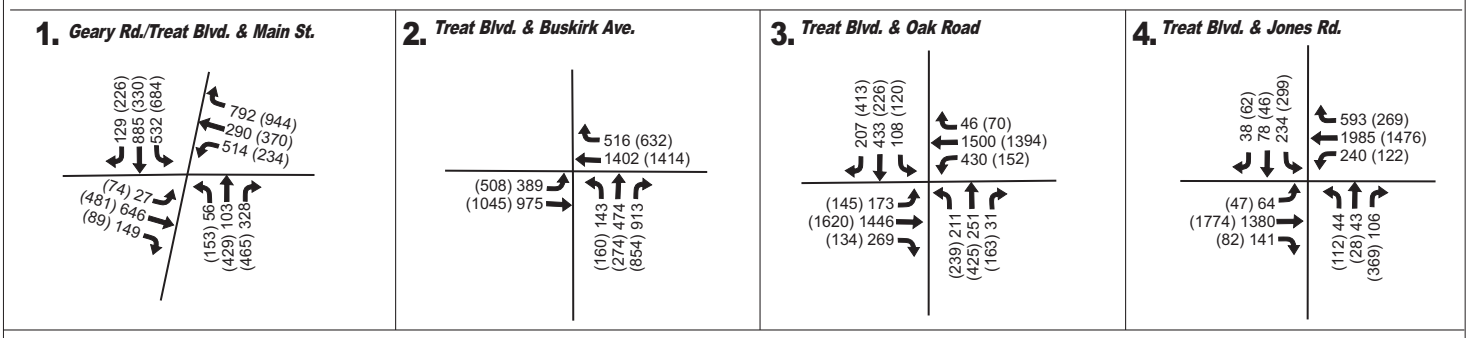
Using tube count technology, DKS conducted 24-hour traffic volume and speed counts over a seven day period on Treat Boulevard between Oak Road and Jones Road. The data indicate pace speeds (speed at which traffic travels when not stopped at the signal) of 21-35 mph during the morning and afternoon peak periods.

The 24-hour traffic volume data plots for the study corridors are shown in Appendix A. The plots depict the average weekday and weekend 24-hour volumes, the proportion of traffic in each direction on weekdays, and average hourly volumes on weekdays that include their 95th percentile confidence intervals. A review of the traffic distribution chart indicates the following traffic pattern along Treat Boulevard: westbound/eastbound split = 58/42 and 48/52 during the A.M. and P.M. peak periods, respectively. The 24-hour counts were also used to identify peak periods for the turning movement counts.

Video data collection methodology was implemented to collect the turning movement counts, which were conducted for 24 hours during a typical weekday (Tuesday) in May 2014, which was characterized by sunny, dry weather. Appendix A contains the peak hour vehicle, pedestrian, and bicycle counts for the study intersections, which were transcribed from the video counts based on the analysis of the daily flow profile for the seven-day counts. The peak hour traffic count data were entered into the Synchro model for existing conditions analysis. Some volume balancing was conducted within the Synchro network for both the A.M. and P.M. peak periods. The video data enabled verification of the traffic counts and aided in capturing pedestrian and bicycle activities and validating turning movements at the study intersections.

Figure 2 shows the A.M. peak hour and P.M. peak hour vehicle turning movement counts for the four study intersections. It also shows the weekday average daily traffic (ADT) along the study corridor. Tables 1 and 2 summarize the A.M and P.M. peak period pedestrian and bicycle counts for the study intersections, respectively.





LEGEND

00 - Study Intersection

XX (YY) - AM (PM) Turning Movement Counts

YY -Directional ADT (Vehs/Day)

P:\P\14\14070-000

DKS

Figure 2

Existing Turn Movement and ADT Volumes

Table 1: Existing Pedestrian Count Summary

ID	Intersection	Peak Period (1-hour counts)	South Crosswalk	North Crosswalk	East Crosswalk	West Crosswalk	Total
1	Treat Blvd/ Main St	A.M.	5	27	4	8	44
		P.M.	7	36	4	17	64
2	Treat Blvd/ Buskirk Ave	A.M.	--	51	2	--	53
		P.M.	1 --	44	0	1 --	46
3	Treat Blvd/ Oak Rd	A.M.	6	29	84	6	125
		P.M.	26	23	46	27	122
4	Treat Blvd/ Jones Rd	A.M.	18	10	13	20	61
		P.M.	23	13	17	19	72

Notes:
-- Crosswalk does not exist
1-- Crosswalk does not exist but one pedestrian crossed illegally
n/a – Data not available

Table 2: Existing Bicycle Count Summary

ID	Intersection	Peak Period (1-hour counts)	Southbound	Northbound	Eastbound	Westbound	Total
1	Treat Blvd/ Main St	A.M.	1	0	2	2	5
		P.M.	1	1	3	0	5
2	Treat Blvd/ Buskirk Ave	A.M.	--	0	0	1	1
		P.M.	--	0	0	3	3
3	Treat Blvd/ Oak Rd	A.M.	0	2	0	1	3
		P.M.	0	2	1	0	3
4	Treat Blvd/ Jones Rd	A.M.	0	0	0	2	2
		P.M.	2	1	0	13	16

Notes:
-- Direction does not exist at intersection

Results of Field Checks

The traffic data collection effort was supplemented with field review of the study corridor to verify the lane configurations, ascertain the validity of the traffic counts, and also understand traffic patterns. Figure 3 shows the existing lane configurations and traffic signal phases at the study intersections.

Details regarding the specific traffic signal phasing sequences, intersection lane configurations, and other attributes for the study corridors are contained in the Synchro model outputs (Appendix B). The following paragraphs describe the observations made while conducting the field review.

Corridor-wide

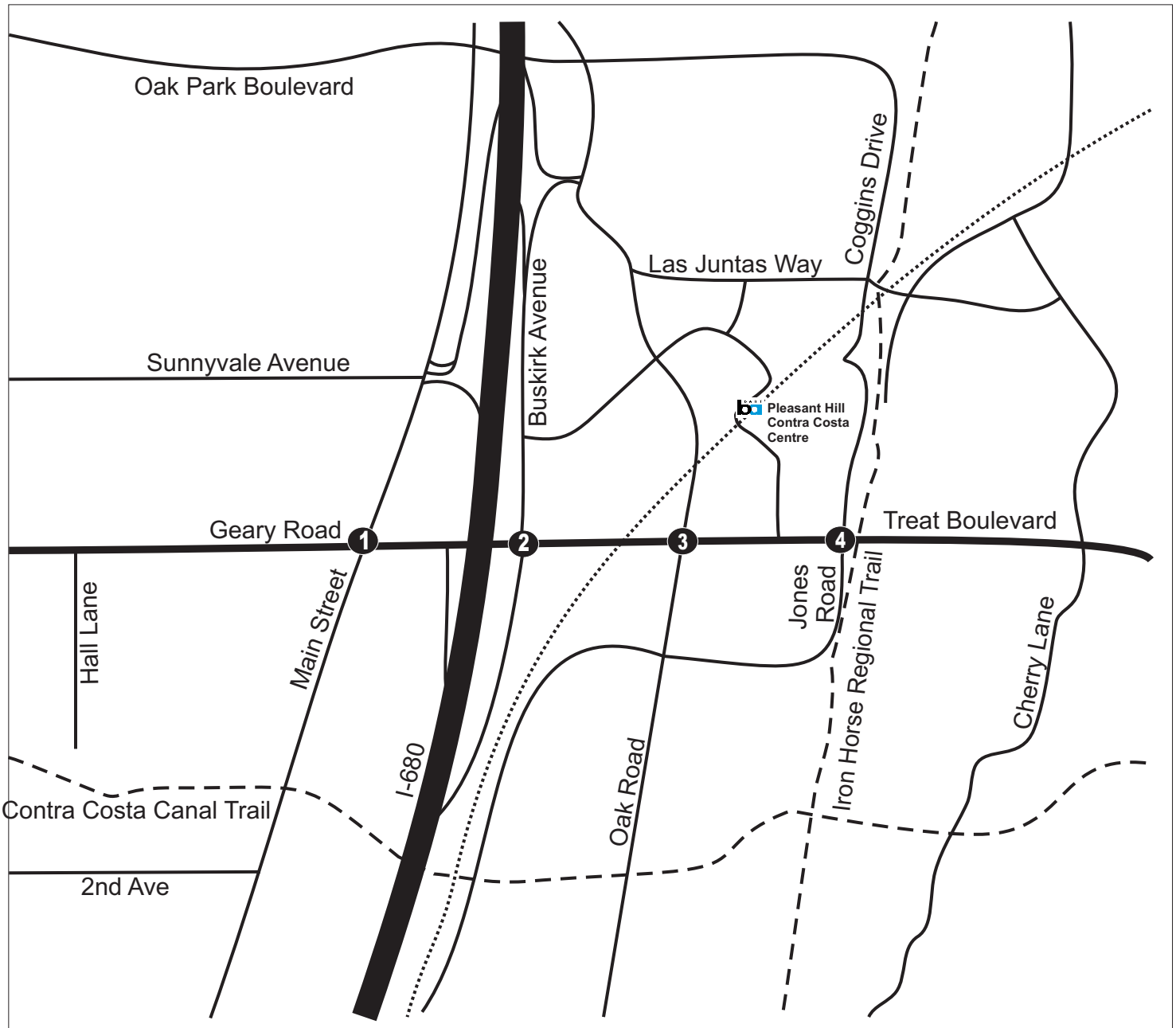
Yield controlled channelized right turns (with pork chops) exist at each study intersection in the westbound direction and at Jones Road in the eastbound direction. Northbound Buskirk Avenue and southbound Oak Road also have channelized right turns. The westbound right turn at Main Street, the southbound right turn at Oak Road, and the northbound right turn at Buskirk Avenue have dedicated receiving lanes to allow for higher traffic flow. Although channelized right turns are advantageous for automobile traffic, they present a less comfortable and safe environment for pedestrians and cyclists, who must cross faster moving right turning traffic that frequently does not expect to conflict with pedestrians.

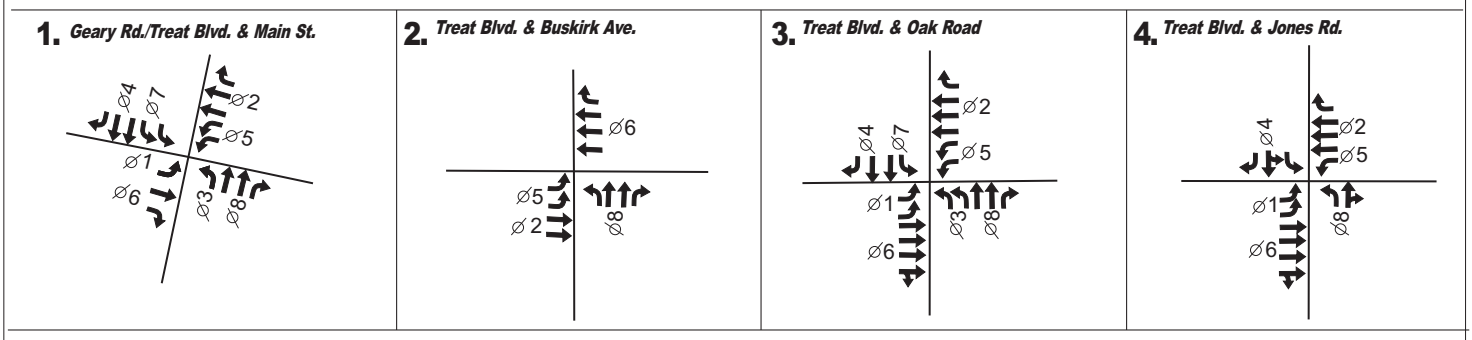
As previously stated, Treat Boulevard consists of nine lanes of travel in some locations. While this provides capacity for automobiles, it presents a long distance for pedestrians to traverse when crossing the street. Reducing this distance, providing longer walk times, or reducing wait times for pedestrians can improve the pedestrian experience.

Narrow sidewalks, especially those along the south side of the corridor, do not provide adequate space for two pedestrians to walk side by side. Intrusions into the sidewalks, such as for utility poles, obstruct the path and can pose difficulties for pedestrians with disabilities. Pavement quality is poor on many sidewalks and pork chops (triangular medians provided for pedestrians, usually elevated, that are located between a free right turn lane and through lanes), usually presents an uneven environment that is challenging for pedestrians with limited mobility to navigate.

Long cycle lengths (140 seconds to 160 seconds) provide higher capacity for automobile traffic but cause frustration for other users and sometimes can result in pedestrians taking risks to reduce their travel time. The cycle length, split times, and signal operation in conjunction with geometry should be examined when considering improvements to the corridor.

Lane widths within the study area vary from 11 ft to 17 ft. A standard lane width is 12 feet but can be reduced to 11 feet, which provides an opportunity to shift extra lane width from automobile use to bicycle use. This converted space can be used in the form of a bicycle lane or potentially a shared use path. In some cases, it may be possible to eliminate lanes in favor of bicycle infrastructure. Queuing analyses will be used to validate the need for current lanes.





LEGEND

00 - Study Intersection

- Lane Geometry

∅ - Traffic Signal Phasing

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DKS

Figure 3

Existing Conditions Lane Configurations and Traffic Signal Phasing

Main Street

Both the westbound left turn/U-turn and westbound right turn movements are heavy at this intersection. Due to the high turning volumes and high left lane utilization, the queue from westbound Main Street backs to the I-680 ramps during the A.M. peak hour. The westbound left turn bays are not adequate for the forming left turn queues and vehicles sometimes queue in the through lanes, creating potential for rear-end collisions.

The southbound left turn volumes are high at Main Street during both the morning and afternoon peak periods. Queues spill back beyond the turn bays during both time periods.

Currently Main Street operates in coordination with Ygnacio Valley Road (coordinated north-south), rather than in coordination with the Treat Boulevard corridor, which may contribute to the formation of westbound queues. East-west coordination should be considered as a potential alternative for this location. Ygnacio Valley Road is about 3 miles south of the Treat Boulevard/Main Street intersection. There are about four traffic signals on Main Street between Ygnacio Valley Road and Treat Boulevard. Additionally, Ygnacio Valley Boulevard, Main Street and Treat Boulevard have interchanges with the I-680 freeway.

I-680 Overcrossing

The bridge that crosses over I-680 between Main Street and I-680 Northbound off-ramp has no sidewalk on the south side and a narrow (5ft to 8ft) sidewalk on the north side. Despite that the sidewalk is not wide enough to comfortably accommodate two pedestrians walking side-by-side, it is also shared by cyclists due to the roadway traffic conditions. The I-680 overcrossing has three westbound through lanes and two eastbound through lanes and two eastbound left-turn lanes. The bridge carries over 20,000 vehicles per day in each direction.

The bridge has wide shoulders in both directions, but particularly in the westbound direction, which presents an opportunity to increase the pedestrian and bicycle space. This could be accomplished through one or a combination of the following: lane adjustment, addition of a sidewalk on the south side of the bridge, widening of the existing sidewalk, and/or addition of bicycle lanes or a cycle track. The construction of a multiuse path on one side would provide service to both pedestrians and bi-directional travel for cyclists on one side of the road. The multiuse path provides excellent service to non-automobile modes, but requires 15’ of space including path, shoulder, and traffic buffer.

I-680 Ramps/Buskirk Avenue

The I-680 northbound ramps at Buskirk Avenue present a challenge to pedestrians wishing to cross the intersection. The northbound right turn traffic onto Treat Boulevard is heavy and due to channelization does not always yield to pedestrians and bicycles.

During the morning peak period, the northbound left turn queues occasionally exceed the left turn bay storage capacity. During the evening peak period, the eastbound Treat Boulevard traffic turning left onto the I-680 ramp was observed to exceed the left turn storage bay.

Treat Boulevard between Oak Road and the I-680 Ramps/Buskirk Avenue

Westbound

The segment of Treat Boulevard between Oak Road and the I-680 ramps is characterized by high weaving volumes and poor visibility. The southbound right turn lane at Oak Road has its own receiving lane westbound which immediately becomes a right turn only onto Buskirk Avenue, which feeds the I-680 NB on ramp and causes high weaving traffic into and out of the westbound Treat Boulevard lane due to the high traffic demand for northbound I-680. Further exacerbating this issue, the BART support columns separate the lanes of travel and limit visibility for traffic merging from the right lane.

These conditions cause two specific problems: a challenging environment for cyclists and the formation of a westbound queue during the afternoon peak hour. High weaving levels demand driver attention, taking away driver awareness of nearby cyclists. Due to this lack of attention, cyclists are currently safest riding in the middle of the lane rather than at the edge of the lane, which is ideally where a bicycle lane would be located. As indicated by low bicycle volumes on this segment (three westbound during the P.M. peak hour), few cyclists brave this environment.

Another effect of the weaving on the westbound portion of this segment is the reduction in travel speeds. The reduced speeds and the disproportionally high right lane utilization through this segment cause traffic to back to Oak Road, reducing the number of vehicles that can travel westbound through the Oak Road intersection during a green light, and in turn the number of vehicles that can travel through the Jones Road intersection during a green light, effectively "wasting" green time at these intersections.

Over 400 vehicles complete the southbound right turn movement from Oak Road onto Treat Boulevard during the P.M. peak period, while the southbound through movement is about half that number. Potential solutions will be assessed in the next task. Measures such as converting the rightmost through lane to a right turn lane and removing the existing right turn lane from Oak may reduce weaving on the Oak Road – I-680 segment. For this scenario, the rightmost westbound lane on Treat Boulevard could be converted to a narrower right turn bay, allowing for bicycle infrastructure and potentially raising driver awareness of cyclists. Side street delay and queuing would need to be evaluated to determine the impact on automobile traffic.

Eastbound

Similar to the westbound direction, the eastbound segment on Treat Boulevard between the I-680 ramps and Oak Road is characterized by high weaving volumes during the morning and afternoon peak periods. A high traffic volume exits the I-680 northbound ramp and turns right onto Treat Boulevard. Many vehicles must execute lane changes in a short space to access Oak Road or Jones Road. The BART support columns separate the lanes and limit visibility, exacerbating this issue.

Because two lanes currently travel eastbound through the I-680/Buskirk intersection and there are three receiving lanes, it may be possible to eliminate the rightmost lane and turn it into a bike lane. Northbound right turn traffic would enter the adjacent lane, rather than the rightmost lane,

avoiding the rightmost lane altogether. This would improve safety for cyclists and increase the distance in which weaving can occur by avoiding BART column roadway separation.

Oak Road

Oak Road is commonly used for pedestrian access to the BART station. About 90 pedestrians cross Treat Boulevard at Oak Road during the morning peak hour. Because the cycle length is long (160s in the morning), many pedestrians cross in two stages, waiting in the narrow median to avoid waiting a full cycle for another opportunity to cross the intersection. Providing the opportunity for pedestrians to cross Treat Boulevard in one stage would minimize pedestrian exposure to traffic and reduce pedestrian delay. During the morning peak period, the westbound left turn and northbound left turn queues occasionally exceed the left turn bay storage capacity.

Treat Boulevard between Jones Road and Oak Road

During the P.M. peak period, about 70 vehicles complete the westbound right turn movement from Treat Boulevard to Oak Road, a volume the through travel lanes may be able to absorb in this segment. Conversion of the rightmost westbound lane on this segment would provide an opportunity for the construction of a wide bicycle lane.

East of Jones Road, the number of eastbound through lanes drops from four to three, and based on field observations it appears most through vehicles avoid the rightmost lane for this reason. Due to the relatively low level of eastbound right turn traffic at Jones, it may be possible to remove the rightmost lane and convert the next lane to accommodate eastbound through/right traffic. This would allow for bicycle infrastructure for eastbound bicycles or for an extension of the curb to accommodate a wider sidewalk.

During the morning peak hour the pace speed is 21 – 30 mph westbound and 21 – 35 mph eastbound between Oak Road and Jones Road. During the afternoon peak hour vehicles travel at a pace of 21 – 35 mph westbound and eastbound.

Jones Road

The Iron Horse Trail crosses over Treat Boulevard at Jones Road. For this reason, pedestrians and cyclists access Treat Boulevard from Jones Road, many of them remaining on the trail overpass to cross the busy street. Westbound left turn traffic occasionally exceeds the left turn storage capacity during the morning and evening peak period.

DEVELOPMENT OF EXISTING CONDITIONS OPERATIONS MODEL

Changes and Adjustments to Synchro Default Values

The City of Walnut Creek provided signal timing sheets for the four study intersections. The timing parameters were entered into the Synchro models.

The default value for ideal saturation flow rate (1,900 vehicles per hour per lane [vphpl]) was used for all study intersections. Additionally, the Synchro models contain heavy vehicle percentages obtained from the turning movement traffic counts, and the peak period conflicting pedestrian and bicycle volumes.

System Measure of Effectiveness

Table 3 summarizes the estimated measures of effectiveness (MOEs) from the Synchro models under existing conditions. Appendix B contains the Synchro model output results for the Arterial Levels of Service and the MOEs for each signal corridor. The MOEs include such corridor performance measures as average number of stops per vehicle, total delay, average speeds, travel time, and emissions.

The MOEs for existing conditions provide a basis for evaluating the proposed improvement concepts (to be presented in the next task of this project). This will be done by comparing the performance of the proposed improvement concepts with the performance of the existing layout of Treat Boulevard. The goal of the roadway improvement concepts will be to improve the environment for pedestrians and cyclists without significantly degrading the efficiency of the Treat Boulevard corridor for the automobile mode of transportation.

Table 3: System Measures of Effectiveness from Existing Conditions Synchro Model

Roadway	*Approach*	*Peak Hour*	*Total Delay/ Vehicle (sec/veh)*	*Stops/ Vehicle*	*Total Travel Time (hr)*	*Average[1] Speed (mph)*	*CO Emissions (kg)*	*NOx Emissions (kg)*	*Arterial LOS*
Treat Boulevard	Westbound	A.M.	22	0.43	103	15	9.27	1.80	D
		P.M.	23	0.43	91	13	8.07	1.57	E
	Eastbound	A.M.	36	0.53	99	9	8.16	1.59	F
		P.M.	32	0.55	95	10	8.18	1.59	E

Notes: Total Delay/Vehicle (sec/veh) = The control delay plus the queue delay experienced per vehicle.
Travel Time (hr) = The total time taken for all vehicles to travel through the corridor.
CO Emissions (kg) = The amount of Carbon Monoxide emissions by all vehicles traveling along the corridor in a period of one hour.
NOx Emissions (kg) = The amount of Nitrogen Monoxide emissions by all vehicles traveling along the corridor in a period of one hour.
[1]Average speed accounts for traffic signal delay at the study intersections and queuing delay.

Individual intersection Level of Service (LOS) was also analyzed. Table 4 presents the findings. As shown, delays are high at each intersection, except the Treat Boulevard/Buskirk Avenue intersection. It will be important to limit the impact on automobile traffic when considering improvements to the pedestrian and bicycle infrastructure. The LOS and delay results will also serve as a basis to evaluate the conceptual improvement plans.

Table 4: Intersection Level of Service from Existing Conditions Synchro Model

Intersection	*Peak Hour*	*Control Delay (s)*	*LOS*
Treat Boulevard and Main Street*	A.M.	55.7	E
	P.M.	42.9	D
Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue	A.M.	30.3	C
	P.M.	17.5	B
Treat Boulevard and Oak Road	A.M.	46.8	D
	P.M.	19.3	B
Treat Boulevard and Jones Road*	A.M.	37.6	D
	P.M.	49.8	D

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.

NEXT STEPS

In the next tasks of this project, the transportation improvement concepts will be analyzed with future (2040) traffic volumes, which will be obtained from the CCTA County wide Travel Demand Model. Our focus will be on the traffic engineering aspect, geometry considerations and traffic analysis, including the traffic signal timing impact for pedestrian crossing. As stated above, this will include an assessment of lane reduction opportunities to provide bicycle lanes. DKS will also evaluate the feasibility of eliminating right turn lanes and implementing right turn on red restriction with the objective of eliminating conflicts between automobiles and pedestrians and bicycles. An assessment of queue spillback from left turn pockets will also be assessed due to the potential for rear-end collisions.

This task will also include exploring the alteration of signal timing strategies for each concept to enhance traffic operations along Treat Boulevard. The analysis for each concept will take into account the California Manual on Uniform Traffic Control Devices (MUTCD) requirements for setting pedestrian and bicycle timing parameters.

STUDY PARTICIPANTS

DKS Personnel

Thomas Krakow, P.E.	Principal-In-Charge
David Mahama, P.E.	Project Manager
Maria Tribelhorn, E.I.T	Assistant Transportation Engineer

Others

Jamar Stamps	Planner, Contra Costa County
John Lieswyn, PTP, MET	Project Manager, Alta Planning
Alexandra Sweet	Planner, Alta Planning
IDAX	Data Collection
Quality Counts, LLC	Data Collection

References

1. *Highway Capacity Manual, 2000, Transportation Research Board.*
2. *Highway Capacity Manual, 2010, Transportation Research Board.*

Appendix A – Traffic Counts

- Seven-day machine classification counts
- Turning movement counts
- Pedestrian and Bicycle counts

Exhibit 1: Daily Traffic: Treat Boulevard between Jones Road & Oak Road, EB and WB directions (Weekday)

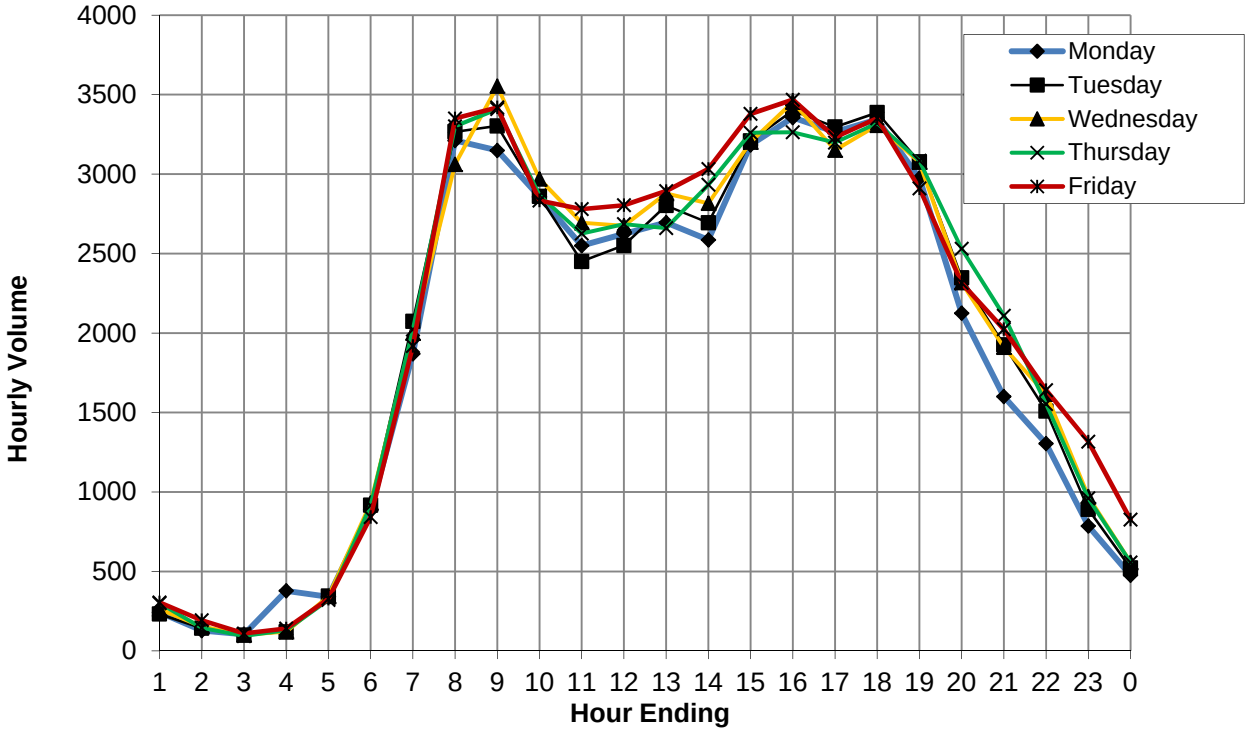


Exhibit 2: Daily Traffic: Treat Boulevard between Jones Road & Oak Road, EB and WB directions (Weekend)

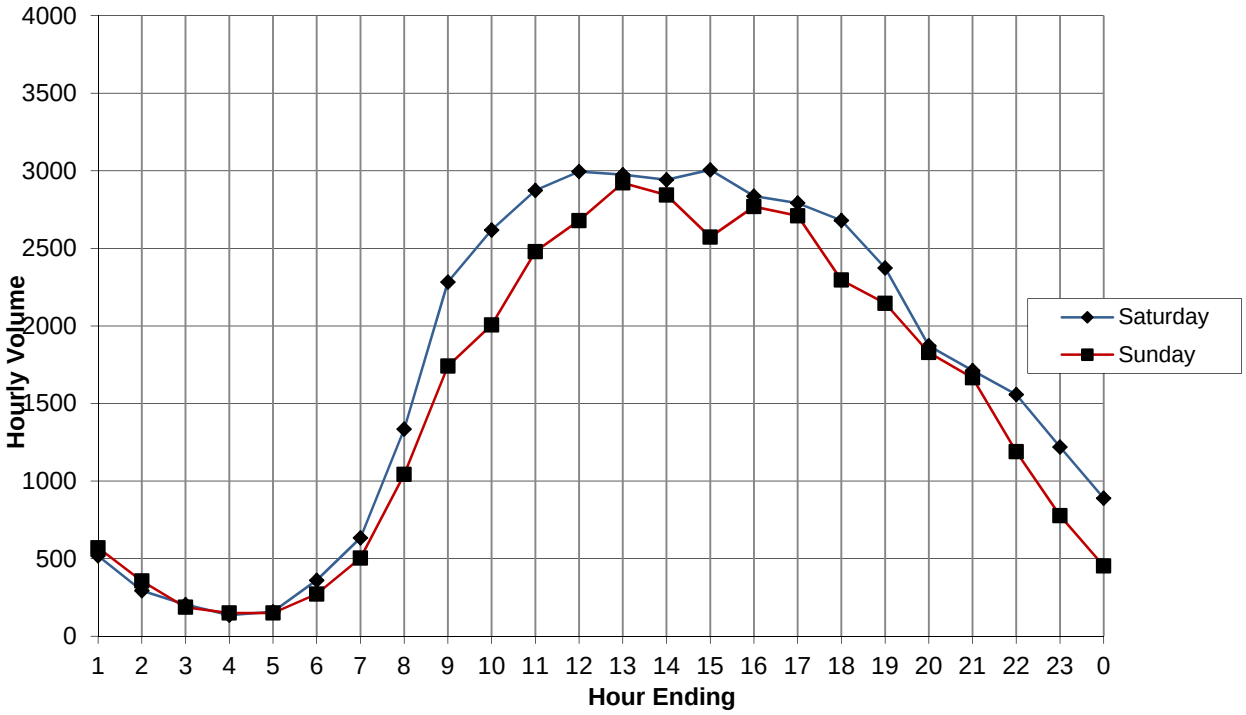


Exhibit 3: Hourly Volume Analysis: Treat Boulevard between Jones Road & Oak Road, WB Direction (Weekday)

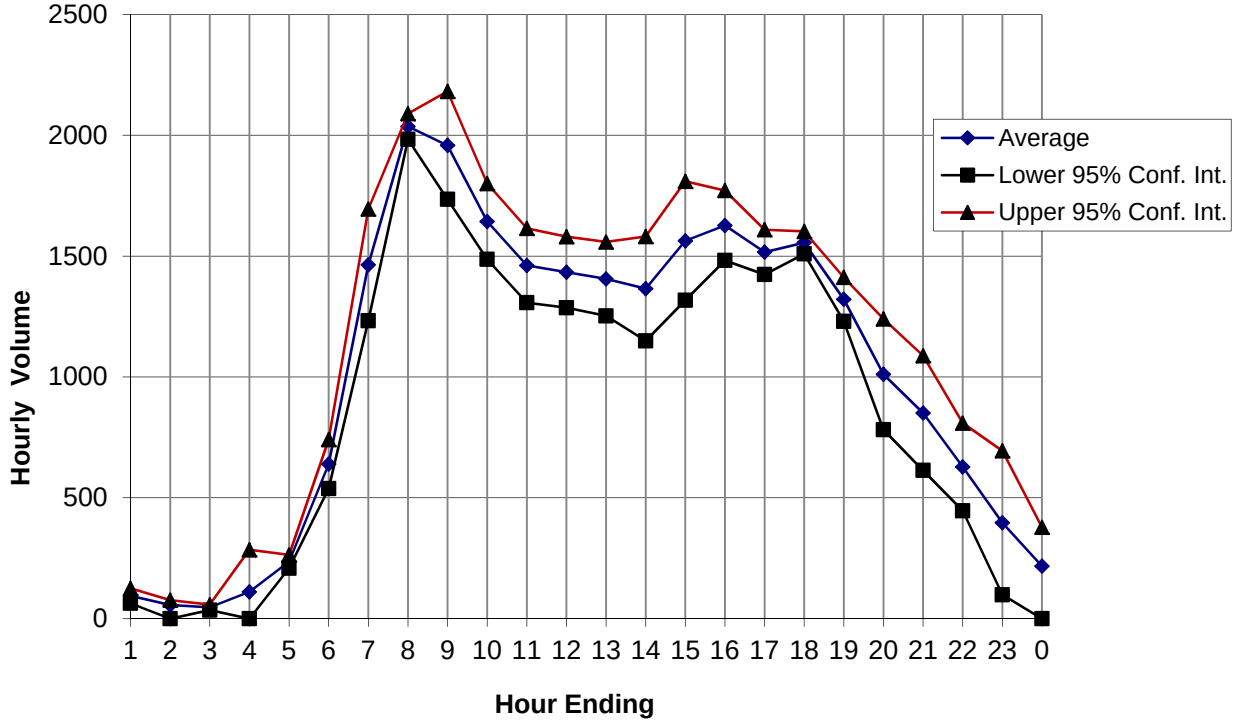


Exhibit 4: Hourly Volume Analysis: Treat Boulevard between Jones Road & Oak Road, EB Direction (Weekday)

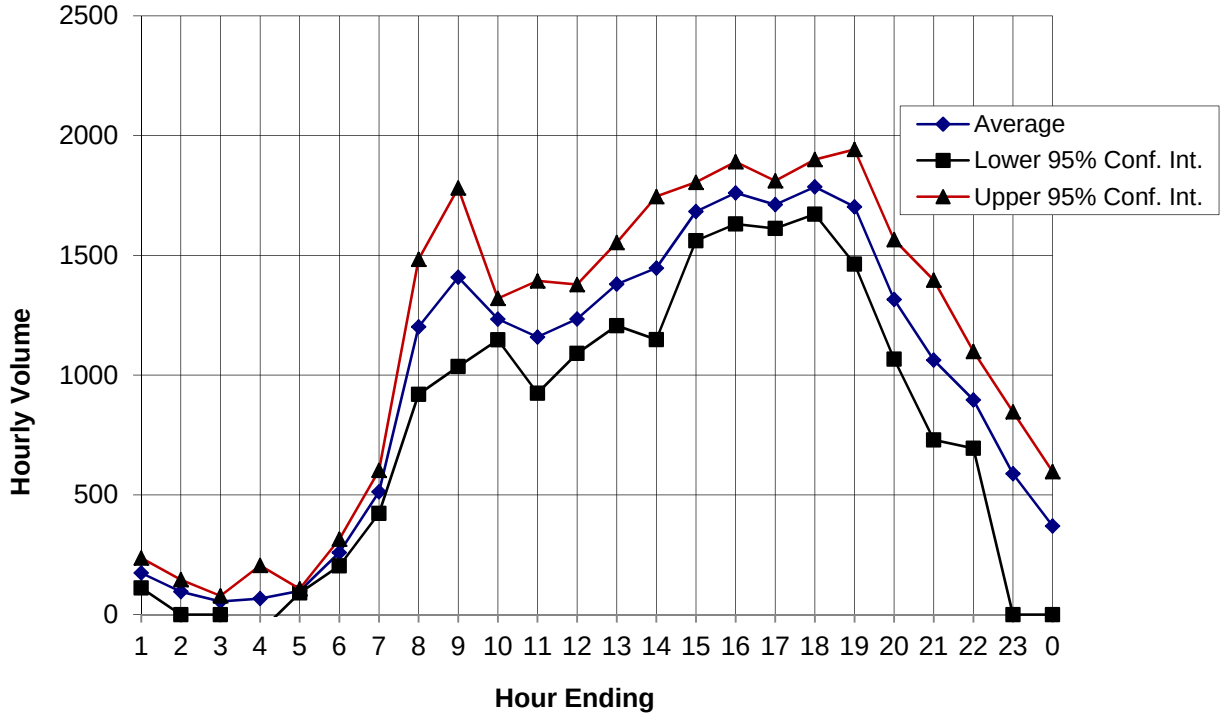
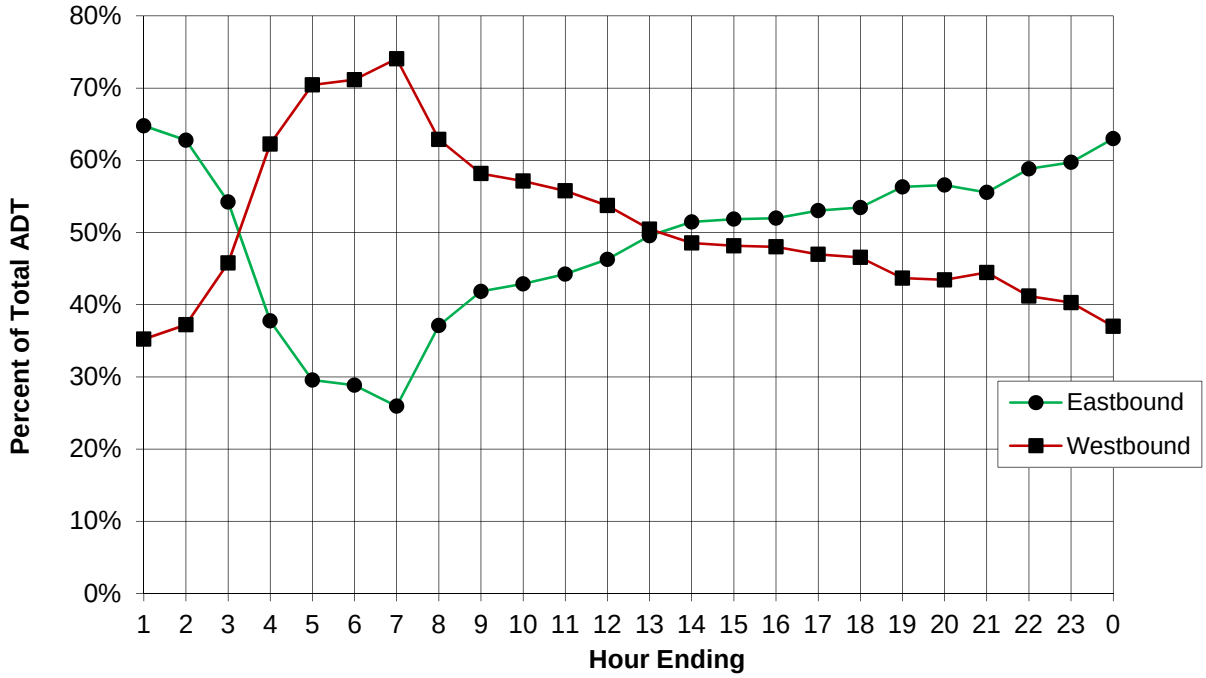
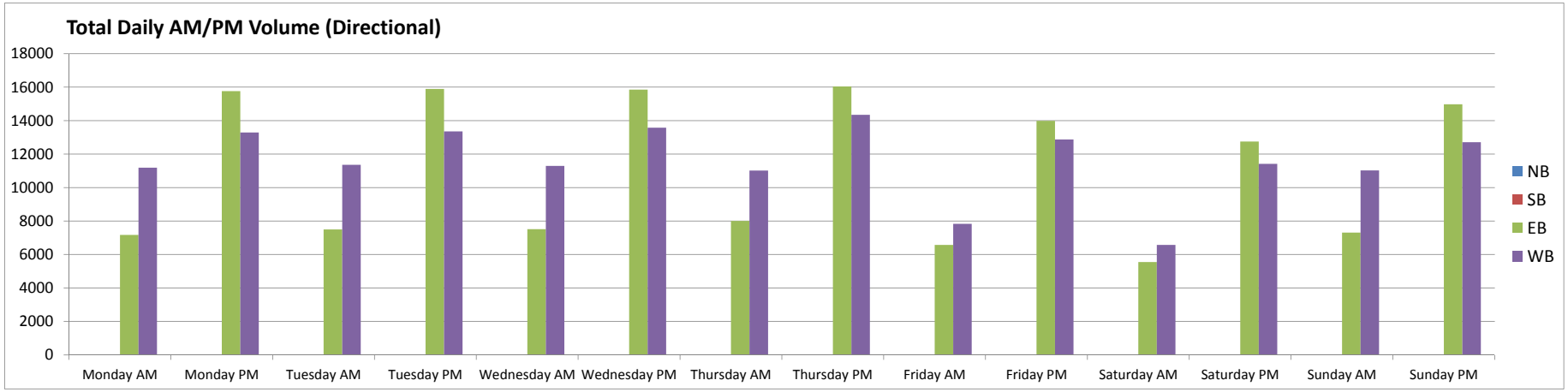
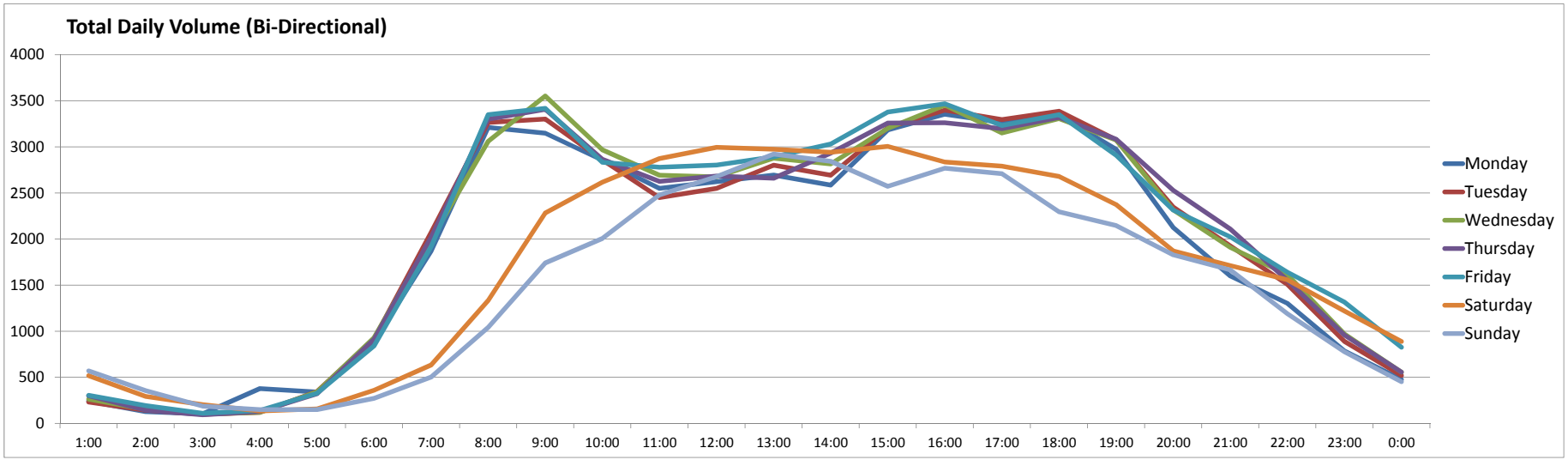


Exhibit 5: Traffic Distribution: Treat Boulevard between Jones Rd and Oak Rd, SB and NB directions (Weekday)



LOCATION #:	001	PROJECT #:	14070-000
ON STREET:	Treat Blvd	START DATE:	Friday, May 30, 2014
CROSS STREETS:	Jones Rd and Oak Rd	VICINITY:	Walnut Creek, CA





Average Daily Traffic Volumes

Quality Counts

LOCATION #:	001	PROJECT #:	14070-000
ON STREET:	Treat Blvd	DATE:	Friday, May 30, 2014
CROSS STREETS:	Jones Rd and Oak Rd	VICINITY:	Walnut Creek, CA

AM COUNTS

	NB	SB	EB		WB		
00:00			58		32		
00:15			65		34		
00:30			42		18		
00:45			36	*201*	20	*104*	***305***
01:00			41		21		
01:15			39		20		
01:30			24		12		
01:45			23	*127*	13	*66*	***193***
02:00			27		13		
02:15			22		14		
02:30			9		5		
02:45			10	*68*	10	*42*	***110***
03:00			19		15		
03:15			5		18		
03:30			16		26		
03:45			17	*57*	25	*84*	***141***
04:00			20		39		
04:15			12		50		
04:30			26		60		
04:45			44	*102*	77	*226*	***328***
05:00			50		110		
05:15			54		128		
05:30			53		154		
05:45			98	*255*	195	*587*	***842***
06:00			95		243		
06:15			114		308		
06:30			163		359		
06:45			187	*559*	449	*1359*	***1918***
07:00			234		476		
07:15			243		512		
07:30			370		536		
07:45			445	*1292*	534	*2058*	***3350***
08:00			448		480		
08:15			355		498		
08:30			348		452		
08:45			390	*1541*	448	*1878*	***3419***
09:00			275		393		
09:15			310		400		
09:30			316		386		
09:45			330	*1231*	423	*1602*	***2833***
10:00			316		382		
10:15			342		406		
10:30			301		340		
10:45			314	*1273*	379	*1507*	***2780***
11:00			302		376		
11:15			286		402		
11:30			332		325		
11:45			380	*1300*	401	*1504*	***2804***
TOTALS:				**8006**		**11017**	**19023**

PM COUNTS

	NB	SB	EB		WB		
12:00			342		375		
12:15			389		365		
12:30			348		365		
12:45			350	*1429*	359	*1464*	***2893***
13:00			398		368		
13:15			362		393		
13:30			382		347		
13:45			424	*1566*	358	*1466*	***3032***
14:00			410		368		
14:15			457		360		
14:30			404		466		
14:45			433	*1704*	481	*1675*	***3379***
15:00			452		400		
15:15			428		406		
15:30			432		434		
15:45			446	*1758*	470	*1710*	***3468***
16:00			405		401		
16:15			396		371		
16:30			458		393		
16:45			420	*1679*	388	*1553*	***3232***
17:00			428		416		
17:15			441		371		
17:30			487		386		
17:45			454	*1810*	368	*1541*	***3351***
18:00			371		357		
18:15			427		355		
18:30			417		311		
18:45			356	*1571*	316	*1339*	***2910***
19:00			337		259		
19:15			290		276		
19:30			293		242		
19:45			322	*1242*	296	*1073*	***2315***
20:00			272		229		
20:15			268		256		
20:30			267		220		
20:45			272	*1079*	240	*945*	***2024***
21:00			234		202		
21:15			252		170		
21:30			238		159		
21:45			226	*950*	160	*691*	***1641***
22:00			218		172		
22:15			186		159		
22:30			200		128		
22:45			137	*741*	117	*576*	***1317***
23:00			138		92		
23:15			145		73		
23:30			124		86		
23:45			106	*513*	62	*313*	***826***
TOTALS:				**16042**		**14346**	**30388**

SPLIT	42.1%	57.9%	**38.5%**	SPLIT	52.8%	47.2%	**61.5%**
PEAK HOUR	07:30	07:15	**07:30**	PEAK HOUR	17:00	14:30	**14:30**
PH VOLUME	1618	2062	**3666**	PH VOLUME	1810	1753	**3470**
PHF	0.90	0.96	**0.94**	PHF	0.93	0.91	**0.95**

DAY'S TOTAL

NB	SB	EB	WB	TOTAL
		24048	25363	**49411**

Average Daily Traffic Volumes

Quality Counts

LOCATION #:	001	PROJECT #:	14070-000
ON STREET:	Treat Blvd	DATE:	Saturday, May 31, 2014
CROSS STREETS:	Jones Rd and Oak Rd	VICINITY:	Walnut Creek, CA

AM COUNTS							PM COUNTS						
	NB	SB	EB		WB			NB	SB	EB		WB	
00:00			101		58		12:00			344		422	
00:15			83		46		12:15			352		389	
00:30			64		43		12:30			344		406	
00:45			77	*325*	46	*193*	***518***	12:45		338	*1378*	380	*1597*	***2975***
01:00			44		24		13:00			336		406	
01:15			55		23		13:15			367		380	
01:30			60		24		13:30			374		384	
01:45			43	*202*	21	*92*	***294***	13:45		341	*1418*	354	*1524*	***2942***
02:00			30		20		14:00			352		345	
02:15			35		18		14:15			426		340	
02:30			28		18		14:30			382		374	
02:45			32	*125*	23	*79*	***204***	14:45		385	*1545*	402	*1461*	***3006***
03:00			23		16		15:00			361		364	
03:15			14		13		15:15			364		324	
03:30			19		21		15:30			366		353	
03:45			18	*74*	12	*62*	***136***	15:45		384	*1475*	321	*1362*	***2837***
04:00			14		24		16:00			373		361	
04:15			10		23		16:15			396		354	
04:30			17		25		16:30			342		322	
04:45			21	*62*	24	*96*	***158***	16:45		318	*1429*	326	*1363*	***2792***
05:00			13		41		17:00			376		329	
05:15			28		50		17:15			341		331	
05:30			25		71		17:30			346		294	
05:45			55	*121*	78	*240*	***361***	17:45		347	*1410*	316	*1270*	***2680***
06:00			27		65		18:00			308		268	
06:15			54		111		18:15			315		289	
06:30			62		110		18:30			370		284	
06:45			89	*232*	116	*402*	***634***	18:45		280	*1273*	260	*1101*	***2374***
07:00			84		142		19:00			291		216	
07:15			118		195		19:15			252		241	
07:30			151		240		19:30			230		199	
07:45			196	*549*	209	*786*	***1335***	19:45		233	*1006*	210	*866*	***1872***
08:00			203		259		20:00			216		192	
08:15			233		289		20:15			233		181	
08:30			280		320		20:30			208		192	
08:45			342	*1058*	357	*1225*	***2283***	20:45		229	*886*	262	*827*	***1713***
09:00			284		333		21:00			209		189	
09:15			258		345		21:15			223		180	
09:30			294		396		21:30			228		172	
09:45			333	*1169*	375	*1449*	***2618***	21:45		219	*879*	138	*679*	***1558***
10:00			305		366		22:00			188		132	
10:15			308		384		22:15			183		162	
10:30			348		406		22:30			179		118	
10:45			349	*1310*	408	*1564*	***2874***	22:45		160	*710*	98	*510*	***1220***
11:00			344		342		23:00			174		95	
11:15			344		455		23:15			129		93	
11:30			308		416		23:30			130		78	
11:45			352	*1348*	434	*1647*	***2995***	23:45		144	*577*	47	*313*	***890***
TOTALS:				**6575**		**7835**	**14410**	TOTALS:			**13986**		**12873**	**26859**

SPLIT	45.6%	54.4%	**34.9%**	SPLIT	52.1%	47.9%	**65.1%**
PEAK HOUR	11:45	11:15	**11:15**	PEAK HOUR	14:15	12:00	**14:15**
PH VOLUME	1392	1727	**3075**	PH VOLUME	1554	1597	**3034**
PHF	0.99	0.95	**0.96**	PHF	0.91	0.95	**0.96**

DAY'S TOTAL

NB	SB	EB	WB	TOTAL
		20561	20708	**41269**

Average Daily Traffic Volumes

Quality Counts

LOCATION #:	001	PROJECT #:	14070-000
ON STREET:	Treat Blvd	DATE:	Sunday, June 01, 2014
CROSS STREETS:	Jones Rd and Oak Rd	VICINITY:	Walnut Creek, CA

AM COUNTS							PM COUNTS						
	NB	SB	EB		WB			NB	SB	EB		WB	
00:00			109		62		12:00			337		326	
00:15			81		54		12:15			310		345	
00:30			87		45		12:30			427		411	
00:45			78	*355*	54	*215*	***570***	12:45		404	*1478*	362	*1444*	***2922***
01:00			56		37		13:00			378		361	
01:15			70		28		13:15			377		357	
01:30			57		32		13:30			368		313	
01:45			51	*234*	25	*122*	***356***	13:45		346	*1469*	344	*1375*	***2844***
02:00			32		24		14:00			380		310	
02:15			40		19		14:15			309		312	
02:30			22		16		14:30			331		306	
02:45			23	*117*	11	*70*	***187***	14:45		337	*1357*	288	*1216*	***2573***
03:00			21		11		15:00			306		293	
03:15			28		20		15:15			366		325	
03:30			19		15		15:30			342		386	
03:45			21	*89*	15	*61*	***150***	15:45		333	*1347*	418	*1422*	***2769***
04:00			10		19		16:00			350		421	
04:15			14		24		16:15			311		381	
04:30			18		14		16:30			329		317	
04:45			18	*60*	33	*90*	***150***	16:45		320	*1310*	281	*1400*	***2710***
05:00			11		30		17:00			301		290	
05:15			22		44		17:15			318		278	
05:30			28		42		17:30			331		240	
05:45			30	*91*	65	*181*	***272***	17:45		304	*1254*	234	*1042*	***2296***
06:00			19		64		18:00			308		224	
06:15			47		86		18:15			311		270	
06:30			51		88		18:30			283		228	
06:45			51	*168*	98	*336*	***504***	18:45		282	*1184*	240	*962*	***2146***
07:00			78		97		19:00			244		193	
07:15			103		120		19:15			290		189	
07:30			166		139		19:30			258		180	
07:45			178	*525*	162	*518*	***1043***	19:45		278	*1070*	197	*759*	***1829***
08:00			202		156		20:00			236		198	
08:15			232		169		20:15			259		220	
08:30			274		221		20:30			198		198	
08:45			243	*951*	244	*790*	***1741***	20:45		186	*879*	171	*787*	***1666***
09:00			190		236		21:00			206		134	
09:15			178		280		21:15			168		156	
09:30			234		289		21:30			171		126	
09:45			251	*853*	348	*1153*	***2006***	21:45		136	*681*	93	*509*	***1190***
10:00			220		316		22:00			116		114	
10:15			242		306		22:15			142		92	
10:30			236		379		22:30			91		65	
10:45			289	*987*	491	*1492*	***2479***	22:45		100	*449*	57	*328*	***777***
11:00			292		502		23:00			84		50	
11:15			281		394		23:15			73		48	
11:30			250		336		23:30			71		46	
11:45			304	*1127*	320	*1552*	***2679***	23:45		48	*276*	33	*177*	***453***
TOTALS:				**5557**		**6580**	**12137**	TOTALS:			**12754**		**11421**	**24175**

SPLIT	45.8%	54.2%	**33.4%**	SPLIT	52.8%	47.2%	**66.6%**
PEAK HOUR	11:45	10:30	**10:30**	PEAK HOUR	12:30	15:30	**12:30**
PH VOLUME	1378	1766	**2864**	PH VOLUME	1586	1606	**3077**
PHF	0.81	0.88	**0.90**	PHF	0.93	0.95	**0.92**

DAY'S TOTAL

NB	SB	EB	WB	TOTAL
		18311	18001	**36312**

Average Daily Traffic Volumes

Quality Counts

LOCATION #:	001	PROJECT #:	14070-000
ON STREET:	Treat Blvd	DATE:	Monday, June 02, 2014
CROSS STREETS:	Jones Rd and Oak Rd	VICINITY:	Walnut Creek, CA

AM COUNTS							PM COUNTS						
	NB	SB	EB		WB				NB	SB	EB		WB		
00:00			52		23			12:00			328		331		
00:15			51		22			12:15			320		383		
00:30			33		27			12:30			304		354		
00:45			21	*157*	14	*86*	***243***	12:45			350	*1302*	325	*1393*	***2695***
01:00			28		17			13:00			308		354		
01:15			27		10			13:15			317		327		
01:30			14		10			13:30			308		302		
01:45			13	*82*	9	*46*	***128***	13:45			352	*1285*	318	*1301*	***2586***
02:00			11		12			14:00			403		322		
02:15			16		8			14:15			446		342		
02:30			13		16			14:30			419		422		
02:45			14	*54*	14	*50*	***104***	14:45			469	*1737*	360	*1446*	***3183***
03:00			30		9			15:00			490		378		
03:15			58		40			15:15			434		404		
03:30			38		95			15:30			441		415		
03:45			29	*155*	79	*223*	***378***	15:45			392	*1757*	401	*1598*	***3355***
04:00			17		46			16:00			425		386		
04:15			15		46			16:15			452		378		
04:30			24		71			16:30			414		389		
04:45			44	*100*	78	*241*	***341***	16:45			443	*1734*	378	*1531*	***3265***
05:00			36		101			17:00			460		382		
05:15			54		154			17:15			450		393		
05:30			67		154			17:30			466		406		
05:45			107	*264*	215	*624*	***888***	17:45			417	*1793*	369	*1550*	***3343***
06:00			75		256			18:00			446		332		
06:15			95		332			18:15			426		340		
06:30			124		353			18:30			420		340		
06:45			174	*468*	460	*1401*	***1869***	18:45			384	*1676*	286	*1298*	***2974***
07:00			192		506			19:00			348		241		
07:15			234		542			19:15			316		240		
07:30			338		546			19:30			262		209		
07:45			394	*1158*	459	*2053*	***3211***	19:45			305	*1231*	204	*894*	***2125***
08:00			342		550			20:00			212		198		
08:15			322		507			20:15			228		186		
08:30			288		434			20:30			206		172		
08:45			332	*1284*	374	*1865*	***3149***	20:45			215	*861*	183	*739*	***1600***
09:00			326		393			21:00			253		143		
09:15			276		409			21:15			201		156		
09:30			264		435			21:30			181		109		
09:45			316	*1182*	438	*1675*	***2857***	21:45			152	*787*	109	*517*	***1304***
10:00			260		334			22:00			165		76		
10:15			269		374			22:15			132		83		
10:30			293		348			22:30			107		68		
10:45			336	*1158*	336	*1392*	***2550***	22:45			93	*497*	62	*289*	***786***
11:00			259		318			23:00			86		50		
11:15			317		345			23:15			86		51		
11:30			322		353			23:30			88		34		
11:45			351	*1249*	359	*1375*	***2624***	23:45			57	*317*	24	*159*	***476***
TOTALS:				**7311**		**11031**	**18342**	TOTALS:				**14977**		**12715**	**27692**

SPLIT	39.9%	60.1%	**39.8%**	SPLIT	54.1%	45.9%	**60.2%**
PEAK HOUR	07:30	07:15	**07:30**	PEAK HOUR	14:45	15:15	**14:45**
PH VOLUME	1396	2097	**3458**	PH VOLUME	1834	1606	**3391**
PHF	0.89	0.95	**0.97**	PHF	0.94	0.97	**0.98**

DAY'S TOTAL

NB	SB	EB	WB	TOTAL
		22288	23746	**46034**

Average Daily Traffic Volumes

Quality Counts

LOCATION #:	001	PROJECT #:	14070-000
ON STREET:	Treat Blvd	DATE:	Tuesday, June 03, 2014
CROSS STREETS:	Jones Rd and Oak Rd	VICINITY:	Walnut Creek, CA

AM COUNTS							PM COUNTS						
	NB	SB	EB		WB				NB	SB	EB		WB		
00:00			49		29			12:00			350		358		
00:15			46		19			12:15			328		358		
00:30			22		20			12:30			326		363		
00:45			35	*152*	12	*80*	***232***	12:45			368	*1372*	351	*1430*	***2802***
01:00			18		20			13:00			335		332		
01:15			17		14			13:15			326		321		
01:30			32		12			13:30			377		316		
01:45			20	*87*	10	*56*	***143***	13:45			368	*1406*	319	*1288*	***2694***
02:00			8		9			14:00			370		300		
02:15			19		11			14:15			431		332		
02:30			12		20			14:30			423		448		
02:45			10	*49*	11	*51*	***100***	14:45			474	*1698*	431	*1511*	***3209***
03:00			12		12			15:00			460		382		
03:15			7		14			15:15			444		408		
03:30			4		20			15:30			408		421		
03:45			12	*35*	39	*85*	***120***	15:45			474	*1786*	402	*1613*	***3399***
04:00			17		39			16:00			382		398		
04:15			10		51			16:15			515		349		
04:30			24		74			16:30			429		394		
04:45			46	*97*	84	*248*	***345***	16:45			436	*1762*	393	*1534*	***3296***
05:00			36		123			17:00			475		409		
05:15			73		135			17:15			466		393		
05:30			58		169			17:30			448		392		
05:45			90	*257*	233	*660*	***917***	17:45			442	*1831*	362	*1556*	***3387***
06:00			79		299			18:00			457		317		
06:15			96		300			18:15			471		314		
06:30			137		422			18:30			424		320		
06:45			196	*508*	544	*1565*	***2073***	18:45			450	*1802*	324	*1275*	***3077***
07:00			214		508			19:00			372		275		
07:15			268		535			19:15			349		268		
07:30			383		516			19:30			303		249		
07:45			383	*1248*	459	*2018*	***3266***	19:45			275	*1299*	256	*1048*	***2347***
08:00			358		514			20:00			311		250		
08:15			299		464			20:15			294		223		
08:30			336		556			20:30			236		184		
08:45			292	*1285*	484	*2018*	***3303***	20:45			247	*1088*	181	*838*	***1926***
09:00			294		451			21:00			257		179		
09:15			300		414			21:15			221		166		
09:30			319		347			21:30			190		164		
09:45			342	*1255*	393	*1605*	***2860***	21:45			196	*864*	136	*645*	***1509***
10:00			246		346			22:00			168		112		
10:15			264		348			22:15			145		110		
10:30			237		358			22:30			135		67		
10:45			290	*1037*	361	*1413*	***2450***	22:45			88	*536*	66	*355*	***891***
11:00			251		347			23:00			82		70		
11:15			308		336			23:15			86		61		
11:30			279		355			23:30			86		35		
11:45			323	*1161*	352	*1390*	***2551***	23:45			70	*324*	32	*198*	***522***
TOTALS:				**7171**		**11189**	**18360**	TOTALS:				**15768**		**13291**	**29059**

SPLIT	39.1%	60.9%	**38.7%**	SPLIT	54.3%	45.7%	**61.3%**
PEAK HOUR	07:30	06:45	**07:15**	PEAK HOUR	16:15	14:30	**14:30**
PH VOLUME	1423	2103	**3416**	PH VOLUME	1855	1669	**3470**
PHF	0.93	0.97	**0.95**	PHF	0.90	0.93	**0.96**

DAY'S TOTAL

NB	SB	EB	WB	TOTAL
		22939	24480	**47419**

Average Daily Traffic Volumes

Quality Counts

LOCATION #:	001	PROJECT #:	14070-000
ON STREET:	Treat Blvd	DATE:	Wednesday, June 04, 2014
CROSS STREETS:	Jones Rd and Oak Rd	VICINITY:	Walnut Creek, CA

AM COUNTS							PM COUNTS						
	NB	SB	EB		WB				NB	SB	EB		WB		
00:00			56		25			12:00			358		344		
00:15			45		27			12:15			340		342		
00:30			39		30			12:30			370		389		
00:45			25	*165*	16	*98*	***263***	12:45			387	*1455*	348	*1423*	***2878***
01:00			32		14			13:00			349		324		
01:15			28		16			13:15			380		385		
01:30			15		14			13:30			359		319		
01:45			20	*95*	15	*59*	***154***	13:45			382	*1470*	318	*1346*	***2816***
02:00			15		15			14:00			345		378		
02:15			16		7			14:15			433		386		
02:30			14		8			14:30			431		410		
02:45			13	*58*	13	*43*	***101***	14:45			420	*1629*	398	*1572*	***3201***
03:00			4		10			15:00			456		378		
03:15			9		15			15:15			456		451		
03:30			11		24			15:30			459		428		
03:45			17	*41*	31	*80*	***121***	15:45			444	*1815*	381	*1638*	***3453***
04:00			15		38			16:00			398		368		
04:15			14		46			16:15			454		374		
04:30			23		79			16:30			423		391		
04:45			50	*102*	78	*241*	***343***	16:45			405	*1680*	338	*1471*	***3151***
05:00			52		92			17:00			405		398		
05:15			57		134			17:15			459		386		
05:30			66		191			17:30			439		411		
05:45			113	*288*	226	*643*	***931***	17:45			420	*1723*	389	*1584*	***3307***
06:00			87		262			18:00			433		332		
06:15			108		328			18:15			468		365		
06:30			135		396			18:30			420		312		
06:45			186	*516*	497	*1483*	***1999***	18:45			411	*1732*	334	*1343*	***3075***
07:00			192		546			19:00			395		238		
07:15			240		544			19:15			370		257		
07:30			298		485			19:30			331		219		
07:45			314	*1044*	442	*2017*	***3061***	19:45			266	*1362*	241	*955*	***2317***
08:00			320		517			20:00			308		206		
08:15			330		522			20:15			286		213		
08:30			410		491			20:30			250		194		
08:45			499	*1559*	464	*1994*	***3553***	20:45			260	*1104*	193	*806*	***1910***
09:00			350		470			21:00			278		184		
09:15			294		432			21:15			256		175		
09:30			258		411			21:30			228		149		
09:45			339	*1241*	415	*1728*	***2969***	21:45			205	*967*	140	*648*	***1615***
10:00			298		362			22:00			184		113		
10:15			279		388			22:15			166		109		
10:30			302		394			22:30			140		80		
10:45			302	*1181*	369	*1513*	***2694***	22:45			105	*595*	74	*376*	***971***
11:00			288		363			23:00			108		60		
11:15			298		365			23:15			89		49		
11:30			298		366			23:30			92		42		
11:45			327	*1211*	370	*1464*	***2675***	23:45			73	*362*	44	*195*	***557***
TOTALS:				**7501**		**11363**	**18864**	TOTALS:				**15894**		**13357**	**29251**

SPLIT	39.8%	60.2%	**39.2%**	SPLIT	54.3%	45.7%	**60.8%**
PEAK HOUR	08:15	06:45	**08:00**	PEAK HOUR	15:00	14:45	**15:00**
PH VOLUME	1589	2072	**3553**	PH VOLUME	1815	1655	**3453**
PHF	0.80	0.95	**0.92**	PHF	0.99	0.92	**0.95**

DAY'S TOTAL

NB	SB	EB	WB	TOTAL
		23395	24720	**48115**

Average Daily Traffic Volumes

Quality Counts

LOCATION #:	001	PROJECT #:	14070-000
ON STREET:	Treat Blvd	DATE:	Thursday, June 05, 2014
CROSS STREETS:	Jones Rd and Oak Rd	VICINITY:	Walnut Creek, CA

AM COUNTS							PM COUNTS						
	NB	SB	EB		WB			NB	SB	EB		WB	
00:00			64		25		12:00			319		332	
00:15			57		31		12:15			346		332	
00:30			33		24		12:30			327		324	
00:45			41	*195*	25	*105*	***300***	12:45		350	*1342*	330	*1318*	***2660***
01:00			26		21		13:00			314		343	
01:15			28		17		13:15			384		372	
01:30			23		10		13:30			398		331	
01:45			11	*88*	9	*57*	***145***	13:45		412	*1508*	379	*1425*	***2933***
02:00			11		15		14:00			419		408	
02:15			14		7		14:15			411		400	
02:30			10		14		14:30			430		392	
02:45			12	*47*	11	*47*	***94***	14:45		388	*1648*	412	*1612*	***3260***
03:00			14		16		15:00			417		370	
03:15			5		15		15:15			396		414	
03:30			15		18		15:30			443		380	
03:45			14	*48*	33	*82*	***130***	15:45		433	*1689*	410	*1574*	***3263***
04:00			9		34		16:00			350		401	
04:15			19		48		16:15			471		356	
04:30			21		53		16:30			414		374	
04:45			46	*95*	91	*226*	***321***	16:45		470	*1705*	362	*1493*	***3198***
05:00			37		122		17:00			434		390	
05:15			46		156		17:15			422		393	
05:30			59		176		17:30			478		367	
05:45			90	*232*	229	*683*	***915***	17:45		439	*1773*	397	*1547*	***3320***
06:00			84		254		18:00			486		357	
06:15			97		334		18:15			413		364	
06:30			149		422		18:30			436		313	
06:45			182	*512*	500	*1510*	***2022***	18:45		399	*1734*	316	*1350*	***3084***
07:00			205		526		19:00			361		303	
07:15			259		560		19:15			403		278	
07:30			356		522		19:30			388		251	
07:45			446	*1266*	427	*2035*	***3301***	19:45		295	*1447*	251	*1083*	***2530***
08:00			397		510		20:00			336		201	
08:15			309		497		20:15			316		270	
08:30			281		498		20:30			256		218	
08:45			387	*1374*	530	*2035*	***3409***	20:45		275	*1183*	237	*926*	***2109***
09:00			329		412		21:00			245		172	
09:15			306		437		21:15			254		183	
09:30			311		362		21:30			221		152	
09:45			314	*1260*	395	*1606*	***2866***	21:45		195	*915*	131	*638*	***1553***
10:00			258		371		22:00			155		110	
10:15			307		362		22:15			162		96	
10:30			280		366		22:30			133		103	
10:45			301	*1146*	381	*1480*	***2626***	22:45		122	*572*	79	*388*	***960***
11:00			289		338		23:00			82		67	
11:15			334		367		23:15			87		63	
11:30			301		320		23:30			86		48	
11:45			327	*1251*	409	*1434*	***2685***	23:45		80	*335*	44	*222*	***557***
TOTALS:				**7514**		**11300**	**18814**	TOTALS:			**15851**		**13576**	**29427**

SPLIT	39.9%	60.1%	**39.0%**	SPLIT	53.9%	46.1%	**61.0%**
PEAK HOUR	07:30	06:45	**07:15**	PEAK HOUR	17:15	14:00	**17:15**
PH VOLUME	1508	2108	**3477**	PH VOLUME	1825	1612	**3339**
PHF	0.85	0.94	**0.96**	PHF	0.94	0.98	**0.99**

DAY'S TOTAL

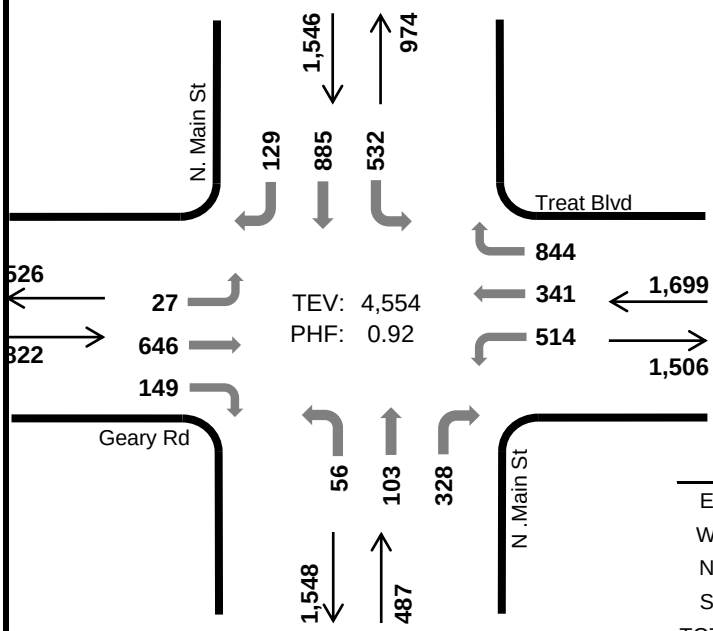
NB	SB	EB	WB	TOTAL
		23365	24876	**48241**

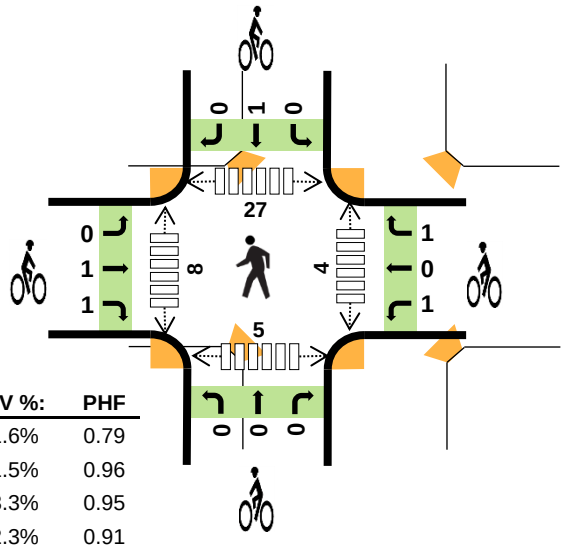
N. Main St
Treat Blvd

Date: Tue, May 13, 2014
Count Period: 7:15 AM to 9:15 AM
Peak Hour: 7:45 AM to 8:45 AM

N

Peak Hour





	HV %:	PHF
EB	1.6%	0.79
WB	1.5%	0.96
NB	3.3%	0.95
SB	2.3%	0.91
TOTAL	2.0%	0.92

Two-Hour Count Summaries

Interval Start		Geary Rd			Treat Blvd			N .Main St			N. Main St			15-min Total	Rolling One Hour
		Eastbound			Westbound			Northbound			Southbound				
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:15 AM		3	111	36	112	81	243	8	18	52	117	229	28	1,038	
7:30 AM		8	131	35	118	66	157	5	23	62	124	238	29	996	
7:45 AM		**5**	**210**	**44**	**141**	**90**	**210**	**10**	**25**	**82**	**140**	**258**	**29**	**1,244**	
8:00 AM		**6**	**189**	**29**	**151**	**78**	**203**	**12**	**23**	**90**	**114**	**224**	**29**	**1,148**	4,426
8:15 AM		**7**	**124**	**45**	**115**	**82**	**195**	**17**	**25**	**75**	**143**	**219**	**32**	**1,079**	4,467
8:30 AM		**9**	**123**	**31**	**107**	**91**	**236**	**17**	**30**	**81**	**135**	**184**	**39**	**1,083**	**4,554**
8:45 AM		9	104	23	112	94	211	18	27	81	159	188	60	1,086	4,396
9:00 AM		11	122	38	96	69	198	18	40	69	161	171	46	1,039	4,287
Count Total		58	1,114	281	952	651	1,653	105	211	592	1,093	1,711	292	8,713	
Peak Hour	**All**	**27**	**646**	**149**	**514**	**341**	**844**	**56**	**103**	**328**	**532**	**885**	**129**	**4,554**	
	HV	**1**	**8**	**4**	**5**	**11**	**10**	**2**	**2**	**12**	**17**	**15**	**3**	**90**	
	HV%	**4%**	**1%**	**3%**	**1%**	**3%**	**1%**	**4%**	**2%**	**4%**	**3%**	**2%**	**2%**	**2%**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:15 AM	6	5	2	11	*24*	0	0	0	2	*2*	1	0	1	1	*3*
7:30 AM	4	5	1	7	*17*	0	0	0	0	*0*	3	0	7	0	*10*
7:45 AM	**4**	**6**	**5**	**9**	***24***	**1**	**1**	**0**	**1**	***3***	**3**	**0**	**6**	**1**	***10***
8:00 AM	**2**	**6**	**2**	**9**	***19***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**8**	**0**	***8***
8:15 AM	**4**	**7**	**6**	**7**	***24***	**0**	**0**	**0**	**0**	***0***	**1**	**5**	**7**	**1**	***14***
8:30 AM	**3**	**7**	**3**	**10**	***23***	**0**	**1**	**0**	**0**	***1***	**0**	**3**	**6**	**3**	***12***
8:45 AM	4	8	3	10	*25*	0	0	0	0	*0*	2	0	6	4	*12*
9:00 AM	9	4	1	11	*25*	0	0	0	0	*0*	3	3	0	2	*8*
Count Total	36	48	23	74	*181*	2	2	0	3	*7*	13	11	41	12	*77*
Peak Hr	**13**	**26**	**16**	**35**	***90***	**2**	**2**	**0**	**1**	***5***	**4**	**8**	**27**	**5**	***44***

Two-Hour Count Summaries - Heavy Vehicles

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Interval Start	Geary Rd			Treat Blvd			N .Main St			N. Main St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:15 AM	0	6	0	2	1	2	1	1	0	3	6	2	24	
7:30 AM	0	3	1	1	3	1	0	0	1	5	1	1	17	
7:45 AM	**0**	**1**	**3**	**0**	**2**	**4**	**0**	**2**	**3**	**2**	**5**	**2**	**24**	
8:00 AM	**0**	**2**	**0**	**1**	**3**	**2**	**0**	**0**	**2**	**3**	**6**	**0**	**19**	**84**
8:15 AM	**0**	**3**	**1**	**2**	**2**	**3**	**0**	**0**	**6**	**4**	**2**	**1**	**24**	**84**
8:30 AM	**1**	**2**	**0**	**2**	**4**	**1**	**2**	**0**	**1**	**8**	**2**	**0**	**23**	**90**
8:45 AM	0	3	1	1	2	5	0	0	3	5	3	2	25	91
9:00 AM	0	9	0	0	2	2	0	0	1	5	4	2	25	97
Count Total	1	29	6	9	19	20	3	3	17	35	29	10	181	
Peak Hour	**1**	**8**	**4**	**5**	**11**	**10**	**2**	**2**	**12**	**17**	**15**	**3**	**90**	

Two-Hour Count Summaries - Bikes

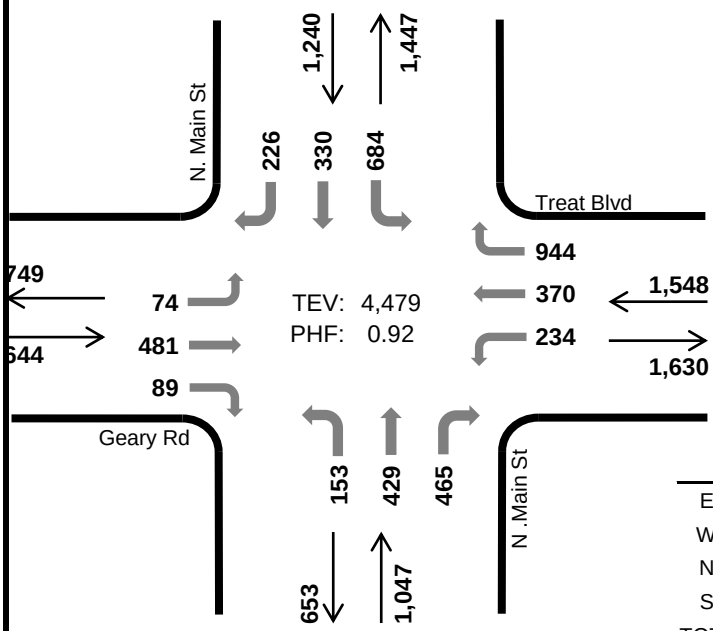
Interval Start	Geary Rd			Treat Blvd			N .Main St			N. Main St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 AM	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**3**	
8:00 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**6**
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**
8:30 AM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**5**
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	1	1	1	0	1	0	0	0	0	3	0	7	
Peak Hour	**0**	**1**	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**5**	

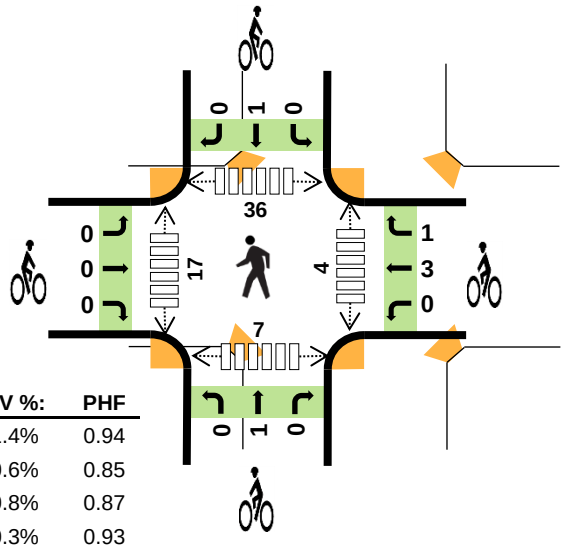
N. Main St
Treat Blvd

Date: Tue, May 13, 2014
Count Period: 3:30 PM to 5:30 PM
Peak Hour: 4:30 PM to 5:30 PM

N

Peak Hour





	HV %:	PHF
EB	1.4%	0.94
WB	0.6%	0.85
NB	0.8%	0.87
SB	0.3%	0.93
TOTAL	0.7%	0.92

Two-Hour Count Summaries

Interval Start		Geary Rd			Treat Blvd			N .Main St			N. Main St			15-min Total	Rolling One Hour
		Eastbound			Westbound			Northbound			Southbound				
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:30 PM		14	122	19	64	83	213	26	72	112	195	96	56	1,072	
3:45 PM		15	148	28	51	85	194	37	104	97	190	113	62	1,124	
4:00 PM		10	148	21	56	69	201	19	78	104	187	81	48	1,022	
4:15 PM		11	167	18	64	83	240	33	100	101	168	82	54	1,121	4,339
4:30 PM		**24**	**102**	**24**	**37**	**70**	**212**	**28**	**106**	**126**	**185**	**69**	**50**	**1,033**	4,300
4:45 PM		**15**	**120**	**18**	**69**	**101**	**245**	**33**	**87**	**110**	**153**	**68**	**52**	**1,071**	4,247
5:00 PM		**15**	**128**	**29**	**50**	**80**	**228**	**45**	**129**	**126**	**168**	**101**	**64**	**1,163**	4,388
5:15 PM		**20**	**131**	**18**	**78**	**119**	**259**	**47**	**107**	**103**	**178**	**92**	**60**	**1,212**	**4,479**
Count Total		124	1,066	175	469	690	1,792	268	783	879	1,424	702	446	8,818	
Peak Hour	**All**	**74**	**481**	**89**	**234**	**370**	**944**	**153**	**429**	**465**	**684**	**330**	**226**	**4,479**	
	HV	**0**	**8**	**1**	**5**	**3**	**2**	**0**	**1**	**7**	**4**	**0**	**0**	**31**	
	HV%	**0%**	**2%**	**1%**	**2%**	**1%**	**0%**	**0%**	**0%**	**2%**	**1%**	**0%**	**0%**	**1%**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:30 PM	2	2	3	3	*10*	0	0	0	0	*0*	0	0	2	1	*3*
3:45 PM	3	1	8	7	*19*	0	0	0	0	*0*	2	0	18	0	*20*
4:00 PM	3	1	3	4	*11*	0	0	0	0	*0*	0	2	4	0	*6*
4:15 PM	1	1	4	4	*10*	0	0	0	0	*0*	0	5	8	4	*17*
4:30 PM	**3**	**2**	**4**	**0**	***9***	**0**	**1**	**0**	**1**	***2***	**1**	**4**	**16**	**2**	***23***
4:45 PM	**2**	**4**	**3**	**3**	***12***	**0**	**0**	**1**	**0**	***1***	**2**	**4**	**4**	**4**	***14***
5:00 PM	**4**	**3**	**0**	**1**	***8***	**0**	**1**	**0**	**0**	***1***	**1**	**4**	**8**	**1**	***14***
5:15 PM	**0**	**1**	**1**	**0**	***2***	**0**	**2**	**0**	**0**	***2***	**0**	**5**	**8**	**0**	***13***
Count Total	18	15	26	22	*81*	0	4	1	1	*6*	6	24	68	12	*110*
Peak Hr	**9**	**10**	**8**	**4**	***31***	**0**	**4**	**1**	**1**	***6***	**4**	**17**	**36**	**7**	***64***

Two-Hour Count Summaries - Heavy Vehicles

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Interval Start	Geary Rd			Treat Blvd			N .Main St			N. Main St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:30 PM	0	2	0	1	1	0	0	1	2	1	1	1	10	
3:45 PM	0	2	1	0	1	0	2	1	5	5	1	1	19	
4:00 PM	0	3	0	0	1	0	0	1	2	2	0	2	11	
4:15 PM	0	1	0	1	0	0	0	2	2	3	1	0	10	50
4:30 PM	**0**	**2**	**1**	**0**	**2**	**0**	**0**	**1**	**3**	**0**	**0**	**0**	**9**	**49**
4:45 PM	**0**	**2**	**0**	**3**	**0**	**1**	**0**	**0**	**3**	**3**	**0**	**0**	**12**	**42**
5:00 PM	**0**	**4**	**0**	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**8**	**39**
5:15 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**31**
Count Total	0	16	2	7	6	2	2	6	18	15	3	4	81	
Peak Hour	**0**	**8**	**1**	**5**	**3**	**2**	**0**	**1**	**7**	**4**	**0**	**0**	**31**	

Two-Hour Count Summaries - Bikes

Interval Start	Geary Rd			Treat Blvd			N .Main St			N. Main St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**2**
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**3**
5:00 PM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**4**
5:15 PM	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**6**
Count Total	0	0	0	0	3	1	0	1	0	0	1	0	6	
Peak Hour	**0**	**0**	**0**	**0**	**3**	**1**	**0**	**1**	**0**	**0**	**1**	**0**	**6**	

Deon Fouche: 415 - 757 - 7714

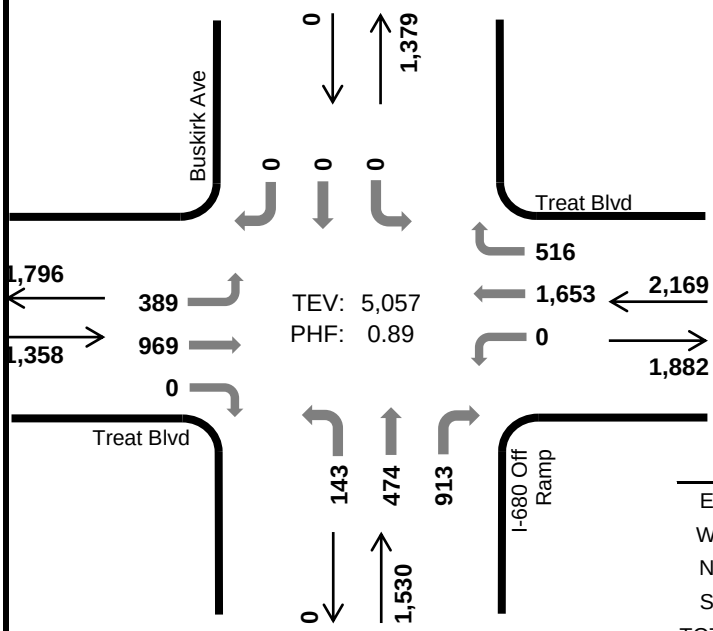
deon.fouche@idaxdata.com

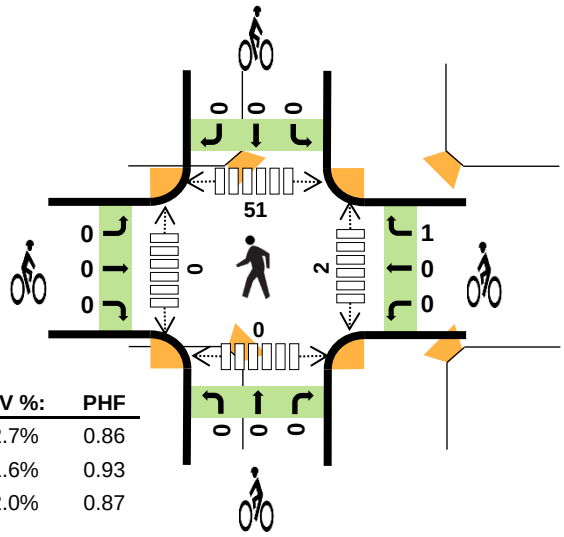
Buskirk Ave
Treat Blvd

Date: Tue, May 13, 2014
Count Period: 7:15 AM to 9:15 AM
Peak Hour: 7:45 AM to 8:45 AM

N

Peak Hour





	HV %:	PHF
EB	2.7%	0.86
WB	1.6%	0.93
NB	2.0%	0.87
SB	-	-
TOTAL	2.0%	0.89

Two-Hour Count Summaries

Interval Start		Treat Blvd Eastbound LT	TH	RT	Treat Blvd Westbound LT	TH	RT	I-680 Off Ramp Northbound LT	TH	RT	Buskirk Ave Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:15 AM		96	166	0	0	438	113	28	87	157	0	0	0	1,085	
7:30 AM		76	204	0	0	333	121	35	103	241	0	0	0	1,113	
7:45 AM		**115**	**279**	**0**	**0**	**432**	**154**	**36**	**105**	**301**	**0**	**0**	**0**	**1,422**	
8:00 AM		**92**	**243**	**0**	**0**	**398**	**129**	**38**	**127**	**220**	**0**	**0**	**0**	**1,247**	4,867
8:15 AM		**82**	**228**	**0**	**0**	**395**	**124**	**38**	**119**	**223**	**0**	**0**	**0**	**1,209**	4,991
8:30 AM		**100**	**219**	**0**	**0**	**428**	**109**	**31**	**123**	**169**	**0**	**0**	**0**	**1,179**	**5,057**
8:45 AM		105	220	0	0	432	108	41	128	192	0	0	0	1,226	4,861
9:00 AM		113	205	0	0	335	105	53	114	171	0	0	0	1,096	4,710
Count Total		779	1,764	0	0	3,191	963	300	906	1,674	0	0	0	9,577	
Peak Hour	**All**	**389**	**969**	**0**	**0**	**1,653**	**516**	**143**	**474**	**913**	**0**	**0**	**0**	**5,057**	
	HV	**10**	**26**	**0**	**0**	**19**	**15**	**11**	**6**	**14**	**0**	**0**	**0**	**101**	
	HV%	**3%**	**3%**	**-**	**-**	**1%**	**3%**	**8%**	**1%**	**2%**	**-**	**-**	**-**	**2%**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:15 AM	11	13	2	0	*26*	0	0	0	0	*0*	0	0	12	0	*12*
7:30 AM	10	5	9	0	*24*	0	0	0	0	*0*	0	0	15	0	*15*
7:45 AM	**9**	**7**	**8**	**0**	***24***	**0**	**1**	**0**	**0**	***1***	**1**	**0**	**20**	**0**	***21***
8:00 AM	**4**	**8**	**6**	**0**	***18***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**12**	**0**	***12***
8:15 AM	**13**	**9**	**7**	**0**	***29***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**14**	**0**	***15***
8:30 AM	**10**	**10**	**10**	**0**	***30***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**5**	**0**	***5***
8:45 AM	11	9	9	0	*29*	0	1	0	0	*1*	0	0	12	0	*12*
9:00 AM	12	5	7	0	*24*	0	1	0	0	*1*	2	0	19	0	*21*
Count Total	80	66	58	0	*204*	0	3	0	0	*3*	4	0	109	0	*113*
Peak Hr	**36**	**34**	**31**	**0**	***101***	**0**	**1**	**0**	**0**	***1***	**2**	**0**	**51**	**0**	***53***

Two-Hour Count Summaries - Heavy Vehicles

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Interval Start	Treat Blvd			Treat Blvd			I-680 Off Ramp			Buskirk Ave			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:15 AM	4	7	0	0	7	6	0	1	1	0	0	0	26	
7:30 AM	1	9	0	0	2	3	2	1	6	0	0	0	24	
7:45 AM	**3**	**6**	**0**	**0**	**5**	**2**	**4**	**1**	**3**	**0**	**0**	**0**	**24**	
8:00 AM	**2**	**2**	**0**	**0**	**6**	**2**	**3**	**1**	**2**	**0**	**0**	**0**	**18**	**92**
8:15 AM	**5**	**8**	**0**	**0**	**4**	**5**	**2**	**1**	**4**	**0**	**0**	**0**	**29**	**95**
8:30 AM	**0**	**10**	**0**	**0**	**4**	**6**	**2**	**3**	**5**	**0**	**0**	**0**	**30**	**101**
8:45 AM	4	7	0	0	7	2	2	2	5	0	0	0	29	106
9:00 AM	4	8	0	0	2	3	2	2	3	0	0	0	24	112
Count Total	23	57	0	0	37	29	17	12	29	0	0	0	204	
Peak Hour	**10**	**26**	**0**	**0**	**19**	**15**	**11**	**6**	**14**	**0**	**0**	**0**	**101**	

Two-Hour Count Summaries - Bikes

Interval Start	Treat Blvd			Treat Blvd			I-680 Off Ramp			Buskirk Ave			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
8:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
8:45 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	1
9:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	2
Count Total	0	0	0	0	1	2	0	0	0	0	0	0	3	
Peak Hour	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	

Deon Fouche: 415 - 757 - 7714

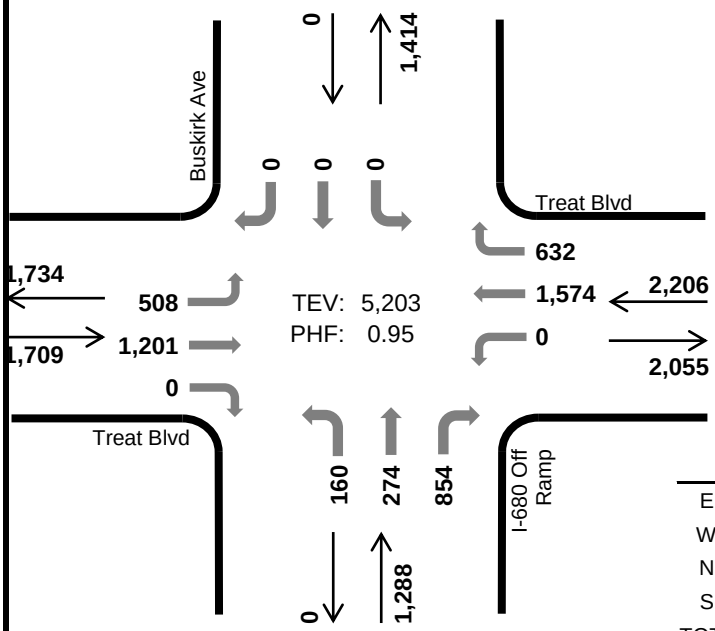
deon.fouche@idaxdata.com

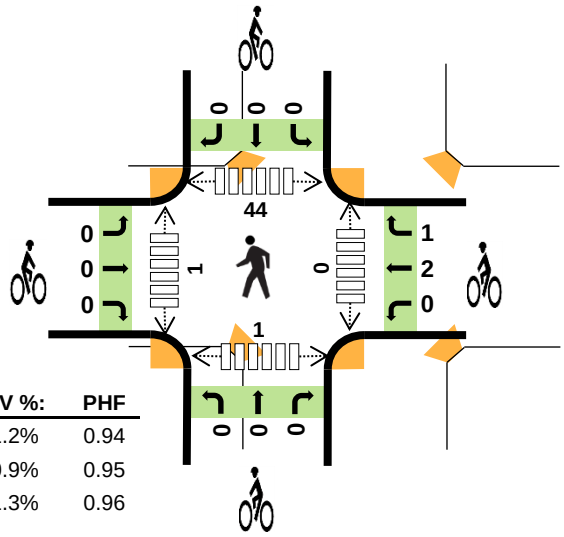
Buskirk Ave
Treat Blvd

Date: Tue, May 13, 2014
Count Period: 3:30 PM to 5:30 PM
Peak Hour: 4:30 PM to 5:30 PM

N

Peak Hour





	HV %:	PHF
EB	1.2%	0.94
WB	0.9%	0.95
NB	1.3%	0.96
SB	-	-
TOTAL	1.1%	0.95

Two-Hour Count Summaries

Interval Start		Treat Blvd Eastbound			Treat Blvd Westbound			I-680 Off Ramp Northbound			Buskirk Ave Southbound			15-min Total	Rolling One Hour
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:30 PM		109	307	0	0	317	158	57	64	232	0	0	0	1,244	
3:45 PM		135	263	0	0	308	182	63	55	218	0	0	0	1,224	
4:00 PM		107	280	0	0	337	155	37	62	183	0	0	0	1,161	
4:15 PM		108	303	0	0	342	152	45	71	197	0	0	0	1,218	4,847
4:30 PM		**139**	**297**	**0**	**0**	**365**	**167**	**35**	**66**	**206**	**0**	**0**	**0**	**1,275**	4,878
4:45 PM		**120**	**265**	**0**	**0**	**375**	**169**	**45**	**73**	**219**	**0**	**0**	**0**	**1,266**	4,920
5:00 PM		**127**	**308**	**0**	**0**	**407**	**143**	**42**	**61**	**210**	**0**	**0**	**0**	**1,298**	5,057
5:15 PM		**122**	**331**	**0**	**0**	**427**	**153**	**38**	**74**	**219**	**0**	**0**	**0**	**1,364**	**5,203**
Count Total		967	2,354	0	0	2,878	1,279	362	526	1,684	0	0	0	10,050	
Peak Hour	**All**	**508**	**1,201**	**0**	**0**	**1,574**	**632**	**160**	**274**	**854**	**0**	**0**	**0**	**5,203**	
	HV	**13**	**8**	**0**	**0**	**15**	**5**	**2**	**4**	**11**	**0**	**0**	**0**	**58**	
	HV%	**3%**	**1%**	**-**	**-**	**1%**	**1%**	**1%**	**1%**	**1%**	**-**	**-**	**-**	**1%**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
3:30 PM	5	5	7	0	*17*	0	0	0	0	*0*	1	0	9	0	*10*
3:45 PM	8	6	3	0	*17*	0	2	0	0	*2*	0	0	20	0	*20*
4:00 PM	5	0	5	0	*10*	0	0	0	0	*0*	0	0	13	0	*13*
4:15 PM	8	4	3	0	*15*	0	2	0	0	*2*	0	0	7	1	*8*
4:30 PM	**6**	**4**	**5**	**0**	***15***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**12**	**0**	***12***
4:45 PM	**8**	**7**	**7**	**0**	***22***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**6**	**0**	***6***
5:00 PM	**6**	**5**	**2**	**0**	***13***	**0**	**2**	**0**	**0**	***2***	**0**	**0**	**15**	**1**	***16***
5:15 PM	**1**	**4**	**3**	**0**	***8***	**0**	**1**	**0**	**0**	***1***	**0**	**1**	**11**	**0**	***12***
Count Total	47	35	35	0	*117*	0	7	0	0	*7*	1	1	93	2	*97*
Peak Hr	**21**	**20**	**17**	**0**	***58***	**0**	**3**	**0**	**0**	***3***	**0**	**1**	**44**	**1**	***46***

Two-Hour Count Summaries - Heavy Vehicles

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Interval Start	Treat Blvd			Treat Blvd			I-680 Off Ramp			Buskirk Ave			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:30 PM	4	1	0	0	2	3	1	2	4	0	0	0	17	
3:45 PM	4	4	0	0	3	3	0	0	3	0	0	0	17	
4:00 PM	3	2	0	0	0	0	0	1	4	0	0	0	10	
4:15 PM	4	4	0	0	2	2	0	2	1	0	0	0	15	59
4:30 PM	**4**	**2**	**0**	**0**	**4**	**0**	**0**	**1**	**4**	**0**	**0**	**0**	**15**	**57**
4:45 PM	**4**	**4**	**0**	**0**	**5**	**2**	**2**	**1**	**4**	**0**	**0**	**0**	**22**	**62**
5:00 PM	**5**	**1**	**0**	**0**	**4**	**1**	**0**	**1**	**1**	**0**	**0**	**0**	**13**	**65**
5:15 PM	**0**	**1**	**0**	**0**	**2**	**2**	**0**	**1**	**2**	**0**	**0**	**0**	**8**	**58**
Count Total	28	19	0	0	22	13	3	9	23	0	0	0	117	
Peak Hour	**13**	**8**	**0**	**0**	**15**	**5**	**2**	**4**	**11**	**0**	**0**	**0**	**58**	

Two-Hour Count Summaries - Bikes

Interval Start	Treat Blvd			Treat Blvd			I-680 Off Ramp			Buskirk Ave			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45 PM	0	0	0	0	2	0	0	0	0	0	0	0	2	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	2	0	0	0	0	0	0	0	2	4
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
5:00 PM	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**4**
5:15 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**
Count Total	0	0	0	0	6	1	0	0	0	0	0	0	7	
Peak Hour	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	

Deon Fouche: 415 - 757 - 7714

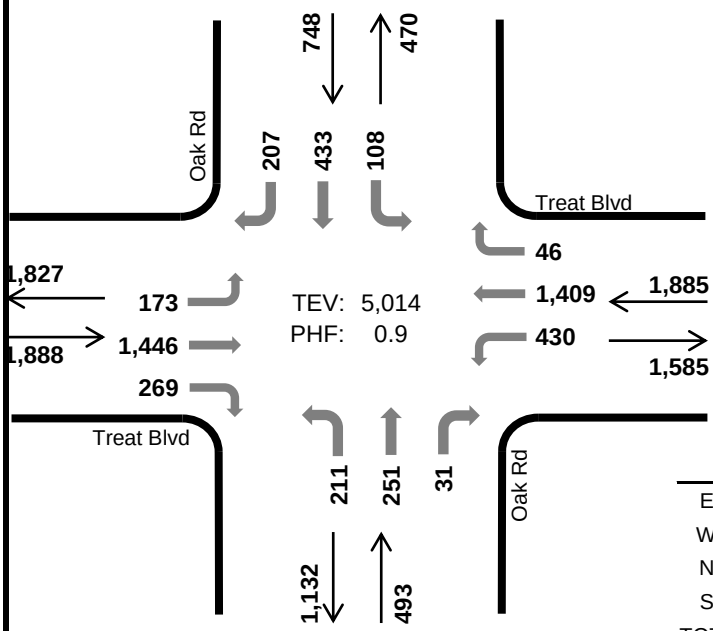
deon.fouche@idaxdata.com

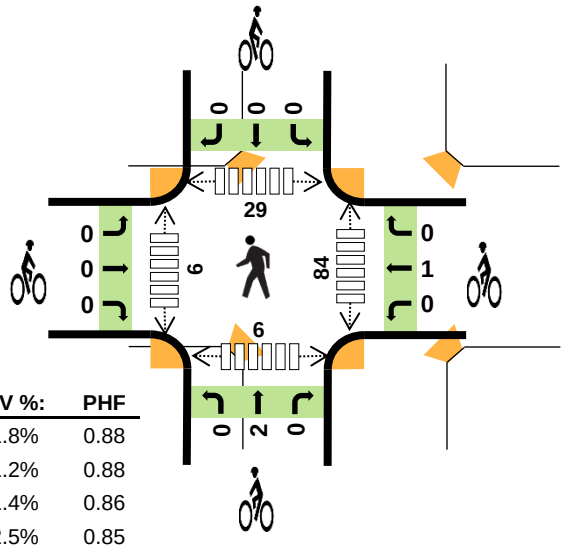
Oak Rd
Treat Blvd

Date: Tue, May 13, 2014
Count Period: 7:15 AM to 9:15 AM
Peak Hour: 7:30 AM to 8:30 AM

N

Peak Hour





	HV %:	PHF
EB	1.8%	0.88
WB	1.2%	0.88
NB	1.4%	0.86
SB	2.5%	0.85
TOTAL	1.6%	0.90

Two-Hour Count Summaries

Interval Start		Treat Blvd Eastbound LT	TH	RT	Treat Blvd Westbound LT	TH	RT	Oak Rd Northbound LT	TH	RT	Oak Rd Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:15 AM		54	225	44	88	419	20	32	41	8	19	68	52	1,070	
7:30 AM		**41**	**383**	**32**	**101**	**359**	**12**	**38**	**51**	**7**	**17**	**99**	**44**	**1,184**	
7:45 AM		**43**	**439**	**53**	**114**	**413**	**10**	**55**	**63**	**6**	**28**	**111**	**64**	**1,399**	
8:00 AM		**47**	**338**	**80**	**101**	**337**	**12**	**54**	**65**	**11**	**29**	**89**	**47**	**1,210**	4,863
8:15 AM		**42**	**286**	**104**	**114**	**300**	**12**	**64**	**72**	**7**	**34**	**134**	**52**	**1,221**	**5,014**
8:30 AM		32	296	71	114	374	21	60	36	17	26	80	50	1,177	5,007
8:45 AM		29	345	61	76	368	17	46	42	9	13	49	50	1,105	4,713
9:00 AM		35	280	65	69	311	11	43	35	10	19	41	36	955	4,458
Count Total		323	2,592	510	777	2,881	115	392	405	75	185	671	395	9,321	
Peak Hour	**All**	**173**	**1,446**	**269**	**430**	**1,409**	**46**	**211**	**251**	**31**	**108**	**433**	**207**	**5,014**	
	HV	**4**	**26**	**4**	**1**	**19**	**2**	**3**	**2**	**2**	**4**	**9**	**6**	**82**	
	HV%	**2%**	**2%**	**1%**	**0%**	**1%**	**4%**	**1%**	**1%**	**6%**	**4%**	**2%**	**3%**	**2%**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:15 AM	8	11	4	6	*29*	0	0	3	0	*3*	19	0	2	0	*21*
7:30 AM	**11**	**4**	**1**	**6**	***22***	**0**	**0**	**0**	**0**	***0***	**19**	**0**	**2**	**0**	***21***
7:45 AM	**6**	**6**	**2**	**4**	***18***	**0**	**1**	**1**	**0**	***2***	**20**	**0**	**10**	**0**	***30***
8:00 AM	**6**	**8**	**4**	**2**	***20***	**0**	**0**	**1**	**0**	***1***	**26**	**0**	**8**	**0**	***34***
8:15 AM	**11**	**4**	**0**	**7**	***22***	**0**	**0**	**0**	**0**	***0***	**19**	**6**	**9**	**6**	***40***
8:30 AM	16	11	1	3	*31*	0	0	0	0	*0*	14	9	10	11	*44*
8:45 AM	13	8	1	2	*24*	0	0	0	0	*0*	7	6	4	5	*22*
9:00 AM	12	2	1	4	*19*	0	0	0	0	*0*	3	8	5	5	*21*
Count Total	83	54	14	34	*185*	0	1	5	0	*6*	127	29	50	27	*233*
Peak Hr	**34**	**22**	**7**	**19**	***82***	**0**	**1**	**2**	**0**	***3***	**84**	**6**	**29**	**6**	***125***

Two-Hour Count Summaries - Heavy Vehicles

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Interval Start	Treat Blvd			Treat Blvd			Oak Rd			Oak Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:15 AM	1	6	1	0	11	0	3	1	0	0	4	2	29	
7:30 AM	**0**	**10**	**1**	**0**	**4**	**0**	**1**	**0**	**0**	**2**	**3**	**1**	**22**	
7:45 AM	**3**	**3**	**0**	**0**	**5**	**1**	**0**	**1**	**1**	**0**	**2**	**2**	**18**	
8:00 AM	**0**	**4**	**2**	**1**	**7**	**0**	**2**	**1**	**1**	**0**	**2**	**0**	**20**	**89**
8:15 AM	**1**	**9**	**1**	**0**	**3**	**1**	**0**	**0**	**0**	**2**	**2**	**3**	**22**	**82**
8:30 AM	1	13	2	0	11	0	0	0	1	0	3	0	31	91
8:45 AM	0	12	1	0	8	0	0	1	0	0	0	2	24	97
9:00 AM	2	8	2	0	1	1	0	1	0	2	1	1	19	96
Count Total	8	65	10	1	50	3	6	5	3	6	17	11	185	
Peak Hour	**4**	**26**	**4**	**1**	**19**	**2**	**3**	**2**	**2**	**4**	**9**	**6**	**82**	

Two-Hour Count Summaries - Bikes

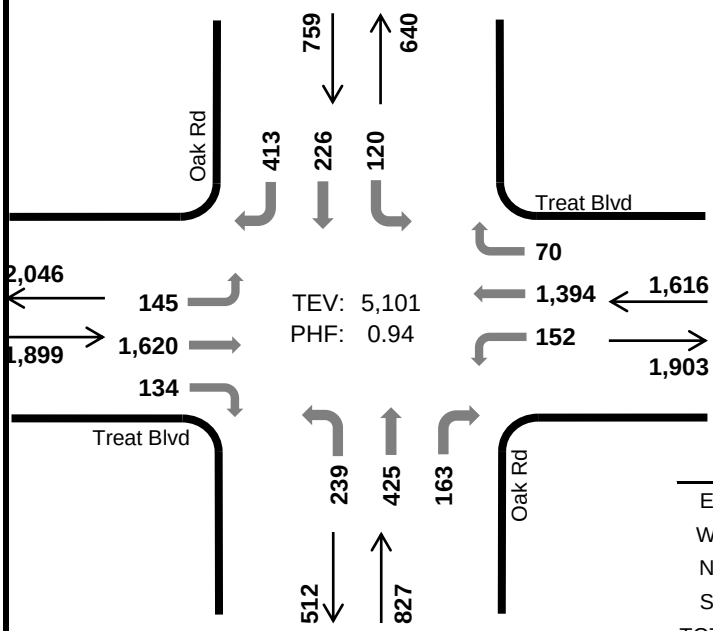
Interval Start	Treat Blvd			Treat Blvd			Oak Rd			Oak Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:15 AM	0	0	0	0	0	0	0	3	0	0	0	0	3	
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
7:45 AM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**	
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**6**
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	1	0	0	5	0	0	0	0	6	
Peak Hour	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**3**	

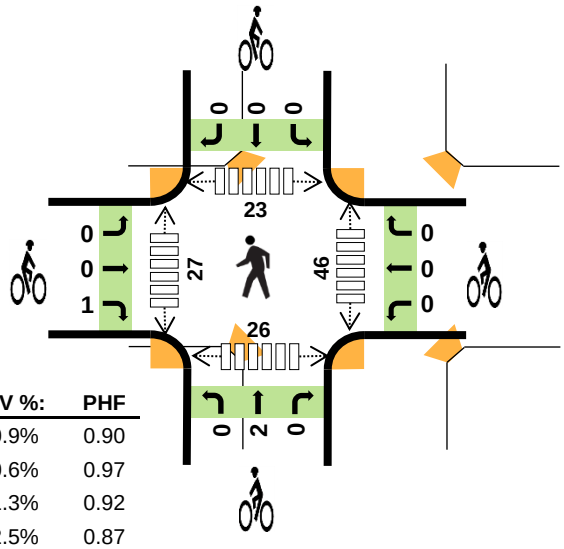
Oak Rd
Treat Blvd

Date: Tue, May 13, 2014
Count Period: 3:30 PM to 5:30 PM
Peak Hour: 4:30 PM to 5:30 PM

N

Peak Hour





	HV %:	PHF
EB	0.9%	0.90
WB	0.6%	0.97
NB	1.3%	0.92
SB	2.5%	0.87
TOTAL	1.1%	0.94

Two-Hour Count Summaries

Interval Start		Treat Blvd Eastbound			Treat Blvd Westbound			Oak Rd Northbound			Oak Rd Southbound			15-min Total	Rolling One Hour
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:30 PM		34	424	52	43	349	17	68	42	18	24	37	60	1,168	
3:45 PM		30	405	46	48	346	14	72	53	19	24	34	56	1,147	
4:00 PM		28	361	58	35	322	8	66	65	27	24	37	84	1,115	
4:15 PM		31	410	57	56	355	26	54	49	38	31	40	86	1,233	4,663
4:30 PM		**29**	**413**	**23**	**29**	**356**	**16**	**56**	**81**	**36**	**33**	**48**	**94**	**1,214**	4,709
4:45 PM		**38**	**374**	**36**	**42**	**321**	**20**	**63**	**110**	**32**	**29**	**55**	**97**	**1,217**	4,779
5:00 PM		**36**	**391**	**33**	**38**	**357**	**19**	**57**	**123**	**45**	**32**	**64**	**122**	**1,317**	4,981
5:15 PM		**42**	**442**	**42**	**43**	**360**	**15**	**63**	**111**	**50**	**26**	**59**	**100**	**1,353**	**5,101**
Count Total		268	3,220	347	334	2,766	135	499	634	265	223	374	699	9,764	
Peak Hour	**All**	**145**	**1,620**	**134**	**152**	**1,394**	**70**	**239**	**425**	**163**	**120**	**226**	**413**	**5,101**	
	HV	**3**	**15**	**0**	**1**	**8**	**0**	**1**	**8**	**2**	**3**	**8**	**8**	**57**	
	HV%	**2%**	**1%**	**0%**	**1%**	**1%**	**0%**	**0%**	**2%**	**1%**	**3%**	**4%**	**2%**	**1%**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:30 PM	4	4	3	4	*15*	0	0	0	0	*0*	3	2	1	2	*8*
3:45 PM	7	2	4	2	*15*	0	0	0	0	*0*	0	5	4	2	*11*
4:00 PM	5	0	1	5	*11*	0	0	0	0	*0*	2	5	2	8	*17*
4:15 PM	4	3	2	2	*11*	0	0	0	0	*0*	3	7	5	2	*17*
4:30 PM	**5**	**1**	**4**	**3**	***13***	**0**	**0**	**0**	**0**	***0***	**13**	**6**	**10**	**11**	***40***
4:45 PM	**6**	**3**	**3**	**5**	***17***	**0**	**0**	**2**	**0**	***2***	**13**	**1**	**1**	**0**	***15***
5:00 PM	**4**	**1**	**3**	**6**	***14***	**1**	**0**	**0**	**0**	***1***	**7**	**14**	**7**	**7**	***35***
5:15 PM	**3**	**4**	**1**	**5**	***13***	**0**	**0**	**0**	**0**	***0***	**13**	**6**	**5**	**8**	***32***
Count Total	38	18	21	32	*109*	1	0	2	0	*3*	54	46	35	40	*175*
Peak Hr	**18**	**9**	**11**	**19**	***57***	**1**	**0**	**2**	**0**	***3***	**46**	**27**	**23**	**26**	***122***

Two-Hour Count Summaries - Heavy Vehicles

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Interval Start	Treat Blvd			Treat Blvd			Oak Rd			Oak Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:30 PM	0	4	0	1	3	0	1	2	0	1	0	3	15	
3:45 PM	0	6	1	0	2	0	3	1	0	1	0	1	15	
4:00 PM	2	3	0	0	0	0	1	0	0	0	3	2	11	
4:15 PM	0	4	0	0	3	0	0	1	1	1	1	0	11	52
4:30 PM	**0**	**5**	**0**	**0**	**1**	**0**	**1**	**3**	**0**	**1**	**0**	**2**	**13**	**50**
4:45 PM	**1**	**5**	**0**	**0**	**3**	**0**	**0**	**2**	**1**	**0**	**3**	**2**	**17**	**52**
5:00 PM	**1**	**3**	**0**	**0**	**1**	**0**	**0**	**2**	**1**	**1**	**2**	**3**	**14**	**55**
5:15 PM	**1**	**2**	**0**	**1**	**3**	**0**	**0**	**1**	**0**	**1**	**3**	**1**	**13**	**57**
Count Total	5	32	1	2	16	0	6	12	3	6	12	14	109	
Peak Hour	**3**	**15**	**0**	**1**	**8**	**0**	**1**	**8**	**2**	**3**	**8**	**8**	**57**	

Two-Hour Count Summaries - Bikes

Interval Start	Treat Blvd			Treat Blvd			Oak Rd			Oak Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**2**
5:00 PM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
Count Total	0	0	1	0	0	0	0	2	0	0	0	0	3	
Peak Hour	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**3**	

Deon Fouche: 415 - 757 - 7714

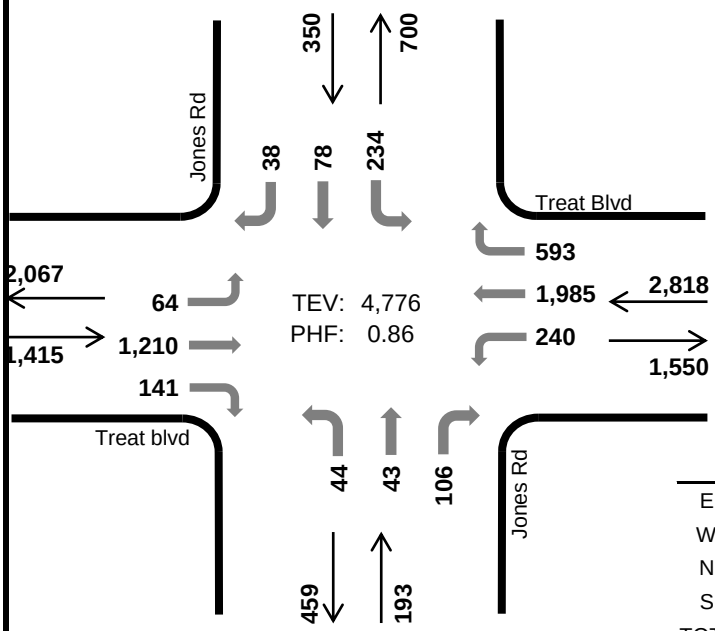
deon.fouche@idaxdata.com

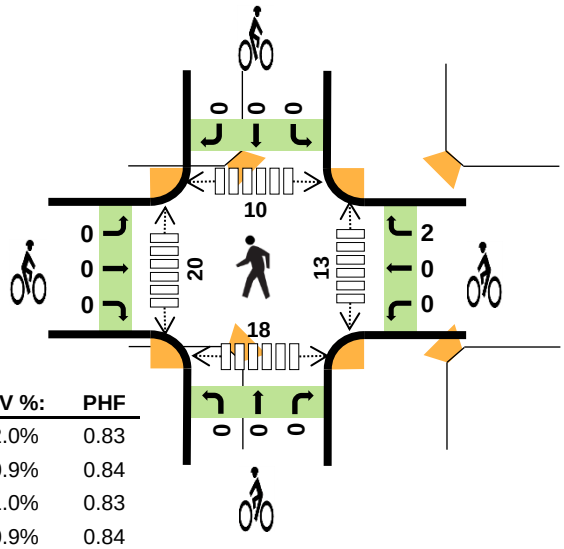
Jones Rd
Treat Blvd

Date: Tue, May 13, 2014
Count Period: 7:15 AM to 9:15 AM
Peak Hour: 7:30 AM to 8:30 AM

N

Peak Hour





	HV %:	PHF
EB	2.0%	0.83
WB	0.9%	0.84
NB	1.0%	0.83
SB	0.9%	0.84
TOTAL	1.3%	0.86

Two-Hour Count Summaries

Interval Start		Treat blvd Eastbound LT	TH	RT	Treat Blvd Westbound LT	TH	RT	Jones Rd Northbound LT	TH	RT	Jones Rd Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:15 AM		19	162	14	57	460	183	10	5	17	31	8	8	974	
7:30 AM		**12**	**311**	**26**	**52**	**481**	**144**	**8**	**11**	**18**	**57**	**15**	**8**	**1,143**	
7:45 AM		**24**	**374**	**29**	**70**	**569**	**199**	**12**	**14**	**19**	**51**	**19**	**6**	**1,386**	
8:00 AM		**22**	**285**	**37**	**49**	**419**	**138**	**14**	**11**	**28**	**62**	**20**	**8**	**1,093**	4,596
8:15 AM		**6**	**240**	**49**	**69**	**516**	**112**	**10**	**7**	**41**	**64**	**24**	**16**	**1,154**	**4,776**
8:30 AM		14	228	33	76	493	94	13	6	35	37	25	12	1,066	4,699
8:45 AM		7	275	52	48	506	100	12	2	23	41	18	9	1,093	4,406
9:00 AM		11	233	26	45	425	48	9	4	39	30	8	11	889	4,202
Count Total		115	2,108	266	466	3,869	1,018	88	60	220	373	137	78	8,798	
Peak Hour	**All**	**64**	**1,210**	**141**	**240**	**1,985**	**593**	**44**	**43**	**106**	**234**	**78**	**38**	**4,776**	
	HV	**3**	**25**	**1**	**1**	**18**	**7**	**0**	**2**	**0**	**3**	**0**	**0**	**60**	
	HV%	**5%**	**2%**	**1%**	**0%**	**1%**	**1%**	**0%**	**5%**	**0%**	**1%**	**0%**	**0%**	**1%**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:15 AM	5	9	0	1	*15*	0	1	0	0	*1*	3	5	4	5	*17*
7:30 AM	**8**	**2**	**1**	**0**	***11***	**0**	**1**	**0**	**0**	***1***	**3**	**8**	**2**	**8**	***21***
7:45 AM	**9**	**5**	**0**	**0**	***14***	**0**	**1**	**0**	**0**	***1***	**3**	**2**	**2**	**8**	***15***
8:00 AM	**3**	**8**	**1**	**2**	***14***	**0**	**0**	**0**	**0**	***0***	**7**	**2**	**4**	**2**	***15***
8:15 AM	**9**	**11**	**0**	**1**	***21***	**0**	**0**	**0**	**0**	***0***	**0**	**8**	**2**	**0**	***10***
8:30 AM	11	10	0	2	*23*	0	1	0	0	*1*	0	8	5	0	*13*
8:45 AM	12	9	0	1	*22*	0	0	0	0	*0*	3	7	2	9	*21*
9:00 AM	10	4	0	2	*16*	0	1	0	0	*1*	5	4	8	5	*22*
Count Total	67	58	2	9	*136*	0	5	0	0	*5*	24	44	29	37	*134*
Peak Hr	**29**	**26**	**2**	**3**	***60***	**0**	**2**	**0**	**0**	***2***	**13**	**20**	**10**	**18**	***61***

Two-Hour Count Summaries - Heavy Vehicles

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Interval Start	Treat blvd			Treat Blvd			Jones Rd			Jones Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:15 AM	0	5	0	0	7	2	0	0	0	1	0	0	15	
7:30 AM	**1**	**6**	**1**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**11**	
7:45 AM	**0**	**9**	**0**	**0**	**4**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	
8:00 AM	**1**	**2**	**0**	**0**	**4**	**4**	**0**	**1**	**0**	**2**	**0**	**0**	**14**	**54**
8:15 AM	**1**	**8**	**0**	**1**	**8**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**21**	**60**
8:30 AM	0	11	0	0	7	3	0	0	0	2	0	0	23	72
8:45 AM	0	12	0	1	7	1	0	0	0	0	0	1	22	80
9:00 AM	0	10	0	0	3	1	0	0	0	1	0	1	16	82
Count Total	3	63	1	2	42	14	0	2	0	7	0	2	136	
Peak Hour	**3**	**25**	**1**	**1**	**18**	**7**	**0**	**2**	**0**	**3**	**0**	**0**	**60**	

Two-Hour Count Summaries - Bikes

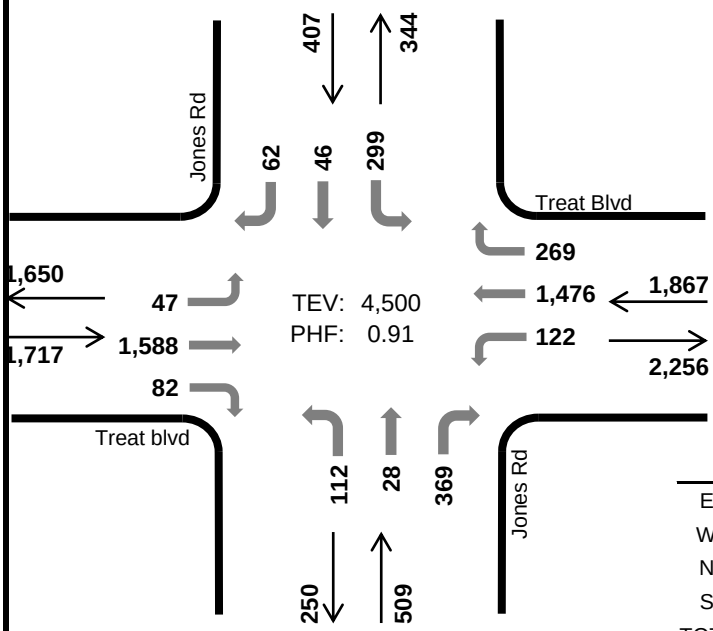
Interval Start	Treat blvd			Treat Blvd			Jones Rd			Jones Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	
7:30 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	
7:45 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
8:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
9:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	2
Count Total	0	0	0	0	1	4	0	0	0	0	0	0	5	
Peak Hour	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	

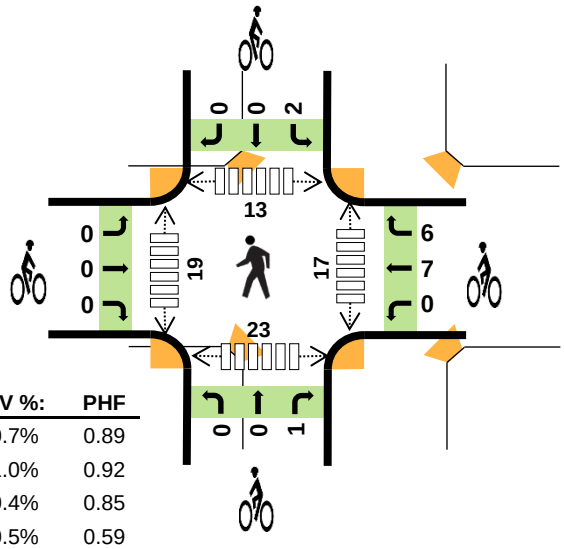
Jones Rd
Treat Blvd

Date: Tue, May 13, 2014
Count Period: 3:30 PM to 5:30 PM
Peak Hour: 4:15 PM to 5:15 PM

N

Peak Hour





	HV %:	PHF
EB	0.7%	0.89
WB	1.0%	0.92
NB	0.4%	0.85
SB	0.5%	0.59
TOTAL	0.8%	0.91

Two-Hour Count Summaries

Interval Start		Treat blvd Eastbound LT	TH	RT	Treat Blvd Westbound LT	TH	RT	Jones Rd Northbound LT	TH	RT	Jones Rd Southbound LT	TH	RT	15-min Total	Rolling One Hour
3:30 PM		17	391	18	31	372	42	24	2	62	55	4	8	1,026	
3:45 PM		12	393	23	44	385	52	15	3	56	66	6	10	1,065	
4:00 PM		9	332	22	25	340	33	28	10	95	56	7	13	970	
4:15 PM		**12**	**448**	**24**	**39**	**406**	**60**	**29**	**5**	**62**	**53**	**9**	**10**	**1,157**	4,218
4:30 PM		**11**	**375**	**14**	**22**	**342**	**63**	**21**	**9**	**100**	**72**	**13**	**11**	**1,053**	4,245
4:45 PM		**12**	**357**	**18**	**39**	**360**	**65**	**28**	**9**	**96**	**47**	**7**	**12**	**1,050**	4,230
5:00 PM		**12**	**408**	**26**	**22**	**368**	**81**	**34**	**5**	**111**	**127**	**17**	**29**	**1,240**	**4,500**
5:15 PM		24	351	15	43	303	93	32	19	136	97	10	34	1,157	4,500
Count Total		109	3,055	160	265	2,876	489	211	62	718	573	73	127	8,718	
Peak Hour	**All**	**47**	**1,588**	**82**	**122**	**1,476**	**269**	**112**	**28**	**369**	**299**	**46**	**62**	**4,500**	
	HV	**0**	**12**	**0**	**1**	**10**	**7**	**0**	**1**	**1**	**2**	**0**	**0**	**34**	
	HV%	**0%**	**1%**	**0%**	**1%**	**1%**	**3%**	**0%**	**4%**	**0%**	**1%**	**0%**	**0%**	**1%**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
3:30 PM	1	5	0	0	*6*	0	0	0	0	*0*	2	5	0	6	*13*
3:45 PM	9	3	0	1	*13*	0	1	0	0	*1*	1	7	1	3	*12*
4:00 PM	3	2	0	1	*6*	0	0	0	1	*1*	0	3	1	8	*12*
4:15 PM	**6**	**5**	**0**	**0**	***11***	**0**	**6**	**1**	**0**	***7***	**0**	**2**	**3**	**3**	***8***
4:30 PM	**0**	**3**	**0**	**0**	***3***	**0**	**1**	**0**	**0**	***1***	**10**	**4**	**5**	**7**	***26***
4:45 PM	**1**	**5**	**1**	**2**	***9***	**0**	**2**	**0**	**0**	***2***	**4**	**7**	**5**	**7**	***23***
5:00 PM	**5**	**5**	**1**	**0**	***11***	**0**	**4**	**0**	**2**	***6***	**3**	**6**	**0**	**6**	***15***
5:15 PM	3	4	0	1	*8*	1	6	0	0	*7*	3	6	5	2	*16*
Count Total	28	32	2	5	*67*	1	20	1	3	*25*	23	40	20	42	*125*
Peak Hr	**12**	**18**	**2**	**2**	***34***	**0**	**13**	**1**	**2**	***16***	**17**	**19**	**13**	**23**	***72***

Two-Hour Count Summaries - Heavy Vehicles

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Interval Start	Treat blvd			Treat Blvd			Jones Rd			Jones Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:30 PM	0	1	0	0	3	2	0	0	0	0	0	0	6	
3:45 PM	0	9	0	0	2	1	0	0	0	1	0	0	13	
4:00 PM	1	2	0	1	0	1	0	0	0	1	0	0	6	
4:15 PM	**0**	**6**	**0**	**1**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**11**	**36**
4:30 PM	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**33**
4:45 PM	**0**	**1**	**0**	**0**	**3**	**2**	**0**	**1**	**0**	**2**	**0**	**0**	**9**	**29**
5:00 PM	**0**	**5**	**0**	**0**	**2**	**3**	**0**	**0**	**1**	**0**	**0**	**0**	**11**	**34**
5:15 PM	1	2	0	0	3	1	0	0	0	1	0	0	8	31
Count Total	2	26	0	2	18	12	0	1	1	5	0	0	67	
Peak Hour	**0**	**12**	**0**	**1**	**10**	**7**	**0**	**1**	**1**	**2**	**0**	**0**	**34**	

Two-Hour Count Summaries - Bikes

Interval Start	Treat blvd			Treat Blvd			Jones Rd			Jones Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	
4:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	
4:15 PM	**0**	**0**	**0**	**0**	**4**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**7**	**9**
4:30 PM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**10**
4:45 PM	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**11**
5:00 PM	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**2**	**0**	**0**	**6**	**16**
5:15 PM	1	0	0	0	4	2	0	0	0	0	0	0	7	16
Count Total	1	0	0	0	12	8	0	0	1	2	1	0	25	
Peak Hour	**0**	**0**	**0**	**0**	**7**	**6**	**0**	**0**	**1**	**2**	**0**	**0**	**16**	

Appendix B – Synchro Model Output for A.M. and P.M. Peak Hours

- Arterial level of service
- Synchro reports for system MOEs
- Synchro reports for intersection level of service

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	87.0	119.7	0.27	8.2	F
NB I-680 Off Ramp	III	35	17.6	7.4	25.0	0.14	19.7	C
Oak Rd	III	35	17.8	44.0	61.8	0.14	8.1	F
Jones Rd.	III	35	18.9	36.1	55.0	0.15	9.7	F
Total	III		87.0	174.5	261.5	0.70	9.6	F

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	29.9	60.9	0.26	15.2	D
Oak Rd.	III	35	18.9	13.1	32.0	0.15	16.6	D
Buskirk Ave	III	35	17.8	10.4	28.2	0.14	17.8	D
N. Main St.	III	35	17.6	25.7	43.3	0.14	11.4	E
Total	III		85.3	79.1	164.4	0.68	14.9	D

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	36	22	28
Total Delay (hr)	72	60	132
Stops / Veh	0.53	0.43	0.47
Stops (#)	3797	4209	8006
Average Speed (mph)	9	15	12
Total Travel Time (hr)	99	103	201
Distance Traveled (mi)	919	1501	2420
Fuel Consumed (gal)	117	133	249
Fuel Economy (mpg)	7.9	11.3	9.7
CO Emissions (kg)	8.16	9.27	17.43
NOx Emissions (kg)	1.59	1.80	3.39
VOC Emissions (kg)	1.89	2.15	4.04
Performance Index	83.0	71.4	154.4

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	33
Total Delay (hr)	206
Stops / Veh	0.51
Stops (#)	11440
Average Speed (mph)	11
Total Travel Time (hr)	307
Distance Traveled (mi)	3465
Fuel Consumed (gal)	367
Fuel Economy (mpg)	9.4
CO Emissions (kg)	25.69
NOx Emissions (kg)	5.00
VOC Emissions (kg)	5.95
Performance Index	238.3

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	54.8	87.5	0.27	11.2	E
NB I-680 Off Ramp	III	35	17.6	6.2	23.8	0.14	20.7	C
Oak Rd	III	35	17.8	40.4	58.2	0.14	8.6	F
Jones Rd.	III	35	18.9	46.6	65.5	0.15	8.1	F
Total	III		87.0	148.0	235.0	0.70	10.7	E

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	43.9	74.9	0.26	12.4	E
Oak Rd.	III	35	18.9	29.3	48.2	0.15	11.0	E
Buskirk Ave	III	35	17.8	13.3	31.1	0.14	16.1	D
N. Main St.	III	35	17.6	38.9	56.5	0.14	8.7	F
Total	III		85.3	125.4	210.7	0.68	11.7	E

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	32	23	28
Total Delay (hr)	68	56	124
Stops / Veh	0.55	0.43	0.48
Stops (#)	4173	3687	7860
Average Speed (mph)	10	13	12
Total Travel Time (hr)	95	91	186
Distance Traveled (mi)	940	1219	2159
Fuel Consumed (gal)	117	116	233
Fuel Economy (mpg)	8.0	10.6	9.3
CO Emissions (kg)	8.18	8.07	16.26
NOx Emissions (kg)	1.59	1.57	3.16
VOC Emissions (kg)	1.90	1.87	3.77
Performance Index	79.6	66.6	146.2

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	31
Total Delay (hr)	194
Stops / Veh	0.52
Stops (#)	11647
Average Speed (mph)	11
Total Travel Time (hr)	291
Distance Traveled (mi)	3324
Fuel Consumed (gal)	354
Fuel Economy (mpg)	9.4
CO Emissions (kg)	24.76
NOx Emissions (kg)	4.82
VOC Emissions (kg)	5.74
Performance Index	226.2

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

7/30/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	646	149	514	290	792	56	103	328	532	885	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	12	16	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3332		3236	3505	1776	1736	3539	1729	3286	3421	1494
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3332		3236	3505	1776	1736	3539	1729	3286	3421	1494
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	34	818	189	535	302	825	59	108	345	585	973	142
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	243	0	0	71
Lane Group Flow (vph)	34	993	0	535	302	825	59	108	102	585	973	71
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	5.3	41.7		24.9	61.3	140.0	6.4	27.6	27.6	23.8	49.0	49.0
Effective Green, g (s)	5.3	41.7		24.9	61.3	140.0	6.4	27.6	27.6	23.8	49.0	49.0
Actuated g/C Ratio	0.04	0.30		0.18	0.44	1.00	0.05	0.20	0.20	0.17	0.35	0.35
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	63	992		575	1534	1776	79	697	340	558	1197	522
v/s Ratio Prot	0.02	c0.30		c0.17	0.09		0.03	0.03		c0.18	c0.28	
v/s Ratio Perm						0.46			0.06			0.05
v/c Ratio	0.54	1.00		0.93	0.20	0.46	0.75	0.15	0.30	1.05	0.81	0.14
Uniform Delay, d1	66.2	49.1		56.7	24.2	0.0	66.0	46.5	47.9	58.1	41.3	31.1
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	4.4	28.8		22.1	0.2	0.9	31.4	0.5	2.2	51.4	6.1	0.5
Delay (s)	70.5	78.0		78.8	24.4	0.9	97.4	47.0	50.2	109.5	47.4	31.6
Level of Service	E	E		E	C	A	F	D	D	F	D	C
Approach Delay (s)		77.7			30.2			55.0			67.5	
Approach LOS		E			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	55.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	975	0	0	1402	516	143	474	913	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	1845	1918	0	0	1881	1918	1759	1881	1937			
Adj Flow Rate, veh/h	452	1134	0	0	1508	0	164	545	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	503	2798	0	0	3049	968	287	613	282			
Arrive On Green	0.15	0.77	0.00	0.00	0.59	0.00	0.17	0.17	0.00			
Sat Flow, veh/h	3408	3741	0	0	5305	1631	1675	3574	1647			
Grp Volume(v), veh/h	452	1134	0	0	1508	0	164	545	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1712	1631	1675	1787	1647			
Q Serve(g_s), s	19.7	15.9	0.0	0.0	25.5	0.0	13.6	22.5	0.0			
Cycle Q Clear(g_c), s	19.7	15.9	0.0	0.0	25.5	0.0	13.6	22.5	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	503	2798	0	0	3049	968	287	613	282			
V/C Ratio(X)	0.90	0.41	0.00	0.00	0.49	0.00	0.57	0.89	0.00			
Avail Cap(c_a), veh/h	654	2798	0	0	3049	968	386	823	379			
HCM Platoon Ratio	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	0.00	0.00	0.64	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	63.3	5.9	0.0	0.0	17.7	0.0	57.5	61.2	0.0			
Incr Delay (d2), s/veh	11.1	0.4	0.0	0.0	0.4	0.0	0.7	7.7	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			
%ile BackOfQ(50%),veh/ln	10.1	8.0	0.0	0.0	12.1	0.0	6.3	11.8	0.0			
LnGrp Delay(d),s/veh	74.4	6.4	0.0	0.0	18.0	0.0	58.2	68.9	0.0			
LnGrp LOS	E	A			B		E	E				
Approach Vol, veh/h		1586			1508			709				
Approach Delay, s/veh		25.7			18.0			66.4				
Approach LOS		C			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		121.0			26.3	94.7		30.1
Change Period (Y+Rc), s		5.0			4.0	5.0		4.2
Max Green Setting (Gmax), s		116.0			29.0	83.0		34.8
Max Q Clear Time (g_c+I1), s		17.9			21.7	27.5		24.5
Green Ext Time (p_c), s		91.6			0.6	53.3		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	1446	269	430	1500	46	211	251	31	108	433	207
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		1.00	1.00		0.88	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	1866	1900	1900	1881	1900	1881	1881	1792	1827	1863	1918
Adj Flow Rate, veh/h	197	1643	306	489	1705	0	245	292	36	127	509	0
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	3
Cap, veh/h	244	2133	397	542	2437	766	294	867	327	148	861	397
Arrive On Green	0.07	0.39	0.39	0.15	0.47	0.00	0.08	0.24	0.24	0.09	0.24	0.00
Sat Flow, veh/h	3442	5456	1016	3510	5136	1615	3476	3574	1348	1740	3539	1631
Grp Volume(v), veh/h	197	1449	500	489	1705	0	245	292	36	127	509	0
Grp Sat Flow(s),veh/h/ln	1721	1604	1659	1755	1712	1615	1738	1787	1348	1740	1770	1631
Q Serve(g_s), s	8.4	39.3	39.3	20.5	39.1	0.0	10.4	10.1	3.1	10.8	19.0	0.0
Cycle Q Clear(g_c), s	8.4	39.3	39.3	20.5	39.1	0.0	10.4	10.1	3.1	10.8	19.0	0.0
Prop In Lane	1.00		0.61	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	244	1882	649	542	2437	766	294	867	327	148	861	397
V/C Ratio(X)	0.81	0.77	0.77	0.90	0.70	0.00	0.83	0.34	0.11	0.86	0.59	0.00
Avail Cap(c_a), veh/h	299	1882	649	680	2437	766	441	955	360	198	899	414
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)	0.84	0.84	0.84	0.56	0.56	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	68.5	39.7	39.7	62.2	30.9	0.0	67.5	46.8	44.1	67.5	50.0	0.0
Incr Delay (d2), s/veh	10.9	2.6	7.3	7.1	1.0	0.0	5.2	0.1	0.1	19.0	2.4	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	4.4	17.9	19.4	10.5	18.7	0.0	5.2	5.0	1.2	6.0	9.6	0.0
LnGrp Delay(d),s/veh	79.4	42.4	47.0	69.3	31.9	0.0	72.7	46.8	44.2	86.5	52.5	0.0
LnGrp LOS	E	D	D	E	C		E	D	D	F	D	
Approach Vol, veh/h		2146			2194			573			636	
Approach Delay, s/veh		46.8			40.2			57.7			59.3	
Approach LOS		D			D			E			E	

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	27.1	74.9	16.6	41.4	14.6	87.4	16.8	41.3
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	29.0	55.0	19.0	38.0	13.0	71.0	17.0	40.0
Max Q Clear Time (g_c+I1), s	22.5	41.3	12.4	21.0	10.4	41.1	12.8	12.1
Green Ext Time (p_c), s	0.6	13.7	0.3	7.5	0.2	29.8	0.1	9.7

Intersection Summary	
HCM 2010 Ctrl Delay	46.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	1380	141	240	1985	593	44	43	106	234	78	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.99		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6278		1745	5136	1544	1745	1638		1641	1693	1450
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6278		1745	5136	1544	1745	1638		1641	1693	1450
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	77	1663	170	286	2363	706	53	52	128	279	93	45
RTOR Reduction (vph)	0	8	0	0	0	135	0	64	0	0	0	39
Lane Group Flow (vph)	77	1825	0	286	2363	571	53	116	0	184	188	6
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	8.3	67.1		34.8	93.6	93.6	15.6	15.6		22.5	22.5	22.5
Effective Green, g (s)	8.3	67.1		34.8	93.6	93.6	15.6	15.6		22.5	22.5	22.5
Actuated g/C Ratio	0.05	0.42		0.22	0.58	0.58	0.10	0.10		0.14	0.14	0.14
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	167	2632		379	3004	903	170	159		230	238	203
v/s Ratio Prot	0.02	0.29		c0.16	c0.46		0.03	c0.07		c0.11	0.11	
v/s Ratio Perm						0.37						0.00
v/c Ratio	0.46	0.69		0.75	0.79	0.63	0.31	0.73		0.80	0.79	0.03
Uniform Delay, d1	73.7	38.0		58.6	25.5	21.9	67.2	70.1		66.6	66.5	59.3
Progression Factor	0.89	0.88		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	1.0		7.4	2.2	3.4	0.4	13.2		16.9	14.8	0.0
Delay (s)	66.1	34.5		66.0	27.7	25.2	67.6	83.3		83.4	81.2	59.4
Level of Service	E	C		E	C	C	E	F		F	F	E
Approach Delay (s)		35.8			30.4			79.8			79.8	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

7/30/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	481	89	234	370	944	153	429	465	684	330	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	12	16	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	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	1.00
Frt	1.00	0.98		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3335		3204	3574	1787	1805	3610	1761	3351	3490	1505
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3335		3204	3574	1787	1805	3610	1761	3351	3490	1505
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	79	512	95	275	435	1111	176	493	534	735	355	243
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	244	0	0	130
Lane Group Flow (vph)	79	596	0	275	435	1111	176	493	290	735	355	113
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	10.7	33.1		18.2	40.6	140.0	18.6	27.9	27.9	38.8	52.1	52.1
Effective Green, g (s)	10.7	33.1		18.2	40.6	140.0	18.6	27.9	27.9	38.8	52.1	52.1
Actuated g/C Ratio	0.08	0.24		0.13	0.29	1.00	0.13	0.20	0.20	0.28	0.37	0.37
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	133	788		416	1036	1787	239	719	350	928	1298	560
v/s Ratio Prot	0.05	c0.18		0.09	0.12		0.10	0.14		c0.22	0.10	
v/s Ratio Perm						c0.62			c0.16			0.08
v/c Ratio	0.59	0.76		0.66	0.42	0.62	0.74	0.69	0.83	0.79	0.27	0.20
Uniform Delay, d1	62.5	49.7		58.0	40.2	0.0	58.3	52.0	53.7	46.9	30.7	29.8
Progression Factor	1.00	1.00		1.38	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	5.5		3.9	0.7	1.5	11.2	5.3	19.7	4.7	0.5	0.8
Delay (s)	67.2	55.1		83.7	38.9	1.5	69.5	57.2	73.5	51.5	31.2	30.6
Level of Service	E	E		F	D	A	E	E	E	D	C	C
Approach Delay (s)		56.5			22.8			66.2			42.3	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	42.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	508	1045	0	0	1414	632	160	274	854	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	1845	1956	0	0	1881	1956	1881	1881	1956			
Adj Flow Rate, veh/h	540	1112	0	0	1488	0	167	285	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	594	2998	0	0	3074	995	208	416	193			
Arrive On Green	0.17	0.81	0.00	0.00	1.00	0.00	0.12	0.12	0.00			
Sat Flow, veh/h	3408	3815	0	0	5305	1663	1792	3574	1663			
Grp Volume(v), veh/h	540	1112	0	0	1488	0	167	285	0			
Grp Sat Flow(s),veh/h/ln	1704	1859	0	0	1712	1663	1792	1787	1663			
Q Serve(g_s), s	18.5	9.8	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Cycle Q Clear(g_c), s	18.5	9.8	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	594	2998	0	0	3074	995	208	416	193			
V/C Ratio(X)	0.91	0.37	0.00	0.00	0.48	0.00	0.80	0.69	0.00			
Avail Cap(c_a), veh/h	630	2998	0	0	3074	995	524	1045	486			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.58	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	48.2	3.2	0.0	0.0	0.0	0.0	51.3	50.5	0.0			
Incr Delay (d2), s/veh	16.1	0.4	0.0	0.0	0.3	0.0	2.7	0.8	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			
%ile BackOfQ(50%),veh/ln	10.0	5.1	0.0	0.0	0.1	0.0	5.5	4.6	0.0			
LnGrp Delay(d),s/veh	64.3	3.5	0.0	0.0	0.3	0.0	54.0	51.3	0.0			
LnGrp LOS	E	A			A		D	D				
Approach Vol, veh/h		1652			1488			452				
Approach Delay, s/veh		23.4			0.3			52.3				
Approach LOS		C			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		122.0			24.7	97.2		18.0
Change Period (Y+Rc), s		5.0			4.0	5.0		4.2
Max Green Setting (Gmax), s		96.0			22.0	70.0		34.8
Max Q Clear Time (g_c+I1), s		11.8			20.5	2.0		12.8
Green Ext Time (p_c), s		78.8			0.2	64.4		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	17.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	1620	134	152	1394	70	239	425	163	120	226	413
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		1.00	1.00		0.93	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	1883	1900	1881	1881	1976	1900	1863	1881	1845	1827	1937
Adj Flow Rate, veh/h	161	1800	149	157	1437	0	260	462	177	138	260	0
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	0	0	2	1	3	4	2
Cap, veh/h	217	2622	217	213	2189	716	326	887	374	166	876	416
Arrive On Green	0.13	0.86	0.86	0.12	0.85	0.00	0.09	0.25	0.25	0.09	0.25	0.00
Sat Flow, veh/h	3442	6125	507	3476	5136	1680	3510	3539	1491	1757	3471	1647
Grp Volume(v), veh/h	161	1427	522	157	1437	0	260	462	177	138	260	0
Grp Sat Flow(s),veh/h/ln	1721	1619	1774	1738	1712	1680	1755	1770	1491	1757	1736	1647
Q Serve(g_s), s	5.2	11.8	11.8	5.0	10.8	0.0	8.3	12.9	11.6	8.9	7.0	0.0
Cycle Q Clear(g_c), s	5.2	11.8	11.8	5.0	10.8	0.0	8.3	12.9	11.6	8.9	7.0	0.0
Prop In Lane	1.00		0.29	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	217	2080	760	213	2189	716	326	887	374	166	876	416
V/C Ratio(X)	0.74	0.69	0.69	0.74	0.66	0.00	0.80	0.52	0.47	0.83	0.30	0.00
Avail Cap(c_a), veh/h	299	2080	760	302	2189	716	611	1108	467	397	1268	602
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.60	0.60	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.3	5.6	5.6	49.6	5.7	0.0	51.1	37.1	36.6	51.1	34.7	0.0
Incr Delay (d2), s/veh	5.6	1.7	4.5	1.6	0.9	0.0	1.7	0.2	0.3	4.0	0.7	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	2.6	5.2	6.3	2.4	4.8	0.0	4.1	6.3	4.8	4.5	3.4	0.0
LnGrp Delay(d),s/veh	54.9	7.3	10.1	51.2	6.6	0.0	52.8	37.3	37.0	55.2	35.4	0.0
LnGrp LOS	D	A	B	D	A		D	D	D	E	D	
Approach Vol, veh/h		2110			1594			899			398	
Approach Delay, s/veh		11.6			11.0			41.7			42.3	
Approach LOS		B			B			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	11.0	55.2	14.7	34.0	11.3	55.0	14.9	33.8
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	10.0	49.0	20.0	42.0	10.0	49.0	26.0	36.0
Max Q Clear Time (g_c+I1), s	7.0	13.8	10.3	9.0	7.2	12.8	10.9	14.9
Green Ext Time (p_c), s	0.1	35.0	0.3	6.7	0.1	36.0	0.1	5.9

Intersection Summary	
HCM 2010 Ctrl Delay	19.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1774	82	122	1476	269	112	28	369	299	46	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	3385	6407		1728	5136	1500	1745	1581		1641	1671	1457
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	3385	6407		1728	5136	1500	1745	1581		1641	1671	1457
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	53	1993	92	133	1604	292	132	33	434	507	78	105
RTOR Reduction (vph)	0	4	0	0	0	120	0	142	0	0	0	83
Lane Group Flow (vph)	53	2081	0	133	1604	172	132	325	0	289	296	22
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	5.7	45.7		13.6	53.6	53.6	31.4	31.4		29.3	29.3	29.3
Effective Green, g (s)	5.7	45.7		13.6	53.6	53.6	31.4	31.4		29.3	29.3	29.3
Actuated g/C Ratio	0.04	0.33		0.10	0.38	0.38	0.22	0.22		0.21	0.21	0.21
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	137	2091		167	1966	574	391	354		343	349	304
v/s Ratio Prot	0.02	c0.32		c0.08	0.31		0.08	c0.21		0.18	c0.18	
v/s Ratio Perm						0.11						0.02
v/c Ratio	0.39	1.00		0.80	0.82	0.30	0.34	0.92		0.84	0.85	0.07
Uniform Delay, d1	65.4	47.0		61.8	38.8	30.1	45.6	53.0		53.1	53.2	44.4
Progression Factor	1.47	0.58		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	15.3		21.2	3.9	1.3	0.2	27.4		16.3	16.5	0.0
Delay (s)	96.8	42.7		83.1	42.6	31.4	45.8	80.5		69.4	69.7	44.5
Level of Service	F	D		F	D	C	D	F		E	E	D
Approach Delay (s)		44.0			43.7			72.8			65.7	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	49.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Appendix B – Treat Boulevard Concepts – Modeling Guidance Memorandum (from Alta Planning)

Memorandum

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Date: November 5, 2014

To: David Mahama, P.E., DKS Associates

From: John Lieswyn, Alexandra Sweet, Alta Planning + Design

Re: Treat Boulevard Concepts – Modeling Guidance

Alta Planning + Design has developed four concepts for the Treat Boulevard Bicycle and Pedestrian Plan. The concepts can be seen on the accompanying figures and described briefly below. This memo seeks to provide modeling guidance.

General Modeling Information

Listed below is general modeling guidance. Any guidance with the term "consider," is not required.

1. **EXCLUDE south side (eastbound) roadway changes** - i.e. all the eastbound changes will be conceptual long term improvements only and NOT modeled.
2. **Retain all right turn on red permissions that currently exist** - any two stage turn boxes would need to be indented into the curbs.
3. **Consider Leading Pedestrian Intervals** at intersections, with particularly attention to the Treat Blvd / Oak Rd intersection.
4. **Consider Shortening Signal Phases** at intersections, particularly Treat Blvd / Oak Rd intersection.
5. **Consider Protected/Concurrent Phasing to Minimize Conflict** with bicyclists and pedestrians.

Concept Descriptions

Please refer to Figures 1A, Figure 1B, Figure 2, and Figure 3. Please note that the following description do *not* include descriptions of any eastbound changes because they will not be included in the modeling task.

Concept 1A (short-term):

Segment 1: Main St to Buskirk Ave

- Narrow westbound lanes between N. Main St and Buskirk Ave to accommodate 5-foot bike lane.
- Convert Walgreens driveways into two 15-foot one-way driveways

Segment 2: Buskirk Ave to Oak Rd

- No Change

Segment 3: Oak Rd to Jones Rd

- No Change

Concept 1B

Segment 1: Main St to Buskirk Ave

- Remove outside westbound lane to accommodate buffered bike lane.
- Convert Walgreens driveways into two 15-foot one-way driveways

Segment 2: Buskirk Ave to Oak Rd

- Remove southbound right free-right turn lane and convert to buffered bike lane (Treat Blvd / Oak Rd)
- Remove outside westbound travel lane and convert to buffered bike lane
- Convert third westbound travel lane to right-turn pocket.

Segment 3: Oak Rd to Jones Rd

- Remove westbound outside dedicated turn pocket and convert to buffered bike lane
- Install westbound right-turn turn pocket 150' in advance of intersection.

Concept 2

Segment 1: Main St to Buskirk Ave

- Narrow and retain all westbound travel lanes
- Convert sidewalk to 12-foot two-way shared-use path

Segment 2: Buskirk Ave to Oak Rd

- Remove southbound right free-right turn lane and convert to bike lane (Treat Blvd / Oak Rd)
- Convert sidewalk to two-way shared-use path
- Consider bike signals

Segment 3: Oak Rd to Jones Rd

- Remove westbound outside turn pocket and convert to buffered bike lane
- Convert third westbound travel to a thru-right at Treat Blvd and Oak Rd intersection
- Remove the westbound free-right turn lane at Treat Blvd and Oak Rd intersection

Concept 3

Segment 1: Main St to Buskirk Ave

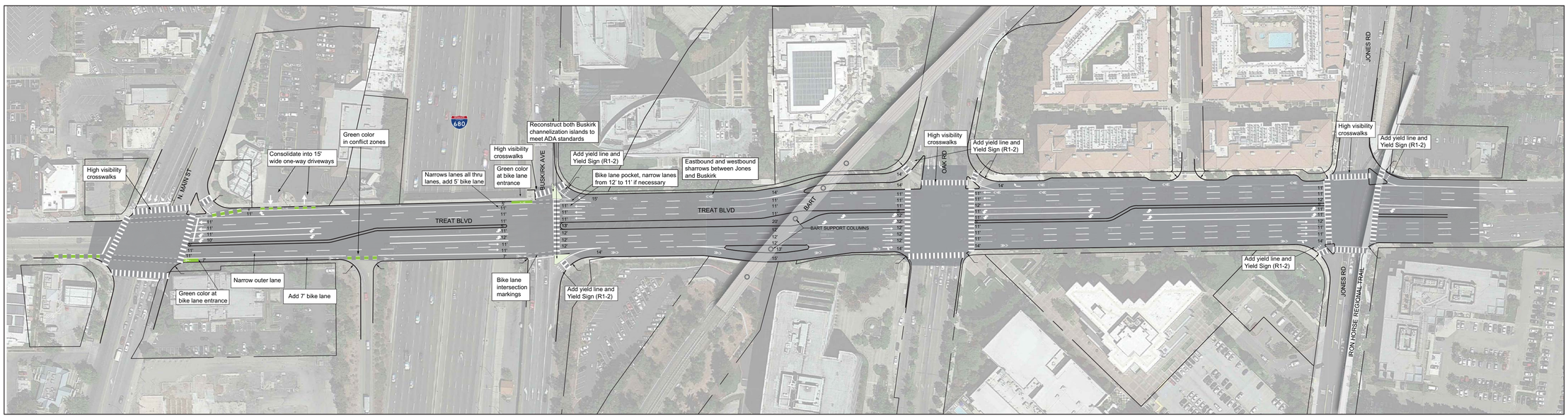
- Narrow and retain all westbound travel lanes
- Convert sidewalk to 12-foot two-way shared-use path
- Convert Walgreens driveways into two 15-foot one-way driveways

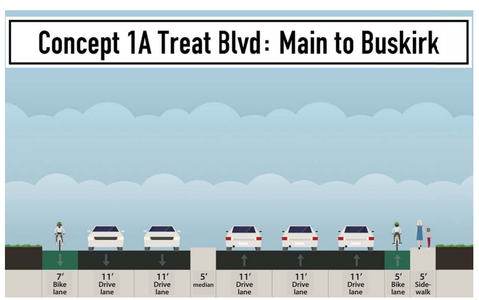
Segment 2: Buskirk Ave to Oak Rd

- Remove southbound right free-right turn lane and convert to bike lane (Treat Blvd / Oak Rd)
- Convert sidewalk to two-way shared-use path
- Consider bike signals

Segment 3: Oak Rd to Jones Rd

- Remove westbound outside turn pocket and convert to parking-protected cycle-track
- Convert third westbound travel to a thru-right at Treat Blvd and Oak Rd intersection
- Remove the westbound free-right turn lane at Treat Blvd and Oak Rd intersection





Treat Boulevard - Concept 1A: Short Term Improvement Option

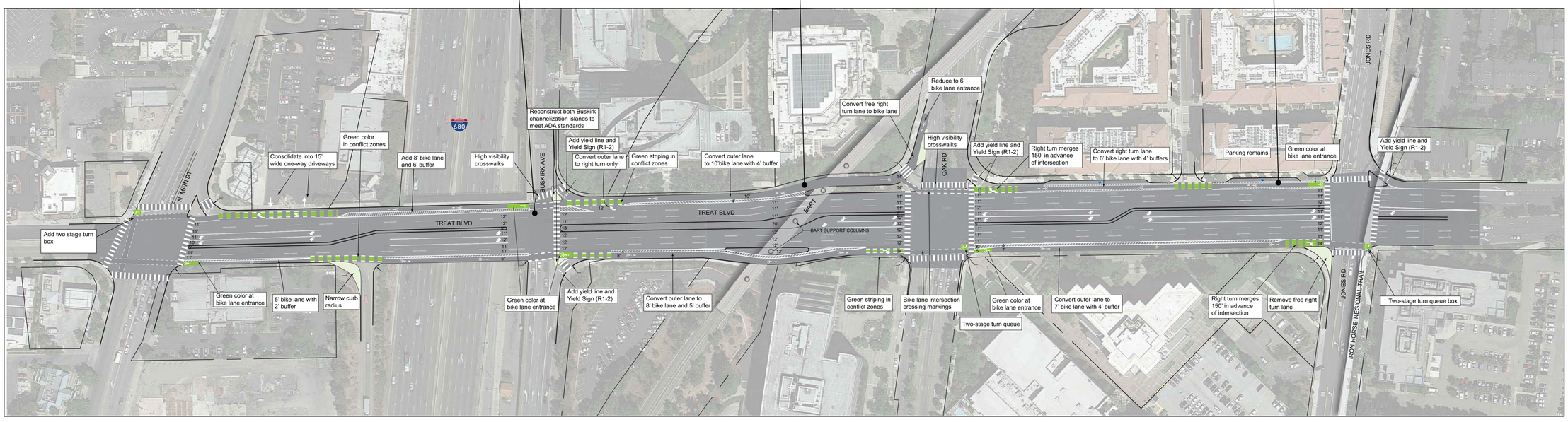
Walnut Creek, CA
October 2014

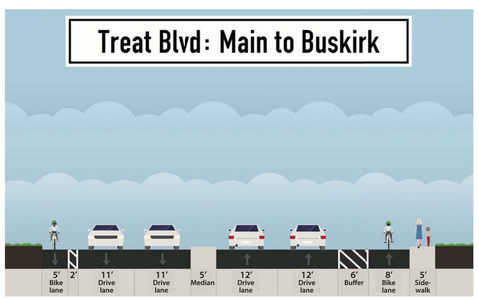
SCALE 1"=100'
1 INCH
0 100' 200'

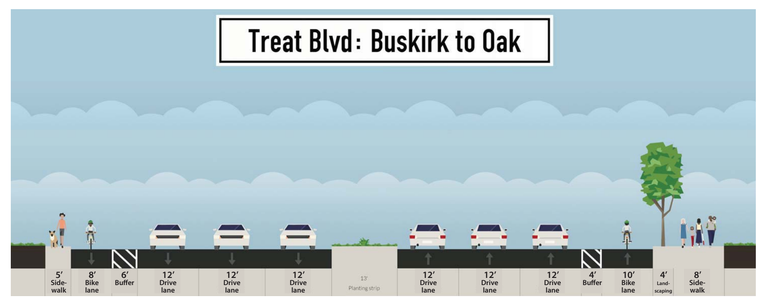
View west along Treat Blvd near Buskirk Ave

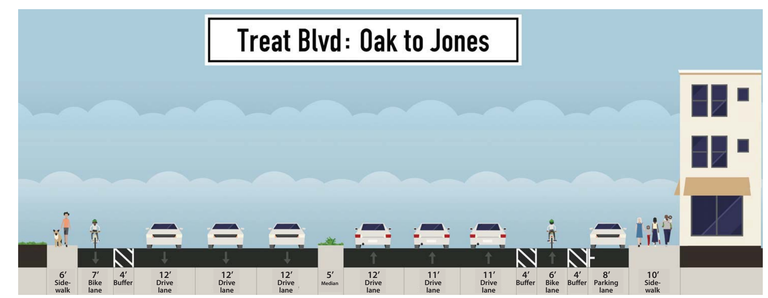
View west along Treat Blvd near the BART overpass

View west along Treat Blvd near Jones Rd





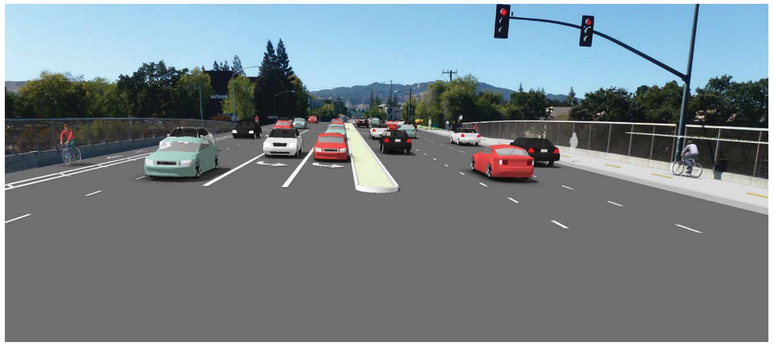




Treat Boulevard - Concept 1B: Buffered Bike Lanes

Walnut Creek, CA
October 2014

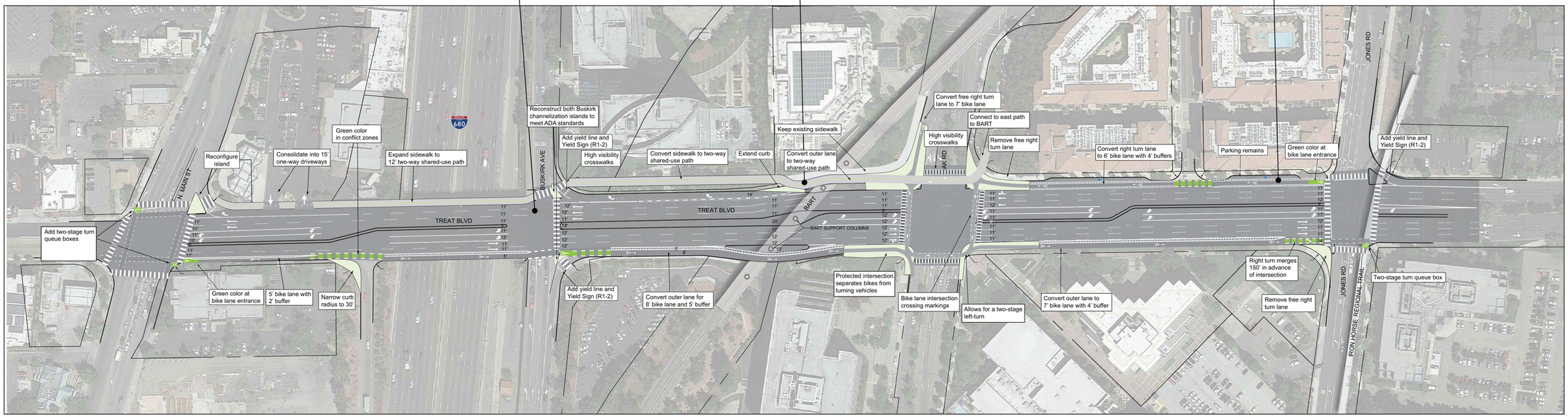
SCALE 1"=100'
1 INCH
0 100' 200'

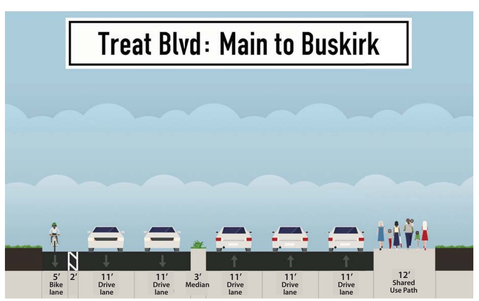


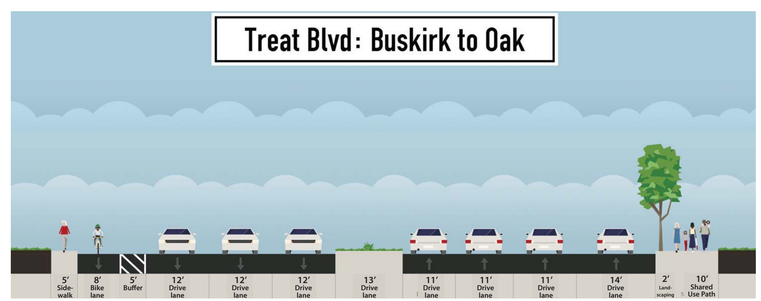
View west along Treat Blvd near Buskirk Ave

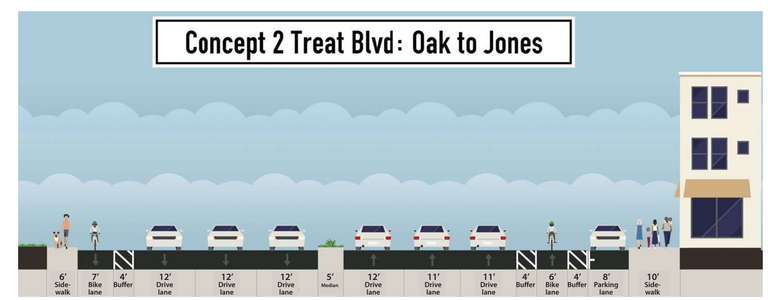
View west along Treat Blvd near the BART overpass

View west along Treat Blvd near Jones Rd









Treat Boulevard - Concept 2: Shared Use Path and Buffered Bike Lanes

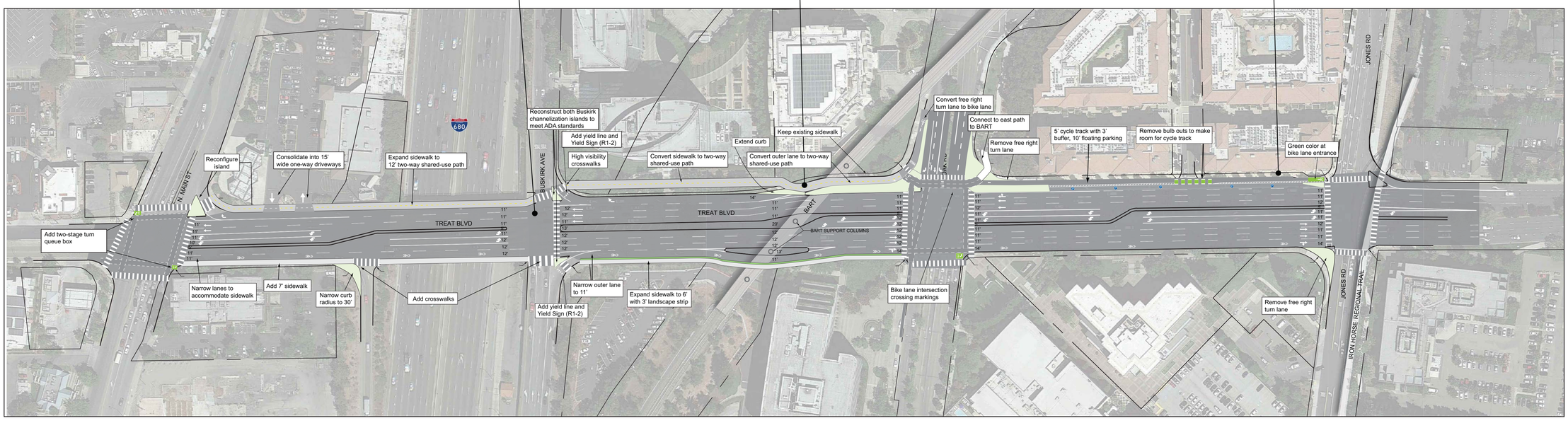
Walnut Creek, CA
October 2014

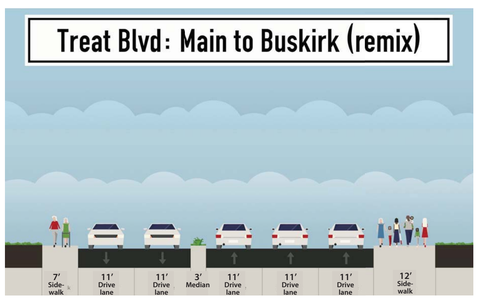
SCALE 1"=100'
1 INCH
0 100' 200'

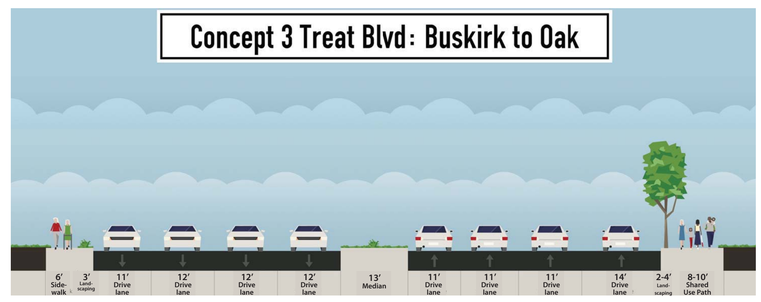
View west along Treat Blvd near Buskirk Ave

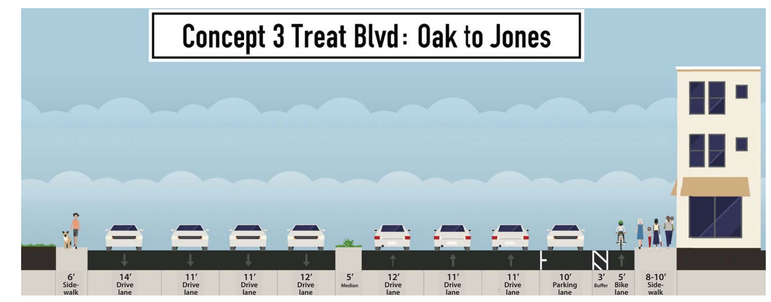
View west along Treat Blvd near the BART overpass

View west along Treat Blvd near Jones Rd









Treat Boulevard - Concept 3: Shared Use Path, Cycle Track and Sidewalk

Walnut Creek, CA
October 2014

SCALE 1"=100'
1 INCH
0 100' 200'

Appendix C – Current Year Synchro Model Output for A.M. and P.M. Peak Hours

- Arterial LOS
- Synchro reports for system MOEs
- Synchro reports for intersection LOS

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	115.3	148.0	0.27	6.6	F
NB I-680 Off Ramp	III	35	17.6	7.5	25.1	0.14	19.7	C
Oak Rd	III	35	17.8	51.9	69.7	0.14	7.2	F
Jones Rd.	III	35	18.9	9.3	28.2	0.15	18.9	C
Total	III		87.0	184.0	271.0	0.70	9.3	F

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	29.7	60.7	0.26	15.3	D
Oak Rd.	III	35	18.9	15.4	34.3	0.15	15.5	D
Buskirk Ave	III	35	17.8	7.5	25.3	0.14	19.8	C
N. Main St.	III	35	17.6	27.8	45.4	0.14	10.9	E
Total	III		85.3	80.4	165.7	0.68	14.8	D

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	35	20	26
Total Delay (hr)	69	56	125
Stops / Veh	0.49	0.47	0.48
Stops (#)	3503	4645	8148
Average Speed (mph)	10	15	12
Total Travel Time (hr)	95	99	194
Distance Traveled (mi)	919	1501	2420
Fuel Consumed (gal)	112	133	245
Fuel Economy (mpg)	8.2	11.3	9.9
CO Emissions (kg)	7.83	9.30	17.13
NOx Emissions (kg)	1.52	1.81	3.33
VOC Emissions (kg)	1.82	2.15	3.97
Unserved Vehicles (#)	87	0	87
Vehicles in dilemma zone (#)	144	141	285
Performance Index	78.9	68.6	147.5

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	32
Total Delay (hr)	200
Stops / Veh	0.52
Stops (#)	11651
Average Speed (mph)	12
Total Travel Time (hr)	301
Distance Traveled (mi)	3465
Fuel Consumed (gal)	364
Fuel Economy (mpg)	9.5
CO Emissions (kg)	25.45
NOx Emissions (kg)	4.95
VOC Emissions (kg)	5.90
Unserved Vehicles (#)	128
Vehicles in dilemma zone (#)	336
Performance Index	232.4

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

11/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	646	149	514	290	792	56	103	328	532	885	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	16	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3333		3236	3388	1776	1736	3539	1730	3286	3421	1496
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3333		3236	3388	1776	1736	3539	1730	3286	3421	1496
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	34	818	189	535	302	825	59	108	345	585	973	142
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	243	0	0	69
Lane Group Flow (vph)	34	993	0	535	302	825	59	108	102	585	973	73
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	5.3	38.7		24.9	58.3	140.0	6.4	30.6	30.6	23.8	52.0	52.0
Effective Green, g (s)	5.3	38.7		24.9	58.3	140.0	6.4	30.6	30.6	23.8	52.0	52.0
Actuated g/C Ratio	0.04	0.28		0.18	0.42	1.00	0.05	0.22	0.22	0.17	0.37	0.37
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	63	921		575	1410	1776	79	773	378	558	1270	555
v/s Ratio Prot	0.02	c0.30		c0.17	0.09		0.03	0.03		c0.18	c0.28	
v/s Ratio Perm						0.46			0.06			0.05
v/c Ratio	0.54	1.08		0.93	0.21	0.46	0.75	0.14	0.27	1.05	0.77	0.13
Uniform Delay, d1	66.2	50.6		56.7	26.2	0.0	66.0	44.1	45.4	58.1	38.7	29.1
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	4.4	53.1		22.1	0.2	0.9	31.4	0.4	1.7	51.4	4.5	0.5
Delay (s)	70.5	103.8		78.8	26.4	0.9	97.4	44.5	47.2	109.5	43.1	29.6
Level of Service	E	F		E	C	A	F	D	D	F	D	C
Approach Delay (s)		102.7			30.6			52.4			64.8	
Approach LOS		F			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	60.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	975	0	0	1402	516	143	474	913	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	1845	1918	0	0	1881	1845	1759	1881	1937			
Adj Flow Rate, veh/h	452	1134	0	0	1508	0	164	545	0			
Adj No. of Lanes	2	2	0	0	2	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	632	2787	0	0	1951	856	288	614	283			
Arrive On Green	0.19	0.76	0.00	0.00	0.55	0.00	0.17	0.17	0.00			
Sat Flow, veh/h	3408	3741	0	0	3668	1568	1675	3574	1647			
Grp Volume(v), veh/h	452	1134	0	0	1508	0	164	545	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1787	1568	1675	1787	1647			
Q Serve(g_s), s	18.8	16.0	0.0	0.0	50.0	0.0	13.6	22.5	0.0			
Cycle Q Clear(g_c), s	18.8	16.0	0.0	0.0	50.0	0.0	13.6	22.5	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	632	2787	0	0	1951	856	288	614	283			
V/C Ratio(X)	0.71	0.41	0.00	0.00	0.77	0.00	0.57	0.89	0.00			
Avail Cap(c_a), veh/h	632	2787	0	0	1951	856	389	829	382			
HCM Platoon Ratio	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	0.00	0.00	0.54	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	57.7	6.1	0.0	0.0	26.9	0.0	57.4	61.1	0.0			
Incr Delay (d2), s/veh	3.3	0.4	0.0	0.0	1.7	0.0	0.7	7.5	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			
%ile BackOfQ(50%),veh/ln	9.1	8.2	0.0	0.0	25.0	0.0	6.3	11.8	0.0			
LnGrp Delay(d),s/veh	61.0	6.5	0.0	0.0	28.6	0.0	58.0	68.6	0.0			
LnGrp LOS	E	A			C		E	E				
Approach Vol, veh/h		1586			1508			709				
Approach Delay, s/veh		22.0			28.6			66.1				
Approach LOS		C			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		120.4			33.0	87.4		30.5
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		115.4			28.0	* 82		35.0
Max Q Clear Time (g_c+I1), s		18.0			20.8	52.0		24.5
Green Ext Time (p_c), s		37.7			6.2	25.2		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	32.9
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	1446	269	430	1500	46	211	251	31	108	433	207
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		1.00	1.00		0.90	1.00		0.91
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	1866	1900	1900	1881	1900	1881	1881	1792	1827	1857	1976
Adj Flow Rate, veh/h	197	1643	306	489	1705	0	245	292	36	127	509	244
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	2
Cap, veh/h	250	1813	338	622	2244	706	308	1006	385	148	608	289
Arrive On Green	0.07	0.33	0.33	0.18	0.44	0.00	0.09	0.28	0.28	0.09	0.27	0.27
Sat Flow, veh/h	3442	5452	1015	3510	5136	1615	3476	3574	1370	1740	2239	1066
Grp Volume(v), veh/h	197	1450	499	489	1705	0	245	292	36	127	400	353
Grp Sat Flow(s),veh/h/ln	1721	1604	1654	1755	1712	1615	1738	1787	1370	1740	1764	1540
Q Serve(g_s), s	8.6	44.1	44.1	20.4	42.9	0.0	10.6	9.8	2.0	11.0	32.8	33.2
Cycle Q Clear(g_c), s	8.6	44.1	44.1	20.4	42.9	0.0	10.6	9.8	2.0	11.0	32.8	33.2
Prop In Lane	1.00		0.61	1.00		1.00	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	250	1601	550	622	2244	706	308	1006	385	148	479	418
V/C Ratio(X)	0.79	0.91	0.91	0.79	0.76	0.00	0.80	0.29	0.09	0.86	0.84	0.84
Avail Cap(c_a), veh/h	292	1601	550	664	2244	706	408	1026	393	193	483	422
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)	0.84	0.84	0.84	0.56	0.56	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.9	48.9	48.9	60.3	36.4	0.0	68.5	43.1	18.4	69.2	52.6	52.8
Incr Delay (d2), s/veh	10.0	7.7	18.5	3.0	1.4	0.0	5.7	0.1	0.0	20.7	14.8	17.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	20.8	23.0	10.2	20.5	0.0	5.3	4.8	1.1	6.2	18.0	16.1
LnGrp Delay(d),s/veh	79.9	56.6	67.4	63.3	37.8	0.0	74.2	43.2	18.4	89.9	67.5	70.1
LnGrp LOS	E	E	E	E	D		E	D	B	F	E	E
Approach Vol, veh/h		2146			2194			573			880	
Approach Delay, s/veh		61.3			43.5			54.9			71.8	
Approach LOS		E			D			D			E	

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	37.8	57.0	18.6	46.6	21.8	73.0	17.0	48.2
Change Period (Y+Rc), s	4.0	6.0	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	29.0	51.0	18.0	* 42	13.0	67.0	17.0	44.0
Max Q Clear Time (g_c+I1), s	22.4	46.1	12.6	35.2	10.6	44.9	13.0	11.8
Green Ext Time (p_c), s	1.1	4.7	1.0	4.5	0.5	19.8	0.1	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	55.5
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	1380	141	240	1985	593	44	43	106	234	78	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.99		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6280		1745	5136	1552	1745	1639		1641	1693	1454
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6280		1745	5136	1552	1745	1639		1641	1693	1454
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	77	1663	170	286	2363	706	53	52	128	279	93	45
RTOR Reduction (vph)	0	8	0	0	0	128	0	65	0	0	0	39
Lane Group Flow (vph)	77	1825	0	286	2363	578	53	115	0	184	188	6
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	8.0	66.7		34.8	93.5	93.5	15.9	15.9		22.6	22.6	22.6
Effective Green, g (s)	8.0	66.7		34.8	93.5	93.5	15.9	15.9		22.6	22.6	22.6
Actuated g/C Ratio	0.05	0.42		0.22	0.58	0.58	0.10	0.10		0.14	0.14	0.14
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	161	2617		379	3001	906	173	162		231	239	205
v/s Ratio Prot	0.02	c0.29		0.16	c0.46		0.03	c0.07		c0.11	0.11	
v/s Ratio Perm						0.37						0.00
v/c Ratio	0.48	0.70		0.75	0.79	0.64	0.31	0.71		0.80	0.79	0.03
Uniform Delay, d1	74.0	38.4		58.6	25.6	22.0	66.9	69.8		66.5	66.4	59.3
Progression Factor	0.46	0.18		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.8		7.4	2.2	3.4	0.4	11.5		16.1	14.5	0.0
Delay (s)	34.6	7.6		66.0	27.8	25.5	67.3	81.4		82.6	80.8	59.3
Level of Service	C	A		E	C	C	E	F		F	F	E
Approach Delay (s)		8.7			30.5			78.2			79.3	
Approach LOS		A			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	115.3	148.0	0.27	6.6	F
NB I-680 Off Ramp	III	35	17.6	7.5	25.1	0.14	19.7	C
Oak Rd	III	35	17.8	52.0	69.8	0.14	7.2	F
Jones Rd.	III	35	18.9	10.0	28.9	0.15	18.4	C
Total	III		87.0	184.8	271.8	0.70	9.2	F

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	30.1	61.1	0.26	15.2	D
Oak Rd.	III	35	18.9	15.4	34.3	0.15	15.5	D
Buskirk Ave	III	35	17.8	7.0	24.8	0.14	20.2	C
N. Main St.	III	35	17.6	27.8	45.4	0.14	10.9	E
Total	III		85.3	80.3	165.6	0.68	14.8	D

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	36	20	27
Total Delay (hr)	72	55	127
Stops / Veh	0.50	0.47	0.48
Stops (#)	3604	4633	8237
Average Speed (mph)	9	15	12
Total Travel Time (hr)	99	98	196
Distance Traveled (mi)	919	1501	2420
Fuel Consumed (gal)	115	132	247
Fuel Economy (mpg)	8.0	11.4	9.8
CO Emissions (kg)	8.06	9.24	17.30
NOx Emissions (kg)	1.57	1.80	3.37
VOC Emissions (kg)	1.87	2.14	4.01
Unserved Vehicles (#)	87	0	87
Vehicles in dilemma zone (#)	112	121	233
Performance Index	82.5	67.6	150.1

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	33
Total Delay (hr)	203
Stops / Veh	0.52
Stops (#)	11736
Average Speed (mph)	11
Total Travel Time (hr)	303
Distance Traveled (mi)	3465
Fuel Consumed (gal)	367
Fuel Economy (mpg)	9.5
CO Emissions (kg)	25.63
NOx Emissions (kg)	4.99
VOC Emissions (kg)	5.94
Unserved Vehicles (#)	128
Vehicles in dilemma zone (#)	284
Performance Index	235.2

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

11/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	646	149	514	290	792	56	103	328	532	885	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	11	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3333		3236	3388	1515	1736	3539	1730	3286	3421	1496
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3333		3236	3388	1515	1736	3539	1730	3286	3421	1496
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	34	818	189	535	302	825	59	108	345	585	973	142
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	243	0	0	69
Lane Group Flow (vph)	34	993	0	535	302	825	59	108	102	585	973	73
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	5.3	38.7		24.9	58.3	140.0	6.4	30.6	30.6	23.8	52.0	52.0
Effective Green, g (s)	5.3	38.7		24.9	58.3	140.0	6.4	30.6	30.6	23.8	52.0	52.0
Actuated g/C Ratio	0.04	0.28		0.18	0.42	1.00	0.05	0.22	0.22	0.17	0.37	0.37
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	63	921		575	1410	1515	79	773	378	558	1270	555
v/s Ratio Prot	0.02	c0.30		c0.17	0.09		0.03	0.03		c0.18	c0.28	
v/s Ratio Perm						0.54			0.06			0.05
v/c Ratio	0.54	1.08		0.93	0.21	0.54	0.75	0.14	0.27	1.05	0.77	0.13
Uniform Delay, d1	66.2	50.6		56.7	26.2	0.0	66.0	44.1	45.4	58.1	38.7	29.1
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	4.4	53.1		22.1	0.2	1.4	31.4	0.4	1.7	51.4	4.5	0.5
Delay (s)	70.5	103.8		78.8	26.4	1.4	97.4	44.5	47.2	109.5	43.1	29.6
Level of Service	E	F		E	C	A	F	D	D	F	D	C
Approach Delay (s)		102.7			30.9			52.4			64.8	
Approach LOS		F			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	60.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	975	0	0	1402	516	143	474	913	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	1845	1918	0	0	1881	1918	1759	1881	1937			
Adj Flow Rate, veh/h	452	1134	0	0	1508	0	164	545	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	503	2787	0	0	3033	963	288	614	283			
Arrive On Green	0.15	0.76	0.00	0.00	0.59	0.00	0.17	0.17	0.00			
Sat Flow, veh/h	3408	3741	0	0	5305	1631	1675	3574	1647			
Grp Volume(v), veh/h	452	1134	0	0	1508	0	164	545	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1712	1631	1675	1787	1647			
Q Serve(g_s), s	19.7	16.0	0.0	0.0	25.7	0.0	13.6	22.5	0.0			
Cycle Q Clear(g_c), s	19.7	16.0	0.0	0.0	25.7	0.0	13.6	22.5	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	503	2787	0	0	3033	963	288	614	283			
V/C Ratio(X)	0.90	0.41	0.00	0.00	0.50	0.00	0.57	0.89	0.00			
Avail Cap(c_a), veh/h	655	2787	0	0	3033	963	389	829	382			
HCM Platoon Ratio	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	0.00	0.00	0.51	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	63.2	6.1	0.0	0.0	17.9	0.0	57.4	61.1	0.0			
Incr Delay (d2), s/veh	11.0	0.4	0.0	0.0	0.3	0.0	0.7	7.5	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			
%ile BackOfQ(50%),veh/ln	10.1	8.2	0.0	0.0	12.2	0.0	6.3	11.8	0.0			
LnGrp Delay(d),s/veh	74.3	6.5	0.0	0.0	18.2	0.0	58.0	68.6	0.0			
LnGrp LOS	E	A			B		E	E				
Approach Vol, veh/h		1586			1508			709				
Approach Delay, s/veh		25.8			18.2			66.1				
Approach LOS		C			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		120.4			26.3	94.1		30.5
Change Period (Y+Rc), s		5.0			4.0	5.0		4.6
Max Green Setting (Gmax), s		115.4			29.0	82.4		35.0
Max Q Clear Time (g_c+I1), s		18.0			21.7	27.7		24.5
Green Ext Time (p_c), s		90.9			0.6	52.6		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	1446	269	430	1500	46	211	251	31	108	433	207
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		0.97	1.00		0.89	1.00		0.90
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	1866	1900	1900	1880	1900	1881	1881	1792	1827	1857	1976
Adj Flow Rate, veh/h	197	1643	306	489	1705	52	245	292	36	127	509	244
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	2	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	1	1	1	6	4	2	2
Cap, veh/h	243	1905	355	582	2339	71	293	935	355	148	587	279
Arrive On Green	0.07	0.35	0.35	0.17	0.46	0.46	0.08	0.26	0.26	0.09	0.26	0.26
Sat Flow, veh/h	3442	5453	1016	3510	5111	156	3476	3574	1359	1740	2236	1064
Grp Volume(v), veh/h	197	1450	499	489	1141	616	245	292	36	127	401	352
Grp Sat Flow(s),veh/h/ln	1721	1604	1656	1755	1710	1846	1738	1787	1359	1740	1764	1536
Q Serve(g_s), s	8.6	42.6	42.6	20.5	41.2	41.2	10.5	10.0	2.1	10.9	32.9	33.3
Cycle Q Clear(g_c), s	8.6	42.6	42.6	20.5	41.2	41.2	10.5	10.0	2.1	10.9	32.9	33.3
Prop In Lane	1.00		0.61	1.00		0.08	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	243	1681	578	582	1565	845	293	935	355	148	463	403
V/C Ratio(X)	0.81	0.86	0.86	0.84	0.73	0.73	0.84	0.31	0.10	0.86	0.87	0.87
Avail Cap(c_a), veh/h	295	1681	578	625	1565	845	435	989	376	195	465	405
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)	0.84	0.84	0.84	0.55	0.55	0.55	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.5	46.0	46.0	61.4	33.5	33.5	68.4	45.1	19.5	68.5	53.4	53.6
Incr Delay (d2), s/veh	11.4	5.2	13.5	5.1	1.7	3.1	5.7	0.1	0.0	20.0	18.2	21.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	19.6	21.6	10.3	19.9	21.8	5.3	4.9	1.1	6.1	18.4	16.6
LnGrp Delay(d),s/veh	80.9	51.2	59.5	66.4	35.2	36.6	74.2	45.1	19.6	88.4	71.6	74.8
LnGrp LOS	F	D	E	E	D	D	E	D	B	F	E	E
Approach Vol, veh/h		2146			2246			573			880	
Approach Delay, s/veh		55.9			42.4			55.9			75.3	
Approach LOS		E			D			E			E	

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	39.4	59.0	16.8	44.8	14.7	83.7	16.9	44.7
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	27.0	* 53	19.0	40.0	13.0	69.0	17.0	42.0
Max Q Clear Time (g_c+I1), s	22.5	44.6	12.5	35.3	10.6	43.2	12.9	12.0
Green Ext Time (p_c), s	2.7	8.1	0.3	3.5	0.1	23.3	0.1	14.6

Intersection Summary	
HCM 2010 Ctrl Delay	53.6
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	1380	141	240	1985	593	44	43	106	234	78	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.99		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6280		1745	5136	1552	1745	1639		1641	1693	1454
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6280		1745	5136	1552	1745	1639		1641	1693	1454
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	77	1663	170	286	2363	706	53	52	128	279	93	45
RTOR Reduction (vph)	0	8	0	0	0	128	0	65	0	0	0	39
Lane Group Flow (vph)	77	1825	0	286	2363	578	53	115	0	184	188	6
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	8.3	66.7		34.8	93.2	93.2	15.9	15.9		22.6	22.6	22.6
Effective Green, g (s)	8.3	66.7		34.8	93.2	93.2	15.9	15.9		22.6	22.6	22.6
Actuated g/C Ratio	0.05	0.42		0.22	0.58	0.58	0.10	0.10		0.14	0.14	0.14
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	167	2617		379	2991	904	173	162		231	239	205
v/s Ratio Prot	0.02	0.29		c0.16	c0.46		0.03	c0.07		c0.11	0.11	
v/s Ratio Perm						0.37						0.00
v/c Ratio	0.46	0.70		0.75	0.79	0.64	0.31	0.71		0.80	0.79	0.03
Uniform Delay, d1	73.7	38.4		58.6	25.8	22.2	66.9	69.8		66.5	66.4	59.3
Progression Factor	1.18	0.19		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.8		7.4	2.2	3.5	0.4	11.5		16.1	14.5	0.0
Delay (s)	87.7	8.3		66.0	28.0	25.7	67.3	81.4		82.6	80.8	59.3
Level of Service	F	A		E	C	C	E	F		F	F	E
Approach Delay (s)		11.5			30.8			78.2			79.3	
Approach LOS		B			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	29.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	115.3	148.0	0.27	6.6	F
NB I-680 Off Ramp	III	35	17.6	7.5	25.1	0.14	19.7	C
Oak Rd	III	35	17.8	52.0	69.8	0.14	7.2	F
Jones Rd.	III	35	18.9	10.0	28.9	0.15	18.4	C
Total	III		87.0	184.8	271.8	0.70	9.2	F

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	30.1	61.1	0.26	15.2	D
Oak Rd.	III	35	18.9	15.4	34.3	0.15	15.5	D
Buskirk Ave	III	35	17.8	7.0	24.8	0.14	20.2	C
N. Main St.	III	35	17.6	27.8	45.4	0.14	10.9	E
Total	III		85.3	80.3	165.6	0.68	14.8	D

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	36	20	27
Total Delay (hr)	72	55	127
Stops / Veh	0.50	0.47	0.48
Stops (#)	3604	4633	8237
Average Speed (mph)	9	15	12
Total Travel Time (hr)	99	98	196
Distance Traveled (mi)	919	1501	2420
Fuel Consumed (gal)	115	132	247
Fuel Economy (mpg)	8.0	11.4	9.8
CO Emissions (kg)	8.06	9.24	17.30
NOx Emissions (kg)	1.57	1.80	3.37
VOC Emissions (kg)	1.87	2.14	4.01
Unserved Vehicles (#)	87	0	87
Vehicles in dilemma zone (#)	112	121	233
Performance Index	82.5	67.6	150.1

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	33
Total Delay (hr)	203
Stops / Veh	0.52
Stops (#)	11736
Average Speed (mph)	11
Total Travel Time (hr)	303
Distance Traveled (mi)	3465
Fuel Consumed (gal)	367
Fuel Economy (mpg)	9.5
CO Emissions (kg)	25.63
NOx Emissions (kg)	4.99
VOC Emissions (kg)	5.94
Unserved Vehicles (#)	128
Vehicles in dilemma zone (#)	284
Performance Index	235.2

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

11/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	646	149	514	290	792	56	103	328	532	885	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	11	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3333		3236	3388	1515	1736	3539	1730	3286	3421	1496
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3333		3236	3388	1515	1736	3539	1730	3286	3421	1496
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	34	818	189	535	302	825	59	108	345	585	973	142
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	243	0	0	69
Lane Group Flow (vph)	34	993	0	535	302	825	59	108	102	585	973	73
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	5.3	38.7		24.9	58.3	140.0	6.4	30.6	30.6	23.8	52.0	52.0
Effective Green, g (s)	5.3	38.7		24.9	58.3	140.0	6.4	30.6	30.6	23.8	52.0	52.0
Actuated g/C Ratio	0.04	0.28		0.18	0.42	1.00	0.05	0.22	0.22	0.17	0.37	0.37
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	63	921		575	1410	1515	79	773	378	558	1270	555
v/s Ratio Prot	0.02	c0.30		c0.17	0.09		0.03	0.03		c0.18	c0.28	
v/s Ratio Perm						0.54			0.06			0.05
v/c Ratio	0.54	1.08		0.93	0.21	0.54	0.75	0.14	0.27	1.05	0.77	0.13
Uniform Delay, d1	66.2	50.6		56.7	26.2	0.0	66.0	44.1	45.4	58.1	38.7	29.1
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	4.4	53.1		22.1	0.2	1.4	31.4	0.4	1.7	51.4	4.5	0.5
Delay (s)	70.5	103.8		78.8	26.4	1.4	97.4	44.5	47.2	109.5	43.1	29.6
Level of Service	E	F		E	C	A	F	D	D	F	D	C
Approach Delay (s)		102.7			30.9			52.4			64.8	
Approach LOS		F			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	60.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	975	0	0	1402	516	143	474	913	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	1845	1918	0	0	1881	1918	1759	1881	1937			
Adj Flow Rate, veh/h	452	1134	0	0	1508	0	164	545	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	503	2787	0	0	3033	963	288	614	283			
Arrive On Green	0.15	0.76	0.00	0.00	0.59	0.00	0.17	0.17	0.00			
Sat Flow, veh/h	3408	3741	0	0	5305	1631	1675	3574	1647			
Grp Volume(v), veh/h	452	1134	0	0	1508	0	164	545	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1712	1631	1675	1787	1647			
Q Serve(g_s), s	19.7	16.0	0.0	0.0	25.7	0.0	13.6	22.5	0.0			
Cycle Q Clear(g_c), s	19.7	16.0	0.0	0.0	25.7	0.0	13.6	22.5	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	503	2787	0	0	3033	963	288	614	283			
V/C Ratio(X)	0.90	0.41	0.00	0.00	0.50	0.00	0.57	0.89	0.00			
Avail Cap(c_a), veh/h	655	2787	0	0	3033	963	389	829	382			
HCM Platoon Ratio	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	0.00	0.00	0.51	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	63.2	6.1	0.0	0.0	17.9	0.0	57.4	61.1	0.0			
Incr Delay (d2), s/veh	11.0	0.4	0.0	0.0	0.3	0.0	0.7	7.5	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			
%ile BackOfQ(50%),veh/ln	10.1	8.2	0.0	0.0	12.2	0.0	6.3	11.8	0.0			
LnGrp Delay(d),s/veh	74.3	6.5	0.0	0.0	18.2	0.0	58.0	68.6	0.0			
LnGrp LOS	E	A			B		E	E				
Approach Vol, veh/h		1586			1508			709				
Approach Delay, s/veh		25.8			18.2			66.1				
Approach LOS		C			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		120.4			26.3	94.1		30.5
Change Period (Y+Rc), s		5.0			4.0	5.0		4.6
Max Green Setting (Gmax), s		115.4			29.0	82.4		35.0
Max Q Clear Time (g_c+I1), s		18.0			21.7	27.7		24.5
Green Ext Time (p_c), s		90.9			0.6	52.6		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	1446	269	430	1500	46	211	251	31	108	433	207
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		0.97	1.00		0.89	1.00		0.90
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	1866	1900	1900	1880	1900	1881	1881	1792	1827	1857	1976
Adj Flow Rate, veh/h	197	1643	306	489	1705	52	245	292	36	127	509	244
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	2	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	1	1	1	6	4	2	2
Cap, veh/h	243	1905	355	582	2339	71	293	935	355	148	587	279
Arrive On Green	0.07	0.35	0.35	0.17	0.46	0.46	0.08	0.26	0.26	0.09	0.26	0.26
Sat Flow, veh/h	3442	5453	1016	3510	5111	156	3476	3574	1359	1740	2236	1064
Grp Volume(v), veh/h	197	1450	499	489	1141	616	245	292	36	127	401	352
Grp Sat Flow(s),veh/h/ln	1721	1604	1656	1755	1710	1846	1738	1787	1359	1740	1764	1536
Q Serve(g_s), s	8.6	42.6	42.6	20.5	41.2	41.2	10.5	10.0	2.1	10.9	32.9	33.3
Cycle Q Clear(g_c), s	8.6	42.6	42.6	20.5	41.2	41.2	10.5	10.0	2.1	10.9	32.9	33.3
Prop In Lane	1.00		0.61	1.00		0.08	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	243	1681	578	582	1565	845	293	935	355	148	463	403
V/C Ratio(X)	0.81	0.86	0.86	0.84	0.73	0.73	0.84	0.31	0.10	0.86	0.87	0.87
Avail Cap(c_a), veh/h	295	1681	578	625	1565	845	435	989	376	195	465	405
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)	0.84	0.84	0.84	0.55	0.55	0.55	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.5	46.0	46.0	61.4	33.5	33.5	68.4	45.1	19.5	68.5	53.4	53.6
Incr Delay (d2), s/veh	11.4	5.2	13.5	5.1	1.7	3.1	5.7	0.1	0.0	20.0	18.2	21.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	19.6	21.6	10.3	19.9	21.8	5.3	4.9	1.1	6.1	18.4	16.6
LnGrp Delay(d),s/veh	80.9	51.2	59.5	66.4	35.2	36.6	74.2	45.1	19.6	88.4	71.6	74.8
LnGrp LOS	F	D	E	E	D	D	E	D	B	F	E	E
Approach Vol, veh/h		2146			2246			573			880	
Approach Delay, s/veh		55.9			42.4			55.9			75.3	
Approach LOS		E			D			E			E	

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	39.4	59.0	16.8	44.8	14.7	83.7	16.9	44.7
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	27.0	* 53	19.0	40.0	13.0	69.0	17.0	42.0
Max Q Clear Time (g_c+I1), s	22.5	44.6	12.5	35.3	10.6	43.2	12.9	12.0
Green Ext Time (p_c), s	2.7	8.1	0.3	3.5	0.1	23.3	0.1	14.6

Intersection Summary	
HCM 2010 Ctrl Delay	53.6
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	1380	141	240	1985	593	44	43	106	234	78	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.99		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6280		1745	5136	1552	1745	1639		1641	1693	1454
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6280		1745	5136	1552	1745	1639		1641	1693	1454
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	77	1663	170	286	2363	706	53	52	128	279	93	45
RTOR Reduction (vph)	0	8	0	0	0	128	0	65	0	0	0	39
Lane Group Flow (vph)	77	1825	0	286	2363	578	53	115	0	184	188	6
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	8.3	66.7		34.8	93.2	93.2	15.9	15.9		22.6	22.6	22.6
Effective Green, g (s)	8.3	66.7		34.8	93.2	93.2	15.9	15.9		22.6	22.6	22.6
Actuated g/C Ratio	0.05	0.42		0.22	0.58	0.58	0.10	0.10		0.14	0.14	0.14
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	167	2617		379	2991	904	173	162		231	239	205
v/s Ratio Prot	0.02	0.29		c0.16	c0.46		0.03	c0.07		c0.11	0.11	
v/s Ratio Perm						0.37						0.00
v/c Ratio	0.46	0.70		0.75	0.79	0.64	0.31	0.71		0.80	0.79	0.03
Uniform Delay, d1	73.7	38.4		58.6	25.8	22.2	66.9	69.8		66.5	66.4	59.3
Progression Factor	1.18	0.19		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.8		7.4	2.2	3.5	0.4	11.5		16.1	14.5	0.0
Delay (s)	87.7	8.3		66.0	28.0	25.7	67.3	81.4		82.6	80.8	59.3
Level of Service	F	A		E	C	C	E	F		F	F	E
Approach Delay (s)		11.5			30.8			78.2			79.3	
Approach LOS		B			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	29.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	173	1446	269	430	1500	46	211	251	31	108	433	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	14	11	12	12	11	12	15
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	5.0	5.0	4.0	5.0	
Lane Util. Factor	0.97	0.86		0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94	1.00	1.00	0.89	1.00	0.99	
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	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	6247		3385	4964	1563	3351	3574	1353	1678	3336	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	6247		3385	4964	1563	3351	3574	1353	1678	3336	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Adj. Flow (vph)	197	1643	306	489	1705	52	245	292	36	127	509	244
RTOR Reduction (vph)	0	19	0	0	0	29	0	0	26	0	36	0
Lane Group Flow (vph)	197	1930	0	489	1705	23	245	292	10	127	717	0
Confl. Peds. (#/hr)	29		6	6		29	6		84	84		6
Confl. Bikes (#/hr)						1			2			
Heavy Vehicles (%)	2%	2%	1%	0%	1%	4%	1%	1%	6%	4%	2%	3%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	12.5	54.5		28.5	70.5	70.5	16.0	42.9	42.9	15.1	42.0	
Effective Green, g (s)	12.5	54.5		28.5	70.5	70.5	16.0	42.9	42.9	15.1	42.0	
Actuated g/C Ratio	0.08	0.34		0.18	0.44	0.44	0.10	0.27	0.27	0.09	0.26	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	3.0	6.0		2.0	6.0	6.0	2.0	2.0	2.0	2.0	6.0	
Lane Grp Cap (vph)	268	2127		602	2187	688	335	958	362	158	875	
v/s Ratio Prot	0.06	c0.31		c0.14	0.34		c0.07	0.08		0.08	c0.21	
v/s Ratio Perm						0.01			0.01			
v/c Ratio	0.74	0.91		0.81	0.78	0.03	0.73	0.30	0.03	0.80	0.82	
Uniform Delay, d1	72.1	50.3		63.2	38.1	25.4	69.9	46.7	43.2	71.0	55.4	
Progression Factor	0.95	0.93		0.84	0.36	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.7	6.2		5.0	1.8	0.1	6.9	0.1	0.0	23.6	7.1	
Delay (s)	77.2	52.9		58.0	15.4	25.5	76.8	46.7	43.2	94.6	62.6	
Level of Service	E	D		E	B	C	E	D	D	F	E	
Approach Delay (s)		55.2			24.9			59.4			67.2	
Approach LOS		E			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	45.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	1446	269	430	1500	46	211	251	31	108	433	207
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		1.00	1.00		0.90	1.00		0.91
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	1866	1900	1900	1881	1900	1881	1881	1792	1827	1857	1976
Adj Flow Rate, veh/h	197	1643	306	489	1705	0	245	292	36	127	509	244
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	2
Cap, veh/h	250	1813	338	622	2244	843	308	1006	655	148	608	289
Arrive On Green	0.07	0.33	0.33	0.18	0.44	0.00	0.09	0.28	0.28	0.09	0.27	0.27
Sat Flow, veh/h	3442	5452	1015	3510	5136	1615	3476	3574	1370	1740	2239	1066
Grp Volume(v), veh/h	197	1450	499	489	1705	0	245	292	36	127	400	353
Grp Sat Flow(s),veh/h/ln	1721	1604	1654	1755	1712	1615	1738	1787	1370	1740	1764	1540
Q Serve(g_s), s	8.6	44.1	44.1	20.4	42.9	0.0	10.6	9.8	0.5	11.0	32.8	33.2
Cycle Q Clear(g_c), s	8.6	44.1	44.1	20.4	42.9	0.0	10.6	9.8	0.5	11.0	32.8	33.2
Prop In Lane	1.00		0.61	1.00		1.00	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	250	1601	550	622	2244	843	308	1006	655	148	479	418
V/C Ratio(X)	0.79	0.91	0.91	0.79	0.76	0.00	0.80	0.29	0.05	0.86	0.84	0.84
Avail Cap(c_a), veh/h	292	1601	550	664	2244	843	408	1026	663	193	483	422
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)	0.84	0.84	0.84	0.56	0.56	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.9	48.9	48.9	60.3	36.4	0.0	68.5	43.1	11.8	69.2	52.6	52.8
Incr Delay (d2), s/veh	10.0	7.7	18.5	3.0	1.4	0.0	5.7	0.1	0.0	20.7	14.8	17.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	20.8	23.0	10.2	20.5	0.0	5.3	4.8	0.6	6.2	18.0	16.1
LnGrp Delay(d),s/veh	79.9	56.6	67.4	63.3	37.8	0.0	74.2	43.2	11.8	89.9	67.5	70.1
LnGrp LOS	E	E	E	E	D		E	D	B	F	E	E
Approach Vol, veh/h		2146			2194			573			880	
Approach Delay, s/veh		61.3			43.5			54.5			71.8	
Approach LOS		E			D			D			E	

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	37.8	57.0	18.6	46.6	21.8	73.0	17.0	48.2
Change Period (Y+Rc), s	4.0	6.0	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	29.0	51.0	18.0	* 42	13.0	67.0	17.0	44.0
Max Q Clear Time (g_c+I1), s	22.4	46.1	12.6	35.2	10.6	44.9	13.0	11.8
Green Ext Time (p_c), s	1.1	4.7	1.0	4.5	0.5	19.8	0.1	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	55.4
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	975	0	0	1402	516	143	474	913	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	1845	1918	0	0	1881	1845	1759	1881	1937			
Adj Flow Rate, veh/h	452	1134	0	0	1508	0	164	545	0			
Adj No. of Lanes	2	2	0	0	2	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	588	2760	0	0	1962	861	291	622	286			
Arrive On Green	0.17	0.76	0.00	0.00	0.55	0.00	0.17	0.17	0.00			
Sat Flow, veh/h	3408	3741	0	0	3668	1568	1675	3574	1647			
Grp Volume(v), veh/h	452	1134	0	0	1508	0	164	545	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1787	1568	1675	1787	1647			
Q Serve(g_s), s	17.6	15.3	0.0	0.0	45.8	0.0	12.5	20.7	0.0			
Cycle Q Clear(g_c), s	17.6	15.3	0.0	0.0	45.8	0.0	12.5	20.7	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	588	2760	0	0	1962	861	291	622	286			
V/C Ratio(X)	0.77	0.41	0.00	0.00	0.77	0.00	0.56	0.88	0.00			
Avail Cap(c_a), veh/h	588	2760	0	0	1962	861	421	899	414			
HCM Platoon Ratio	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	0.00	0.00	0.49	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	55.0	6.0	0.0	0.0	24.5	0.0	52.7	56.0	0.0			
Incr Delay (d2), s/veh	5.6	0.5	0.0	0.0	1.5	0.0	0.6	5.2	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			
%ile BackOfQ(50%),veh/ln	8.7	7.7	0.0	0.0	23.0	0.0	5.8	10.7	0.0			
LnGrp Delay(d),s/veh	60.5	6.4	0.0	0.0	26.0	0.0	53.3	61.2	0.0			
LnGrp LOS	E	A			C		D	E				
Approach Vol, veh/h		1586			1508			709				
Approach Delay, s/veh		21.8			26.0			59.4				
Approach LOS		C			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		110.4			29.0	81.4		28.8
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		105.4			24.0	* 76		35.0
Max Q Clear Time (g_c+I1), s		17.3			19.6	47.8		22.7
Green Ext Time (p_c), s		36.5			3.9	23.9		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	1446	269	430	1500	46	211	251	31	108	433	207
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		1.00	1.00		0.90	1.00		0.91
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	1866	1900	1900	1881	1900	1881	1881	1792	1827	1857	1976
Adj Flow Rate, veh/h	197	1643	306	489	1705	0	245	292	36	127	509	244
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	2
Cap, veh/h	250	1849	344	564	2194	690	291	1023	393	148	630	300
Arrive On Green	0.07	0.34	0.34	0.16	0.43	0.00	0.08	0.29	0.29	0.09	0.28	0.28
Sat Flow, veh/h	3442	5453	1016	3510	5136	1615	3476	3574	1372	1740	2242	1067
Grp Volume(v), veh/h	197	1450	499	489	1705	0	245	292	36	127	400	353
Grp Sat Flow(s),veh/h/ln	1721	1604	1655	1755	1712	1615	1738	1787	1372	1740	1764	1545
Q Serve(g_s), s	8.3	42.0	42.0	20.0	42.0	0.0	10.2	9.4	2.0	10.6	31.1	31.4
Cycle Q Clear(g_c), s	8.3	42.0	42.0	20.0	42.0	0.0	10.2	9.4	2.0	10.6	31.1	31.4
Prop In Lane	1.00		0.61	1.00		1.00	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	250	1632	561	564	2194	690	291	1023	393	148	496	434
V/C Ratio(X)	0.79	0.89	0.89	0.87	0.78	0.00	0.84	0.29	0.09	0.86	0.81	0.81
Avail Cap(c_a), veh/h	280	1632	561	595	2194	690	306	1023	393	177	502	440
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)	0.84	0.84	0.84	0.54	0.54	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.3	46.1	46.1	60.4	36.2	0.0	66.6	40.9	18.3	66.5	49.3	49.4
Incr Delay (d2), s/veh	10.9	6.6	16.3	6.8	1.5	0.0	17.0	0.1	0.0	24.9	12.1	14.1
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	4.3	19.7	21.8	10.2	20.0	0.0	5.6	4.6	1.0	6.1	16.8	15.1
LnGrp Delay(d),s/veh	78.2	52.7	62.4	67.2	37.7	0.0	83.6	41.0	18.4	91.5	61.4	63.6
LnGrp LOS	E	D	E	E	D		F	D	B	F	E	E
Approach Vol, veh/h		2146			2194			573			880	
Approach Delay, s/veh		57.3			44.3			57.8			66.6	
Approach LOS		E			D			E			E	

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	30.2	56.0	17.3	46.5	17.2	69.0	16.6	47.2
Change Period (Y+Rc), s	4.0	6.0	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	25.0	50.0	13.0	* 42	12.0	63.0	15.0	41.0
Max Q Clear Time (g_c+I1), s	22.0	44.0	12.2	33.4	10.3	44.0	12.6	11.4
Green Ext Time (p_c), s	0.6	5.8	0.1	5.4	0.4	17.2	0.0	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	53.8
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	1380	141	240	1985	593	44	43	106	234	78	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.99		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6282		1745	5136	1553	1745	1640		1641	1693	1456
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6282		1745	5136	1553	1745	1640		1641	1693	1456
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	77	1663	170	286	2363	706	53	52	128	279	93	45
RTOR Reduction (vph)	0	7	0	0	0	131	0	70	0	0	0	39
Lane Group Flow (vph)	77	1826	0	286	2363	575	53	110	0	184	188	6
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	7.0	80.7		13.0	86.7	86.7	14.8	14.8		21.5	21.5	21.5
Effective Green, g (s)	7.0	80.7		13.0	86.7	86.7	14.8	14.8		21.5	21.5	21.5
Actuated g/C Ratio	0.05	0.54		0.09	0.58	0.58	0.10	0.10		0.14	0.14	0.14
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	150	3379		151	2968	897	172	161		235	242	208
v/s Ratio Prot	0.02	0.29		c0.16	c0.46		0.03	c0.07		c0.11	0.11	
v/s Ratio Perm						0.37						0.00
v/c Ratio	0.51	0.54		1.89	0.80	0.64	0.31	0.68		0.78	0.78	0.03
Uniform Delay, d1	69.8	22.6		68.5	24.7	21.2	62.8	65.3		62.0	61.9	55.3
Progression Factor	0.69	0.15		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	0.3		426.2	2.3	3.5	0.4	9.1		14.4	13.3	0.0
Delay (s)	49.0	3.8		494.7	27.1	24.7	63.2	74.4		76.4	75.2	55.3
Level of Service	D	A		F	C	C	E	E		E	E	E
Approach Delay (s)		5.6			66.4			71.9			73.6	
Approach LOS		A			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	47.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	56.3	89.0	0.27	11.0	E
NB I-680 Off Ramp	III	35	17.6	3.3	20.9	0.14	23.6	C
Oak Rd	III	35	17.8	37.4	55.2	0.14	9.1	F
Jones Rd.	III	35	18.9	25.1	44.0	0.15	12.1	E
Total	III		87.0	122.1	209.1	0.70	12.0	E

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	40.9	71.9	0.26	12.9	E
Oak Rd.	III	35	18.9	18.2	37.1	0.15	14.3	D
Buskirk Ave	III	35	17.8	9.5	27.3	0.14	18.4	C
N. Main St.	III	35	17.6	25.8	43.4	0.14	11.4	E
Total	III		85.3	94.4	179.7	0.68	13.7	E

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	27	18	23
Total Delay (hr)	58	44	102
Stops / Veh	0.48	0.39	0.43
Stops (#)	3682	3391	7073
Average Speed (mph)	11	15	13
Total Travel Time (hr)	85	79	164
Distance Traveled (mi)	940	1219	2159
Fuel Consumed (gal)	106	104	210
Fuel Economy (mpg)	8.9	11.7	10.3
CO Emissions (kg)	7.40	7.30	14.70
NOx Emissions (kg)	1.44	1.42	2.86
VOC Emissions (kg)	1.71	1.69	3.41
Unserved Vehicles (#)	6	0	6
Vehicles in dilemma zone (#)	162	155	317
Performance Index	67.9	53.7	121.6

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	27
Total Delay (hr)	169
Stops / Veh	0.48
Stops (#)	10782
Average Speed (mph)	12
Total Travel Time (hr)	266
Distance Traveled (mi)	3324
Fuel Consumed (gal)	329
Fuel Economy (mpg)	10.1
CO Emissions (kg)	23.03
NOx Emissions (kg)	4.48
VOC Emissions (kg)	5.34
Unserved Vehicles (#)	6
Vehicles in dilemma zone (#)	362
Performance Index	198.9

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

11/13/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	481	89	234	370	944	153	429	465	684	330	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	16	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	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	1.00
Frt	1.00	0.98		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3336		3204	3455	1787	1805	3610	1762	3351	3490	1508
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3336		3204	3455	1787	1805	3610	1762	3351	3490	1508
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	79	512	95	275	435	1111	176	493	534	735	355	243
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	203	0	0	135
Lane Group Flow (vph)	79	595	0	275	435	1111	176	493	331	735	355	108
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	10.7	32.4		17.8	39.5	140.0	18.6	32.9	32.9	34.9	53.2	53.2
Effective Green, g (s)	10.7	32.4		17.8	39.5	140.0	18.6	32.9	32.9	34.9	53.2	53.2
Actuated g/C Ratio	0.08	0.23		0.13	0.28	1.00	0.13	0.23	0.23	0.25	0.38	0.38
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	133	772		407	974	1787	239	848	414	835	1326	573
v/s Ratio Prot	0.05	c0.18		0.09	0.13		0.10	0.14		c0.22	0.10	
v/s Ratio Perm						c0.62			c0.19			0.07
v/c Ratio	0.59	0.77		0.68	0.45	0.62	0.74	0.58	0.80	0.88	0.27	0.19
Uniform Delay, d1	62.5	50.3		58.3	41.3	0.0	58.3	47.4	50.4	50.5	30.0	29.0
Progression Factor	1.00	1.00		1.20	0.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	6.0		3.8	0.7	1.3	11.2	2.9	14.8	10.7	0.5	0.7
Delay (s)	67.2	56.4		73.7	25.4	1.3	69.5	50.4	65.2	61.2	30.5	29.7
Level of Service	E	E		E	C	A	E	D	E	E	C	C
Approach Delay (s)		57.6			18.0			59.8			47.3	
Approach LOS		E			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	41.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	508	1045	0	0	1414	632	160	274	854	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	1845	1956	0	0	1881	1881	1881	1881	1956			
Adj Flow Rate, veh/h	540	1112	0	0	1488	0	167	285	0			
Adj No. of Lanes	2	2	0	0	2	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	602	2984	0	0	2087	934	209	416	194			
Arrive On Green	0.18	0.80	0.00	0.00	1.00	0.00	0.12	0.12	0.00			
Sat Flow, veh/h	3408	3815	0	0	3668	1599	1792	3574	1663			
Grp Volume(v), veh/h	540	1112	0	0	1488	0	167	285	0			
Grp Sat Flow(s),veh/h/ln	1704	1859	0	0	1787	1599	1792	1787	1663			
Q Serve(g_s), s	18.4	10.0	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Cycle Q Clear(g_c), s	18.4	10.0	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	602	2984	0	0	2087	934	209	416	194			
V/C Ratio(X)	0.90	0.37	0.00	0.00	0.71	0.00	0.80	0.68	0.00			
Avail Cap(c_a), veh/h	602	2984	0	0	2087	934	528	1053	490			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.54	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	47.9	3.3	0.0	0.0	0.0	0.0	51.2	50.4	0.0			
Incr Delay (d2), s/veh	15.7	0.4	0.0	0.0	1.2	0.0	2.7	0.7	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			
%ile BackOfQ(50%),veh/ln	10.0	5.2	0.0	0.0	0.3	0.0	5.5	4.6	0.0			
LnGrp Delay(d),s/veh	63.6	3.7	0.0	0.0	1.2	0.0	53.8	51.2	0.0			
LnGrp LOS	E	A			A		D	D				
Approach Vol, veh/h		1652			1488			452				
Approach Delay, s/veh		23.2			1.2			52.1				
Approach LOS		C			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		121.6			47.2	74.4		18.4
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		95.4			21.0	* 69		35.0
Max Q Clear Time (g_c+I1), s		12.0			20.4	2.0		12.8
Green Ext Time (p_c), s		35.1			0.5	46.4		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	17.7
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	1620	134	152	1394	70	239	425	163	120	226	413
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		1.00	1.00		0.95	1.00		0.96
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	1883	1900	1881	1881	1976	1900	1863	1881	1845	1850	1976
Adj Flow Rate, veh/h	161	1800	149	157	1437	0	260	462	177	138	260	475
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	0	0	2	1	3	4	4
Cap, veh/h	210	2200	182	208	1918	627	318	1158	494	164	579	497
Arrive On Green	0.12	0.72	0.72	0.04	0.25	0.00	0.09	0.33	0.33	0.09	0.33	0.33
Sat Flow, veh/h	3442	6123	507	3476	5136	1680	3510	3539	1512	1757	1757	1507
Grp Volume(v), veh/h	161	1428	521	157	1437	0	260	462	177	138	260	475
Grp Sat Flow(s),veh/h/ln	1721	1619	1772	1738	1712	1680	1755	1770	1512	1757	1757	1507
Q Serve(g_s), s	5.9	26.3	26.3	5.8	33.8	0.0	9.5	13.2	9.2	10.1	15.2	40.4
Cycle Q Clear(g_c), s	5.9	26.3	26.3	5.8	33.8	0.0	9.5	13.2	9.2	10.1	15.2	40.4
Prop In Lane	1.00		0.29	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	210	1745	637	208	1918	627	318	1158	494	164	579	497
V/C Ratio(X)	0.77	0.82	0.82	0.75	0.75	0.00	0.82	0.40	0.36	0.84	0.45	0.96
Avail Cap(c_a), veh/h	263	1745	637	213	1918	627	537	1158	494	349	591	507
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.64	0.64	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.5	15.5	15.5	61.8	43.4	0.0	58.4	34.1	20.7	58.4	34.5	42.9
Incr Delay (d2), s/veh	9.0	4.0	10.2	8.2	1.8	0.0	2.0	0.1	0.2	4.5	2.0	30.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	11.9	14.1	3.0	16.3	0.0	4.7	6.5	4.3	5.1	7.7	20.9
LnGrp Delay(d),s/veh	65.5	19.5	25.6	70.0	45.2	0.0	60.4	34.1	20.9	62.9	36.5	73.3
LnGrp LOS	E	B	C	E	D		E	C	C	E	D	E
Approach Vol, veh/h		2110			1594			899			873	
Approach Delay, s/veh		24.5			47.6			39.1			60.7	
Approach LOS		C			D			D			E	

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	53.0	15.8	48.1	12.0	54.8	16.2	47.8
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	8.0	* 47	20.0	44.0	10.0	47.0	26.0	38.0
Max Q Clear Time (g_c+I1), s	7.8	28.3	11.5	42.4	7.9	35.8	12.1	15.2
Green Ext Time (p_c), s	0.0	17.5	0.3	0.8	0.1	10.0	0.1	13.5

Intersection Summary	
HCM 2010 Ctrl Delay	39.4
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1774	82	122	1476	269	112	28	369	299	46	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	3385	6408		1728	5136	1508	1745	1582		1641	1671	1460
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	3385	6408		1728	5136	1508	1745	1582		1641	1671	1460
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	53	1993	92	133	1604	292	132	33	434	507	78	105
RTOR Reduction (vph)	0	4	0	0	0	107	0	227	0	0	0	82
Lane Group Flow (vph)	53	2081	0	133	1604	185	132	240	0	289	296	23
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	8.0	50.6		14.2	56.8	56.8	24.8	24.8		30.4	30.4	30.4
Effective Green, g (s)	8.0	50.6		14.2	56.8	56.8	24.8	24.8		30.4	30.4	30.4
Actuated g/C Ratio	0.06	0.36		0.10	0.41	0.41	0.18	0.18		0.22	0.22	0.22
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	193	2316		175	2083	611	309	280		356	362	317
v/s Ratio Prot	0.02	c0.32		0.08	c0.31		0.08	c0.15		0.18	c0.18	
v/s Ratio Perm						0.12						0.02
v/c Ratio	0.27	0.90		0.76	0.77	0.30	0.43	0.86		0.81	0.82	0.07
Uniform Delay, d1	63.2	42.3		61.2	36.0	28.2	51.3	55.9		52.1	52.2	43.6
Progression Factor	0.48	0.33		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	4.2		15.9	2.8	1.3	0.3	21.1		12.5	12.7	0.0
Delay (s)	30.7	18.2		77.1	38.8	29.5	51.6	77.0		64.6	64.9	43.6
Level of Service	C	B		E	D	C	D	E		E	E	D
Approach Delay (s)		18.5			39.9			71.4			61.5	
Approach LOS		B			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	37.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	55.3	88.0	0.27	11.1	E
NB I-680 Off Ramp	III	35	17.6	3.1	20.7	0.14	23.8	C
Oak Rd	III	35	17.8	36.7	54.5	0.14	9.2	F
Jones Rd.	III	35	18.9	25.1	44.0	0.15	12.1	E
Total	III		87.0	120.2	207.2	0.70	12.1	E

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	41.2	72.2	0.26	12.9	E
Oak Rd.	III	35	18.9	18.6	37.5	0.15	14.2	D
Buskirk Ave	III	35	17.8	7.8	25.6	0.14	19.6	C
N. Main St.	III	35	17.6	25.5	43.1	0.14	11.5	E
Total	III		85.3	93.1	178.4	0.68	13.8	E

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	27	19	23
Total Delay (hr)	57	45	102
Stops / Veh	0.48	0.40	0.44
Stops (#)	3657	3435	7092
Average Speed (mph)	11	15	13
Total Travel Time (hr)	84	80	164
Distance Traveled (mi)	940	1219	2159
Fuel Consumed (gal)	105	105	210
Fuel Economy (mpg)	8.9	11.6	10.3
CO Emissions (kg)	7.35	7.36	14.71
NOx Emissions (kg)	1.43	1.43	2.86
VOC Emissions (kg)	1.70	1.71	3.41
Unserved Vehicles (#)	6	0	6
Vehicles in dilemma zone (#)	156	185	341
Performance Index	67.1	54.6	121.7

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	27
Total Delay (hr)	171
Stops / Veh	0.48
Stops (#)	10802
Average Speed (mph)	12
Total Travel Time (hr)	268
Distance Traveled (mi)	3324
Fuel Consumed (gal)	331
Fuel Economy (mpg)	10.0
CO Emissions (kg)	23.13
NOx Emissions (kg)	4.50
VOC Emissions (kg)	5.36
Unserved Vehicles (#)	6
Vehicles in dilemma zone (#)	386
Performance Index	200.7

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

11/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	481	89	234	370	944	153	429	465	684	330	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	11	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	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	1.00
Frt	1.00	0.98		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3336		3204	3455	1525	1805	3610	1762	3351	3490	1508
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3336		3204	3455	1525	1805	3610	1762	3351	3490	1508
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	79	512	95	275	435	1111	176	493	534	735	355	243
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	199	0	0	134
Lane Group Flow (vph)	79	596	0	275	435	1111	176	493	335	735	355	109
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	10.7	32.8		17.6	39.7	140.0	18.6	35.0	35.0	32.6	53.0	53.0
Effective Green, g (s)	10.7	32.8		17.6	39.7	140.0	18.6	35.0	35.0	32.6	53.0	53.0
Actuated g/C Ratio	0.08	0.23		0.13	0.28	1.00	0.13	0.25	0.25	0.23	0.38	0.38
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	133	781		402	979	1525	239	902	440	780	1321	570
v/s Ratio Prot	0.05	0.18		0.09	0.13		0.10	0.14		c0.22	0.10	
v/s Ratio Perm						c0.73			0.19			0.07
v/c Ratio	0.59	0.76		0.68	0.44	0.73	0.74	0.55	0.76	0.94	0.27	0.19
Uniform Delay, d1	62.5	50.0		58.5	41.1	0.0	58.3	45.6	48.6	52.8	30.1	29.2
Progression Factor	1.00	1.00		1.16	0.59	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	5.7		4.8	0.8	2.8	11.2	2.4	11.8	19.5	0.5	0.7
Delay (s)	67.2	55.7		72.9	25.2	2.8	69.5	48.0	60.4	72.2	30.6	29.9
Level of Service	E	E		E	C	A	E	D	E	E	C	C
Approach Delay (s)		57.0			18.8			56.7			53.4	
Approach LOS		E			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	508	1045	0	0	1414	632	160	274	854	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	1845	1956	0	0	1881	1956	1881	1881	1956			
Adj Flow Rate, veh/h	540	1112	0	0	1488	0	167	285	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	602	2984	0	0	2999	971	209	416	194			
Arrive On Green	0.18	0.80	0.00	0.00	1.00	0.00	0.12	0.12	0.00			
Sat Flow, veh/h	3408	3815	0	0	5305	1663	1792	3574	1663			
Grp Volume(v), veh/h	540	1112	0	0	1488	0	167	285	0			
Grp Sat Flow(s),veh/h/ln	1704	1859	0	0	1712	1663	1792	1787	1663			
Q Serve(g_s), s	18.4	10.0	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Cycle Q Clear(g_c), s	18.4	10.0	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	602	2984	0	0	2999	971	209	416	194			
V/C Ratio(X)	0.90	0.37	0.00	0.00	0.50	0.00	0.80	0.68	0.00			
Avail Cap(c_a), veh/h	602	2984	0	0	2999	971	528	1053	490			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.51	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	47.9	3.3	0.0	0.0	0.0	0.0	51.2	50.4	0.0			
Incr Delay (d2), s/veh	15.7	0.4	0.0	0.0	0.3	0.0	2.7	0.7	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			
%ile BackOfQ(50%),veh/ln	10.0	5.2	0.0	0.0	0.1	0.0	5.5	4.6	0.0			
LnGrp Delay(d),s/veh	63.6	3.7	0.0	0.0	0.3	0.0	53.8	51.2	0.0			
LnGrp LOS	E	A			A		D	D				
Approach Vol, veh/h		1652			1488			452				
Approach Delay, s/veh		23.2			0.3			52.1				
Approach LOS		C			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		121.6			47.2	74.4		18.4
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		95.4			21.0	* 69		35.0
Max Q Clear Time (g_c+I1), s		12.0			20.4	2.0		12.8
Green Ext Time (p_c), s		35.1			0.5	43.8		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	17.4
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	1620	134	152	1394	70	239	425	163	120	226	413
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		0.98	1.00		0.95	1.00		0.96
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	1883	1900	1881	1882	1900	1900	1863	1881	1845	1850	1976
Adj Flow Rate, veh/h	161	1800	149	157	1437	72	260	462	177	138	260	475
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	1	0	2	1	3	4	4
Cap, veh/h	210	2200	182	208	1869	94	318	1158	495	164	579	497
Arrive On Green	0.12	0.72	0.72	0.04	0.25	0.25	0.09	0.33	0.33	0.09	0.33	0.33
Sat Flow, veh/h	3442	6123	507	3476	5006	251	3510	3539	1512	1757	1757	1507
Grp Volume(v), veh/h	161	1428	521	157	983	526	260	462	177	138	260	475
Grp Sat Flow(s),veh/h/ln	1721	1619	1772	1738	1713	1832	1755	1770	1512	1757	1757	1507
Q Serve(g_s), s	5.9	26.3	26.3	5.8	34.9	34.9	9.5	13.2	9.2	10.1	15.2	40.4
Cycle Q Clear(g_c), s	5.9	26.3	26.3	5.8	34.9	34.9	9.5	13.2	9.2	10.1	15.2	40.4
Prop In Lane	1.00		0.29	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	210	1745	637	208	1279	684	318	1158	495	164	579	497
V/C Ratio(X)	0.77	0.82	0.82	0.75	0.77	0.77	0.82	0.40	0.36	0.84	0.45	0.96
Avail Cap(c_a), veh/h	263	1745	637	213	1279	684	537	1158	495	349	591	507
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.64	0.64	0.64	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.5	15.5	15.5	61.8	43.8	43.8	58.4	34.1	20.7	58.4	34.5	42.9
Incr Delay (d2), s/veh	9.0	4.0	10.2	8.2	2.9	5.3	2.0	0.1	0.2	4.5	2.0	30.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	11.9	14.1	3.0	17.0	18.7	4.7	6.5	4.3	5.1	7.7	20.9
LnGrp Delay(d),s/veh	65.5	19.5	25.6	70.0	46.7	49.1	60.4	34.1	20.9	62.9	36.5	73.3
LnGrp LOS	E	B	C	E	D	D	E	C	C	E	D	E
Approach Vol, veh/h		2110			1666			899			873	
Approach Delay, s/veh		24.5			49.6			39.1			60.7	
Approach LOS		C			D			D			E	

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	53.0	15.8	48.1	12.0	54.8	16.2	47.8
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	8.0	* 47	20.0	44.0	10.0	47.0	26.0	38.0
Max Q Clear Time (g_c+I1), s	7.8	28.3	11.5	42.4	7.9	36.9	12.1	15.2
Green Ext Time (p_c), s	0.0	17.5	0.3	0.8	0.1	9.2	0.1	13.5

Intersection Summary	
HCM 2010 Ctrl Delay	40.1
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1774	82	122	1476	269	112	28	369	299	46	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	3385	6408		1728	5136	1508	1745	1582		1641	1671	1460
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	3385	6408		1728	5136	1508	1745	1582		1641	1671	1460
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	53	1993	92	133	1604	292	132	33	434	507	78	105
RTOR Reduction (vph)	0	4	0	0	0	110	0	218	0	0	0	82
Lane Group Flow (vph)	53	2081	0	133	1604	182	132	249	0	289	296	23
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	8.0	50.3		14.2	56.5	56.5	25.2	25.2		30.3	30.3	30.3
Effective Green, g (s)	8.0	50.3		14.2	56.5	56.5	25.2	25.2		30.3	30.3	30.3
Actuated g/C Ratio	0.06	0.36		0.10	0.40	0.40	0.18	0.18		0.22	0.22	0.22
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	193	2302		175	2072	608	314	284		355	361	315
v/s Ratio Prot	0.02	c0.32		0.08	c0.31		0.08	c0.16		0.18	c0.18	
v/s Ratio Perm						0.12						0.02
v/c Ratio	0.27	0.90		0.76	0.77	0.30	0.42	0.88		0.81	0.82	0.07
Uniform Delay, d1	63.2	42.6		61.2	36.2	28.3	50.9	55.9		52.2	52.3	43.7
Progression Factor	0.51	0.32		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	4.5		15.9	2.9	1.3	0.3	24.0		12.7	12.9	0.0
Delay (s)	32.6	18.3		77.1	39.1	29.6	51.3	79.9		64.9	65.1	43.7
Level of Service	C	B		E	D	C	D	E		E	E	D
Approach Delay (s)		18.6			40.2			73.6			61.8	
Approach LOS		B			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	38.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	55.3	88.0	0.27	11.1	E
NB I-680 Off Ramp	III	35	17.6	3.1	20.7	0.14	23.8	C
Oak Rd	III	35	17.8	36.7	54.5	0.14	9.2	F
Jones Rd.	III	35	18.9	25.1	44.0	0.15	12.1	E
Total	III		87.0	120.2	207.2	0.70	12.1	E

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	41.2	72.2	0.26	12.9	E
Oak Rd.	III	35	18.9	18.6	37.5	0.15	14.2	D
Buskirk Ave	III	35	17.8	7.8	25.6	0.14	19.6	C
N. Main St.	III	35	17.6	25.5	43.1	0.14	11.5	E
Total	III		85.3	93.1	178.4	0.68	13.8	E

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	27	19	23
Total Delay (hr)	57	45	102
Stops / Veh	0.48	0.40	0.44
Stops (#)	3657	3435	7092
Average Speed (mph)	11	15	13
Total Travel Time (hr)	84	80	164
Distance Traveled (mi)	940	1219	2159
Fuel Consumed (gal)	105	105	210
Fuel Economy (mpg)	8.9	11.6	10.3
CO Emissions (kg)	7.35	7.36	14.71
NOx Emissions (kg)	1.43	1.43	2.86
VOC Emissions (kg)	1.70	1.71	3.41
Unserved Vehicles (#)	6	0	6
Vehicles in dilemma zone (#)	156	185	341
Performance Index	67.1	54.6	121.7

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	27
Total Delay (hr)	171
Stops / Veh	0.48
Stops (#)	10802
Average Speed (mph)	12
Total Travel Time (hr)	268
Distance Traveled (mi)	3324
Fuel Consumed (gal)	331
Fuel Economy (mpg)	10.0
CO Emissions (kg)	23.13
NOx Emissions (kg)	4.50
VOC Emissions (kg)	5.36
Unserved Vehicles (#)	6
Vehicles in dilemma zone (#)	386
Performance Index	200.7

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

11/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	481	89	234	370	944	153	429	465	684	330	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	11	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	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	1.00
Frt	1.00	0.98		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3336		3204	3455	1525	1805	3610	1762	3351	3490	1508
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3336		3204	3455	1525	1805	3610	1762	3351	3490	1508
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	79	512	95	275	435	1111	176	493	534	735	355	243
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	199	0	0	134
Lane Group Flow (vph)	79	596	0	275	435	1111	176	493	335	735	355	109
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	10.7	32.8		17.6	39.7	140.0	18.6	35.0	35.0	32.6	53.0	53.0
Effective Green, g (s)	10.7	32.8		17.6	39.7	140.0	18.6	35.0	35.0	32.6	53.0	53.0
Actuated g/C Ratio	0.08	0.23		0.13	0.28	1.00	0.13	0.25	0.25	0.23	0.38	0.38
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	133	781		402	979	1525	239	902	440	780	1321	570
v/s Ratio Prot	0.05	0.18		0.09	0.13		0.10	0.14		c0.22	0.10	
v/s Ratio Perm						c0.73			0.19			0.07
v/c Ratio	0.59	0.76		0.68	0.44	0.73	0.74	0.55	0.76	0.94	0.27	0.19
Uniform Delay, d1	62.5	50.0		58.5	41.1	0.0	58.3	45.6	48.6	52.8	30.1	29.2
Progression Factor	1.00	1.00		1.16	0.59	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	5.7		4.8	0.8	2.8	11.2	2.4	11.8	19.5	0.5	0.7
Delay (s)	67.2	55.7		72.9	25.2	2.8	69.5	48.0	60.4	72.2	30.6	29.9
Level of Service	E	E		E	C	A	E	D	E	E	C	C
Approach Delay (s)		57.0			18.8			56.7			53.4	
Approach LOS		E			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	508	1045	0	0	1414	632	160	274	854	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	1845	1956	0	0	1881	1956	1881	1881	1956			
Adj Flow Rate, veh/h	540	1112	0	0	1488	0	167	285	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	602	2984	0	0	2999	971	209	416	194			
Arrive On Green	0.18	0.80	0.00	0.00	1.00	0.00	0.12	0.12	0.00			
Sat Flow, veh/h	3408	3815	0	0	5305	1663	1792	3574	1663			
Grp Volume(v), veh/h	540	1112	0	0	1488	0	167	285	0			
Grp Sat Flow(s),veh/h/ln	1704	1859	0	0	1712	1663	1792	1787	1663			
Q Serve(g_s), s	18.4	10.0	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Cycle Q Clear(g_c), s	18.4	10.0	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	602	2984	0	0	2999	971	209	416	194			
V/C Ratio(X)	0.90	0.37	0.00	0.00	0.50	0.00	0.80	0.68	0.00			
Avail Cap(c_a), veh/h	602	2984	0	0	2999	971	528	1053	490			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.51	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	47.9	3.3	0.0	0.0	0.0	0.0	51.2	50.4	0.0			
Incr Delay (d2), s/veh	15.7	0.4	0.0	0.0	0.3	0.0	2.7	0.7	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			
%ile BackOfQ(50%),veh/ln	10.0	5.2	0.0	0.0	0.1	0.0	5.5	4.6	0.0			
LnGrp Delay(d),s/veh	63.6	3.7	0.0	0.0	0.3	0.0	53.8	51.2	0.0			
LnGrp LOS	E	A			A		D	D				
Approach Vol, veh/h		1652			1488			452				
Approach Delay, s/veh		23.2			0.3			52.1				
Approach LOS		C			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		121.6			47.2	74.4		18.4
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		95.4			21.0	* 69		35.0
Max Q Clear Time (g_c+I1), s		12.0			20.4	2.0		12.8
Green Ext Time (p_c), s		35.1			0.5	43.8		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	17.4
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	1620	134	152	1394	70	239	425	163	120	226	413
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		0.98	1.00		0.95	1.00		0.96
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	1883	1900	1881	1882	1900	1900	1863	1881	1845	1850	1976
Adj Flow Rate, veh/h	161	1800	149	157	1437	72	260	462	177	138	260	475
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	1	0	2	1	3	4	4
Cap, veh/h	210	2200	182	208	1869	94	318	1158	495	164	579	497
Arrive On Green	0.12	0.72	0.72	0.04	0.25	0.25	0.09	0.33	0.33	0.09	0.33	0.33
Sat Flow, veh/h	3442	6123	507	3476	5006	251	3510	3539	1512	1757	1757	1507
Grp Volume(v), veh/h	161	1428	521	157	983	526	260	462	177	138	260	475
Grp Sat Flow(s),veh/h/ln	1721	1619	1772	1738	1713	1832	1755	1770	1512	1757	1757	1507
Q Serve(g_s), s	5.9	26.3	26.3	5.8	34.9	34.9	9.5	13.2	9.2	10.1	15.2	40.4
Cycle Q Clear(g_c), s	5.9	26.3	26.3	5.8	34.9	34.9	9.5	13.2	9.2	10.1	15.2	40.4
Prop In Lane	1.00		0.29	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	210	1745	637	208	1279	684	318	1158	495	164	579	497
V/C Ratio(X)	0.77	0.82	0.82	0.75	0.77	0.77	0.82	0.40	0.36	0.84	0.45	0.96
Avail Cap(c_a), veh/h	263	1745	637	213	1279	684	537	1158	495	349	591	507
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.64	0.64	0.64	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.5	15.5	15.5	61.8	43.8	43.8	58.4	34.1	20.7	58.4	34.5	42.9
Incr Delay (d2), s/veh	9.0	4.0	10.2	8.2	2.9	5.3	2.0	0.1	0.2	4.5	2.0	30.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	11.9	14.1	3.0	17.0	18.7	4.7	6.5	4.3	5.1	7.7	20.9
LnGrp Delay(d),s/veh	65.5	19.5	25.6	70.0	46.7	49.1	60.4	34.1	20.9	62.9	36.5	73.3
LnGrp LOS	E	B	C	E	D	D	E	C	C	E	D	E
Approach Vol, veh/h		2110			1666			899			873	
Approach Delay, s/veh		24.5			49.6			39.1			60.7	
Approach LOS		C			D			D			E	

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	53.0	15.8	48.1	12.0	54.8	16.2	47.8
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	8.0	* 47	20.0	44.0	10.0	47.0	26.0	38.0
Max Q Clear Time (g_c+I1), s	7.8	28.3	11.5	42.4	7.9	36.9	12.1	15.2
Green Ext Time (p_c), s	0.0	17.5	0.3	0.8	0.1	9.2	0.1	13.5

Intersection Summary	
HCM 2010 Ctrl Delay	40.1
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1774	82	122	1476	269	112	28	369	299	46	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	3385	6408		1728	5136	1508	1745	1582		1641	1671	1460
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	3385	6408		1728	5136	1508	1745	1582		1641	1671	1460
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	53	1993	92	133	1604	292	132	33	434	507	78	105
RTOR Reduction (vph)	0	4	0	0	0	110	0	218	0	0	0	82
Lane Group Flow (vph)	53	2081	0	133	1604	182	132	249	0	289	296	23
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	8.0	50.3		14.2	56.5	56.5	25.2	25.2		30.3	30.3	30.3
Effective Green, g (s)	8.0	50.3		14.2	56.5	56.5	25.2	25.2		30.3	30.3	30.3
Actuated g/C Ratio	0.06	0.36		0.10	0.40	0.40	0.18	0.18		0.22	0.22	0.22
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	193	2302		175	2072	608	314	284		355	361	315
v/s Ratio Prot	0.02	c0.32		0.08	c0.31		0.08	c0.16		0.18	c0.18	
v/s Ratio Perm						0.12						0.02
v/c Ratio	0.27	0.90		0.76	0.77	0.30	0.42	0.88		0.81	0.82	0.07
Uniform Delay, d1	63.2	42.6		61.2	36.2	28.3	50.9	55.9		52.2	52.3	43.7
Progression Factor	0.51	0.32		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	4.5		15.9	2.9	1.3	0.3	24.0		12.7	12.9	0.0
Delay (s)	32.6	18.3		77.1	39.1	29.6	51.3	79.9		64.9	65.1	43.7
Level of Service	C	B		E	D	C	D	E		E	E	D
Approach Delay (s)		18.6			40.2			73.6			61.8	
Approach LOS		B			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	38.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Appendix D – Future Year Synchro Model Output for A.M. and P.M. Peak Hours

- Arterial LOS
- Synchro reports for system MOEs
- Synchro reports for intersection LOS

Appendix D – Future Year Synchro Model Output for A.M. and P.M. Peak Hours

- Arterial level of service
- Synchro reports for system MOEs
- Synchro reports for intersection level of service

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	127.1	159.8	0.27	6.1	F
NB I-680 Off Ramp	III	35	17.6	9.1	26.7	0.14	18.5	C
Oak Rd	III	35	17.8	71.0	88.8	0.14	5.6	F
Jones Rd.	III	35	18.9	85.9	104.8	0.15	5.1	F
Total	III		87.0	293.1	380.1	0.70	6.6	F

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	38.3	69.3	0.26	13.4	E
Oak Rd.	III	35	18.9	20.5	39.4	0.15	13.5	E
Buskirk Ave	III	35	17.8	5.0	22.8	0.14	22.0	C
N. Main St.	III	35	17.6	29.3	46.9	0.14	10.5	E
Total	III		85.3	93.1	178.4	0.68	13.8	E

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	59	27	41
Total Delay (hr)	143	88	231
Stops / Veh	0.61	0.42	0.50
Stops (#)	5311	4909	10220
Average Speed (mph)	6	13	9
Total Travel Time (hr)	175	137	312
Distance Traveled (mi)	1126	1716	2841
Fuel Consumed (gal)	188	167	354
Fuel Economy (mpg)	6.0	10.3	8.0
CO Emissions (kg)	13.13	11.64	24.77
NOx Emissions (kg)	2.55	2.27	4.82
VOC Emissions (kg)	3.04	2.70	5.74
Unserved Vehicles (#)	477	113	590
Vehicles in dilemma zone (#)	175	181	356
Performance Index	158.0	101.3	259.3

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	45
Total Delay (hr)	330
Stops / Veh	0.53
Stops (#)	14037
Average Speed (mph)	9
Total Travel Time (hr)	447
Distance Traveled (mi)	4048
Fuel Consumed (gal)	499
Fuel Economy (mpg)	8.1
CO Emissions (kg)	34.92
NOx Emissions (kg)	6.79
VOC Emissions (kg)	8.09
Unserved Vehicles (#)	717
Vehicles in dilemma zone (#)	410
Performance Index	368.9

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

12/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	789	167	554	363	1095	70	136	356	585	890	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	12	16	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3342		3236	3505	1776	1736	3539	1730	3286	3421	1496
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3342		3236	3505	1776	1736	3539	1730	3286	3421	1496
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	51	999	211	577	378	1141	74	143	375	643	978	179
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	218	0	0	76
Lane Group Flow (vph)	51	1198	0	577	378	1141	74	143	157	643	978	103
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	7.1	43.0		20.8	56.7	140.0	8.7	32.2	32.2	22.0	49.5	49.5
Effective Green, g (s)	7.1	43.0		20.8	56.7	140.0	8.7	32.2	32.2	22.0	49.5	49.5
Actuated g/C Ratio	0.05	0.31		0.15	0.41	1.00	0.06	0.23	0.23	0.16	0.35	0.35
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	85	1026		480	1419	1776	107	813	397	516	1209	528
v/s Ratio Prot	0.03	c0.36		c0.18	0.11		0.04	0.04		c0.20	c0.29	
v/s Ratio Perm						0.64			0.09			0.07
v/c Ratio	0.60	1.17		1.20	0.27	0.64	0.69	0.18	0.40	1.25	0.81	0.20
Uniform Delay, d1	65.1	48.5		59.6	27.8	0.0	64.3	43.3	45.7	59.0	41.0	31.4
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	7.4	86.0		109.5	0.3	1.8	17.5	0.5	2.9	126.2	5.9	0.8
Delay (s)	72.4	134.5		169.1	28.1	1.8	81.9	43.7	48.6	185.2	46.9	32.3
Level of Service	E	F		F	C	A	F	D	D	F	D	C
Approach Delay (s)		131.9			52.6			51.6			94.8	
Approach LOS		F			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	83.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	1189	0	0	1767	531	187	500	1171	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	1845	1918	0	0	1881	1918	1759	1881	1937			
Adj Flow Rate, veh/h	452	1383	0	0	1900	0	215	575	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	650	2759	0	0	2738	869	302	643	296			
Arrive On Green	0.19	0.76	0.00	0.00	0.53	0.00	0.18	0.18	0.00			
Sat Flow, veh/h	3408	3741	0	0	5305	1631	1675	3574	1647			
Grp Volume(v), veh/h	452	1383	0	0	1900	0	215	575	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1712	1631	1675	1787	1647			
Q Serve(g_s), s	18.8	22.6	0.0	0.0	41.7	0.0	18.3	23.9	0.0			
Cycle Q Clear(g_c), s	18.8	22.6	0.0	0.0	41.7	0.0	18.3	23.9	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	650	2759	0	0	2738	869	302	643	296			
V/C Ratio(X)	0.69	0.50	0.00	0.00	0.69	0.00	0.71	0.89	0.00			
Avail Cap(c_a), veh/h	650	2759	0	0	2738	869	390	833	384			
HCM Platoon Ratio	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	0.00	0.00	0.34	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	57.3	7.2	0.0	0.0	26.3	0.0	58.6	60.9	0.0			
Incr Delay (d2), s/veh	2.7	0.7	0.0	0.0	0.5	0.0	2.5	8.6	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			
%ile BackOfQ(50%),veh/ln	9.1	11.6	0.0	0.0	19.8	0.0	8.7	12.6	0.0			
LnGrp Delay(d),s/veh	60.1	7.9	0.0	0.0	26.8	0.0	61.1	69.5	0.0			
LnGrp LOS	E	A			C		E	E				
Approach Vol, veh/h		1835			1900			790				
Approach Delay, s/veh		20.7			26.8			67.2				
Approach LOS		C			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		120.0			34.0	86.0		32.0
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		115.0			29.0	* 81		35.4
Max Q Clear Time (g_c+I1), s		24.6			20.8	43.7		25.9
Green Ext Time (p_c), s		52.0			7.5	33.5		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	31.4
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	1859	306	412	1745	44	318	317	44	116	408	235
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		1.00	1.00		0.90	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	1865	1900	1900	1881	1900	1881	1881	1792	1827	1863	1918
Adj Flow Rate, veh/h	222	2112	348	468	1983	0	370	369	51	136	480	0
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	3
Cap, veh/h	262	2121	347	490	2279	717	352	965	368	156	892	411
Arrive On Green	0.08	0.38	0.38	0.14	0.44	0.00	0.10	0.27	0.27	0.09	0.25	0.00
Sat Flow, veh/h	3442	5578	914	3510	5136	1615	3476	3574	1364	1740	3539	1631
Grp Volume(v), veh/h	222	1820	640	468	1983	0	370	369	51	136	480	0
Grp Sat Flow(s),veh/h/ln	1721	1604	1679	1755	1712	1615	1738	1787	1364	1740	1770	1631
Q Serve(g_s), s	10.1	59.5	60.0	20.9	55.2	0.0	16.0	13.3	3.3	12.2	18.5	0.0
Cycle Q Clear(g_c), s	10.1	59.5	60.0	20.9	55.2	0.0	16.0	13.3	3.3	12.2	18.5	0.0
Prop In Lane	1.00		0.54	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	262	1830	639	490	2279	717	352	965	368	156	892	411
V/C Ratio(X)	0.85	0.99	1.00	0.96	0.87	0.00	1.05	0.38	0.14	0.87	0.54	0.00
Avail Cap(c_a), veh/h	262	1830	639	490	2279	717	352	965	368	187	942	434
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)	0.70	0.70	0.70	0.41	0.41	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	72.0	48.7	48.9	67.4	39.8	0.0	70.9	46.9	23.3	70.9	51.1	0.0
Incr Delay (d2), s/veh	16.5	16.4	30.2	16.5	2.1	0.0	61.6	0.1	0.1	26.2	1.8	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	5.4	29.1	33.0	11.3	26.5	0.0	10.7	6.6	1.6	7.0	9.3	0.0
LnGrp Delay(d),s/veh	88.5	65.1	79.1	83.9	41.9	0.0	132.4	47.0	23.4	97.1	52.9	0.0
LnGrp LOS	F	E	F	F	D		F	D	C	F	D	
Approach Vol, veh/h		2682			2451			790			616	
Approach Delay, s/veh		70.4			49.9			85.5			62.7	
Approach LOS		E			D			F			E	

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	28.2	66.0	21.0	44.8	18.2	76.0	18.2	47.6
Change Period (Y+Rc), s	4.0	6.0	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	22.0	60.0	16.0	* 42	12.0	70.0	17.0	42.0
Max Q Clear Time (g_c+I1), s	22.9	62.0	18.0	20.5	12.1	57.2	14.2	15.3
Green Ext Time (p_c), s	0.0	0.0	0.0	6.9	0.0	12.3	0.0	2.5

Intersection Summary	
HCM 2010 Ctrl Delay	63.8
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	1664	218	233	2051	811	63	80	106	236	106	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.98		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6248		1745	5136	1552	1745	1673		1641	1705	1454
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6248		1745	5136	1552	1745	1673		1641	1705	1454
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	165	2005	263	277	2442	965	76	96	128	281	126	65
RTOR Reduction (vph)	0	14	0	0	0	190	0	33	0	0	0	55
Lane Group Flow (vph)	165	2254	0	277	2442	775	76	191	0	200	207	10
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	7.0	50.3		42.8	86.1	86.1	22.6	22.6		24.3	24.3	24.3
Effective Green, g (s)	7.0	50.3		42.8	86.1	86.1	22.6	22.6		24.3	24.3	24.3
Actuated g/C Ratio	0.04	0.31		0.27	0.54	0.54	0.14	0.14		0.15	0.15	0.15
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	141	1964		466	2763	835	246	236		249	258	220
v/s Ratio Prot	0.05	c0.36		0.16	0.48		0.04	c0.11		c0.12	0.12	
v/s Ratio Perm						c0.50						0.01
v/c Ratio	1.17	1.15		0.59	0.88	0.93	0.31	0.81		0.80	0.80	0.04
Uniform Delay, d1	76.5	54.9		51.0	32.5	34.1	61.7	66.6		65.5	65.5	57.9
Progression Factor	0.50	0.26		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	99.0	68.6		1.4	4.6	17.9	0.3	17.1		16.0	15.4	0.0
Delay (s)	137.0	83.1		52.4	37.1	52.0	61.9	83.7		81.5	81.0	58.0
Level of Service	F	F		D	D	D	E	F		F	F	E
Approach Delay (s)		86.8			42.2			78.2			78.0	
Approach LOS		F			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	61.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	127.1	159.8	0.27	6.1	F
NB I-680 Off Ramp	III	35	17.6	9.0	26.6	0.14	18.6	C
Oak Rd	III	35	17.8	71.0	88.8	0.14	5.6	F
Jones Rd.	III	35	18.9	85.9	104.8	0.15	5.1	F
Total	III		87.0	293.0	380.0	0.70	6.6	F

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	37.2	68.2	0.26	13.6	E
Oak Rd.	III	35	18.9	21.5	40.4	0.15	13.2	E
Buskirk Ave	III	35	17.8	10.8	28.6	0.14	17.5	D
N. Main St.	III	35	17.6	29.5	47.1	0.14	10.5	E
Total	III		85.3	99.0	184.3	0.68	13.3	E

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	62	28	43
Total Delay (hr)	150	90	240
Stops / Veh	0.61	0.44	0.51
Stops (#)	5297	5065	10362
Average Speed (mph)	6	12	9
Total Travel Time (hr)	182	139	321
Distance Traveled (mi)	1126	1716	2841
Fuel Consumed (gal)	193	169	362
Fuel Economy (mpg)	5.8	10.1	7.8
CO Emissions (kg)	13.47	11.84	25.31
NOx Emissions (kg)	2.62	2.30	4.92
VOC Emissions (kg)	3.12	2.74	5.87
Unserved Vehicles (#)	493	113	606
Vehicles in dilemma zone (#)	175	171	346
Performance Index	164.7	104.0	268.7

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	47
Total Delay (hr)	346
Stops / Veh	0.54
Stops (#)	14294
Average Speed (mph)	9
Total Travel Time (hr)	464
Distance Traveled (mi)	4048
Fuel Consumed (gal)	513
Fuel Economy (mpg)	7.9
CO Emissions (kg)	35.87
NOx Emissions (kg)	6.98
VOC Emissions (kg)	8.31
Unserved Vehicles (#)	755
Vehicles in dilemma zone (#)	400
Performance Index	385.9

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

12/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	789	167	554	363	1095	70	136	356	585	890	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	16	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3342		3236	3388	1776	1736	3539	1730	3286	3421	1496
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3342		3236	3388	1776	1736	3539	1730	3286	3421	1496
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	51	999	211	577	378	1141	74	143	375	643	978	179
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	219	0	0	76
Lane Group Flow (vph)	51	1198	0	577	378	1141	74	143	156	643	978	103
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	7.1	43.0		20.8	56.7	140.0	8.7	33.2	33.2	21.0	49.5	49.5
Effective Green, g (s)	7.1	43.0		20.8	56.7	140.0	8.7	33.2	33.2	21.0	49.5	49.5
Actuated g/C Ratio	0.05	0.31		0.15	0.41	1.00	0.06	0.24	0.24	0.15	0.35	0.35
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	85	1026		480	1372	1776	107	839	410	492	1209	528
v/s Ratio Prot	0.03	c0.36		c0.18	0.11		0.04	0.04		c0.20	c0.29	
v/s Ratio Perm						0.64			0.09			0.07
v/c Ratio	0.60	1.17		1.20	0.28	0.64	0.69	0.17	0.38	1.31	0.81	0.20
Uniform Delay, d1	65.1	48.5		59.6	27.9	0.0	64.3	42.5	44.8	59.5	41.0	31.4
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	7.4	86.0		109.5	0.3	1.8	17.5	0.4	2.7	152.2	5.9	0.8
Delay (s)	72.4	134.5		169.1	28.2	1.8	81.9	42.9	47.5	211.7	46.9	32.3
Level of Service	E	F		F	C	A	F	D	D	F	D	C
Approach Delay (s)		131.9			52.6			50.7			104.3	
Approach LOS		F			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	86.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	1189	0	0	1767	531	187	500	1171	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	1845	1918	0	0	1881	1845	1759	1881	1937			
Adj Flow Rate, veh/h	452	1383	0	0	1900	0	215	575	0			
Adj No. of Lanes	2	2	0	0	2	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	470	2760	0	0	2097	920	301	643	296			
Arrive On Green	0.14	0.76	0.00	0.00	0.59	0.00	0.18	0.18	0.00			
Sat Flow, veh/h	3408	3741	0	0	3668	1568	1675	3574	1647			
Grp Volume(v), veh/h	452	1383	0	0	1900	0	215	575	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1787	1568	1675	1787	1647			
Q Serve(g_s), s	20.1	22.6	0.0	0.0	71.5	0.0	18.4	24.0	0.0			
Cycle Q Clear(g_c), s	20.1	22.6	0.0	0.0	71.5	0.0	18.4	24.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	470	2760	0	0	2097	920	301	643	296			
V/C Ratio(X)	0.96	0.50	0.00	0.00	0.91	0.00	0.71	0.89	0.00			
Avail Cap(c_a), veh/h	470	2760	0	0	2097	920	385	821	378			
HCM Platoon Ratio	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	0.00	0.00	0.24	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	65.3	7.2	0.0	0.0	27.8	0.0	58.8	61.1	0.0			
Incr Delay (d2), s/veh	31.8	0.7	0.0	0.0	1.9	0.0	2.7	9.0	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			
%ile BackOfQ(50%),veh/ln	11.6	11.6	0.0	0.0	35.7	0.0	8.8	12.6	0.0			
LnGrp Delay(d),s/veh	97.1	7.9	0.0	0.0	29.7	0.0	61.6	70.1	0.0			
LnGrp LOS	F	A			C		E	E				
Approach Vol, veh/h		1835			1900			790				
Approach Delay, s/veh		29.9			29.7			67.8				
Approach LOS		C			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		120.4			26.0	94.4		32.0
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		115.4			21.0	* 89		35.0
Max Q Clear Time (g_c+I1), s		24.6			22.1	73.5		26.0
Green Ext Time (p_c), s		52.1			0.0	15.2		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	36.4
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	1859	306	412	1745	44	318	317	44	116	408	235
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		1.00	1.00		0.90	1.00		0.90
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	1865	1900	1900	1881	1900	1881	1881	1792	1827	1856	1976
Adj Flow Rate, veh/h	222	2112	348	468	1983	0	370	369	51	136	480	276
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	2
Cap, veh/h	258	2094	343	483	2250	707	348	995	381	156	543	310
Arrive On Green	0.08	0.38	0.38	0.14	0.44	0.00	0.10	0.28	0.28	0.09	0.26	0.26
Sat Flow, veh/h	3442	5578	914	3510	5136	1615	3476	3574	1368	1740	2077	1185
Grp Volume(v), veh/h	222	1821	639	468	1983	0	370	369	51	136	407	349
Grp Sat Flow(s),veh/h/ln	1721	1604	1679	1755	1712	1615	1738	1787	1368	1740	1763	1498
Q Serve(g_s), s	10.2	60.0	60.0	21.2	56.5	0.0	16.0	13.3	3.3	12.3	35.4	35.8
Cycle Q Clear(g_c), s	10.2	60.0	60.0	21.2	56.5	0.0	16.0	13.3	3.3	12.3	35.4	35.8
Prop In Lane	1.00		0.54	1.00		1.00	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	258	1807	630	483	2250	707	348	995	381	156	461	392
V/C Ratio(X)	0.86	1.01	1.01	0.97	0.88	0.00	1.06	0.37	0.13	0.87	0.88	0.89
Avail Cap(c_a), veh/h	258	1807	630	483	2250	707	348	995	381	185	463	394
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)	0.70	0.70	0.70	0.43	0.43	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	73.1	49.9	49.9	68.6	41.1	0.0	71.9	46.4	23.1	71.8	56.6	56.8
Incr Delay (d2), s/veh	18.0	19.6	33.7	19.5	2.4	0.0	66.0	0.1	0.1	27.1	20.1	23.9
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	5.5	29.7	33.6	11.6	27.1	0.0	10.8	6.6	1.6	7.1	19.9	17.4
LnGrp Delay(d),s/veh	91.1	69.5	83.6	88.0	43.6	0.0	137.9	46.5	23.2	99.0	76.7	80.7
LnGrp LOS	F	F	F	F	D		F	D	C	F	E	F
Approach Vol, veh/h		2682			2451			790			892	
Approach Delay, s/veh		74.6			52.0			87.8			81.7	
Approach LOS		E			D			F			F	

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	26.2	66.0	21.0	46.8	16.2	76.0	18.3	49.5
Change Period (Y+Rc), s	4.0	6.0	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	22.0	60.0	16.0	* 42	12.0	70.0	17.0	42.0
Max Q Clear Time (g_c+I1), s	23.2	62.0	18.0	37.8	12.2	58.5	14.3	15.3
Green Ext Time (p_c), s	0.0	0.0	0.0	2.9	0.0	11.1	0.0	2.5

Intersection Summary	
HCM 2010 Ctrl Delay	69.0
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	1664	218	233	2051	811	63	80	106	236	106	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.98		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6248		1745	5136	1552	1745	1673		1641	1705	1454
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6248		1745	5136	1552	1745	1673		1641	1705	1454
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	165	2005	263	277	2442	965	76	96	128	281	126	65
RTOR Reduction (vph)	0	14	0	0	0	189	0	33	0	0	0	55
Lane Group Flow (vph)	165	2254	0	277	2442	776	76	191	0	200	207	10
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	6.0	50.3		42.8	87.1	87.1	22.6	22.6		24.3	24.3	24.3
Effective Green, g (s)	6.0	50.3		42.8	87.1	87.1	22.6	22.6		24.3	24.3	24.3
Actuated g/C Ratio	0.04	0.31		0.27	0.54	0.54	0.14	0.14		0.15	0.15	0.15
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	120	1964		466	2795	844	246	236		249	258	220
v/s Ratio Prot	c0.05	c0.36		0.16	0.48		0.04	c0.11		c0.12	0.12	
v/s Ratio Perm						c0.50						0.01
v/c Ratio	1.38	1.15		0.59	0.87	0.92	0.31	0.81		0.80	0.80	0.04
Uniform Delay, d1	77.0	54.9		51.0	31.7	33.2	61.7	66.6		65.5	65.5	57.9
Progression Factor	0.50	0.26		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	185.2	68.6		1.4	4.2	16.7	0.3	17.1		16.0	15.4	0.0
Delay (s)	223.8	83.1		52.4	35.8	49.9	61.9	83.7		81.5	81.0	58.0
Level of Service	F	F		D	D	D	E	F		F	F	E
Approach Delay (s)		92.6			40.8			78.2			78.0	
Approach LOS		F			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	63.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	138.2	170.9	0.27	5.7	F
NB I-680 Off Ramp	III	35	17.6	9.1	26.7	0.14	18.5	C
Oak Rd	III	35	17.8	60.8	78.6	0.14	6.4	F
Jones Rd.	III	35	18.9	7.3	26.2	0.15	20.3	C
Total	III		87.0	215.4	302.4	0.70	8.3	F

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	38.3	69.3	0.26	13.4	E
Oak Rd.	III	35	18.9	20.4	39.3	0.15	13.5	E
Buskirk Ave	III	35	17.8	9.7	27.5	0.14	18.2	C
N. Main St.	III	35	17.6	30.2	47.8	0.14	10.3	E
Total	III		85.3	98.6	183.9	0.68	13.4	E

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	43	34	38
Total Delay (hr)	104	109	213
Stops / Veh	0.50	0.47	0.48
Stops (#)	4323	5387	9710
Average Speed (mph)	8	11	10
Total Travel Time (hr)	136	158	294
Distance Traveled (mi)	1126	1716	2841
Fuel Consumed (gal)	151	186	337
Fuel Economy (mpg)	7.4	9.2	8.4
CO Emissions (kg)	10.58	13.00	23.58
NOx Emissions (kg)	2.06	2.53	4.59
VOC Emissions (kg)	2.45	3.01	5.47
Unserved Vehicles (#)	186	200	386
Vehicles in dilemma zone (#)	178	175	353
Performance Index	115.6	124.2	239.8

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	43
Total Delay (hr)	312
Stops / Veh	0.52
Stops (#)	13653
Average Speed (mph)	9
Total Travel Time (hr)	429
Distance Traveled (mi)	4048
Fuel Consumed (gal)	483
Fuel Economy (mpg)	8.4
CO Emissions (kg)	33.76
NOx Emissions (kg)	6.57
VOC Emissions (kg)	7.83
Unserved Vehicles (#)	492
Vehicles in dilemma zone (#)	407
Performance Index	349.6

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

11/19/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	789	167	554	363	1095	70	136	356	585	890	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	11	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3342		3236	3388	1515	1736	3539	1730	3286	3421	1496
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3342		3236	3388	1515	1736	3539	1730	3286	3421	1496
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	51	999	211	577	378	1141	74	143	375	643	978	179
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	218	0	0	75
Lane Group Flow (vph)	51	1197	0	577	378	1141	74	143	157	643	978	104
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	7.1	42.0		20.8	55.7	140.0	8.7	32.2	32.2	23.0	50.5	50.5
Effective Green, g (s)	7.1	42.0		20.8	55.7	140.0	8.7	32.2	32.2	23.0	50.5	50.5
Actuated g/C Ratio	0.05	0.30		0.15	0.40	1.00	0.06	0.23	0.23	0.16	0.36	0.36
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	85	1002		480	1347	1515	107	813	397	539	1234	539
v/s Ratio Prot	0.03	c0.36		c0.18	0.11		0.04	0.04		c0.20	c0.29	
v/s Ratio Perm						0.75			0.09			0.07
v/c Ratio	0.60	1.20		1.20	0.28	0.75	0.69	0.18	0.40	1.19	0.79	0.19
Uniform Delay, d1	65.1	49.0		59.6	28.6	0.0	64.3	43.3	45.7	58.5	40.1	30.8
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	7.4	97.6		109.5	0.3	3.5	17.5	0.5	2.9	104.1	5.3	0.8
Delay (s)	72.4	146.6		169.1	28.9	3.5	81.9	43.7	48.6	162.6	45.3	31.6
Level of Service	E	F		F	C	A	F	D	D	F	D	C
Approach Delay (s)		143.6			53.7			51.6			85.8	
Approach LOS		F			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	83.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	1189	0	0	1767	531	187	500	1171	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	1845	1918	0	0	1881	1918	1759	1881	1937			
Adj Flow Rate, veh/h	452	1383	0	0	1900	0	215	575	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	503	2759	0	0	2994	951	302	643	296			
Arrive On Green	0.15	0.76	0.00	0.00	0.58	0.00	0.18	0.18	0.00			
Sat Flow, veh/h	3408	3741	0	0	5305	1631	1675	3574	1647			
Grp Volume(v), veh/h	452	1383	0	0	1900	0	215	575	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1712	1631	1675	1787	1647			
Q Serve(g_s), s	19.8	22.6	0.0	0.0	37.2	0.0	18.3	23.9	0.0			
Cycle Q Clear(g_c), s	19.8	22.6	0.0	0.0	37.2	0.0	18.3	23.9	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	503	2759	0	0	2994	951	302	643	296			
V/C Ratio(X)	0.90	0.50	0.00	0.00	0.63	0.00	0.71	0.89	0.00			
Avail Cap(c_a), veh/h	673	2759	0	0	2994	951	390	833	384			
HCM Platoon Ratio	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	0.00	0.00	0.26	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	63.6	7.2	0.0	0.0	21.0	0.0	58.6	60.9	0.0			
Incr Delay (d2), s/veh	10.2	0.7	0.0	0.0	0.3	0.0	2.5	8.6	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			
%ile BackOfQ(50%),veh/ln	10.1	11.6	0.0	0.0	17.7	0.0	8.7	12.6	0.0			
LnGrp Delay(d),s/veh	73.9	7.9	0.0	0.0	21.3	0.0	61.1	69.5	0.0			
LnGrp LOS	E	A			C		E	E				
Approach Vol, veh/h		1835			1900			790				
Approach Delay, s/veh		24.1			21.3			67.2				
Approach LOS		C			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		120.0			26.4	93.6		32.0
Change Period (Y+Rc), s		5.0			4.0	5.0		4.6
Max Green Setting (Gmax), s		115.0			30.0	81.0		35.4
Max Q Clear Time (g_c+I1), s		24.6			21.8	39.2		25.9
Green Ext Time (p_c), s		89.1			0.6	41.5		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	1859	306	412	1745	44	318	317	44	116	408	235
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		0.97	1.00		0.89	1.00		0.90
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	1865	1900	1900	1880	1900	1881	1881	1792	1827	1856	1976
Adj Flow Rate, veh/h	222	2112	348	468	1983	50	370	369	51	136	480	276
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	2	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	1	1	1	6	4	2	2
Cap, veh/h	237	2168	355	440	2353	59	370	946	360	156	514	293
Arrive On Green	0.07	0.39	0.39	0.13	0.46	0.46	0.11	0.26	0.26	0.09	0.25	0.25
Sat Flow, veh/h	3442	5578	914	3510	5144	130	3476	3574	1361	1740	2072	1182
Grp Volume(v), veh/h	222	1820	640	468	1318	715	370	369	51	136	408	348
Grp Sat Flow(s),veh/h/ln	1721	1604	1679	1755	1711	1852	1738	1787	1361	1740	1763	1490
Q Serve(g_s), s	10.2	59.3	60.0	20.0	54.2	54.4	17.0	13.5	3.4	12.3	36.1	36.6
Cycle Q Clear(g_c), s	10.2	59.3	60.0	20.0	54.2	54.4	17.0	13.5	3.4	12.3	36.1	36.6
Prop In Lane	1.00		0.54	1.00		0.07	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	237	1870	653	440	1565	847	370	946	360	156	437	369
V/C Ratio(X)	0.94	0.97	0.98	1.06	0.84	0.84	1.00	0.39	0.14	0.87	0.93	0.94
Avail Cap(c_a), veh/h	237	1870	653	440	1565	847	370	946	360	185	442	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)	0.70	0.70	0.70	0.41	0.41	0.41	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	73.9	48.0	48.2	69.8	38.2	38.2	71.3	48.1	24.3	71.7	58.7	58.9
Incr Delay (d2), s/veh	32.6	12.2	25.1	46.1	2.4	4.4	46.5	0.1	0.1	27.0	28.5	33.6
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	28.4	32.4	12.5	26.2	28.9	10.5	6.7	1.6	7.1	21.0	18.5
LnGrp Delay(d),s/veh	106.6	60.2	73.2	115.9	40.6	42.7	117.8	48.2	24.3	98.7	87.2	92.5
LnGrp LOS	F	E	E	F	D	D	F	D	C	F	F	F
Approach Vol, veh/h		2682			2501			790			892	
Approach Delay, s/veh		67.1			55.3			79.3			91.0	
Approach LOS		E			E			E			F	

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	26.4	68.0	21.0	44.6	15.0	79.4	18.3	47.2
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	20.0	* 62	17.0	40.0	11.0	73.0	17.0	40.0
Max Q Clear Time (g_c+I1), s	22.0	62.0	19.0	38.6	12.2	56.4	14.3	15.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.8	0.0	16.0	0.0	13.5

Intersection Summary	
HCM 2010 Ctrl Delay	67.3
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	1664	218	233	2051	811	63	80	106	236	106	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.98		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6248		1745	5136	1552	1745	1673		1641	1705	1454
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6248		1745	5136	1552	1745	1673		1641	1705	1454
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	165	2005	263	277	2442	965	76	96	128	281	126	65
RTOR Reduction (vph)	0	11	0	0	0	190	0	33	0	0	0	55
Lane Group Flow (vph)	165	2257	0	277	2442	775	76	191	0	200	207	10
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	7.0	77.1		16.0	86.1	86.1	22.6	22.6		24.3	24.3	24.3
Effective Green, g (s)	7.0	77.1		16.0	86.1	86.1	22.6	22.6		24.3	24.3	24.3
Actuated g/C Ratio	0.04	0.48		0.10	0.54	0.54	0.14	0.14		0.15	0.15	0.15
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	141	3010		174	2763	835	246	236		249	258	220
v/s Ratio Prot	0.05	0.36		c0.16	0.48		0.04	c0.11		c0.12	0.12	
v/s Ratio Perm						c0.50						0.01
v/c Ratio	1.17	0.75		1.59	0.88	0.93	0.31	0.81		0.80	0.80	0.04
Uniform Delay, d1	76.5	33.6		72.0	32.5	34.1	61.7	66.6		65.5	65.5	57.9
Progression Factor	0.75	0.16		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	101.8	0.7		291.8	4.6	17.9	0.3	17.1		16.0	15.4	0.0
Delay (s)	159.3	6.1		363.8	37.1	52.0	61.9	83.7		81.5	81.0	58.0
Level of Service	F	A		F	D	D	E	F		F	F	E
Approach Delay (s)		16.4			65.6			78.2			78.0	
Approach LOS		B			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	49.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	138.2	170.9	0.27	5.7	F
NB I-680 Off Ramp	III	35	17.6	9.1	26.7	0.14	18.5	C
Oak Rd	III	35	17.8	60.8	78.6	0.14	6.4	F
Jones Rd.	III	35	18.9	7.3	26.2	0.15	20.3	C
Total	III		87.0	215.4	302.4	0.70	8.3	F

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	38.3	69.3	0.26	13.4	E
Oak Rd.	III	35	18.9	20.4	39.3	0.15	13.5	E
Buskirk Ave	III	35	17.8	9.7	27.5	0.14	18.2	C
N. Main St.	III	35	17.6	30.2	47.8	0.14	10.3	E
Total	III		85.3	98.6	183.9	0.68	13.4	E

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	43	34	38
Total Delay (hr)	104	109	213
Stops / Veh	0.50	0.47	0.48
Stops (#)	4323	5387	9710
Average Speed (mph)	8	11	10
Total Travel Time (hr)	136	158	294
Distance Traveled (mi)	1126	1716	2841
Fuel Consumed (gal)	151	186	337
Fuel Economy (mpg)	7.4	9.2	8.4
CO Emissions (kg)	10.58	13.00	23.58
NOx Emissions (kg)	2.06	2.53	4.59
VOC Emissions (kg)	2.45	3.01	5.47
Unserved Vehicles (#)	186	200	386
Vehicles in dilemma zone (#)	178	175	353
Performance Index	115.6	124.2	239.8

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	43
Total Delay (hr)	312
Stops / Veh	0.52
Stops (#)	13653
Average Speed (mph)	9
Total Travel Time (hr)	429
Distance Traveled (mi)	4048
Fuel Consumed (gal)	483
Fuel Economy (mpg)	8.4
CO Emissions (kg)	33.76
NOx Emissions (kg)	6.57
VOC Emissions (kg)	7.83
Unserved Vehicles (#)	492
Vehicles in dilemma zone (#)	407
Performance Index	349.6

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

11/19/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	789	167	554	363	1095	70	136	356	585	890	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	11	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3342		3236	3388	1515	1736	3539	1730	3286	3421	1496
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3342		3236	3388	1515	1736	3539	1730	3286	3421	1496
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	51	999	211	577	378	1141	74	143	375	643	978	179
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	218	0	0	75
Lane Group Flow (vph)	51	1197	0	577	378	1141	74	143	157	643	978	104
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	7.1	42.0		20.8	55.7	140.0	8.7	32.2	32.2	23.0	50.5	50.5
Effective Green, g (s)	7.1	42.0		20.8	55.7	140.0	8.7	32.2	32.2	23.0	50.5	50.5
Actuated g/C Ratio	0.05	0.30		0.15	0.40	1.00	0.06	0.23	0.23	0.16	0.36	0.36
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	85	1002		480	1347	1515	107	813	397	539	1234	539
v/s Ratio Prot	0.03	c0.36		c0.18	0.11		0.04	0.04		c0.20	c0.29	
v/s Ratio Perm						0.75			0.09			0.07
v/c Ratio	0.60	1.20		1.20	0.28	0.75	0.69	0.18	0.40	1.19	0.79	0.19
Uniform Delay, d1	65.1	49.0		59.6	28.6	0.0	64.3	43.3	45.7	58.5	40.1	30.8
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	7.4	97.6		109.5	0.3	3.5	17.5	0.5	2.9	104.1	5.3	0.8
Delay (s)	72.4	146.6		169.1	28.9	3.5	81.9	43.7	48.6	162.6	45.3	31.6
Level of Service	E	F		F	C	A	F	D	D	F	D	C
Approach Delay (s)		143.6			53.7			51.6			85.8	
Approach LOS		F			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	83.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	1189	0	0	1767	531	187	500	1171	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	1845	1918	0	0	1881	1918	1759	1881	1937			
Adj Flow Rate, veh/h	452	1383	0	0	1900	0	215	575	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	503	2759	0	0	2994	951	302	643	296			
Arrive On Green	0.15	0.76	0.00	0.00	0.58	0.00	0.18	0.18	0.00			
Sat Flow, veh/h	3408	3741	0	0	5305	1631	1675	3574	1647			
Grp Volume(v), veh/h	452	1383	0	0	1900	0	215	575	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1712	1631	1675	1787	1647			
Q Serve(g_s), s	19.8	22.6	0.0	0.0	37.2	0.0	18.3	23.9	0.0			
Cycle Q Clear(g_c), s	19.8	22.6	0.0	0.0	37.2	0.0	18.3	23.9	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	503	2759	0	0	2994	951	302	643	296			
V/C Ratio(X)	0.90	0.50	0.00	0.00	0.63	0.00	0.71	0.89	0.00			
Avail Cap(c_a), veh/h	673	2759	0	0	2994	951	390	833	384			
HCM Platoon Ratio	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	0.00	0.00	0.26	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	63.6	7.2	0.0	0.0	21.0	0.0	58.6	60.9	0.0			
Incr Delay (d2), s/veh	10.2	0.7	0.0	0.0	0.3	0.0	2.5	8.6	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			
%ile BackOfQ(50%),veh/ln	10.1	11.6	0.0	0.0	17.7	0.0	8.7	12.6	0.0			
LnGrp Delay(d),s/veh	73.9	7.9	0.0	0.0	21.3	0.0	61.1	69.5	0.0			
LnGrp LOS	E	A			C		E	E				
Approach Vol, veh/h		1835			1900			790				
Approach Delay, s/veh		24.1			21.3			67.2				
Approach LOS		C			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		120.0			26.4	93.6		32.0
Change Period (Y+Rc), s		5.0			4.0	5.0		4.6
Max Green Setting (Gmax), s		115.0			30.0	81.0		35.4
Max Q Clear Time (g_c+I1), s		24.6			21.8	39.2		25.9
Green Ext Time (p_c), s		89.1			0.6	41.5		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	1859	306	412	1745	44	318	317	44	116	408	235
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		0.97	1.00		0.89	1.00		0.90
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	1865	1900	1900	1880	1900	1881	1881	1792	1827	1856	1976
Adj Flow Rate, veh/h	222	2112	348	468	1983	50	370	369	51	136	480	276
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	2	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	1	1	1	6	4	2	2
Cap, veh/h	237	2168	355	440	2353	59	370	946	360	156	514	293
Arrive On Green	0.07	0.39	0.39	0.13	0.46	0.46	0.11	0.26	0.26	0.09	0.25	0.25
Sat Flow, veh/h	3442	5578	914	3510	5144	130	3476	3574	1361	1740	2072	1182
Grp Volume(v), veh/h	222	1820	640	468	1318	715	370	369	51	136	408	348
Grp Sat Flow(s),veh/h/ln	1721	1604	1679	1755	1711	1852	1738	1787	1361	1740	1763	1490
Q Serve(g_s), s	10.2	59.3	60.0	20.0	54.2	54.4	17.0	13.5	3.4	12.3	36.1	36.6
Cycle Q Clear(g_c), s	10.2	59.3	60.0	20.0	54.2	54.4	17.0	13.5	3.4	12.3	36.1	36.6
Prop In Lane	1.00		0.54	1.00		0.07	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	237	1870	653	440	1565	847	370	946	360	156	437	369
V/C Ratio(X)	0.94	0.97	0.98	1.06	0.84	0.84	1.00	0.39	0.14	0.87	0.93	0.94
Avail Cap(c_a), veh/h	237	1870	653	440	1565	847	370	946	360	185	442	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)	0.70	0.70	0.70	0.41	0.41	0.41	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	73.9	48.0	48.2	69.8	38.2	38.2	71.3	48.1	24.3	71.7	58.7	58.9
Incr Delay (d2), s/veh	32.6	12.2	25.1	46.1	2.4	4.4	46.5	0.1	0.1	27.0	28.5	33.6
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	28.4	32.4	12.5	26.2	28.9	10.5	6.7	1.6	7.1	21.0	18.5
LnGrp Delay(d),s/veh	106.6	60.2	73.2	115.9	40.6	42.7	117.8	48.2	24.3	98.7	87.2	92.5
LnGrp LOS	F	E	E	F	D	D	F	D	C	F	F	F
Approach Vol, veh/h		2682			2501			790			892	
Approach Delay, s/veh		67.1			55.3			79.3			91.0	
Approach LOS		E			E			E			F	

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	26.4	68.0	21.0	44.6	15.0	79.4	18.3	47.2
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	20.0	* 62	17.0	40.0	11.0	73.0	17.0	40.0
Max Q Clear Time (g_c+I1), s	22.0	62.0	19.0	38.6	12.2	56.4	14.3	15.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.8	0.0	16.0	0.0	13.5

Intersection Summary	
HCM 2010 Ctrl Delay	67.3
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	1664	218	233	2051	811	63	80	106	236	106	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.98		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6248		1745	5136	1552	1745	1673		1641	1705	1454
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6248		1745	5136	1552	1745	1673		1641	1705	1454
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	165	2005	263	277	2442	965	76	96	128	281	126	65
RTOR Reduction (vph)	0	11	0	0	0	190	0	33	0	0	0	55
Lane Group Flow (vph)	165	2257	0	277	2442	775	76	191	0	200	207	10
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	7.0	77.1		16.0	86.1	86.1	22.6	22.6		24.3	24.3	24.3
Effective Green, g (s)	7.0	77.1		16.0	86.1	86.1	22.6	22.6		24.3	24.3	24.3
Actuated g/C Ratio	0.04	0.48		0.10	0.54	0.54	0.14	0.14		0.15	0.15	0.15
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	141	3010		174	2763	835	246	236		249	258	220
v/s Ratio Prot	0.05	0.36		c0.16	0.48		0.04	c0.11		c0.12	0.12	
v/s Ratio Perm						c0.50						0.01
v/c Ratio	1.17	0.75		1.59	0.88	0.93	0.31	0.81		0.80	0.80	0.04
Uniform Delay, d1	76.5	33.6		72.0	32.5	34.1	61.7	66.6		65.5	65.5	57.9
Progression Factor	0.75	0.16		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	101.8	0.7		291.8	4.6	17.9	0.3	17.1		16.0	15.4	0.0
Delay (s)	159.3	6.1		363.8	37.1	52.0	61.9	83.7		81.5	81.0	58.0
Level of Service	F	A		F	D	D	E	F		F	F	E
Approach Delay (s)		16.4			65.6			78.2			78.0	
Approach LOS		B			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	49.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Oak Rd/Oak Rd. & Treat Blvd

12/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	195	1859	306	412	1745	44	318	317	44	116	408	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	14	11	12	12	11	12	15
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	5.0	5.0	4.0	5.0	
Lane Util. Factor	0.97	0.86		0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94	1.00	1.00	0.89	1.00	0.99	
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	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	6263		3385	4964	1563	3351	3574	1353	1678	3311	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	6263		3385	4964	1563	3351	3574	1353	1678	3311	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Adj. Flow (vph)	222	2112	348	468	1983	50	370	369	51	136	480	276
RTOR Reduction (vph)	0	19	0	0	0	29	0	0	35	0	51	0
Lane Group Flow (vph)	222	2441	0	468	1983	21	370	369	16	136	705	0
Confl. Peds. (#/hr)	29		6	6		29	6		84	84		6
Confl. Bikes (#/hr)						1			2			
Heavy Vehicles (%)	2%	2%	1%	0%	1%	4%	1%	1%	6%	4%	2%	3%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	10.0	57.0		19.0	66.0	66.0	23.0	49.5	49.5	15.5	42.0	
Effective Green, g (s)	10.0	57.0		19.0	66.0	66.0	23.0	49.5	49.5	15.5	42.0	
Actuated g/C Ratio	0.06	0.36		0.12	0.41	0.41	0.14	0.31	0.31	0.10	0.26	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	3.0	6.0		2.0	6.0	6.0	2.0	2.0	2.0	2.0	6.0	
Lane Grp Cap (vph)	214	2231		401	2047	644	481	1105	418	162	869	
v/s Ratio Prot	0.06	c0.39		c0.14	0.40		c0.11	0.10		0.08	c0.21	
v/s Ratio Perm						0.01			0.01			
v/c Ratio	1.04	1.09		1.17	0.97	0.03	0.77	0.33	0.04	0.84	0.81	
Uniform Delay, d1	75.0	51.5		70.5	46.0	28.0	65.9	42.6	38.6	71.0	55.3	
Progression Factor	0.95	0.92		0.65	0.46	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	63.1	48.5		89.0	8.8	0.0	6.6	0.1	0.0	28.8	6.9	
Delay (s)	134.1	95.8		134.7	29.7	28.0	72.5	42.6	38.6	99.9	62.1	
Level of Service	F	F		F	C	C	E	D	D	F	E	
Approach Delay (s)		99.0			49.3			56.4			67.9	
Approach LOS		F			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	72.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM 2010 Signalized Intersection Summary
3: Oak Rd/Oak Rd. & Treat Blvd

12/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	1859	306	412	1745	44	318	317	44	116	408	235
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		1.00	1.00		0.90	1.00		0.90
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	1865	1900	1900	1881	1900	1881	1881	1792	1827	1856	1976
Adj Flow Rate, veh/h	222	2112	348	468	1983	0	370	369	51	136	480	276
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	2
Cap, veh/h	258	2094	343	483	2250	852	348	995	590	156	543	310
Arrive On Green	0.08	0.38	0.38	0.14	0.44	0.00	0.10	0.28	0.28	0.09	0.26	0.26
Sat Flow, veh/h	3442	5578	914	3510	5136	1615	3476	3574	1368	1740	2077	1185
Grp Volume(v), veh/h	222	1821	639	468	1983	0	370	369	51	136	407	349
Grp Sat Flow(s),veh/h/ln	1721	1604	1679	1755	1712	1615	1738	1787	1368	1740	1763	1498
Q Serve(g_s), s	10.2	60.0	60.0	21.2	56.5	0.0	16.0	13.3	0.7	12.3	35.4	35.8
Cycle Q Clear(g_c), s	10.2	60.0	60.0	21.2	56.5	0.0	16.0	13.3	0.7	12.3	35.4	35.8
Prop In Lane	1.00		0.54	1.00		1.00	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	258	1807	630	483	2250	852	348	995	590	156	461	392
V/C Ratio(X)	0.86	1.01	1.01	0.97	0.88	0.00	1.06	0.37	0.09	0.87	0.88	0.89
Avail Cap(c_a), veh/h	258	1807	630	483	2250	852	348	995	590	185	463	394
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)	0.70	0.70	0.70	0.43	0.43	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	73.1	49.9	49.9	68.6	41.1	0.0	71.9	46.4	15.2	71.8	56.6	56.8
Incr Delay (d2), s/veh	18.0	19.6	33.7	19.5	2.4	0.0	66.0	0.1	0.0	27.1	20.1	23.9
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	5.5	29.7	33.6	11.6	27.1	0.0	10.8	6.6	1.0	7.1	19.9	17.4
LnGrp Delay(d),s/veh	91.1	69.5	83.6	88.0	43.6	0.0	137.9	46.5	15.2	99.0	76.7	80.7
LnGrp LOS	F	F	F	F	D		F	D	B	F	E	F
Approach Vol, veh/h		2682			2451			790			892	
Approach Delay, s/veh		74.6			52.0			87.3			81.7	
Approach LOS		E			D			F			F	

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	26.2	66.0	21.0	46.8	16.2	76.0	18.3	49.5
Change Period (Y+Rc), s	4.0	6.0	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	22.0	60.0	16.0	* 42	12.0	70.0	17.0	42.0
Max Q Clear Time (g_c+I1), s	23.2	62.0	18.0	37.8	12.2	58.5	14.3	15.3
Green Ext Time (p_c), s	0.0	0.0	0.0	2.9	0.0	11.1	0.0	2.5

Intersection Summary	
HCM 2010 Ctrl Delay	68.9
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	1664	218	233	2051	811	63	80	106	236	106	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.98		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6250		1745	5136	1553	1745	1674		1641	1705	1456
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6250		1745	5136	1553	1745	1674		1641	1705	1456
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	165	2005	263	277	2442	965	76	96	128	281	126	65
RTOR Reduction (vph)	0	16	0	0	0	195	0	36	0	0	0	55
Lane Group Flow (vph)	165	2252	0	277	2442	770	76	188	0	200	207	10
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	6.0	43.3		42.3	79.6	79.6	21.2	21.2		23.2	23.2	23.2
Effective Green, g (s)	6.0	43.3		42.3	79.6	79.6	21.2	21.2		23.2	23.2	23.2
Actuated g/C Ratio	0.04	0.29		0.28	0.53	0.53	0.14	0.14		0.15	0.15	0.15
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	128	1804		492	2725	824	246	236		253	263	225
v/s Ratio Prot	0.05	c0.36		0.16	0.48		0.04	c0.11		c0.12	0.12	
v/s Ratio Perm						c0.50						0.01
v/c Ratio	1.29	1.25		0.56	0.90	0.93	0.31	0.80		0.79	0.79	0.04
Uniform Delay, d1	72.0	53.4		46.0	31.5	32.8	57.8	62.3		61.1	61.0	54.0
Progression Factor	0.49	0.27		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	144.6	113.1		0.9	5.1	19.0	0.3	15.8		14.4	13.3	0.0
Delay (s)	179.7	127.5		46.8	36.6	51.8	58.1	78.1		75.5	74.3	54.0
Level of Service	F	F		D	D	D	E	E		E	E	D
Approach Delay (s)		131.1			41.4			73.0			72.0	
Approach LOS		F			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	76.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	1189	0	0	1767	531	187	500	1171	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	1845	1918	0	0	1881	1845	1759	1881	1937			
Adj Flow Rate, veh/h	452	1383	0	0	1900	0	215	575	0			
Adj No. of Lanes	2	2	0	0	2	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	436	2732	0	0	2095	919	305	651	300			
Arrive On Green	0.13	0.75	0.00	0.00	0.59	0.00	0.18	0.18	0.00			
Sat Flow, veh/h	3408	3741	0	0	3668	1568	1675	3574	1647			
Grp Volume(v), veh/h	452	1383	0	0	1900	0	215	575	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1787	1568	1675	1787	1647			
Q Serve(g_s), s	18.0	21.5	0.0	0.0	66.1	0.0	16.9	22.0	0.0			
Cycle Q Clear(g_c), s	18.0	21.5	0.0	0.0	66.1	0.0	16.9	22.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	436	2732	0	0	2095	919	305	651	300			
V/C Ratio(X)	1.04	0.51	0.00	0.00	0.91	0.00	0.70	0.88	0.00			
Avail Cap(c_a), veh/h	436	2732	0	0	2095	919	417	890	410			
HCM Platoon Ratio	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	0.00	0.00	0.17	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	61.3	7.1	0.0	0.0	25.7	0.0	54.0	56.0	0.0			
Incr Delay (d2), s/veh	52.7	0.7	0.0	0.0	1.4	0.0	1.5	6.5	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			
%ile BackOfQ(50%),veh/ln	11.6	11.0	0.0	0.0	32.9	0.0	8.0	11.4	0.0			
LnGrp Delay(d),s/veh	114.0	7.8	0.0	0.0	27.1	0.0	55.5	62.6	0.0			
LnGrp LOS	F	A			C		E	E				
Approach Vol, veh/h		1835			1900			790				
Approach Delay, s/veh		33.9			27.1			60.6				
Approach LOS		C			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		110.4			23.0	87.4		30.2
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		105.4			18.0	* 82		35.0
Max Q Clear Time (g_c+I1), s		23.5			20.0	68.1		24.0
Green Ext Time (p_c), s		49.2			0.0	13.8		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	35.7
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	1859	306	412	1745	44	318	317	44	116	408	235
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		1.00	1.00		0.90	1.00		0.91
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	1865	1900	1900	1881	1900	1881	1881	1792	1827	1856	1976
Adj Flow Rate, veh/h	222	2112	348	468	1983	0	370	369	51	136	480	276
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	2
Cap, veh/h	230	2013	330	446	2163	680	349	1053	405	157	579	330
Arrive On Green	0.07	0.36	0.36	0.13	0.42	0.00	0.10	0.29	0.29	0.09	0.28	0.28
Sat Flow, veh/h	3442	5577	913	3510	5136	1615	3476	3574	1376	1740	2082	1188
Grp Volume(v), veh/h	222	1821	639	468	1983	0	370	369	51	136	406	350
Grp Sat Flow(s),veh/h/ln	1721	1604	1678	1755	1712	1615	1738	1787	1376	1740	1763	1507
Q Serve(g_s), s	9.6	54.0	54.0	19.0	54.5	0.0	15.0	12.1	3.0	11.5	32.3	32.7
Cycle Q Clear(g_c), s	9.6	54.0	54.0	19.0	54.5	0.0	15.0	12.1	3.0	11.5	32.3	32.7
Prop In Lane	1.00		0.54	1.00		1.00	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	230	1737	606	446	2163	680	349	1053	405	157	490	419
V/C Ratio(X)	0.96	1.05	1.06	1.05	0.92	0.00	1.06	0.35	0.13	0.86	0.83	0.84
Avail Cap(c_a), veh/h	230	1737	606	446	2163	680	349	1053	405	186	495	423
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)	0.70	0.70	0.70	0.39	0.39	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.6	47.8	47.8	65.3	40.8	0.0	67.3	41.5	20.9	67.1	50.6	50.8
Incr Delay (d2), s/veh	40.0	32.2	46.2	40.6	3.3	0.0	65.4	0.1	0.1	25.8	13.8	16.6
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	5.8	29.0	32.7	11.7	26.4	0.0	10.3	6.0	1.5	6.7	17.6	15.5
LnGrp Delay(d),s/veh	109.6	80.0	94.0	105.9	44.1	0.0	132.7	41.6	20.9	92.9	64.5	67.4
LnGrp LOS	F	F	F	F	D		F	D	C	F	E	E
Approach Vol, veh/h		2682			2451			790			892	
Approach Delay, s/veh		85.8			55.9			82.9			70.0	
Approach LOS		F			E			F			E	

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	23.4	60.0	20.0	46.6	14.4	69.0	17.5	49.0
Change Period (Y+Rc), s	4.0	6.0	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	19.0	54.0	15.0	* 42	10.0	63.0	16.0	42.0
Max Q Clear Time (g_c+I1), s	21.0	56.0	17.0	34.7	11.6	56.5	13.5	14.1
Green Ext Time (p_c), s	0.0	0.0	0.0	4.8	0.0	6.4	0.0	2.5

Intersection Summary	
HCM 2010 Ctrl Delay	72.6
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	85.7	118.4	0.27	8.3	F
NB I-680 Off Ramp	III	35	17.6	3.6	21.2	0.14	23.3	C
Oak Rd	III	35	17.8	44.6	62.4	0.14	8.0	F
Jones Rd.	III	35	18.9	164.8	183.7	0.15	2.9	F
Total	III		87.0	298.7	385.7	0.70	6.5	F

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	289.4	320.4	0.26	2.9	F
Oak Rd.	III	35	18.9	14.4	33.3	0.15	16.0	D
Buskirk Ave	III	35	17.8	9.2	27.0	0.14	18.6	C
N. Main St.	III	35	17.6	25.3	42.9	0.14	11.5	E
Total	III		85.3	338.3	423.6	0.68	5.8	F

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	63	79	72
Total Delay (hr)	146	254	400
Stops / Veh	0.55	0.39	0.46
Stops (#)	4607	4569	9176
Average Speed (mph)	6	5	6
Total Travel Time (hr)	176	300	477
Distance Traveled (mi)	1054	1636	2690
Fuel Consumed (gal)	182	283	465
Fuel Economy (mpg)	5.8	5.8	5.8
CO Emissions (kg)	12.73	19.76	32.49
NOx Emissions (kg)	2.48	3.84	6.32
VOC Emissions (kg)	2.95	4.58	7.53
Unserved Vehicles (#)	465	933	1398
Vehicles in dilemma zone (#)	240	134	374
Performance Index	159.2	266.4	425.5

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	69
Total Delay (hr)	518
Stops / Veh	0.51
Stops (#)	13740
Average Speed (mph)	6
Total Travel Time (hr)	635
Distance Traveled (mi)	4012
Fuel Consumed (gal)	633
Fuel Economy (mpg)	6.3
CO Emissions (kg)	44.23
NOx Emissions (kg)	8.61
VOC Emissions (kg)	10.25
Unserved Vehicles (#)	1574
Vehicles in dilemma zone (#)	431
Performance Index	555.9

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

12/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	614	223	589	501	1030	179	401	509	626	625	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	12	16	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98	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	1.00
Frt	1.00	0.96		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3276		3204	3574	1787	1805	3610	1762	3351	3490	1508
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3276		3204	3574	1787	1805	3610	1762	3351	3490	1508
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	86	653	237	693	589	1212	206	461	585	673	672	238
RTOR Reduction (vph)	0	27	0	0	0	0	0	0	271	0	0	111
Lane Group Flow (vph)	86	863	0	693	589	1212	206	461	314	673	672	127
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	10.6	36.0		26.0	51.4	140.0	20.0	33.0	33.0	23.0	40.0	40.0
Effective Green, g (s)	10.6	36.0		26.0	51.4	140.0	20.0	33.0	33.0	23.0	40.0	40.0
Actuated g/C Ratio	0.08	0.26		0.19	0.37	1.00	0.14	0.24	0.24	0.16	0.29	0.29
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	132	842		595	1312	1787	257	850	415	550	997	430
v/s Ratio Prot	0.05	c0.26		c0.22	0.16		0.11	0.13		c0.20	0.19	
v/s Ratio Perm						c0.68			c0.18			0.08
v/c Ratio	0.65	1.03		1.16	0.45	0.68	0.80	0.54	0.76	1.22	0.67	0.29
Uniform Delay, d1	62.9	52.0		57.0	33.6	0.0	58.1	46.9	49.8	58.5	44.2	39.0
Progression Factor	1.00	1.00		0.78	0.71	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.5	37.6		88.3	0.5	1.7	16.3	2.5	12.1	116.2	3.6	1.7
Delay (s)	71.4	89.6		132.7	24.5	1.7	74.4	49.4	61.8	174.7	47.9	40.7
Level of Service	E	F		F	C	A	E	D	E	F	D	D
Approach Delay (s)		88.0			43.5			59.3			100.7	
Approach LOS		F			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	67.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	523	1155	0	0	1924	657	201	260	847	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	1845	1956	0	0	1881	1956	1881	1881	1956			
Adj Flow Rate, veh/h	556	1229	0	0	2025	0	209	271	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	727	2909	0	0	2713	879	248	496	231			
Arrive On Green	0.21	0.78	0.00	0.00	0.70	0.00	0.14	0.14	0.00			
Sat Flow, veh/h	3408	3815	0	0	5305	1663	1792	3574	1663			
Grp Volume(v), veh/h	556	1229	0	0	2025	0	209	271	0			
Grp Sat Flow(s),veh/h/ln	1704	1859	0	0	1712	1663	1792	1787	1663			
Q Serve(g_s), s	18.7	13.1	0.0	0.0	30.1	0.0	13.9	8.6	0.0			
Cycle Q Clear(g_c), s	18.7	13.1	0.0	0.0	30.1	0.0	13.9	8.6	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	727	2909	0	0	2713	879	248	496	231			
V/C Ratio(X)	0.76	0.42	0.00	0.00	0.75	0.00	0.84	0.55	0.00			
Avail Cap(c_a), veh/h	727	2909	0	0	2713	879	514	1026	477			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.29	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	45.1	4.3	0.0	0.0	13.0	0.0	51.2	48.9	0.0			
Incr Delay (d2), s/veh	4.4	0.5	0.0	0.0	0.6	0.0	3.0	0.4	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			
%ile BackOfQ(50%),veh/ln	9.2	6.8	0.0	0.0	14.0	0.0	7.1	4.3	0.0			
LnGrp Delay(d),s/veh	49.5	4.8	0.0	0.0	13.6	0.0	54.2	49.3	0.0			
LnGrp LOS	D	A			B		D	D				
Approach Vol, veh/h		1785			2025			480				
Approach Delay, s/veh		18.7			13.6			51.4				
Approach LOS		B			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		118.5			49.1	69.4		21.5
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		95.4			26.0	* 64		35.0
Max Q Clear Time (g_c+I1), s		15.1			20.7	32.1		15.9
Green Ext Time (p_c), s		41.0			4.8	30.1		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	19.9
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	144	1657	201	292	1877	93	259	448	174	128	354	445
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		1.00	1.00		0.93	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	1883	1900	1881	1881	1976	1900	1863	1881	1845	1827	1937
Adj Flow Rate, veh/h	160	1841	223	301	1935	0	282	487	189	147	407	0
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	0	0	2	1	3	4	2
Cap, veh/h	184	2291	277	345	2316	758	295	894	377	172	897	426
Arrive On Green	0.04	0.26	0.26	0.10	0.45	0.00	0.08	0.25	0.25	0.10	0.26	0.00
Sat Flow, veh/h	3442	5877	712	3476	5136	1680	3510	3539	1492	1757	3471	1647
Grp Volume(v), veh/h	160	1522	542	301	1935	0	282	487	189	147	407	0
Grp Sat Flow(s),veh/h/ln	1721	1620	1730	1738	1712	1680	1755	1770	1492	1757	1736	1647
Q Serve(g_s), s	6.1	38.3	38.3	11.2	43.4	0.0	10.5	15.6	10.7	10.8	12.9	0.0
Cycle Q Clear(g_c), s	6.1	38.3	38.3	11.2	43.4	0.0	10.5	15.6	10.7	10.8	12.9	0.0
Prop In Lane	1.00		0.41	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	184	1894	674	345	2316	758	295	894	377	172	897	426
V/C Ratio(X)	0.87	0.80	0.80	0.87	0.84	0.00	0.96	0.54	0.50	0.86	0.45	0.00
Avail Cap(c_a), veh/h	184	1894	674	345	2316	758	295	1055	445	215	1141	541
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	0.09	0.09	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	62.6	43.6	43.6	58.1	31.6	0.0	59.7	42.4	23.8	58.1	40.7	0.0
Incr Delay (d2), s/veh	30.1	3.3	8.8	2.3	0.4	0.0	40.0	0.2	0.4	20.1	1.3	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	3.6	17.7	20.1	5.5	20.5	0.0	6.7	7.7	5.1	6.2	6.3	0.0
LnGrp Delay(d),s/veh	92.7	46.9	52.4	60.4	32.0	0.0	99.7	42.6	24.2	78.2	42.0	0.0
LnGrp LOS	F	D	D	E	C		F	D	C	E	D	
Approach Vol, veh/h		2224			2236			958			554	
Approach Delay, s/veh		51.6			35.8			55.8			51.6	
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	19.0	57.0	16.0	38.8	11.0	65.0	16.8	38.0
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	13.0	* 51	11.0	* 43	7.0	59.0	16.0	39.0
Max Q Clear Time (g_c+I1), s	13.2	40.3	12.5	14.9	8.1	45.4	12.8	17.6
Green Ext Time (p_c), s	0.0	10.3	0.0	6.6	0.0	13.0	0.1	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	46.3
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1774	135	210	2008	307	153	32	392	505	118	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00
Satd. Flow (prot)	3385	6369		1728	5136	1503	1745	1584		1641	1681	1460
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00
Satd. Flow (perm)	3385	6369		1728	5136	1503	1745	1584		1641	1681	1460
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	56	1993	152	228	2183	334	180	38	461	856	200	220
RTOR Reduction (vph)	0	8	0	0	0	117	0	80	0	0	0	116
Lane Group Flow (vph)	56	2137	0	228	2183	217	180	419	0	522	534	104
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	5.6	36.0		7.0	37.4	37.4	37.0	37.0		40.0	40.0	40.0
Effective Green, g (s)	5.6	36.0		7.0	37.4	37.4	37.0	37.0		40.0	40.0	40.0
Actuated g/C Ratio	0.04	0.26		0.05	0.27	0.27	0.26	0.26		0.29	0.29	0.29
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	135	1637		86	1372	401	461	418		468	480	417
v/s Ratio Prot	0.02	c0.34		c0.13	c0.43		0.10	c0.26		c0.32	0.32	
v/s Ratio Perm						0.14						0.07
v/c Ratio	0.41	1.31		2.65	1.59	0.54	0.39	1.00		1.12	1.11	0.25
Uniform Delay, d1	65.6	52.0		66.5	51.3	44.0	42.2	51.5		50.0	50.0	38.4
Progression Factor	0.59	0.49		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	139.9		775.2	269.5	5.2	0.2	44.5		77.0	75.5	0.1
Delay (s)	39.3	165.2		841.7	320.8	49.2	42.4	96.0		127.0	125.5	38.6
Level of Service	D	F		F	F	D	D	F		F	F	D
Approach Delay (s)		162.0			331.0			81.8			111.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	211.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	114.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	85.7	118.4	0.27	8.3	F
NB I-680 Off Ramp	III	35	17.6	6.5	24.1	0.14	20.5	C
Oak Rd	III	35	17.8	37.0	54.8	0.14	9.1	F
Jones Rd.	III	35	18.9	165.7	184.6	0.15	2.9	F
Total	III		87.0	294.9	381.9	0.70	6.6	F

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	289.4	320.4	0.26	2.9	F
Oak Rd.	III	35	18.9	13.2	32.1	0.15	16.6	D
Buskirk Ave	III	35	17.8	17.7	35.5	0.14	14.1	D
N. Main St.	III	35	17.6	38.9	56.5	0.14	8.7	F
Total	III		85.3	359.2	444.5	0.68	5.5	F

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	69	80	75
Total Delay (hr)	158	258	417
Stops / Veh	0.57	0.39	0.47
Stops (#)	4770	4554	9324
Average Speed (mph)	6	5	5
Total Travel Time (hr)	188	305	494
Distance Traveled (mi)	1054	1636	2690
Fuel Consumed (gal)	192	286	478
Fuel Economy (mpg)	5.5	5.7	5.6
CO Emissions (kg)	13.43	19.99	33.42
NOx Emissions (kg)	2.61	3.89	6.50
VOC Emissions (kg)	3.11	4.63	7.74
Unserved Vehicles (#)	554	933	1487
Vehicles in dilemma zone (#)	208	100	308
Performance Index	171.5	271.1	442.6

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	72
Total Delay (hr)	536
Stops / Veh	0.52
Stops (#)	13956
Average Speed (mph)	6
Total Travel Time (hr)	653
Distance Traveled (mi)	4012
Fuel Consumed (gal)	648
Fuel Economy (mpg)	6.2
CO Emissions (kg)	45.27
NOx Emissions (kg)	8.81
VOC Emissions (kg)	10.49
Unserved Vehicles (#)	1664
Vehicles in dilemma zone (#)	365
Performance Index	574.7

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

12/3/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	614	223	589	501	1030	179	401	509	626	625	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	16	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98	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	1.00
Frt	1.00	0.96		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3276		3204	3455	1787	1805	3610	1762	3351	3490	1508
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3276		3204	3455	1787	1805	3610	1762	3351	3490	1508
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	86	653	237	693	589	1212	206	461	585	673	672	238
RTOR Reduction (vph)	0	27	0	0	0	0	0	0	281	0	0	111
Lane Group Flow (vph)	86	863	0	693	589	1212	206	461	304	673	672	127
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	29.1	36.0		26.0	32.9	140.0	20.0	33.0	33.0	23.0	40.0	40.0
Effective Green, g (s)	29.1	36.0		26.0	32.9	140.0	20.0	33.0	33.0	23.0	40.0	40.0
Actuated g/C Ratio	0.21	0.26		0.19	0.23	1.00	0.14	0.24	0.24	0.16	0.29	0.29
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	362	842		595	811	1787	257	850	415	550	997	430
v/s Ratio Prot	0.05	c0.26		c0.22	0.17		0.11	0.13		c0.20	0.19	
v/s Ratio Perm						c0.68			0.17			0.08
v/c Ratio	0.24	1.03		1.16	0.73	0.68	0.80	0.54	0.73	1.22	0.67	0.29
Uniform Delay, d1	46.2	52.0		57.0	49.4	0.0	58.1	46.9	49.4	58.5	44.2	39.0
Progression Factor	1.00	1.00		0.65	0.73	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	37.6		84.4	2.5	1.2	16.3	2.5	10.9	116.2	3.6	1.7
Delay (s)	46.3	89.6		121.7	38.7	1.2	74.4	49.4	60.3	174.7	47.9	40.7
Level of Service	D	F		F	D	A	E	D	E	F	D	D
Approach Delay (s)		85.8			43.5			58.6			100.7	
Approach LOS		F			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	67.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	523	1155	0	0	1924	657	201	260	847	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	1845	1956	0	0	1881	1881	1881	1881	1956			
Adj Flow Rate, veh/h	556	1229	0	0	2025	0	209	271	0			
Adj No. of Lanes	2	2	0	0	2	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	503	2909	0	0	2123	950	248	496	231			
Arrive On Green	0.15	0.78	0.00	0.00	1.00	0.00	0.14	0.14	0.00			
Sat Flow, veh/h	3408	3815	0	0	3668	1599	1792	3574	1663			
Grp Volume(v), veh/h	556	1229	0	0	2025	0	209	271	0			
Grp Sat Flow(s),veh/h/ln	1704	1859	0	0	1787	1599	1792	1787	1663			
Q Serve(g_s), s	18.0	13.1	0.0	0.0	0.0	0.0	13.9	8.6	0.0			
Cycle Q Clear(g_c), s	18.0	13.1	0.0	0.0	0.0	0.0	13.9	8.6	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	503	2909	0	0	2123	950	248	496	231			
V/C Ratio(X)	1.10	0.42	0.00	0.00	0.95	0.00	0.84	0.55	0.00			
Avail Cap(c_a), veh/h	503	2909	0	0	2123	950	514	1026	477			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.25	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	52.0	4.3	0.0	0.0	0.0	0.0	51.2	48.9	0.0			
Incr Delay (d2), s/veh	71.9	0.5	0.0	0.0	3.7	0.0	3.0	0.4	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			
%ile BackOfQ(50%),veh/ln	13.4	6.8	0.0	0.0	1.1	0.0	7.1	4.3	0.0			
LnGrp Delay(d),s/veh	123.8	4.8	0.0	0.0	3.7	0.0	54.2	49.3	0.0			
LnGrp LOS	F	A			A		D	D				
Approach Vol, veh/h		1785			2025			480				
Approach Delay, s/veh		41.8			3.7			51.4				
Approach LOS		D			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		118.5			41.1	77.4		21.5
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		95.4			18.0	* 72		35.0
Max Q Clear Time (g_c+I1), s		15.1			20.0	2.0		15.9
Green Ext Time (p_c), s		41.0			0.0	63.5		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	24.9
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	144	1657	201	292	1877	93	259	448	174	128	354	445
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		1.00	1.00		0.94	1.00		0.96
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	1883	1900	1881	1881	1976	1900	1863	1881	1845	1847	1976
Adj Flow Rate, veh/h	160	1841	223	301	1935	0	282	487	189	147	407	511
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	0	0	2	1	3	4	4
Cap, veh/h	172	2140	259	323	2164	708	276	1048	445	170	539	460
Arrive On Green	0.10	0.73	0.73	0.09	0.42	0.00	0.08	0.30	0.30	0.10	0.31	0.31
Sat Flow, veh/h	3442	5876	712	3476	5136	1680	3510	3539	1505	1757	1754	1499
Grp Volume(v), veh/h	160	1522	542	301	1935	0	282	487	189	147	407	511
Grp Sat Flow(s),veh/h/ln	1721	1620	1729	1738	1712	1680	1755	1770	1505	1757	1754	1499
Q Serve(g_s), s	6.5	31.9	31.9	12.0	49.0	0.0	11.0	15.7	10.7	11.5	29.3	43.0
Cycle Q Clear(g_c), s	6.5	31.9	31.9	12.0	49.0	0.0	11.0	15.7	10.7	11.5	29.3	43.0
Prop In Lane	1.00		0.41	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	1770	630	323	2164	708	276	1048	445	170	539	460
V/C Ratio(X)	0.93	0.86	0.86	0.93	0.89	0.00	1.02	0.46	0.42	0.86	0.76	1.11
Avail Cap(c_a), veh/h	172	1770	630	323	2164	708	276	1048	445	201	539	460
HCM Platoon Ratio	2.00	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)	0.88	0.88	0.88	0.09	0.09	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.8	16.4	16.4	63.1	37.6	0.0	64.5	40.2	22.7	62.3	43.8	48.5
Incr Delay (d2), s/veh	45.0	5.1	12.9	5.2	0.6	0.0	60.1	0.1	0.2	24.5	8.6	75.3
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	4.1	14.7	17.0	6.0	23.2	0.0	7.6	7.7	5.1	6.8	15.4	27.4
LnGrp Delay(d),s/veh	107.7	21.5	29.3	68.3	38.2	0.0	124.6	40.3	22.9	86.8	52.3	123.8
LnGrp LOS	F	C	C	E	D		F	D	C	F	D	F
Approach Vol, veh/h		2224			2236			958			1065	
Approach Delay, s/veh		29.6			42.3			61.7			91.4	
Approach LOS		C			D			E			F	

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	19.0	57.0	16.0	48.0	11.0	65.0	17.5	46.5
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	13.0	* 51	11.0	* 43	7.0	59.0	16.0	39.0
Max Q Clear Time (g_c+I1), s	14.0	33.9	13.0	45.0	8.5	51.0	13.5	17.7
Green Ext Time (p_c), s	0.0	16.3	0.0	0.0	0.0	7.8	0.0	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	48.9
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1774	135	210	2008	307	153	32	392	505	118	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00
Satd. Flow (prot)	3385	6369		1728	5136	1503	1745	1584		1641	1681	1460
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00
Satd. Flow (perm)	3385	6369		1728	5136	1503	1745	1584		1641	1681	1460
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	56	1993	152	228	2183	334	180	38	461	856	200	220
RTOR Reduction (vph)	0	8	0	0	0	117	0	80	0	0	0	116
Lane Group Flow (vph)	56	2137	0	228	2183	217	180	419	0	522	534	104
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	5.6	36.0		7.0	37.4	37.4	37.0	37.0		40.0	40.0	40.0
Effective Green, g (s)	5.6	36.0		7.0	37.4	37.4	37.0	37.0		40.0	40.0	40.0
Actuated g/C Ratio	0.04	0.26		0.05	0.27	0.27	0.26	0.26		0.29	0.29	0.29
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	135	1637		86	1372	401	461	418		468	480	417
v/s Ratio Prot	0.02	c0.34		c0.13	c0.43		0.10	c0.26		c0.32	0.32	
v/s Ratio Perm						0.14						0.07
v/c Ratio	0.41	1.31		2.65	1.59	0.54	0.39	1.00		1.12	1.11	0.25
Uniform Delay, d1	65.6	52.0		66.5	51.3	44.0	42.2	51.5		50.0	50.0	38.4
Progression Factor	0.61	0.52		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	139.9		775.2	269.5	5.2	0.2	44.5		77.0	75.5	0.1
Delay (s)	40.5	166.8		841.7	320.8	49.2	42.4	96.0		127.0	125.5	38.6
Level of Service	D	F		F	F	D	D	F		F	F	D
Approach Delay (s)		163.6			331.0			81.8			111.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	212.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	114.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	72.1	104.8	0.27	9.4	F
NB I-680 Off Ramp	III	35	17.6	3.7	21.3	0.14	23.2	C
Oak Rd	III	35	17.8	42.1	59.9	0.14	8.4	F
Jones Rd.	III	35	18.9	165.2	184.1	0.15	2.9	F
Total	III		87.0	283.1	370.1	0.70	6.8	F

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	289.4	320.4	0.26	2.9	F
Oak Rd.	III	35	18.9	15.5	34.4	0.15	15.5	D
Buskirk Ave	III	35	17.8	10.7	28.5	0.14	17.6	D
N. Main St.	III	35	17.6	26.0	43.6	0.14	11.3	E
Total	III		85.3	341.6	426.9	0.68	5.8	F

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	62	84	75
Total Delay (hr)	142	272	414
Stops / Veh	0.55	0.43	0.48
Stops (#)	4582	4941	9523
Average Speed (mph)	6	5	5
Total Travel Time (hr)	172	319	491
Distance Traveled (mi)	1054	1636	2690
Fuel Consumed (gal)	179	299	478
Fuel Economy (mpg)	5.9	5.5	5.6
CO Emissions (kg)	12.50	20.91	33.41
NOx Emissions (kg)	2.43	4.07	6.50
VOC Emissions (kg)	2.90	4.85	7.74
Unserved Vehicles (#)	445	1012	1457
Vehicles in dilemma zone (#)	245	118	363
Performance Index	154.8	286.1	441.0

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	72
Total Delay (hr)	536
Stops / Veh	0.53
Stops (#)	14214
Average Speed (mph)	6
Total Travel Time (hr)	653
Distance Traveled (mi)	4012
Fuel Consumed (gal)	649
Fuel Economy (mpg)	6.2
CO Emissions (kg)	45.40
NOx Emissions (kg)	8.83
VOC Emissions (kg)	10.52
Unserved Vehicles (#)	1633
Vehicles in dilemma zone (#)	420
Performance Index	575.3

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

11/19/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	614	223	589	501	1030	179	401	509	626	625	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	11	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98	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	1.00
Frt	1.00	0.96		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3276		3204	3455	1525	1805	3610	1762	3351	3490	1508
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3276		3204	3455	1525	1805	3610	1762	3351	3490	1508
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	86	653	237	693	589	1212	206	461	585	673	672	238
RTOR Reduction (vph)	0	26	0	0	0	0	0	0	237	0	0	103
Lane Group Flow (vph)	86	864	0	693	589	1212	206	461	348	673	672	135
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	10.6	38.0		22.0	49.4	140.0	19.9	35.0	35.0	23.0	42.1	42.1
Effective Green, g (s)	10.6	38.0		22.0	49.4	140.0	19.9	35.0	35.0	23.0	42.1	42.1
Actuated g/C Ratio	0.08	0.27		0.16	0.35	1.00	0.14	0.25	0.25	0.16	0.30	0.30
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	132	889		503	1219	1525	256	902	440	550	1049	453
v/s Ratio Prot	0.05	c0.26		c0.22	0.17		0.11	0.13		c0.20	0.19	
v/s Ratio Perm						c0.79			0.20			0.09
v/c Ratio	0.65	0.97		1.38	0.48	0.79	0.80	0.51	0.79	1.22	0.64	0.30
Uniform Delay, d1	62.9	50.5		59.0	35.3	0.0	58.2	45.1	49.1	58.5	42.4	37.6
Progression Factor	1.00	1.00		0.78	0.69	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.5	23.8		179.5	0.7	3.4	16.6	2.1	13.5	116.2	3.0	1.7
Delay (s)	71.4	74.2		225.3	25.1	3.4	74.7	47.2	62.6	174.7	45.4	39.3
Level of Service	E	E		F	C	A	E	D	E	F	D	D
Approach Delay (s)		74.0			70.2			58.9			99.4	
Approach LOS		E			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	75.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	523	1155	0	0	1924	657	201	260	847	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	1845	1956	0	0	1881	1956	1881	1881	1956			
Adj Flow Rate, veh/h	556	1229	0	0	2025	0	209	271	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	727	2909	0	0	2713	879	248	496	231			
Arrive On Green	0.21	0.78	0.00	0.00	1.00	0.00	0.14	0.14	0.00			
Sat Flow, veh/h	3408	3815	0	0	5305	1663	1792	3574	1663			
Grp Volume(v), veh/h	556	1229	0	0	2025	0	209	271	0			
Grp Sat Flow(s),veh/h/ln	1704	1859	0	0	1712	1663	1792	1787	1663			
Q Serve(g_s), s	18.7	13.1	0.0	0.0	0.0	0.0	13.9	8.6	0.0			
Cycle Q Clear(g_c), s	18.7	13.1	0.0	0.0	0.0	0.0	13.9	8.6	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	727	2909	0	0	2713	879	248	496	231			
V/C Ratio(X)	0.76	0.42	0.00	0.00	0.75	0.00	0.84	0.55	0.00			
Avail Cap(c_a), veh/h	727	2909	0	0	2713	879	514	1026	477			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.21	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	45.1	4.3	0.0	0.0	0.0	0.0	51.2	48.9	0.0			
Incr Delay (d2), s/veh	4.4	0.5	0.0	0.0	0.4	0.0	3.0	0.4	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			
%ile BackOfQ(50%),veh/ln	9.2	6.8	0.0	0.0	0.1	0.0	7.1	4.3	0.0			
LnGrp Delay(d),s/veh	49.5	4.8	0.0	0.0	0.4	0.0	54.2	49.3	0.0			
LnGrp LOS	D	A			A		D	D				
Approach Vol, veh/h		1785			2025			480				
Approach Delay, s/veh		18.7			0.4			51.4				
Approach LOS		B			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		118.5			49.1	69.4		21.5
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		95.4			26.0	* 64		35.0
Max Q Clear Time (g_c+I1), s		15.1			20.7	2.0		15.9
Green Ext Time (p_c), s		41.0			4.8	54.9		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	13.7
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	144	1657	201	292	1877	93	259	448	174	128	354	445
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		0.98	1.00		0.94	1.00		0.95
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	1883	1900	1881	1882	1900	1900	1863	1881	1845	1847	1976
Adj Flow Rate, veh/h	160	1841	223	301	1935	96	282	487	189	147	407	511
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	1	0	2	1	3	4	4
Cap, veh/h	172	2225	269	323	2183	108	276	998	423	170	514	438
Arrive On Green	0.07	0.50	0.50	0.19	0.87	0.87	0.08	0.28	0.28	0.10	0.29	0.29
Sat Flow, veh/h	3442	5876	712	3476	5010	248	3510	3539	1501	1757	1754	1496
Grp Volume(v), veh/h	160	1522	542	301	1321	710	282	487	189	147	407	511
Grp Sat Flow(s),veh/h/ln	1721	1620	1729	1738	1713	1833	1755	1770	1501	1757	1754	1496
Q Serve(g_s), s	6.5	37.3	37.3	11.9	30.4	30.9	11.0	16.0	11.0	11.5	29.9	41.0
Cycle Q Clear(g_c), s	6.5	37.3	37.3	11.9	30.4	30.9	11.0	16.0	11.0	11.5	29.9	41.0
Prop In Lane	1.00		0.41	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	1839	655	323	1492	799	276	998	423	170	514	438
V/C Ratio(X)	0.93	0.83	0.83	0.93	0.89	0.89	1.02	0.49	0.45	0.87	0.79	1.17
Avail Cap(c_a), veh/h	172	1839	655	323	1492	799	276	998	423	188	514	438
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	0.09	0.09	0.09	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.1	30.9	30.9	56.6	7.0	7.1	64.5	41.9	23.9	62.3	45.6	49.5
Incr Delay (d2), s/veh	45.0	3.9	10.3	5.2	0.8	1.6	60.1	0.1	0.3	27.9	10.9	97.2
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	4.2	17.2	19.5	5.9	13.0	14.5	7.6	7.9	5.2	6.9	16.0	28.7
LnGrp Delay(d),s/veh	110.1	34.8	41.2	61.8	7.9	8.6	124.6	42.0	24.2	90.2	56.5	146.7
LnGrp LOS	F	C	D	E	A	A	F	D	C	F	E	F
Approach Vol, veh/h		2224			2332			958			1065	
Approach Delay, s/veh		41.8			15.1			62.8			104.4	
Approach LOS		D			B			E			F	

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	19.0	59.0	16.0	46.0	11.0	67.0	17.5	44.5
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	13.0	* 53	11.0	* 41	7.0	61.0	15.0	38.0
Max Q Clear Time (g_c+I1), s	13.9	39.3	13.0	43.0	8.5	32.9	13.5	18.0
Green Ext Time (p_c), s	0.0	13.1	0.0	0.0	0.0	26.4	0.0	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	45.5
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1774	135	210	2008	307	153	32	392	505	118	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00
Satd. Flow (prot)	3385	6369		1728	5136	1503	1745	1584		1641	1681	1460
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00
Satd. Flow (perm)	3385	6369		1728	5136	1503	1745	1584		1641	1681	1460
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	56	1993	152	228	2183	334	180	38	461	856	200	220
RTOR Reduction (vph)	0	8	0	0	0	117	0	80	0	0	0	116
Lane Group Flow (vph)	56	2137	0	228	2183	217	180	419	0	522	534	104
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	5.6	36.0		7.0	37.4	37.4	37.0	37.0		40.0	40.0	40.0
Effective Green, g (s)	5.6	36.0		7.0	37.4	37.4	37.0	37.0		40.0	40.0	40.0
Actuated g/C Ratio	0.04	0.26		0.05	0.27	0.27	0.26	0.26		0.29	0.29	0.29
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	135	1637		86	1372	401	461	418		468	480	417
v/s Ratio Prot	0.02	c0.34		c0.13	c0.43		0.10	c0.26		c0.32	0.32	
v/s Ratio Perm						0.14						0.07
v/c Ratio	0.41	1.31		2.65	1.59	0.54	0.39	1.00		1.12	1.11	0.25
Uniform Delay, d1	65.6	52.0		66.5	51.3	44.0	42.2	51.5		50.0	50.0	38.4
Progression Factor	0.59	0.49		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	140.1		775.2	269.5	5.2	0.2	44.5		77.0	75.5	0.1
Delay (s)	39.4	165.8		841.7	320.8	49.2	42.4	96.0		127.0	125.5	38.6
Level of Service	D	F		F	F	D	D	F		F	F	D
Approach Delay (s)		162.6			331.0			81.8			111.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	212.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	114.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Arterial Level of Service: EB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
N. Main St.	III	35	32.7	72.1	104.8	0.27	9.4	F
NB I-680 Off Ramp	III	35	17.6	3.7	21.3	0.14	23.2	C
Oak Rd	III	35	17.8	42.1	59.9	0.14	8.4	F
Jones Rd.	III	35	18.9	165.2	184.1	0.15	2.9	F
Total	III		87.0	283.1	370.1	0.70	6.8	F

Arterial Level of Service: WB Treat Blvd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Jones Rd.	III	35	31.0	289.4	320.4	0.26	2.9	F
Oak Rd.	III	35	18.9	15.5	34.4	0.15	15.5	D
Buskirk Ave	III	35	17.8	10.7	28.5	0.14	17.6	D
N. Main St.	III	35	17.6	26.0	43.6	0.14	11.3	E
Total	III		85.3	341.6	426.9	0.68	5.8	F

Treat Blvd

Direction	EB	WB	All
Total Delay / Veh (s/v)	62	84	75
Total Delay (hr)	142	272	414
Stops / Veh	0.55	0.43	0.48
Stops (#)	4582	4941	9523
Average Speed (mph)	6	5	5
Total Travel Time (hr)	172	319	491
Distance Traveled (mi)	1054	1636	2690
Fuel Consumed (gal)	179	299	478
Fuel Economy (mpg)	5.9	5.5	5.6
CO Emissions (kg)	12.50	20.91	33.41
NOx Emissions (kg)	2.43	4.07	6.50
VOC Emissions (kg)	2.90	4.85	7.74
Unserved Vehicles (#)	445	1012	1457
Vehicles in dilemma zone (#)	245	118	363
Performance Index	154.8	286.1	441.0

Network Totals

Number of Intersections	5
Total Delay / Veh (s/v)	72
Total Delay (hr)	536
Stops / Veh	0.53
Stops (#)	14214
Average Speed (mph)	6
Total Travel Time (hr)	653
Distance Traveled (mi)	4012
Fuel Consumed (gal)	649
Fuel Economy (mpg)	6.2
CO Emissions (kg)	45.40
NOx Emissions (kg)	8.83
VOC Emissions (kg)	10.52
Unserved Vehicles (#)	1633
Vehicles in dilemma zone (#)	420
Performance Index	575.3

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

11/19/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	614	223	589	501	1030	179	401	509	626	625	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	11	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98	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	1.00
Frt	1.00	0.96		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3276		3204	3455	1525	1805	3610	1762	3351	3490	1508
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3276		3204	3455	1525	1805	3610	1762	3351	3490	1508
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	86	653	237	693	589	1212	206	461	585	673	672	238
RTOR Reduction (vph)	0	26	0	0	0	0	0	0	237	0	0	103
Lane Group Flow (vph)	86	864	0	693	589	1212	206	461	348	673	672	135
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	10.6	38.0		22.0	49.4	140.0	19.9	35.0	35.0	23.0	42.1	42.1
Effective Green, g (s)	10.6	38.0		22.0	49.4	140.0	19.9	35.0	35.0	23.0	42.1	42.1
Actuated g/C Ratio	0.08	0.27		0.16	0.35	1.00	0.14	0.25	0.25	0.16	0.30	0.30
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	132	889		503	1219	1525	256	902	440	550	1049	453
v/s Ratio Prot	0.05	c0.26		c0.22	0.17		0.11	0.13		c0.20	0.19	
v/s Ratio Perm						c0.79			0.20			0.09
v/c Ratio	0.65	0.97		1.38	0.48	0.79	0.80	0.51	0.79	1.22	0.64	0.30
Uniform Delay, d1	62.9	50.5		59.0	35.3	0.0	58.2	45.1	49.1	58.5	42.4	37.6
Progression Factor	1.00	1.00		0.78	0.69	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.5	23.8		179.5	0.7	3.4	16.6	2.1	13.5	116.2	3.0	1.7
Delay (s)	71.4	74.2		225.3	25.1	3.4	74.7	47.2	62.6	174.7	45.4	39.3
Level of Service	E	E		F	C	A	E	D	E	F	D	D
Approach Delay (s)		74.0			70.2			58.9			99.4	
Approach LOS		E			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	75.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	523	1155	0	0	1924	657	201	260	847	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	1845	1956	0	0	1881	1956	1881	1881	1956			
Adj Flow Rate, veh/h	556	1229	0	0	2025	0	209	271	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	727	2909	0	0	2713	879	248	496	231			
Arrive On Green	0.21	0.78	0.00	0.00	1.00	0.00	0.14	0.14	0.00			
Sat Flow, veh/h	3408	3815	0	0	5305	1663	1792	3574	1663			
Grp Volume(v), veh/h	556	1229	0	0	2025	0	209	271	0			
Grp Sat Flow(s),veh/h/ln	1704	1859	0	0	1712	1663	1792	1787	1663			
Q Serve(g_s), s	18.7	13.1	0.0	0.0	0.0	0.0	13.9	8.6	0.0			
Cycle Q Clear(g_c), s	18.7	13.1	0.0	0.0	0.0	0.0	13.9	8.6	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	727	2909	0	0	2713	879	248	496	231			
V/C Ratio(X)	0.76	0.42	0.00	0.00	0.75	0.00	0.84	0.55	0.00			
Avail Cap(c_a), veh/h	727	2909	0	0	2713	879	514	1026	477			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.21	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	45.1	4.3	0.0	0.0	0.0	0.0	51.2	48.9	0.0			
Incr Delay (d2), s/veh	4.4	0.5	0.0	0.0	0.4	0.0	3.0	0.4	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			
%ile BackOfQ(50%),veh/ln	9.2	6.8	0.0	0.0	0.1	0.0	7.1	4.3	0.0			
LnGrp Delay(d),s/veh	49.5	4.8	0.0	0.0	0.4	0.0	54.2	49.3	0.0			
LnGrp LOS	D	A			A		D	D				
Approach Vol, veh/h		1785			2025			480				
Approach Delay, s/veh		18.7			0.4			51.4				
Approach LOS		B			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		118.5			49.1	69.4		21.5
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		95.4			26.0	* 64		35.0
Max Q Clear Time (g_c+I1), s		15.1			20.7	2.0		15.9
Green Ext Time (p_c), s		41.0			4.8	54.9		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	13.7
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	144	1657	201	292	1877	93	259	448	174	128	354	445
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		0.98	1.00		0.94	1.00		0.95
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	1883	1900	1881	1882	1900	1900	1863	1881	1845	1847	1976
Adj Flow Rate, veh/h	160	1841	223	301	1935	96	282	487	189	147	407	511
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	1	0	2	1	3	4	4
Cap, veh/h	172	2225	269	323	2183	108	276	998	423	170	514	438
Arrive On Green	0.07	0.50	0.50	0.19	0.87	0.87	0.08	0.28	0.28	0.10	0.29	0.29
Sat Flow, veh/h	3442	5876	712	3476	5010	248	3510	3539	1501	1757	1754	1496
Grp Volume(v), veh/h	160	1522	542	301	1321	710	282	487	189	147	407	511
Grp Sat Flow(s),veh/h/ln	1721	1620	1729	1738	1713	1833	1755	1770	1501	1757	1754	1496
Q Serve(g_s), s	6.5	37.3	37.3	11.9	30.4	30.9	11.0	16.0	11.0	11.5	29.9	41.0
Cycle Q Clear(g_c), s	6.5	37.3	37.3	11.9	30.4	30.9	11.0	16.0	11.0	11.5	29.9	41.0
Prop In Lane	1.00		0.41	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	1839	655	323	1492	799	276	998	423	170	514	438
V/C Ratio(X)	0.93	0.83	0.83	0.93	0.89	0.89	1.02	0.49	0.45	0.87	0.79	1.17
Avail Cap(c_a), veh/h	172	1839	655	323	1492	799	276	998	423	188	514	438
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	0.09	0.09	0.09	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.1	30.9	30.9	56.6	7.0	7.1	64.5	41.9	23.9	62.3	45.6	49.5
Incr Delay (d2), s/veh	45.0	3.9	10.3	5.2	0.8	1.6	60.1	0.1	0.3	27.9	10.9	97.2
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	4.2	17.2	19.5	5.9	13.0	14.5	7.6	7.9	5.2	6.9	16.0	28.7
LnGrp Delay(d),s/veh	110.1	34.8	41.2	61.8	7.9	8.6	124.6	42.0	24.2	90.2	56.5	146.7
LnGrp LOS	F	C	D	E	A	A	F	D	C	F	E	F
Approach Vol, veh/h		2224			2332			958			1065	
Approach Delay, s/veh		41.8			15.1			62.8			104.4	
Approach LOS		D			B			E			F	

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	19.0	59.0	16.0	46.0	11.0	67.0	17.5	44.5
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	13.0	* 53	11.0	* 41	7.0	61.0	15.0	38.0
Max Q Clear Time (g_c+I1), s	13.9	39.3	13.0	43.0	8.5	32.9	13.5	18.0
Green Ext Time (p_c), s	0.0	13.1	0.0	0.0	0.0	26.4	0.0	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	45.5
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1774	135	210	2008	307	153	32	392	505	118	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00
Satd. Flow (prot)	3385	6369		1728	5136	1503	1745	1584		1641	1681	1460
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00
Satd. Flow (perm)	3385	6369		1728	5136	1503	1745	1584		1641	1681	1460
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	56	1993	152	228	2183	334	180	38	461	856	200	220
RTOR Reduction (vph)	0	8	0	0	0	117	0	80	0	0	0	116
Lane Group Flow (vph)	56	2137	0	228	2183	217	180	419	0	522	534	104
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	5.6	36.0		7.0	37.4	37.4	37.0	37.0		40.0	40.0	40.0
Effective Green, g (s)	5.6	36.0		7.0	37.4	37.4	37.0	37.0		40.0	40.0	40.0
Actuated g/C Ratio	0.04	0.26		0.05	0.27	0.27	0.26	0.26		0.29	0.29	0.29
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	135	1637		86	1372	401	461	418		468	480	417
v/s Ratio Prot	0.02	c0.34		c0.13	c0.43		0.10	c0.26		c0.32	0.32	
v/s Ratio Perm						0.14						0.07
v/c Ratio	0.41	1.31		2.65	1.59	0.54	0.39	1.00		1.12	1.11	0.25
Uniform Delay, d1	65.6	52.0		66.5	51.3	44.0	42.2	51.5		50.0	50.0	38.4
Progression Factor	0.59	0.49		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	140.1		775.2	269.5	5.2	0.2	44.5		77.0	75.5	0.1
Delay (s)	39.4	165.8		841.7	320.8	49.2	42.4	96.0		127.0	125.5	38.6
Level of Service	D	F		F	F	D	D	F		F	F	D
Approach Delay (s)		162.6			331.0			81.8			111.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	212.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	114.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Appendix E – Focused Analysis for Concept 4

Introduction

With the goal of providing more livable communities, Contra Costa County Department of Conservation and Development has decided to complete the I-680/Treat Boulevard Bicycle and Pedestrian Plan. To finish the bicycle and pedestrian transportation network, Contra Costa County has targeted Treat Boulevard between Main Street and Jones Road to provide safe and convenient access from the Iron Horse Trail to businesses and restaurants on Main Street, focusing especially on the I-680 interchange. The Transportation for Livable Communities (TLC) program is the funding source for this project, which is managed by the Contra Costa Transportation Authority (CCTA).

This project includes the following intersections:

- Treat Boulevard/Geary Road and Main Street
- Treat Boulevard and Buskirk Avenue/I-680 northbound ramps
- Treat Boulevard and Oak Road
- Treat Boulevard and Jones Road/Iron Horse Trail

The field observations on this corridor indicate that there are high vehicle turning volumes that conflict with pedestrians, high weaving volumes that create a challenging environment for cyclists, and that the current infrastructure could be improved to better serve pedestrians and cyclists.

The performance of the four study intersections was evaluated for AM and PM peak periods for the current year (2014) traffic conditions and future year (2040) traffic conditions. Three initial study concept (Concept 1B, Concept 2, and Concept 3) geometric improvements as well as traffic signal timing improvements were evaluated to determine the performance of the network. Once the initial alternatives were evaluated by the stakeholders, a final concept (Concept 4) was developed.

This report presents a traffic impact evaluation for the Concept 4 pedestrian and bicycle related improvements to the transportation environment along Treat Boulevard. This final design is a modified version of Concept 3 and is split into Phase 1 and Phase 2. Phase 1 represents the near-term improvements while Phase 2 represents the long-term improvement options. Phase 2 includes the elimination of free right turns at Treat Boulevard/Oak Road, which is expected to eliminate the weaving behavior along Treat Boulevard between Oak Road and Buskirk Avenue in the westbound direction.

Current Year Analysis (2014)

For the current year (2014 volumes), overall network performance is not largely impacted as compared to the existing condition. Individual intersection level of service (LOS) was analyzed to assess the potential impacts of the concept alternatives. A queuing analysis was also included for traffic movements of concern and Table 1 presents the results of the analysis. As shown in Table 1, intersection delay is high in general under existing conditions. The Phase 1 improvements result in some delay increase at Main Street and Oak Road. LOS

generally remains the same, except at Oak Road, which deteriorates, and Jones Road during the morning peak period, which improves to a LOS C.

The queuing analysis shows little to no impact at Treat Boulevard/Main Street and Treat Boulevard/Oak Road. However, queuing is expected to increase for the westbound right turn at Treat Boulevard/I-680 ramps/Buskirk Avenue during the a.m. peak hour.

For the proposed alternatives the signal timings were optimized to benefit the overall performance of the Treat Boulevard corridor in the westbound and eastbound directions. Optimization of the corridor is expected to result in improved performance of the Treat Boulevard/Jones Road intersection but decreased efficiency of the Treat Boulevard/Oak Road intersection. It also results in lower expected queuing for the westbound right turn movement at Treat Boulevard/I-680 ramps/Buskirk Avenue during the p.m. peak hour.

Table 1: Intersection LOS Comparison for Current Year (2014)

Intersection	*Peak Hour*	*Existing*				*Phase 1 Improvements*			
		Control Delay (s)	*LOS*	*Movmt. of Interest*	*Queue Length (ft)*	*Control Delay (s)*	*LOS*	*Movmt. of Interest*	*Queue Length (ft)*
Treat Boulevard and Main Street*	A.M.	55.7	E	WBLT	356	60.1	E	WBLT	356
				WBRT	0			WBRT	0
	P.M.	42.9	D	WBLT	174	42.2	D	WBLT	151
				WBRT	890			WBRT	888
Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue	A.M.	30.3	C	WBRT	126	30.3	C	WBRT	418
				NBRT	0			NBRT	0
	P.M.	17.5	B	WBRT	169	17.4	B	WBRT	108
				NBRT	0			NBRT	0
Treat Boulevard and Oak Road	A.M.	46.8	D	SBRT	140	49.3	D	SBRT	134
				WBRT	0			WBRT	0
	P.M.	19.3	B	SBRT	382	34.1	C	SBRT	356
				WBRT	16			WBRT	0
Treat Boulevard and Jones Road*	A.M.	37.6	D	No movement of interest		29.9	C	No movement of interest	
	P.M.	49.8	D			37.9	D		

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.
Queue Length = 95th Percentile Queue Length

Future Year Analysis (2040)

Individual intersection delay and LOS were analyzed to assess the potential impacts of the concept alternatives for the future year (2040). A queuing analysis was also completed for movements of concern. Table 2, on the next page, presents the findings for Phase 1 and Phase 2. As shown, intersection delay is high in general for the future year.

Phase 2 eliminates the free right turns at Treat Boulevard/Oak Road. Three mitigation scenarios, with geometric and/or timing modifications, were analyzed for Phase 2.

Mitigation 1 consists of timing adjustments to the signal, overlapping the southbound right turn (SBRT) movement with the eastbound left turn (EBLT) movement to allow better traffic flow for the SBRT movement.

Mitigation 2 consists of geometric modification to the southbound approach, providing for one southbound left turn (SBLT) lane, one southbound through (SBTH) lane, and two SBRT lanes. This option requires the removal of the west crosswalk.

Mitigation 3 requires timing signal operation and geometric modifications, consisting of modification of the southbound approach to include one SBLT lane, two SBTH lanes, and one SBRT lane. The signal would also operate with a SBRT/EBLT overlap in this scenario.

In general, the removal of the free right turns (Phase 2) has a negative impact on delay and queuing at Oak Road during the morning and evening peak periods when compared to the Phase 1 improvements. Mitigation 1, with signal timing adjustments, results in a queue length increase for the SBRT movement during the a.m. peak hour and the SBTH movement during the a.m. (694ft) and p.m. (445ft) peak hours as compared to Phase 1. The 694ft queue during the morning corresponds to an average delay less than the cycle length, meaning that, on average, vehicles are able to travel through the intersection on the first green indication that they receive. As this is an average, some vehicles may have to wait for the second green they receive.

Mitigation 2, with geometric modifications to provide two SBRT lanes, the improvement is expected to result in queue length decrease for the SBRT movement during the a.m. and p.m. peak hours. However, the queuing for the SBTH is expected to increase during the a.m. and p.m. peak hours. As with Mitigation 1, the long SBTH queue during the morning corresponds to an average delay less than the cycle length. On average vehicles are able to travel through the intersection on the first green indication but some vehicles may have to wait for the second green. Compared to Mitigation 1, Mitigation 2 results in less queueing for the SBRT movement. The tradeoff for the geometric improvement for the queue length reduction is the need to eliminate the west leg crosswalk.

The geometric modification includes offsetting the curb and gutter at the north eastern corner of the intersection inwards and cutting back the median nose on the east leg to accommodate convenient southbound left-turn movements.

Mitigation 3, with geometric modifications and timing adjustments, is expected to result in queue length increase for the SBRT movement during the a.m. peak hour and a small increase in queue length for the SBTH movement for the p.m. peak hour. This scenario results in better intersection delay and queue lengths than Mitigation 1 and Mitigation 2.

For the future year alternatives the signal timings were optimized to benefit the overall performance of the Treat Boulevard corridor in the westbound and eastbound directions. This optimization results in higher delays for side street and left turn movements, as indicated by the high delay at Treat Boulevard/Jones Road during the p.m. peak hour. Although performance degrades slightly with the free right turn removal at Oak Road, the

high weaving volumes observed between Oak Road and the I-680 ramps are mitigated. Removing the inefficient and unsafe weaving behavior on this segment reduces the potential negative impact of the improvements at the corridor level.

Table 2: Intersection LOS Comparison for Future Year (2040)

Intersection	*Peak Hour*	*Phase 1 Improvements*				*Free RT Removal at Oak Road Mitigation 1, (Mitigation 2), and [Mitigation 3]*			
		Control Delay (s)	*LOS*	*Movmt. of Interest*	*Queue Length (ft)*	*Control Delay (s)*	*LOS*	*Movmt. of Interest*	*Queue Length (ft)*
Treat Boulevard and Main Street*	A.M.	83.3	F	WBLT	455	Not Applicable			
				WBRT	0				
	P.M.	75.9	E	WBLT	506				
				WBRT	562				
Treat Boulevard and I-680 Northbound Ramps/Buskirk Avenue	A.M.	30.5	C	WBRT	310				
				NBRT	0				
	P.M.	13.8	B	WBRT	135				
				NBRT	0				
Treat Boulevard and Oak Road	A.M.	61.3	E	SBRT	0	67.5 (67.6) [61.9]	E	SBRT	211 (113) [211]
				SBTH	273			SBTH	694 (694) [276]
				WBRT	25			WBRT	n/a
				WBTH	188			WB TH/RT	193 (193) [193]
	P.M.	30.9	C	SBRT	498	36.7 (29.3) [30.5]	D	SBRT	314 (188) [314]
				SBTH	198			SBTH	445 (445) [217]
				WBRT	0			WBRT	n/a
				WBTH	64			WB TH/RT	67 (67) [67]
Treat Boulevard and Jones Road*	A.M.	49.6	D	No movement of interest		Not Applicable			
	P.M.	212.1	F						

Notes: HCM 2010 analysis unless specified by *.
*HCM 2000 analysis due to HCM 2010 limitations.
Queue Length = 95th Percentile Queue Length

Mitigation 1 – Overlap signal operation for SBRT with EBLT
(Mitigation 2) – Reconfigure SB approach to have double SBRT, requires removal of west crosswalk
[Mitigation 3] - Reconfigure SB approach to have double SBTH and a SBRT with overlap operation

Conclusion

Implementation of Concept 4 is expected to result in some increased delay and queuing for motorists at specific intersections on Treat Boulevard. As expected, Phase 2 (the elimination of free right-turn movements at the Treat Boulevard/Oak Road intersection) for the future year is expected to result in increased delay and queuing than Phase 1. The three mitigation measures presented is expected to reduce the impact of the Phase 2 improvements. Specific signal timing and geometric modifications may result in optimal performance for pedestrians, cyclists, and automobiles simultaneously. Implementing the Phase 2 improvements is expected to achieve the goal of eliminating the potentially dangerous weaving along Treat Boulevard between Oak Road and Buskirk. When compared to the benefits for other transportation modes, the increased delay for motorists is relatively small.

Appendix A – Current Year Synchro Reports

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

7/30/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	646	149	514	290	792	56	103	328	532	885	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	12	16	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3332		3236	3505	1776	1736	3539	1729	3286	3421	1494
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3332		3236	3505	1776	1736	3539	1729	3286	3421	1494
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	34	818	189	535	302	825	59	108	345	585	973	142
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	243	0	0	71
Lane Group Flow (vph)	34	993	0	535	302	825	59	108	102	585	973	71
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	5.3	41.7		24.9	61.3	140.0	6.4	27.6	27.6	23.8	49.0	49.0
Effective Green, g (s)	5.3	41.7		24.9	61.3	140.0	6.4	27.6	27.6	23.8	49.0	49.0
Actuated g/C Ratio	0.04	0.30		0.18	0.44	1.00	0.05	0.20	0.20	0.17	0.35	0.35
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	63	992		575	1534	1776	79	697	340	558	1197	522
v/s Ratio Prot	0.02	c0.30		c0.17	0.09		0.03	0.03		c0.18	c0.28	
v/s Ratio Perm						0.46			0.06			0.05
v/c Ratio	0.54	1.00		0.93	0.20	0.46	0.75	0.15	0.30	1.05	0.81	0.14
Uniform Delay, d1	66.2	49.1		56.7	24.2	0.0	66.0	46.5	47.9	58.1	41.3	31.1
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	4.4	28.8		22.1	0.2	0.9	31.4	0.5	2.2	51.4	6.1	0.5
Delay (s)	70.5	78.0		78.8	24.4	0.9	97.4	47.0	50.2	109.5	47.4	31.6
Level of Service	E	E		E	C	A	F	D	D	F	D	C
Approach Delay (s)		77.7			30.2			55.0			67.5	
Approach LOS		E			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	55.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	975	0	0	1402	516	143	474	913	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	1845	1918	0	0	1881	1918	1759	1881	1937			
Adj Flow Rate, veh/h	452	1134	0	0	1508	0	164	545	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	503	2798	0	0	3049	968	287	613	282			
Arrive On Green	0.15	0.77	0.00	0.00	0.59	0.00	0.17	0.17	0.00			
Sat Flow, veh/h	3408	3741	0	0	5305	1631	1675	3574	1647			
Grp Volume(v), veh/h	452	1134	0	0	1508	0	164	545	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1712	1631	1675	1787	1647			
Q Serve(g_s), s	19.7	15.9	0.0	0.0	25.5	0.0	13.6	22.5	0.0			
Cycle Q Clear(g_c), s	19.7	15.9	0.0	0.0	25.5	0.0	13.6	22.5	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	503	2798	0	0	3049	968	287	613	282			
V/C Ratio(X)	0.90	0.41	0.00	0.00	0.49	0.00	0.57	0.89	0.00			
Avail Cap(c_a), veh/h	654	2798	0	0	3049	968	386	823	379			
HCM Platoon Ratio	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	0.00	0.00	0.64	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	63.3	5.9	0.0	0.0	17.7	0.0	57.5	61.2	0.0			
Incr Delay (d2), s/veh	11.1	0.4	0.0	0.0	0.4	0.0	0.7	7.7	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			
%ile BackOfQ(50%),veh/ln	10.1	8.0	0.0	0.0	12.1	0.0	6.3	11.8	0.0			
LnGrp Delay(d),s/veh	74.4	6.4	0.0	0.0	18.0	0.0	58.2	68.9	0.0			
LnGrp LOS	E	A			B		E	E				
Approach Vol, veh/h		1586			1508			709				
Approach Delay, s/veh		25.7			18.0			66.4				
Approach LOS		C			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		121.0			26.3	94.7		30.1
Change Period (Y+Rc), s		5.0			4.0	5.0		4.2
Max Green Setting (Gmax), s		116.0			29.0	83.0		34.8
Max Q Clear Time (g_c+I1), s		17.9			21.7	27.5		24.5
Green Ext Time (p_c), s		91.6			0.6	53.3		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	1446	269	430	1500	46	211	251	31	108	433	207
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		1.00	1.00		0.88	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	1866	1900	1900	1881	1900	1881	1881	1792	1827	1863	1918
Adj Flow Rate, veh/h	197	1643	306	489	1705	0	245	292	36	127	509	0
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	3
Cap, veh/h	244	2133	397	542	2437	766	294	867	327	148	861	397
Arrive On Green	0.07	0.39	0.39	0.15	0.47	0.00	0.08	0.24	0.24	0.09	0.24	0.00
Sat Flow, veh/h	3442	5456	1016	3510	5136	1615	3476	3574	1348	1740	3539	1631
Grp Volume(v), veh/h	197	1449	500	489	1705	0	245	292	36	127	509	0
Grp Sat Flow(s),veh/h/ln	1721	1604	1659	1755	1712	1615	1738	1787	1348	1740	1770	1631
Q Serve(g_s), s	8.4	39.3	39.3	20.5	39.1	0.0	10.4	10.1	3.1	10.8	19.0	0.0
Cycle Q Clear(g_c), s	8.4	39.3	39.3	20.5	39.1	0.0	10.4	10.1	3.1	10.8	19.0	0.0
Prop In Lane	1.00		0.61	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	244	1882	649	542	2437	766	294	867	327	148	861	397
V/C Ratio(X)	0.81	0.77	0.77	0.90	0.70	0.00	0.83	0.34	0.11	0.86	0.59	0.00
Avail Cap(c_a), veh/h	299	1882	649	680	2437	766	441	955	360	198	899	414
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)	0.84	0.84	0.84	0.56	0.56	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	68.5	39.7	39.7	62.2	30.9	0.0	67.5	46.8	44.1	67.5	50.0	0.0
Incr Delay (d2), s/veh	10.9	2.6	7.3	7.1	1.0	0.0	5.2	0.1	0.1	19.0	2.4	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	4.4	17.9	19.4	10.5	18.7	0.0	5.2	5.0	1.2	6.0	9.6	0.0
LnGrp Delay(d),s/veh	79.4	42.4	47.0	69.3	31.9	0.0	72.7	46.8	44.2	86.5	52.5	0.0
LnGrp LOS	E	D	D	E	C		E	D	D	F	D	
Approach Vol, veh/h		2146			2194			573			636	
Approach Delay, s/veh		46.8			40.2			57.7			59.3	
Approach LOS		D			D			E			E	

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	27.1	74.9	16.6	41.4	14.6	87.4	16.8	41.3
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	29.0	55.0	19.0	38.0	13.0	71.0	17.0	40.0
Max Q Clear Time (g_c+I1), s	22.5	41.3	12.4	21.0	10.4	41.1	12.8	12.1
Green Ext Time (p_c), s	0.6	13.7	0.3	7.5	0.2	29.8	0.1	9.7

Intersection Summary	
HCM 2010 Ctrl Delay	46.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	1380	141	240	1985	593	44	43	106	234	78	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.99		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6278		1745	5136	1544	1745	1638		1641	1693	1450
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6278		1745	5136	1544	1745	1638		1641	1693	1450
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	77	1663	170	286	2363	706	53	52	128	279	93	45
RTOR Reduction (vph)	0	8	0	0	0	135	0	64	0	0	0	39
Lane Group Flow (vph)	77	1825	0	286	2363	571	53	116	0	184	188	6
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	8.3	67.1		34.8	93.6	93.6	15.6	15.6		22.5	22.5	22.5
Effective Green, g (s)	8.3	67.1		34.8	93.6	93.6	15.6	15.6		22.5	22.5	22.5
Actuated g/C Ratio	0.05	0.42		0.22	0.58	0.58	0.10	0.10		0.14	0.14	0.14
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	167	2632		379	3004	903	170	159		230	238	203
v/s Ratio Prot	0.02	0.29		c0.16	c0.46		0.03	c0.07		c0.11	0.11	
v/s Ratio Perm						0.37						0.00
v/c Ratio	0.46	0.69		0.75	0.79	0.63	0.31	0.73		0.80	0.79	0.03
Uniform Delay, d1	73.7	38.0		58.6	25.5	21.9	67.2	70.1		66.6	66.5	59.3
Progression Factor	0.89	0.88		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	1.0		7.4	2.2	3.4	0.4	13.2		16.9	14.8	0.0
Delay (s)	66.1	34.5		66.0	27.7	25.2	67.6	83.3		83.4	81.2	59.4
Level of Service	E	C		E	C	C	E	F		F	F	E
Approach Delay (s)		35.8			30.4			79.8			79.8	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	34	1007	535	302	825	59	108	345	585	973	142
v/c Ratio	0.39	1.04	0.93	0.20	0.46	0.62	0.14	0.57	1.09	0.77	0.23
Control Delay	76.0	87.0	80.4	25.7	0.9	91.7	45.2	11.9	100.4	45.0	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.0	87.0	80.4	25.7	0.9	91.7	45.2	11.9	100.4	45.0	10.1
Queue Length 50th (ft)	31	~514	250	92	0	53	42	31	~208	422	20
Queue Length 95th (ft)	59	#512	#356	131	0	#116	70	127	#295	510	69
Internal Link Dist (ft)		1359		306			1086			1080	
Turn Bay Length (ft)	68		243			225		102	196		90
Base Capacity (vph)	179	968	577	1535	1776	99	758	608	539	1256	617
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	1.04	0.93	0.20	0.46	0.60	0.14	0.57	1.09	0.77	0.23

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	452	1134	1508	555	164	545	1049
v/c Ratio	0.85	0.40	0.51	0.61	0.56	0.84	0.65
Control Delay	81.0	7.4	10.4	11.5	66.6	75.3	2.0
Queue Delay	0.0	0.5	0.1	0.3	0.0	0.0	0.0
Total Delay	81.0	7.9	10.5	11.8	66.6	75.3	2.0
Queue Length 50th (ft)	239	195	111	95	158	292	0
Queue Length 95th (ft)	281	246	130	126	222	334	0
Internal Link Dist (ft)		258	655			1047	
Turn Bay Length (ft)	220				267		437
Base Capacity (vph)	616	2845	2976	910	351	777	1616
Starvation Cap Reductn	0	1132	424	68	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.66	0.59	0.66	0.47	0.70	0.65

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	197	1949	489	1705	52	245	292	36	127	509	244
v/c Ratio	0.72	0.82	0.88	0.74	0.07	0.74	0.34	0.09	0.80	0.60	0.46
Control Delay	89.3	44.0	88.0	13.1	0.5	84.1	51.2	0.5	104.3	57.6	20.6
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.3	44.0	88.0	13.3	0.5	84.1	51.2	0.5	104.3	57.6	20.6
Queue Length 50th (ft)	93	531	225	506	3	130	135	0	131	252	70
Queue Length 95th (ft)	140	586	287	62	m0	168	170	0	#203	295	140
Internal Link Dist (ft)		655		700			1075			548	
Turn Bay Length (ft)	164		235			264		202			125
Base Capacity (vph)	285	2389	613	2303	756	397	893	410	178	845	526
Starvation Cap Reductn	0	0	0	94	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.82	0.80	0.77	0.07	0.62	0.33	0.09	0.71	0.60	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	77	1833	286	2363	706	53	180	184	188	45
v/c Ratio	0.46	0.69	0.75	0.79	0.68	0.31	0.81	0.80	0.79	0.15
Control Delay	71.1	36.1	71.8	29.9	17.3	69.7	67.7	90.0	88.3	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.1	36.1	71.8	29.9	17.3	69.7	67.7	90.0	88.3	1.1
Queue Length 50th (ft)	43	233	284	670	268	53	115	198	203	0
Queue Length 95th (ft)	m55	345	352	847	459	87	172	257	261	0
Internal Link Dist (ft)		700		1282			449		751	
Turn Bay Length (ft)	341		175			295		228		
Base Capacity (vph)	178	2640	379	3005	1038	381	413	369	380	410
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.69	0.75	0.79	0.68	0.14	0.44	0.50	0.49	0.11

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

7/30/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	481	89	234	370	944	153	429	465	684	330	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	12	16	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	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	1.00
Frt	1.00	0.98		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3335		3204	3574	1787	1805	3610	1761	3351	3490	1505
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3335		3204	3574	1787	1805	3610	1761	3351	3490	1505
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	79	512	95	275	435	1111	176	493	534	735	355	243
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	244	0	0	130
Lane Group Flow (vph)	79	596	0	275	435	1111	176	493	290	735	355	113
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	10.7	33.1		18.2	40.6	140.0	18.6	27.9	27.9	38.8	52.1	52.1
Effective Green, g (s)	10.7	33.1		18.2	40.6	140.0	18.6	27.9	27.9	38.8	52.1	52.1
Actuated g/C Ratio	0.08	0.24		0.13	0.29	1.00	0.13	0.20	0.20	0.28	0.37	0.37
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	133	788		416	1036	1787	239	719	350	928	1298	560
v/s Ratio Prot	0.05	c0.18		0.09	0.12		0.10	0.14		c0.22	0.10	
v/s Ratio Perm						c0.62			c0.16			0.08
v/c Ratio	0.59	0.76		0.66	0.42	0.62	0.74	0.69	0.83	0.79	0.27	0.20
Uniform Delay, d1	62.5	49.7		58.0	40.2	0.0	58.3	52.0	53.7	46.9	30.7	29.8
Progression Factor	1.00	1.00		1.38	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	5.5		3.9	0.7	1.5	11.2	5.3	19.7	4.7	0.5	0.8
Delay (s)	67.2	55.1		83.7	38.9	1.5	69.5	57.2	73.5	51.5	31.2	30.6
Level of Service	E	E		F	D	A	E	E	E	D	C	C
Approach Delay (s)		56.5			22.8			66.2			42.3	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	42.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	508	1045	0	0	1414	632	160	274	854	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	1845	1956	0	0	1881	1956	1881	1881	1956			
Adj Flow Rate, veh/h	540	1112	0	0	1488	0	167	285	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	594	2998	0	0	3074	995	208	416	193			
Arrive On Green	0.17	0.81	0.00	0.00	1.00	0.00	0.12	0.12	0.00			
Sat Flow, veh/h	3408	3815	0	0	5305	1663	1792	3574	1663			
Grp Volume(v), veh/h	540	1112	0	0	1488	0	167	285	0			
Grp Sat Flow(s),veh/h/ln	1704	1859	0	0	1712	1663	1792	1787	1663			
Q Serve(g_s), s	18.5	9.8	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Cycle Q Clear(g_c), s	18.5	9.8	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	594	2998	0	0	3074	995	208	416	193			
V/C Ratio(X)	0.91	0.37	0.00	0.00	0.48	0.00	0.80	0.69	0.00			
Avail Cap(c_a), veh/h	630	2998	0	0	3074	995	524	1045	486			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.58	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	48.2	3.2	0.0	0.0	0.0	0.0	51.3	50.5	0.0			
Incr Delay (d2), s/veh	16.1	0.4	0.0	0.0	0.3	0.0	2.7	0.8	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			
%ile BackOfQ(50%),veh/ln	10.0	5.1	0.0	0.0	0.1	0.0	5.5	4.6	0.0			
LnGrp Delay(d),s/veh	64.3	3.5	0.0	0.0	0.3	0.0	54.0	51.3	0.0			
LnGrp LOS	E	A			A		D	D				
Approach Vol, veh/h		1652			1488			452				
Approach Delay, s/veh		23.4			0.3			52.3				
Approach LOS		C			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		122.0			24.7	97.2		18.0
Change Period (Y+Rc), s		5.0			4.0	5.0		4.2
Max Green Setting (Gmax), s		96.0			22.0	70.0		34.8
Max Q Clear Time (g_c+I1), s		11.8			20.5	2.0		12.8
Green Ext Time (p_c), s		78.8			0.2	64.4		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	17.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	1620	134	152	1394	70	239	425	163	120	226	413
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		1.00	1.00		0.93	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	1883	1900	1881	1881	1976	1900	1863	1881	1845	1827	1937
Adj Flow Rate, veh/h	161	1800	149	157	1437	0	260	462	177	138	260	0
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	0	0	2	1	3	4	2
Cap, veh/h	217	2622	217	213	2189	716	326	887	374	166	876	416
Arrive On Green	0.13	0.86	0.86	0.12	0.85	0.00	0.09	0.25	0.25	0.09	0.25	0.00
Sat Flow, veh/h	3442	6125	507	3476	5136	1680	3510	3539	1491	1757	3471	1647
Grp Volume(v), veh/h	161	1427	522	157	1437	0	260	462	177	138	260	0
Grp Sat Flow(s),veh/h/ln	1721	1619	1774	1738	1712	1680	1755	1770	1491	1757	1736	1647
Q Serve(g_s), s	5.2	11.8	11.8	5.0	10.8	0.0	8.3	12.9	11.6	8.9	7.0	0.0
Cycle Q Clear(g_c), s	5.2	11.8	11.8	5.0	10.8	0.0	8.3	12.9	11.6	8.9	7.0	0.0
Prop In Lane	1.00		0.29	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	217	2080	760	213	2189	716	326	887	374	166	876	416
V/C Ratio(X)	0.74	0.69	0.69	0.74	0.66	0.00	0.80	0.52	0.47	0.83	0.30	0.00
Avail Cap(c_a), veh/h	299	2080	760	302	2189	716	611	1108	467	397	1268	602
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.60	0.60	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.3	5.6	5.6	49.6	5.7	0.0	51.1	37.1	36.6	51.1	34.7	0.0
Incr Delay (d2), s/veh	5.6	1.7	4.5	1.6	0.9	0.0	1.7	0.2	0.3	4.0	0.7	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	2.6	5.2	6.3	2.4	4.8	0.0	4.1	6.3	4.8	4.5	3.4	0.0
LnGrp Delay(d),s/veh	54.9	7.3	10.1	51.2	6.6	0.0	52.8	37.3	37.0	55.2	35.4	0.0
LnGrp LOS	D	A	B	D	A		D	D	D	E	D	
Approach Vol, veh/h		2110			1594			899			398	
Approach Delay, s/veh		11.6			11.0			41.7			42.3	
Approach LOS		B			B			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	11.0	55.2	14.7	34.0	11.3	55.0	14.9	33.8
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	10.0	49.0	20.0	42.0	10.0	49.0	26.0	36.0
Max Q Clear Time (g_c+I1), s	7.0	13.8	10.3	9.0	7.2	12.8	10.9	14.9
Green Ext Time (p_c), s	0.1	35.0	0.3	6.7	0.1	36.0	0.1	5.9

Intersection Summary	
HCM 2010 Ctrl Delay	19.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1774	82	122	1476	269	112	28	369	299	46	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	3385	6407		1728	5136	1500	1745	1581		1641	1671	1457
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	3385	6407		1728	5136	1500	1745	1581		1641	1671	1457
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	53	1993	92	133	1604	292	132	33	434	507	78	105
RTOR Reduction (vph)	0	4	0	0	0	120	0	142	0	0	0	83
Lane Group Flow (vph)	53	2081	0	133	1604	172	132	325	0	289	296	22
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	5.7	45.7		13.6	53.6	53.6	31.4	31.4		29.3	29.3	29.3
Effective Green, g (s)	5.7	45.7		13.6	53.6	53.6	31.4	31.4		29.3	29.3	29.3
Actuated g/C Ratio	0.04	0.33		0.10	0.38	0.38	0.22	0.22		0.21	0.21	0.21
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	137	2091		167	1966	574	391	354		343	349	304
v/s Ratio Prot	0.02	c0.32		c0.08	0.31		0.08	c0.21		0.18	c0.18	
v/s Ratio Perm						0.11						0.02
v/c Ratio	0.39	1.00		0.80	0.82	0.30	0.34	0.92		0.84	0.85	0.07
Uniform Delay, d1	65.4	47.0		61.8	38.8	30.1	45.6	53.0		53.1	53.2	44.4
Progression Factor	1.47	0.58		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	15.3		21.2	3.9	1.3	0.2	27.4		16.3	16.5	0.0
Delay (s)	96.8	42.7		83.1	42.6	31.4	45.8	80.5		69.4	69.7	44.5
Level of Service	F	D		F	D	C	D	F		E	E	D
Approach Delay (s)		44.0			43.7			72.8			65.7	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	49.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	79	607	275	435	1111	176	493	534	735	355	243
v/c Ratio	0.59	0.76	0.66	0.42	0.62	0.74	0.68	0.90	0.79	0.27	0.35
Control Delay	79.8	54.8	86.5	38.9	7.0	75.9	57.4	41.9	36.2	34.1	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.8	54.8	86.5	38.9	7.0	75.9	57.4	41.9	36.2	34.1	9.4
Queue Length 50th (ft)	71	265	126	138	128	156	221	224	197	118	21
Queue Length 95th (ft)	124	317	174	114	890	222	273	#395	#409	190	102
Internal Link Dist (ft)		1359		309			1086			1080	
Turn Bay Length (ft)	68		243			225		102	196		90
Base Capacity (vph)	199	902	572	1178	1787	309	722	596	927	1300	690
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.67	0.48	0.37	0.62	0.57	0.68	0.90	0.79	0.27	0.35

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	540	1112	1488	665	167	285	890
v/c Ratio	0.76	0.36	0.51	0.68	0.75	0.61	0.54
Control Delay	56.2	6.2	13.3	12.0	77.9	62.7	1.3
Queue Delay	0.0	0.3	0.0	0.4	0.0	0.0	0.0
Total Delay	56.2	6.4	13.3	12.4	77.9	62.7	1.3
Queue Length 50th (ft)	261	166	158	133	149	131	0
Queue Length 95th (ft)	m270	m244	181	169	218	170	0
Internal Link Dist (ft)		255	655			1047	
Turn Bay Length (ft)	220				267		437
Base Capacity (vph)	710	3066	2911	981	428	888	1652
Starvation Cap Reductn	0	1144	0	61	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.58	0.51	0.72	0.39	0.32	0.54

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	161	1949	157	1437	72	260	462	177	138	260	475
v/c Ratio	0.64	0.77	0.68	0.74	0.10	0.71	0.45	0.32	0.73	0.26	0.78
Control Delay	71.8	40.4	91.4	29.3	5.1	71.4	42.3	6.6	80.5	38.1	38.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.8	40.4	91.4	29.3	5.1	71.4	42.3	6.6	80.5	38.1	38.9
Queue Length 50th (ft)	72	462	77	182	3	120	180	0	123	94	268
Queue Length 95th (ft)	107	540	m99	275	m16	163	236	57	181	127	382
Internal Link Dist (ft)		655		700			1075			548	
Turn Bay Length (ft)	164		235			264		202			125
Base Capacity (vph)	257	2524	243	1936	707	483	1021	557	314	1060	624
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.77	0.65	0.74	0.10	0.54	0.45	0.32	0.44	0.25	0.76

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	53	2085	133	1604	292	132	467	289	296	105
v/c Ratio	0.32	1.00	0.79	0.80	0.42	0.34	0.94	0.84	0.85	0.26
Control Delay	97.9	46.6	92.2	43.9	14.6	46.9	60.1	73.9	74.3	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	97.9	46.6	92.2	43.9	14.6	46.9	60.1	73.9	74.3	5.7
Queue Length 50th (ft)	26	~645	119	506	62	98	267	266	273	0
Queue Length 95th (ft)	m36	#756	#214	#693	162	150	#403	215	221	0
Internal Link Dist (ft)		700		1282			449		751	
Turn Bay Length (ft)	341		175			295		228		
Base Capacity (vph)	241	2093	186	1996	700	440	535	421	429	467
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	1.00	0.72	0.80	0.42	0.30	0.87	0.69	0.69	0.22

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

6/15/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	646	149	514	290	792	56	103	328	532	885	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	11	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3333		3236	3388	1515	1736	3539	1730	3286	3421	1496
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3333		3236	3388	1515	1736	3539	1730	3286	3421	1496
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	34	818	189	535	302	825	59	108	345	585	973	142
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	243	0	0	69
Lane Group Flow (vph)	34	993	0	535	302	825	59	108	102	585	973	73
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	5.3	38.7		24.9	58.3	140.0	6.4	30.6	30.6	23.8	52.0	52.0
Effective Green, g (s)	5.3	38.7		24.9	58.3	140.0	6.4	30.6	30.6	23.8	52.0	52.0
Actuated g/C Ratio	0.04	0.28		0.18	0.42	1.00	0.05	0.22	0.22	0.17	0.37	0.37
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	63	921		575	1410	1515	79	773	378	558	1270	555
v/s Ratio Prot	0.02	c0.30		c0.17	0.09		0.03	0.03		c0.18	c0.28	
v/s Ratio Perm						0.54			0.06			0.05
v/c Ratio	0.54	1.08		0.93	0.21	0.54	0.75	0.14	0.27	1.05	0.77	0.13
Uniform Delay, d1	66.2	50.6		56.7	26.2	0.0	66.0	44.1	45.4	58.1	38.7	29.1
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	4.4	53.1		22.1	0.2	1.4	31.4	0.4	1.7	51.4	4.5	0.5
Delay (s)	70.5	103.8		78.8	26.4	1.4	97.4	44.5	47.2	109.5	43.1	29.6
Level of Service	E	F		E	C	A	F	D	D	F	D	C
Approach Delay (s)		102.7			30.9			52.4			64.8	
Approach LOS		F			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	60.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	975	0	0	1402	516	143	474	913	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	1845	1918	0	0	1881	1918	1759	1881	1937			
Adj Flow Rate, veh/h	452	1134	0	0	1508	0	164	545	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	503	2787	0	0	3033	963	288	614	283			
Arrive On Green	0.15	0.76	0.00	0.00	0.59	0.00	0.17	0.17	0.00			
Sat Flow, veh/h	3408	3741	0	0	5305	1631	1675	3574	1647			
Grp Volume(v), veh/h	452	1134	0	0	1508	0	164	545	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1712	1631	1675	1787	1647			
Q Serve(g_s), s	19.7	16.0	0.0	0.0	25.7	0.0	13.6	22.5	0.0			
Cycle Q Clear(g_c), s	19.7	16.0	0.0	0.0	25.7	0.0	13.6	22.5	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	503	2787	0	0	3033	963	288	614	283			
V/C Ratio(X)	0.90	0.41	0.00	0.00	0.50	0.00	0.57	0.89	0.00			
Avail Cap(c_a), veh/h	655	2787	0	0	3033	963	389	829	382			
HCM Platoon Ratio	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	0.00	0.00	0.62	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	63.2	6.1	0.0	0.0	17.9	0.0	57.4	61.1	0.0			
Incr Delay (d2), s/veh	11.0	0.4	0.0	0.0	0.4	0.0	0.7	7.5	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			
%ile BackOfQ(50%),veh/ln	10.1	8.2	0.0	0.0	12.2	0.0	6.3	11.8	0.0			
LnGrp Delay(d),s/veh	74.3	6.5	0.0	0.0	18.3	0.0	58.0	68.6	0.0			
LnGrp LOS	E	A			B		E	E				
Approach Vol, veh/h		1586			1508			709				
Approach Delay, s/veh		25.8			18.3			66.1				
Approach LOS		C			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		120.4			26.3	94.1		30.5
Change Period (Y+Rc), s		5.0			4.0	5.0		4.6
Max Green Setting (Gmax), s		115.4			29.0	82.4		35.0
Max Q Clear Time (g_c+I1), s		18.0			21.7	27.7		24.5
Green Ext Time (p_c), s		90.9			0.6	52.6		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	1446	269	430	1500	46	211	251	31	108	433	207
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		1.00	1.00		0.89	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	1866	1900	1900	1881	1827	1881	1881	1792	1827	1863	1918
Adj Flow Rate, veh/h	197	1643	306	489	1705	0	245	292	36	127	509	0
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	3
Cap, veh/h	243	1929	359	588	2381	720	294	906	344	148	900	415
Arrive On Green	0.07	0.35	0.35	0.17	0.46	0.00	0.08	0.25	0.25	0.09	0.25	0.00
Sat Flow, veh/h	3442	5454	1016	3510	5136	1553	3476	3574	1355	1740	3539	1631
Grp Volume(v), veh/h	197	1450	499	489	1705	0	245	292	36	127	509	0
Grp Sat Flow(s),veh/h/ln	1721	1604	1656	1755	1712	1553	1738	1787	1355	1740	1770	1631
Q Serve(g_s), s	8.5	41.8	41.8	20.2	40.0	0.0	10.4	10.0	2.1	10.8	18.8	0.0
Cycle Q Clear(g_c), s	8.5	41.8	41.8	20.2	40.0	0.0	10.4	10.0	2.1	10.8	18.8	0.0
Prop In Lane	1.00		0.61	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	243	1702	586	588	2381	720	294	906	344	148	900	415
V/C Ratio(X)	0.81	0.85	0.85	0.83	0.72	0.00	0.83	0.32	0.10	0.86	0.57	0.00
Avail Cap(c_a), veh/h	299	1702	586	632	2381	720	441	1002	380	197	945	435
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)	0.84	0.84	0.84	0.55	0.55	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	68.6	44.8	44.8	60.4	32.3	0.0	67.6	45.5	19.7	67.6	48.7	0.0
Incr Delay (d2), s/veh	10.9	4.8	12.5	4.6	1.0	0.0	5.3	0.1	0.0	19.1	2.1	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	4.4	19.3	21.2	10.2	19.0	0.0	5.2	4.9	1.1	6.0	9.4	0.0
LnGrp Delay(d),s/veh	79.6	49.6	57.3	65.0	33.3	0.0	72.9	45.5	19.7	86.7	50.7	0.0
LnGrp LOS	E	D	E	E	C		E	D	B	F	D	
Approach Vol, veh/h		2146			2194			573			636	
Approach Delay, s/veh		54.1			40.4			55.6			57.9	
Approach LOS		D			D			E			E	

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	41.2	59.0	16.7	43.1	14.6	85.6	16.8	43.0
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	27.0	* 53	19.0	40.0	13.0	69.0	17.0	42.0
Max Q Clear Time (g_c+I1), s	22.2	43.8	12.4	20.8	10.5	42.0	12.8	12.0
Green Ext Time (p_c), s	2.9	8.9	0.3	8.1	0.1	24.2	0.1	10.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.3
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	1380	141	240	1985	593	44	43	106	234	78	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.99		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6280		1745	5136	1552	1745	1639		1641	1693	1454
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6280		1745	5136	1552	1745	1639		1641	1693	1454
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	77	1663	170	286	2363	706	53	52	128	279	93	45
RTOR Reduction (vph)	0	8	0	0	0	128	0	65	0	0	0	39
Lane Group Flow (vph)	77	1825	0	286	2363	578	53	115	0	184	188	6
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	8.3	66.7		34.8	93.2	93.2	15.9	15.9		22.6	22.6	22.6
Effective Green, g (s)	8.3	66.7		34.8	93.2	93.2	15.9	15.9		22.6	22.6	22.6
Actuated g/C Ratio	0.05	0.42		0.22	0.58	0.58	0.10	0.10		0.14	0.14	0.14
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	167	2617		379	2991	904	173	162		231	239	205
v/s Ratio Prot	0.02	0.29		c0.16	c0.46		0.03	c0.07		c0.11	0.11	
v/s Ratio Perm						0.37						0.00
v/c Ratio	0.46	0.70		0.75	0.79	0.64	0.31	0.71		0.80	0.79	0.03
Uniform Delay, d1	73.7	38.4		58.6	25.8	22.2	66.9	69.8		66.5	66.4	59.3
Progression Factor	1.20	0.20		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.9		7.4	2.2	3.5	0.4	11.5		16.1	14.5	0.0
Delay (s)	88.7	8.4		66.0	28.0	25.7	67.3	81.4		82.6	80.8	59.3
Level of Service	F	A		E	C	C	E	F		F	F	E
Approach Delay (s)		11.6			30.8			78.2			79.3	
Approach LOS		B			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: N. Main St. & Treat Blvd

6/15/2015

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	34	1007	535	302	825	59	108	345	585	973	142
v/c Ratio	0.39	1.12	0.93	0.21	0.54	0.62	0.13	0.53	1.09	0.73	0.22
Control Delay	76.0	115.3	80.4	27.8	1.4	91.7	42.7	10.2	99.2	41.2	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.0	115.3	80.4	27.8	1.4	91.7	42.7	10.2	99.2	41.2	9.4
Queue Length 50th (ft)	31	~551	250	96	0	53	41	24	~177	407	19
Queue Length 95th (ft)	59	#548	#356	137	0	#116	68	114	#295	492	67
Internal Link Dist (ft)		1359		306			1086			1080	
Turn Bay Length (ft)	68		243			225		102	196		90
Base Capacity (vph)	179	897	577	1411	1515	99	834	645	539	1329	648
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	1.12	0.93	0.21	0.54	0.60	0.13	0.53	1.09	0.73	0.22

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
2: NB I-680 Off Ramp/Buskirk Ave & Treat Blvd

6/15/2015

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	452	1134	1508	555	164	545	1049
v/c Ratio	0.85	0.40	0.53	0.63	0.56	0.84	0.65
Control Delay	81.0	7.5	5.1	7.2	66.5	75.2	2.0
Queue Delay	0.0	0.5	0.2	0.8	0.0	0.0	0.0
Total Delay	81.0	8.0	5.3	8.0	66.5	75.2	2.0
Queue Length 50th (ft)	239	197	43	26	158	292	0
Queue Length 95th (ft)	281	250	187	418	222	333	0
Internal Link Dist (ft)		258	655			1047	
Turn Bay Length (ft)	220			330	267		437
Base Capacity (vph)	616	2834	2862	882	353	781	1616
Starvation Cap Reductn	0	1125	509	114	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.66	0.64	0.72	0.46	0.70	0.65

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	197	1949	489	1705	52	245	292	36	127	509	244
v/c Ratio	0.71	0.88	0.80	0.76	0.08	0.74	0.32	0.08	0.80	0.57	0.45
Control Delay	100.7	49.6	45.1	13.6	0.8	84.1	49.5	0.4	104.3	55.5	19.3
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	100.7	49.6	45.1	13.8	0.8	84.1	49.5	0.4	104.3	55.5	19.3
Queue Length 50th (ft)	109	551	260	557	5	130	133	0	131	247	67
Queue Length 95th (ft)	151	592	296	56	m0	168	166	0	#203	290	134
Internal Link Dist (ft)		655		700			1075			548	
Turn Bay Length (ft)	164		235		600	264		202			125
Base Capacity (vph)	287	2211	613	2241	676	397	938	439	178	887	547
Starvation Cap Reductn	0	0	0	77	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	6	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.88	0.80	0.79	0.08	0.62	0.31	0.08	0.71	0.57	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	77	1833	286	2363	706	53	180	184	188	45
v/c Ratio	0.46	0.70	0.75	0.79	0.68	0.31	0.79	0.80	0.79	0.15
Control Delay	93.0	10.1	71.8	30.1	18.2	69.5	65.2	89.4	87.9	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.0	10.1	71.8	30.1	18.2	69.5	65.2	89.4	87.9	1.1
Queue Length 50th (ft)	43	66	284	670	283	53	113	198	203	0
Queue Length 95th (ft)	m52	425	352	850	481	87	171	256	261	0
Internal Link Dist (ft)		700		1282			449		751	
Turn Bay Length (ft)	341		175			295		228		
Base Capacity (vph)	178	2625	379	2992	1031	403	434	410	423	445
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.70	0.75	0.79	0.68	0.13	0.41	0.45	0.44	0.10

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: N. Main St. & Treat Blvd

6/15/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	481	89	234	370	944	153	429	465	684	330	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	11	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	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	1.00
Frt	1.00	0.98		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3336		3204	3455	1525	1805	3610	1762	3351	3490	1508
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3336		3204	3455	1525	1805	3610	1762	3351	3490	1508
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	79	512	95	275	435	1111	176	493	534	735	355	243
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	199	0	0	134
Lane Group Flow (vph)	79	596	0	275	435	1111	176	493	335	735	355	109
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	10.7	32.8		17.6	39.7	140.0	18.6	35.0	35.0	32.6	53.0	53.0
Effective Green, g (s)	10.7	32.8		17.6	39.7	140.0	18.6	35.0	35.0	32.6	53.0	53.0
Actuated g/C Ratio	0.08	0.23		0.13	0.28	1.00	0.13	0.25	0.25	0.23	0.38	0.38
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	133	781		402	979	1525	239	902	440	780	1321	570
v/s Ratio Prot	0.05	0.18		0.09	0.13		0.10	0.14		c0.22	0.10	
v/s Ratio Perm						c0.73			0.19			0.07
v/c Ratio	0.59	0.76		0.68	0.44	0.73	0.74	0.55	0.76	0.94	0.27	0.19
Uniform Delay, d1	62.5	50.0		58.5	41.1	0.0	58.3	45.6	48.6	52.8	30.1	29.2
Progression Factor	1.00	1.00		1.18	0.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	5.7		4.8	0.8	2.8	11.2	2.4	11.8	19.5	0.5	0.7
Delay (s)	67.2	55.7		74.0	25.4	2.8	69.5	48.0	60.4	72.2	30.6	29.9
Level of Service	E	E		E	C	A	E	D	E	E	C	C
Approach Delay (s)		57.0			19.0			56.7			53.4	
Approach LOS		E			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	508	1045	0	0	1414	632	160	274	854	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	1845	1956	0	0	1881	1956	1881	1881	1956			
Adj Flow Rate, veh/h	540	1112	0	0	1488	0	167	285	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	602	2984	0	0	2999	971	209	416	194			
Arrive On Green	0.18	0.80	0.00	0.00	1.00	0.00	0.12	0.12	0.00			
Sat Flow, veh/h	3408	3815	0	0	5305	1663	1792	3574	1663			
Grp Volume(v), veh/h	540	1112	0	0	1488	0	167	285	0			
Grp Sat Flow(s),veh/h/ln	1704	1859	0	0	1712	1663	1792	1787	1663			
Q Serve(g_s), s	18.4	10.0	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Cycle Q Clear(g_c), s	18.4	10.0	0.0	0.0	0.0	0.0	10.8	9.1	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	602	2984	0	0	2999	971	209	416	194			
V/C Ratio(X)	0.90	0.37	0.00	0.00	0.50	0.00	0.80	0.68	0.00			
Avail Cap(c_a), veh/h	602	2984	0	0	2999	971	528	1053	490			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.57	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	47.9	3.3	0.0	0.0	0.0	0.0	51.2	50.4	0.0			
Incr Delay (d2), s/veh	15.7	0.4	0.0	0.0	0.3	0.0	2.7	0.7	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			
%ile BackOfQ(50%),veh/ln	10.0	5.2	0.0	0.0	0.1	0.0	5.5	4.6	0.0			
LnGrp Delay(d),s/veh	63.6	3.7	0.0	0.0	0.3	0.0	53.8	51.2	0.0			
LnGrp LOS	E	A			A		D	D				
Approach Vol, veh/h		1652			1488			452				
Approach Delay, s/veh		23.2			0.3			52.1				
Approach LOS		C			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		121.6			47.2	74.4		18.4
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		95.4			21.0	* 69		35.0
Max Q Clear Time (g_c+I1), s		12.0			20.4	2.0		12.8
Green Ext Time (p_c), s		35.1			0.5	43.8		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	17.4
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	1620	134	152	1394	70	239	425	163	120	226	413
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		1.00	1.00		0.93	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	1883	1900	1881	1881	1900	1900	1863	1881	1845	1827	1937
Adj Flow Rate, veh/h	161	1800	149	157	1437	0	260	462	177	138	260	0
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	0	0	2	1	3	4	2
Cap, veh/h	219	2476	205	216	2157	678	325	915	386	166	903	429
Arrive On Green	0.08	0.54	0.54	0.04	0.28	0.00	0.09	0.26	0.26	0.09	0.26	0.00
Sat Flow, veh/h	3442	6124	507	3476	5136	1615	3510	3539	1494	1757	3471	1647
Grp Volume(v), veh/h	161	1428	521	157	1437	0	260	462	177	138	260	0
Grp Sat Flow(s),veh/h/ln	1721	1619	1774	1738	1712	1615	1755	1770	1494	1757	1736	1647
Q Serve(g_s), s	5.3	25.9	25.9	5.2	28.8	0.0	8.4	12.9	9.1	9.0	7.0	0.0
Cycle Q Clear(g_c), s	5.3	25.9	25.9	5.2	28.8	0.0	8.4	12.9	9.1	9.0	7.0	0.0
Prop In Lane	1.00		0.29	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	219	1964	717	216	2157	678	325	915	386	166	903	429
V/C Ratio(X)	0.74	0.73	0.73	0.73	0.67	0.00	0.80	0.51	0.46	0.83	0.29	0.00
Avail Cap(c_a), veh/h	296	1964	717	239	2157	678	604	1157	488	393	1314	623
HCM Platoon Ratio	1.33	1.33	1.33	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.64	0.64	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	52.3	22.0	22.0	54.7	34.6	0.0	51.7	36.8	22.6	51.7	34.4	0.0
Incr Delay (d2), s/veh	5.6	2.2	5.7	5.0	1.1	0.0	1.7	0.2	0.3	4.1	0.6	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	2.7	11.8	13.7	2.7	13.9	0.0	4.2	6.4	4.2	4.6	3.4	0.0
LnGrp Delay(d),s/veh	57.9	24.1	27.7	59.8	35.6	0.0	53.4	36.9	22.9	55.8	35.0	0.0
LnGrp LOS	E	C	C	E	D		D	D	C	E	D	
Approach Vol, veh/h		2110			1594			899			398	
Approach Delay, s/veh		27.6			38.0			38.9			42.2	
Approach LOS		C			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	13.2	53.0	14.8	35.3	11.4	54.8	15.0	35.0
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	8.0	* 47	20.0	44.0	10.0	47.0	26.0	38.0
Max Q Clear Time (g_c+I1), s	7.2	27.9	10.4	9.0	7.3	30.8	11.0	14.9
Green Ext Time (p_c), s	0.1	17.8	0.3	6.7	0.1	13.9	0.1	6.1

Intersection Summary	
HCM 2010 Ctrl Delay	34.1
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1774	82	122	1476	269	112	28	369	299	46	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	3385	6408		1728	5136	1508	1745	1582		1641	1671	1460
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	3385	6408		1728	5136	1508	1745	1582		1641	1671	1460
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	53	1993	92	133	1604	292	132	33	434	507	78	105
RTOR Reduction (vph)	0	4	0	0	0	110	0	218	0	0	0	82
Lane Group Flow (vph)	53	2081	0	133	1604	182	132	249	0	289	296	23
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	8.0	50.3		14.2	56.5	56.5	25.2	25.2		30.3	30.3	30.3
Effective Green, g (s)	8.0	50.3		14.2	56.5	56.5	25.2	25.2		30.3	30.3	30.3
Actuated g/C Ratio	0.06	0.36		0.10	0.40	0.40	0.18	0.18		0.22	0.22	0.22
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	193	2302		175	2072	608	314	284		355	361	315
v/s Ratio Prot	0.02	c0.32		0.08	c0.31		0.08	c0.16		0.18	c0.18	
v/s Ratio Perm						0.12						0.02
v/c Ratio	0.27	0.90		0.76	0.77	0.30	0.42	0.88		0.81	0.82	0.07
Uniform Delay, d1	63.2	42.6		61.2	36.2	28.3	50.9	55.9		52.2	52.3	43.7
Progression Factor	0.50	0.31		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	4.5		15.9	2.9	1.3	0.3	24.0		12.7	12.9	0.0
Delay (s)	31.9	17.7		77.1	39.1	29.6	51.3	79.9		64.9	65.1	43.7
Level of Service	C	B		E	D	C	D	E		E	E	D
Approach Delay (s)		18.1			40.2			73.6			61.8	
Approach LOS		B			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	37.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: N. Main St. & Treat Blvd

6/15/2015

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	79	607	275	435	1111	176	493	534	735	355	243
v/c Ratio	0.59	0.77	0.68	0.44	0.73	0.74	0.55	0.84	0.94	0.27	0.35
Control Delay	79.8	55.3	77.4	25.7	11.1	75.9	48.3	37.2	53.4	33.1	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.8	55.3	77.4	25.7	11.1	75.9	48.3	37.2	53.4	33.1	8.2
Queue Length 50th (ft)	71	265	125	117	421	156	206	250	197	118	16
Queue Length 95th (ft)	124	321	151	140	888	222	255	377	#436	182	90
Internal Link Dist (ft)		1359		309			1086			1080	
Turn Bay Length (ft)	68		243			225		102	196		90
Base Capacity (vph)	199	916	457	1046	1525	309	902	639	779	1321	704
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.66	0.60	0.42	0.73	0.57	0.55	0.84	0.94	0.27	0.35

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	540	1112	1488	665	167	285	890
v/c Ratio	1.01	0.36	0.49	0.65	0.75	0.61	0.54
Control Delay	81.1	3.1	6.8	6.2	77.9	62.7	1.3
Queue Delay	0.0	0.2	0.0	0.6	0.0	0.0	0.0
Total Delay	81.1	3.3	6.8	6.8	77.9	62.7	1.3
Queue Length 50th (ft)	~250	98	92	58	149	131	0
Queue Length 95th (ft)	m#336	m133	130	108	218	170	0
Internal Link Dist (ft)		255	655			1047	
Turn Bay Length (ft)	220			330	267		437
Base Capacity (vph)	534	3055	3056	1026	431	893	1652
Starvation Cap Reductn	0	956	0	107	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.53	0.49	0.72	0.39	0.32	0.54

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	161	1949	157	1437	72	260	462	177	138	260	475
v/c Ratio	0.64	0.80	0.66	0.77	0.11	0.71	0.43	0.31	0.73	0.24	0.74
Control Delay	75.3	37.4	38.1	17.4	0.4	71.4	40.8	6.3	80.5	36.8	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.3	37.4	38.1	17.4	0.4	71.4	40.8	6.3	80.5	36.8	34.0
Queue Length 50th (ft)	77	385	73	61	0	120	182	0	123	95	253
Queue Length 95th (ft)	117	418	m78	170	m0	163	231	55	181	124	356
Internal Link Dist (ft)		655		700			1075			548	
Turn Bay Length (ft)	164		235		600	264		202			125
Base Capacity (vph)	259	2428	239	1870	631	483	1066	575	314	1107	657
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.80	0.66	0.77	0.11	0.54	0.43	0.31	0.44	0.23	0.72

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	53	2085	133	1604	292	132	467	289	296	105
v/c Ratio	0.24	0.91	0.76	0.76	0.40	0.42	0.93	0.82	0.82	0.25
Control Delay	32.7	24.7	86.7	41.2	16.1	52.5	48.8	69.7	70.0	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	24.7	86.7	41.2	16.1	52.5	48.8	69.7	70.0	3.6
Queue Length 50th (ft)	23	516	119	475	65	107	198	266	272	0
Queue Length 95th (ft)	m28	#832	#214	#788	187	147	276	206	211	0
Internal Link Dist (ft)		700		1282			449		751	
Turn Bay Length (ft)	341		175			295		228		
Base Capacity (vph)	241	2303	194	2102	723	461	614	468	477	517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.91	0.69	0.76	0.40	0.29	0.76	0.62	0.62	0.20

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Appendix B – Future Year Synchro Reports

HCM Signalized Intersection Capacity Analysis Phase 1
1: N. Main St. & Treat Blvd

6/15/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	789	167	554	363	1095	70	136	356	585	890	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	11	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	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	0.98
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	0.97		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1678	3342		3236	3388	1515	1736	3539	1730	3286	3421	1496
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1678	3342		3236	3388	1515	1736	3539	1730	3286	3421	1496
Peak-hour factor, PHF	0.79	0.79	0.79	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	51	999	211	577	378	1141	74	143	375	643	978	179
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	218	0	0	75
Lane Group Flow (vph)	51	1197	0	577	378	1141	74	143	157	643	978	104
Confl. Peds. (#/hr)	27		5	5		27	8		4	4		8
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	1%	3%	1%	3%	1%	4%	2%	4%	3%	2%	2%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	7.1	42.0		20.8	55.7	140.0	8.7	32.2	32.2	23.0	50.5	50.5
Effective Green, g (s)	7.1	42.0		20.8	55.7	140.0	8.7	32.2	32.2	23.0	50.5	50.5
Actuated g/C Ratio	0.05	0.30		0.15	0.40	1.00	0.06	0.23	0.23	0.16	0.36	0.36
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	85	1002		480	1347	1515	107	813	397	539	1234	539
v/s Ratio Prot	0.03	c0.36		c0.18	0.11		0.04	0.04		c0.20	c0.29	
v/s Ratio Perm						0.75			0.09			0.07
v/c Ratio	0.60	1.20		1.20	0.28	0.75	0.69	0.18	0.40	1.19	0.79	0.19
Uniform Delay, d1	65.1	49.0		59.6	28.6	0.0	64.3	43.3	45.7	58.5	40.1	30.8
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	7.4	97.6		109.5	0.3	3.5	17.5	0.5	2.9	104.1	5.3	0.8
Delay (s)	72.4	146.6		169.1	28.9	3.5	81.9	43.7	48.6	162.6	45.3	31.6
Level of Service	E	F		F	C	A	F	D	D	F	D	C
Approach Delay (s)		143.6			53.7			51.6			85.8	
Approach LOS		F			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	83.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	389	1189	0	0	1767	531	187	500	1171	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	1845	1918	0	0	1881	1918	1759	1881	1937			
Adj Flow Rate, veh/h	452	1383	0	0	1900	0	215	575	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.86	0.86	0.86	0.93	0.93	0.93	0.87	0.87	0.87			
Percent Heavy Veh, %	3	3	0	0	1	3	8	1	2			
Cap, veh/h	503	2759	0	0	2994	951	302	643	296			
Arrive On Green	0.15	0.76	0.00	0.00	0.58	0.00	0.18	0.18	0.00			
Sat Flow, veh/h	3408	3741	0	0	5305	1631	1675	3574	1647			
Grp Volume(v), veh/h	452	1383	0	0	1900	0	215	575	0			
Grp Sat Flow(s),veh/h/ln	1704	1823	0	0	1712	1631	1675	1787	1647			
Q Serve(g_s), s	19.8	22.6	0.0	0.0	37.2	0.0	18.3	23.9	0.0			
Cycle Q Clear(g_c), s	19.8	22.6	0.0	0.0	37.2	0.0	18.3	23.9	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	503	2759	0	0	2994	951	302	643	296			
V/C Ratio(X)	0.90	0.50	0.00	0.00	0.63	0.00	0.71	0.89	0.00			
Avail Cap(c_a), veh/h	673	2759	0	0	2994	951	390	833	384			
HCM Platoon Ratio	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	0.00	0.00	0.46	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	63.6	7.2	0.0	0.0	21.0	0.0	58.6	60.9	0.0			
Incr Delay (d2), s/veh	10.2	0.7	0.0	0.0	0.5	0.0	2.5	8.6	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			
%ile BackOfQ(50%),veh/ln	10.1	11.6	0.0	0.0	17.7	0.0	8.7	12.6	0.0			
LnGrp Delay(d),s/veh	73.9	7.9	0.0	0.0	21.5	0.0	61.1	69.5	0.0			
LnGrp LOS	E	A			C		E	E				
Approach Vol, veh/h		1835			1900			790				
Approach Delay, s/veh		24.1			21.5			67.2				
Approach LOS		C			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		120.0			26.4	93.6		32.0
Change Period (Y+Rc), s		5.0			4.0	5.0		4.6
Max Green Setting (Gmax), s		115.0			30.0	81.0		35.4
Max Q Clear Time (g_c+I1), s		24.6			21.8	39.2		25.9
Green Ext Time (p_c), s		89.1			0.6	41.5		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	1859	306	412	1745	44	318	317	44	116	408	235
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		1.00	1.00		0.89	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	1865	1900	1900	1881	1827	1881	1881	1792	1827	1863	1918
Adj Flow Rate, veh/h	222	2112	348	468	1983	0	370	369	51	136	480	0
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	4	1	1	6	4	2	3
Cap, veh/h	240	2192	359	445	2376	718	374	920	349	156	847	390
Arrive On Green	0.07	0.39	0.39	0.13	0.46	0.00	0.11	0.26	0.26	0.09	0.24	0.00
Sat Flow, veh/h	3442	5579	914	3510	5136	1553	3476	3574	1357	1740	3539	1631
Grp Volume(v), veh/h	222	1820	640	468	1983	0	370	369	51	136	480	0
Grp Sat Flow(s),veh/h/ln	1721	1604	1680	1755	1712	1553	1738	1787	1357	1740	1770	1631
Q Serve(g_s), s	10.1	58.3	58.9	20.0	53.3	0.0	16.8	13.5	3.4	12.2	18.8	0.0
Cycle Q Clear(g_c), s	10.1	58.3	58.9	20.0	53.3	0.0	16.8	13.5	3.4	12.2	18.8	0.0
Prop In Lane	1.00		0.54	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	240	1891	660	445	2376	718	374	920	349	156	847	390
V/C Ratio(X)	0.93	0.96	0.97	1.05	0.83	0.00	0.99	0.40	0.15	0.87	0.57	0.00
Avail Cap(c_a), veh/h	240	1891	660	445	2376	718	374	920	349	187	897	413
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)	0.70	0.70	0.70	0.41	0.41	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	73.0	46.8	47.0	68.9	37.1	0.0	70.3	48.5	24.5	70.9	52.8	0.0
Incr Delay (d2), s/veh	30.2	10.5	22.8	42.0	1.5	0.0	43.1	0.1	0.1	26.2	2.2	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	5.8	27.6	31.5	12.2	25.5	0.0	10.3	6.7	1.7	7.0	9.5	0.0
LnGrp Delay(d),s/veh	103.2	57.3	69.7	110.9	38.6	0.0	113.4	48.6	24.5	97.1	55.0	0.0
LnGrp LOS	F	E	E	F	D		F	D	C	F	D	
Approach Vol, veh/h		2682			2451			790			616	
Approach Delay, s/veh		64.1			52.4			77.4			64.3	
Approach LOS		E			D			E			E	

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	28.2	68.0	21.0	42.8	15.0	81.2	18.2	45.6
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	20.0	* 62	17.0	40.0	11.0	73.0	17.0	40.0
Max Q Clear Time (g_c+I1), s	22.0	60.9	18.8	20.8	12.1	55.3	14.2	15.5
Green Ext Time (p_c), s	0.0	1.1	0.0	7.5	0.0	17.0	0.0	9.1

Intersection Summary	
HCM 2010 Ctrl Delay	61.3
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	1664	218	233	2051	811	63	80	106	236	106	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.98		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	0.98		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	3224	6248		1745	5136	1552	1745	1673		1641	1705	1454
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	3224	6248		1745	5136	1552	1745	1673		1641	1705	1454
Peak-hour factor, PHF	0.83	0.83	0.83	0.84	0.84	0.84	0.83	0.83	0.83	0.84	0.84	0.84
Adj. Flow (vph)	165	2005	263	277	2442	965	76	96	128	281	126	65
RTOR Reduction (vph)	0	11	0	0	0	190	0	33	0	0	0	55
Lane Group Flow (vph)	165	2257	0	277	2442	775	76	191	0	200	207	10
Confl. Peds. (#/hr)	10		18	18		10	20		13	13		20
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	5%	2%	1%	0%	1%	1%	0%	5%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	7.0	77.1		16.0	86.1	86.1	22.6	22.6		24.3	24.3	24.3
Effective Green, g (s)	7.0	77.1		16.0	86.1	86.1	22.6	22.6		24.3	24.3	24.3
Actuated g/C Ratio	0.04	0.48		0.10	0.54	0.54	0.14	0.14		0.15	0.15	0.15
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	141	3010		174	2763	835	246	236		249	258	220
v/s Ratio Prot	0.05	0.36		c0.16	0.48		0.04	c0.11		c0.12	0.12	
v/s Ratio Perm						c0.50						0.01
v/c Ratio	1.17	0.75		1.59	0.88	0.93	0.31	0.81		0.80	0.80	0.04
Uniform Delay, d1	76.5	33.6		72.0	32.5	34.1	61.7	66.6		65.5	65.5	57.9
Progression Factor	0.75	0.16		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	101.8	0.7		291.8	4.6	17.9	0.3	17.1		16.0	15.4	0.0
Delay (s)	159.3	6.1		363.8	37.1	52.0	61.9	83.7		81.5	81.0	58.0
Level of Service	F	A		F	D	D	E	F		F	F	E
Approach Delay (s)		16.4			65.6			78.2			78.0	
Approach LOS		B			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	49.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues Phase 1
1: N. Main St. & Treat Blvd

6/15/2015

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	51	1210	577	378	1141	74	143	375	643	978	179
v/c Ratio	0.53	1.19	1.25	0.28	0.75	0.69	0.17	0.60	1.19	0.78	0.29
Control Delay	82.7	138.2	176.9	30.2	3.5	95.4	43.3	16.4	137.1	44.7	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.7	138.2	176.9	30.2	3.5	95.4	43.3	16.4	137.1	44.7	12.7
Queue Length 50th (ft)	46	~694	~337	125	0	67	55	68	~278	415	37
Queue Length 95th (ft)	80	#669	#455	170	0	#142	86	178	#400	502	95
Internal Link Dist (ft)		1359		306			1086			1080	
Turn Bay Length (ft)	68		243			225		102	196		90
Base Capacity (vph)	119	1015	462	1347	1515	111	834	624	539	1254	622
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	1.19	1.25	0.28	0.75	0.67	0.17	0.60	1.19	0.78	0.29

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	452	1383	1900	571	215	575	1346
v/c Ratio	0.84	0.49	0.68	0.66	0.70	0.85	0.83
Control Delay	80.0	9.1	5.6	6.0	72.6	74.4	5.2
Queue Delay	0.0	0.8	0.5	1.0	0.0	0.0	0.7
Total Delay	80.0	9.8	6.2	7.1	72.6	74.4	5.9
Queue Length 50th (ft)	239	276	138	37	212	308	0
Queue Length 95th (ft)	279	333	m379	m310	286	352	0
Internal Link Dist (ft)		258	655			1047	
Turn Bay Length (ft)	220				267		437
Base Capacity (vph)	637	2802	2812	867	357	790	1616
Starvation Cap Reductn	0	997	456	116	0	0	0
Spillback Cap Reductn	0	173	0	0	0	0	74
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.77	0.81	0.76	0.60	0.73	0.87

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	222	2460	468	1983	50	370	369	51	136	480	276
v/c Ratio	0.94	1.01	1.01	0.88	0.07	1.04	0.40	0.12	0.84	0.54	0.16
Control Delay	121.0	60.8	75.3	18.9	1.3	125.4	50.9	0.5	108.1	54.8	0.2
Queue Delay	0.0	2.3	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	121.0	63.1	75.3	19.5	1.3	125.4	50.9	0.5	108.1	54.8	0.2
Queue Length 50th (ft)	124	~751	~259	202	0	~214	171	0	141	231	0
Queue Length 95th (ft)	m#186	#801	m#324	188	m3	#300	212	0	#225	273	0
Internal Link Dist (ft)		655		700			1075			548	
Turn Bay Length (ft)	164		235		600	264		202			125
Base Capacity (vph)	236	2446	465	2264	683	356	926	436	178	884	1701
Starvation Cap Reductn	0	20	0	73	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	10	0	0	0	0	0	0	3
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	1.01	1.01	0.91	0.07	1.04	0.40	0.12	0.76	0.54	0.16

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	165	2268	277	2442	965	76	224	200	207	65
v/c Ratio	1.17	0.75	1.59	0.88	0.94	0.31	0.83	0.80	0.80	0.20
Control Delay	151.3	7.3	334.2	38.3	37.9	63.0	79.3	87.7	86.8	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	151.3	7.3	334.2	38.3	37.9	63.0	79.3	87.7	86.8	1.4
Queue Length 50th (ft)	~107	71	~411	801	643	73	193	216	224	0
Queue Length 95th (ft)	m#114	196	#552	#1013	#965	110	248	272	281	0
Internal Link Dist (ft)		700		1282			449		751	
Turn Bay Length (ft)	341		175			295		228		
Base Capacity (vph)	141	3022	174	2763	1024	403	416	410	426	455
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.17	0.75	1.59	0.88	0.94	0.19	0.54	0.49	0.49	0.14

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis Phase 1
1: N. Main St. & Treat Blvd

6/15/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	614	223	589	501	1030	179	401	509	626	625	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	11	11	12	12	16	11	11	11
Total Lost time (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.98	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	1.00
Frt	1.00	0.96		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	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1745	3276		3204	3455	1525	1805	3610	1762	3351	3490	1508
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1745	3276		3204	3455	1525	1805	3610	1762	3351	3490	1508
Peak-hour factor, PHF	0.94	0.94	0.94	0.85	0.85	0.85	0.87	0.87	0.87	0.93	0.93	0.93
Adj. Flow (vph)	86	653	237	693	589	1212	206	461	585	673	672	238
RTOR Reduction (vph)	0	26	0	0	0	0	0	0	237	0	0	103
Lane Group Flow (vph)	86	864	0	693	589	1212	206	461	348	673	672	135
Confl. Peds. (#/hr)	36		7	7		36	17		4	4		17
Confl. Bikes (#/hr)						4			1			1
Heavy Vehicles (%)	0%	2%	1%	2%	1%	0%	0%	0%	2%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1 9	6	
Permitted Phases						Free			2			6
Actuated Green, G (s)	10.6	38.0		22.0	49.4	140.0	19.9	35.0	35.0	23.0	42.1	42.1
Effective Green, g (s)	10.6	38.0		22.0	49.4	140.0	19.9	35.0	35.0	23.0	42.1	42.1
Actuated g/C Ratio	0.08	0.27		0.16	0.35	1.00	0.14	0.25	0.25	0.16	0.30	0.30
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.0	6.0		4.0	6.0		3.0	6.0	6.0		6.0	6.0
Lane Grp Cap (vph)	132	889		503	1219	1525	256	902	440	550	1049	453
v/s Ratio Prot	0.05	c0.26		c0.22	0.17		0.11	0.13		c0.20	0.19	
v/s Ratio Perm						c0.79			0.20			0.09
v/c Ratio	0.65	0.97		1.38	0.48	0.79	0.80	0.51	0.79	1.22	0.64	0.30
Uniform Delay, d1	62.9	50.5		59.0	35.3	0.0	58.2	45.1	49.1	58.5	42.4	37.6
Progression Factor	1.00	1.00		0.77	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.5	23.8		179.5	0.7	3.4	16.6	2.1	13.5	116.2	3.0	1.7
Delay (s)	71.4	74.2		225.2	25.4	3.4	74.7	47.2	62.6	174.7	45.4	39.3
Level of Service	E	E		F	C	A	E	D	E	F	D	D
Approach Delay (s)		74.0			70.2			58.9			99.4	
Approach LOS		E			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	75.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	523	1155	0	0	1924	657	201	260	847	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	1845	1956	0	0	1881	1956	1881	1881	1956			
Adj Flow Rate, veh/h	556	1229	0	0	2025	0	209	271	0			
Adj No. of Lanes	2	2	0	0	3	1	1	2	1			
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96			
Percent Heavy Veh, %	3	1	0	0	1	1	1	1	1			
Cap, veh/h	727	2909	0	0	2713	879	248	496	231			
Arrive On Green	0.21	0.78	0.00	0.00	1.00	0.00	0.14	0.14	0.00			
Sat Flow, veh/h	3408	3815	0	0	5305	1663	1792	3574	1663			
Grp Volume(v), veh/h	556	1229	0	0	2025	0	209	271	0			
Grp Sat Flow(s),veh/h/ln	1704	1859	0	0	1712	1663	1792	1787	1663			
Q Serve(g_s), s	18.7	13.1	0.0	0.0	0.0	0.0	13.9	8.6	0.0			
Cycle Q Clear(g_c), s	18.7	13.1	0.0	0.0	0.0	0.0	13.9	8.6	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	727	2909	0	0	2713	879	248	496	231			
V/C Ratio(X)	0.76	0.42	0.00	0.00	0.75	0.00	0.84	0.55	0.00			
Avail Cap(c_a), veh/h	727	2909	0	0	2713	879	514	1026	477			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.32	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	45.1	4.3	0.0	0.0	0.0	0.0	51.2	48.9	0.0			
Incr Delay (d2), s/veh	4.4	0.5	0.0	0.0	0.6	0.0	3.0	0.4	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			
%ile BackOfQ(50%),veh/ln	9.2	6.8	0.0	0.0	0.2	0.0	7.1	4.3	0.0			
LnGrp Delay(d),s/veh	49.5	4.8	0.0	0.0	0.6	0.0	54.2	49.3	0.0			
LnGrp LOS	D	A			A		D	D				
Approach Vol, veh/h		1785			2025			480				
Approach Delay, s/veh		18.7			0.6			51.4				
Approach LOS		B			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		118.5			49.1	69.4		21.5
Change Period (Y+Rc), s		5.0			5.0	* 5		4.6
Max Green Setting (Gmax), s		95.4			26.0	* 64		35.0
Max Q Clear Time (g_c+I1), s		15.1			20.7	2.0		15.9
Green Ext Time (p_c), s		41.0			4.8	54.9		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	13.8
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	144	1657	201	292	1877	93	259	448	174	128	354	445
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		1.00	1.00		0.93	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	1883	1900	1881	1881	1900	1900	1863	1881	1845	1827	1937
Adj Flow Rate, veh/h	160	1841	223	301	1935	0	282	487	189	147	407	0
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	0	0	2	1	3	4	2
Cap, veh/h	183	2365	286	343	2378	748	293	857	360	171	862	409
Arrive On Green	0.07	0.54	0.54	0.20	0.93	0.00	0.08	0.24	0.24	0.10	0.25	0.00
Sat Flow, veh/h	3442	5877	712	3476	5136	1615	3510	3539	1488	1757	3471	1647
Grp Volume(v), veh/h	160	1522	542	301	1935	0	282	487	189	147	407	0
Grp Sat Flow(s),veh/h/ln	1721	1620	1730	1738	1712	1615	1755	1770	1488	1757	1736	1647
Q Serve(g_s), s	6.1	32.9	32.9	11.1	14.9	0.0	10.5	15.9	11.0	10.9	13.1	0.0
Cycle Q Clear(g_c), s	6.1	32.9	32.9	11.1	14.9	0.0	10.5	15.9	11.0	10.9	13.1	0.0
Prop In Lane	1.00		0.41	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	183	1955	696	343	2378	748	293	857	360	171	862	409
V/C Ratio(X)	0.87	0.78	0.78	0.88	0.81	0.00	0.96	0.57	0.52	0.86	0.47	0.00
Avail Cap(c_a), veh/h	183	1955	696	343	2378	748	293	1021	429	200	1080	513
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	0.09	0.09	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	60.8	25.9	25.9	52.1	3.2	0.0	60.2	43.9	25.0	58.6	42.1	0.0
Incr Delay (d2), s/veh	31.4	2.8	7.5	2.5	0.3	0.0	41.9	0.2	0.4	23.8	1.5	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	3.7	15.0	17.1	5.4	5.8	0.0	6.8	7.8	5.2	6.4	6.5	0.0
LnGrp Delay(d),s/veh	92.1	28.7	33.4	54.6	3.5	0.0	102.1	44.1	25.4	82.4	43.6	0.0
LnGrp LOS	F	C	C	D	A		F	D	C	F	D	
Approach Vol, veh/h		2224			2236			958			554	
Approach Delay, s/veh		34.4			10.3			57.5			53.9	
Approach LOS		C			B			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	19.0	59.0	16.0	37.7	11.0	67.0	16.8	36.9
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	13.0	* 53	11.0	* 41	7.0	61.0	15.0	38.0
Max Q Clear Time (g_c+I1), s	13.1	34.9	12.5	15.1	8.1	16.9	12.9	17.9
Green Ext Time (p_c), s	0.0	17.2	0.0	6.3	0.0	39.6	0.0	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	30.9
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1774	135	210	2008	307	153	32	392	505	118	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	11	10
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.86		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.97		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	0.99		1.00	1.00	0.85	1.00	0.86		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00
Satd. Flow (prot)	3385	6369		1728	5136	1503	1745	1584		1641	1681	1460
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00
Satd. Flow (perm)	3385	6369		1728	5136	1503	1745	1584		1641	1681	1460
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.85	0.85	0.85	0.59	0.59	0.59
Adj. Flow (vph)	56	1993	152	228	2183	334	180	38	461	856	200	220
RTOR Reduction (vph)	0	8	0	0	0	117	0	80	0	0	0	116
Lane Group Flow (vph)	56	2137	0	228	2183	217	180	419	0	522	534	104
Confl. Peds. (#/hr)	13		23	23		13	19		17	17		19
Confl. Bikes (#/hr)						13			1			
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	0%	4%	0%	1%	0%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	5.6	36.0		7.0	37.4	37.4	37.0	37.0		40.0	40.0	40.0
Effective Green, g (s)	5.6	36.0		7.0	37.4	37.4	37.0	37.0		40.0	40.0	40.0
Actuated g/C Ratio	0.04	0.26		0.05	0.27	0.27	0.26	0.26		0.29	0.29	0.29
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	2.0	6.0		2.0	6.0	6.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	135	1637		86	1372	401	461	418		468	480	417
v/s Ratio Prot	0.02	c0.34		c0.13	c0.43		0.10	c0.26		c0.32	0.32	
v/s Ratio Perm						0.14						0.07
v/c Ratio	0.41	1.31		2.65	1.59	0.54	0.39	1.00		1.12	1.11	0.25
Uniform Delay, d1	65.6	52.0		66.5	51.3	44.0	42.2	51.5		50.0	50.0	38.4
Progression Factor	0.59	0.49		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	140.1		775.2	269.5	5.2	0.2	44.5		77.0	75.5	0.1
Delay (s)	39.4	165.8		841.7	320.8	49.2	42.4	96.0		127.0	125.5	38.6
Level of Service	D	F		F	F	D	D	F		F	F	D
Approach Delay (s)		162.6			331.0			81.8			111.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	212.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	114.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues Phase 1
1: N. Main St. & Treat Blvd

6/15/2015

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	86	890	693	589	1212	206	461	585	673	672	238
v/c Ratio	0.65	0.97	1.38	0.48	0.79	0.80	0.51	0.86	1.22	0.64	0.43
Control Delay	84.8	72.1	215.5	26.3	14.7	80.8	47.5	36.7	149.2	46.4	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.8	72.1	215.5	26.3	14.7	80.8	47.5	36.7	149.2	46.4	17.9
Queue Length 50th (ft)	77	410	~426	177	877	182	191	257	~300	283	62
Queue Length 95th (ft)	135	#552	#506	163	562	260	238	#406	#422	359	146
Internal Link Dist (ft)		1359		309			1086			1080	
Turn Bay Length (ft)	68		243			225		102	196		90
Base Capacity (vph)	162	915	503	1218	1525	296	902	677	550	1049	556
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.97	1.38	0.48	0.79	0.70	0.51	0.86	1.22	0.64	0.43

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	556	1229	2025	692	209	271	882
v/c Ratio	0.85	0.41	0.73	0.73	0.79	0.49	0.53
Control Delay	50.9	3.7	10.0	7.6	76.9	56.3	1.2
Queue Delay	0.0	0.5	0.2	0.4	0.0	0.0	0.0
Total Delay	50.9	4.2	10.2	7.9	76.9	56.3	1.2
Queue Length 50th (ft)	212	111	191	113	186	120	0
Queue Length 95th (ft)	m211	m130	m276	m135	260	155	0
Internal Link Dist (ft)		255	655			1047	
Turn Bay Length (ft)	220				267		437
Base Capacity (vph)	655	2964	2759	944	431	893	1652
Starvation Cap Reductn	0	1147	159	40	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.68	0.78	0.77	0.48	0.30	0.53

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	160	2064	301	1935	96	282	487	189	147	407	511
v/c Ratio	0.94	0.85	0.84	0.90	0.13	0.97	0.50	0.34	0.85	0.40	0.87
Control Delay	118.9	42.1	34.1	12.3	0.0	109.4	44.8	6.9	100.4	41.1	50.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	118.9	42.1	34.1	12.3	0.0	109.4	44.8	6.9	100.4	41.1	50.0
Queue Length 50th (ft)	78	474	150	141	0	134	198	0	133	156	337
Queue Length 95th (ft)	#152	431	m112	m64	m0	#228	255	60	#237	198	#498
Internal Link Dist (ft)		655		700			1075			548	
Turn Bay Length (ft)	164		235		600	264		202			125
Base Capacity (vph)	171	2417	359	2162	717	290	979	551	181	1016	589
Starvation Cap Reductn	0	0	0	3	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.85	0.84	0.90	0.13	0.97	0.50	0.34	0.81	0.40	0.87

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	56	2145	228	2183	334	180	499	522	534	220
v/c Ratio	0.34	1.30	2.65	1.56	0.64	0.39	1.00	1.12	1.11	0.41
Control Delay	41.7	165.2	798.8	289.4	29.7	45.3	80.7	122.5	121.1	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	165.2	798.8	289.4	29.7	45.3	80.7	122.5	121.1	13.9
Queue Length 50th (ft)	23	~699	~349	~1053	145	135	~378	~571	~584	39
Queue Length 95th (ft)	m28	#765	#521	#1146	258	195	#553	389	395	27
Internal Link Dist (ft)		700		1282			449		751	
Turn Bay Length (ft)	341		175			295		228		
Base Capacity (vph)	169	1645	86	1401	525	461	498	468	480	533
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	1.30	2.65	1.56	0.64	0.39	1.00	1.12	1.11	0.41

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	1859	306	412	1745	44	318	317	44	116	408	235
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		0.97	1.00		0.89	1.00		0.90
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	1865	1900	1900	1880	1900	1881	1881	1792	1827	1863	1918
Adj Flow Rate, veh/h	222	2112	348	468	1983	50	370	369	51	136	480	276
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	1	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	1	1	1	6	4	2	3
Cap, veh/h	258	2162	354	439	2315	58	369	953	363	156	466	489
Arrive On Green	0.08	0.39	0.39	0.13	0.45	0.45	0.11	0.27	0.27	0.09	0.25	0.25
Sat Flow, veh/h	3442	5578	914	3510	5144	130	3476	3574	1362	1740	1863	1466
Grp Volume(v), veh/h	222	1820	640	468	1318	715	370	369	51	136	480	276
Grp Sat Flow(s),veh/h/ln	1721	1604	1679	1755	1711	1852	1738	1787	1362	1740	1863	1466
Q Serve(g_s), s	10.2	59.6	60.3	20.0	55.1	55.3	17.0	13.5	3.4	12.3	40.0	25.0
Cycle Q Clear(g_c), s	10.2	59.6	60.3	20.0	55.1	55.3	17.0	13.5	3.4	12.3	40.0	25.0
Prop In Lane	1.00		0.54	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	258	1865	651	439	1540	833	369	953	363	156	466	489
V/C Ratio(X)	0.86	0.98	0.98	1.07	0.86	0.86	1.00	0.39	0.14	0.87	1.03	0.56
Avail Cap(c_a), veh/h	258	1865	651	439	1540	833	369	953	363	185	466	489
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)	0.70	0.70	0.70	0.41	0.41	0.41	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	73.2	48.3	48.5	70.0	39.4	39.4	71.5	48.0	24.2	71.9	60.0	44.9
Incr Delay (d2), s/veh	18.2	12.7	25.7	47.1	2.7	5.0	47.3	0.1	0.1	27.2	49.8	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	5.5	28.7	32.5	12.6	26.6	29.4	10.6	6.7	1.6	7.1	27.0	10.6
LnGrp Delay(d),s/veh	91.3	60.9	74.2	117.1	42.1	44.4	118.8	48.1	24.3	99.1	109.8	48.7
LnGrp LOS	F	E	E	F	D	D	F	D	C	F	F	D
Approach Vol, veh/h		2682			2501			790			892	
Approach Delay, s/veh		66.6			56.8			79.7			89.3	
Approach LOS		E			E			E			F	

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	26.0	68.0	21.0	45.0	16.0	78.0	18.4	47.6
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	20.0	* 62	17.0	40.0	12.0	72.0	17.0	40.0
Max Q Clear Time (g_c+I1), s	22.0	62.3	19.0	42.0	12.2	57.3	14.3	15.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	14.2	0.0	12.6

Intersection Summary	
HCM 2010 Ctrl Delay	67.5
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	222	2460	468	2033	370	369	51	136	480	276
v/c Ratio	0.86	1.01	1.01	0.92	1.04	0.40	0.12	0.84	1.03	0.44
Control Delay	108.1	60.8	75.3	21.4	125.4	50.9	0.5	108.1	107.4	28.3
Queue Delay	0.0	2.3	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	108.1	63.1	75.3	22.4	125.4	50.9	0.5	108.1	107.4	28.3
Queue Length 50th (ft)	123	~751	~259	295	~214	171	0	141	~536	146
Queue Length 95th (ft)	m#173	#801	m#324	193	#300	212	0	#225	#694	211
Internal Link Dist (ft)		655		700		1075			548	
Turn Bay Length (ft)	164		235		264		202			125
Base Capacity (vph)	257	2446	465	2221	356	926	436	178	465	622
Starvation Cap Reductn	0	20	0	56	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	26	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	1.01	1.01	0.94	1.04	0.40	0.12	0.76	1.03	0.44

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	1859	306	412	1745	44	318	317	44	116	408	235
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		0.97	1.00		0.89	1.00		0.90
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	1865	1900	1900	1880	1900	1881	1881	1792	1827	1863	1918
Adj Flow Rate, veh/h	222	2112	348	468	1983	50	370	369	51	136	480	276
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	1	2
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	1	1	1	6	4	2	3
Cap, veh/h	258	2162	354	439	2315	58	369	953	363	156	466	645
Arrive On Green	0.08	0.39	0.39	0.13	0.45	0.45	0.11	0.27	0.27	0.09	0.25	0.25
Sat Flow, veh/h	3442	5578	914	3510	5144	130	3476	3574	1362	1740	1863	2581
Grp Volume(v), veh/h	222	1820	640	468	1318	715	370	369	51	136	480	276
Grp Sat Flow(s),veh/h/ln	1721	1604	1679	1755	1711	1852	1738	1787	1362	1740	1863	1290
Q Serve(g_s), s	10.2	59.6	60.3	20.0	55.1	55.3	17.0	13.5	3.4	12.3	40.0	14.4
Cycle Q Clear(g_c), s	10.2	59.6	60.3	20.0	55.1	55.3	17.0	13.5	3.4	12.3	40.0	14.4
Prop In Lane	1.00		0.54	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	258	1865	651	439	1540	833	369	953	363	156	466	645
V/C Ratio(X)	0.86	0.98	0.98	1.07	0.86	0.86	1.00	0.39	0.14	0.87	1.03	0.43
Avail Cap(c_a), veh/h	258	1865	651	439	1540	833	369	953	363	185	466	645
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)	0.70	0.70	0.70	0.41	0.41	0.41	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	73.2	48.3	48.5	70.0	39.4	39.4	71.5	48.0	24.2	71.9	60.0	50.4
Incr Delay (d2), s/veh	18.2	12.7	25.7	47.1	2.7	5.0	47.3	0.1	0.1	27.2	49.8	1.6
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	28.7	32.5	12.6	26.6	29.4	10.6	6.7	1.6	7.1	27.0	5.3
LnGrp Delay(d),s/veh	91.3	60.9	74.2	117.1	42.1	44.4	118.8	48.1	24.3	99.1	109.8	52.0
LnGrp LOS	F	E	E	F	D	D	F	D	C	F	F	D
Approach Vol, veh/h		2682			2501			790			892	
Approach Delay, s/veh		66.6			56.8			79.7			90.3	
Approach LOS		E			E			E			F	

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	26.0	68.0	21.0	45.0	16.0	78.0	18.4	47.6
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	20.0	* 62	17.0	40.0	12.0	72.0	17.0	40.0
Max Q Clear Time (g_c+I1), s	22.0	62.3	19.0	42.0	12.2	57.3	14.3	15.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	14.2	0.0	12.7

Intersection Summary	
HCM 2010 Ctrl Delay	67.6
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	222	2460	468	2033	370	369	51	136	480	276
v/c Ratio	0.86	1.01	1.01	0.92	1.04	0.40	0.12	0.84	1.03	0.33
Control Delay	108.1	60.8	75.3	21.4	125.4	50.9	0.5	108.1	107.4	29.0
Queue Delay	0.0	2.3	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	108.1	63.1	75.3	22.4	125.4	50.9	0.5	108.1	107.4	29.0
Queue Length 50th (ft)	123	~751	~259	295	~214	171	0	141	~536	76
Queue Length 95th (ft)	m#173	#801	m#324	193	#300	212	0	#225	#694	113
Internal Link Dist (ft)		655		700		1075			548	
Turn Bay Length (ft)	164		235		264		202			125
Base Capacity (vph)	257	2446	465	2221	356	926	436	178	465	831
Starvation Cap Reductn	0	20	0	56	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	26	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	1.01	1.01	0.94	1.04	0.40	0.12	0.76	1.03	0.33

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	1859	306	412	1745	44	318	317	44	116	408	235
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		0.97	1.00		0.89	1.00		0.90
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	1865	1900	1900	1880	1900	1881	1881	1792	1827	1863	1918
Adj Flow Rate, veh/h	222	2112	348	468	1983	50	370	369	51	136	480	276
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	2	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.86	0.86	0.86	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	1	1	1	1	6	4	2	3
Cap, veh/h	260	2181	357	443	2336	59	373	931	354	156	861	479
Arrive On Green	0.08	0.39	0.39	0.13	0.45	0.45	0.11	0.26	0.26	0.09	0.24	0.24
Sat Flow, veh/h	3442	5579	914	3510	5144	130	3476	3574	1359	1740	3539	1462
Grp Volume(v), veh/h	222	1820	640	468	1318	715	370	369	51	136	480	276
Grp Sat Flow(s),veh/h/ln	1721	1604	1680	1755	1711	1852	1738	1787	1359	1740	1770	1462
Q Serve(g_s), s	10.1	58.7	59.4	20.0	54.2	54.4	16.9	13.5	3.4	12.2	18.8	25.1
Cycle Q Clear(g_c), s	10.1	58.7	59.4	20.0	54.2	54.4	16.9	13.5	3.4	12.2	18.8	25.1
Prop In Lane	1.00		0.54	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	260	1882	657	443	1554	841	373	931	354	156	861	479
V/C Ratio(X)	0.85	0.97	0.97	1.06	0.85	0.85	0.99	0.40	0.14	0.87	0.56	0.58
Avail Cap(c_a), veh/h	260	1882	657	443	1554	841	373	931	354	187	893	492
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)	0.70	0.70	0.70	0.41	0.41	0.41	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	72.4	47.3	47.5	69.3	38.4	38.5	70.7	48.3	24.4	71.2	52.5	45.3
Incr Delay (d2), s/veh	17.1	11.2	23.7	43.8	2.6	4.7	44.6	0.1	0.1	26.6	2.1	4.1
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	5.4	27.9	31.9	12.3	26.2	28.9	10.4	6.7	1.7	7.0	9.5	10.7
LnGrp Delay(d),s/veh	89.5	58.5	71.2	113.1	41.0	43.2	115.3	48.4	24.4	97.8	54.6	49.4
LnGrp LOS	F	E	E	F	D	D	F	D	C	F	D	D
Approach Vol, veh/h		2682			2501			790			892	
Approach Delay, s/veh		64.1			55.1			78.2			59.6	
Approach LOS		E			E			E			E	

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	27.4	68.0	21.0	43.6	16.0	79.4	18.2	46.3
Change Period (Y+Rc), s	6.0	* 6	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	20.0	* 62	17.0	40.0	12.0	72.0	17.0	40.0
Max Q Clear Time (g_c+I1), s	22.0	61.4	18.9	27.1	12.1	56.4	14.2	15.5
Green Ext Time (p_c), s	0.0	0.6	0.0	7.4	0.0	15.0	0.0	12.5

Intersection Summary	
HCM 2010 Ctrl Delay	61.9
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	222	2460	468	2033	370	369	51	136	480	276
v/c Ratio	0.69	0.89	1.01	0.85	1.04	0.50	0.14	0.84	0.69	0.49
Control Delay	89.1	40.5	75.3	15.6	125.4	58.3	0.8	108.1	64.6	30.7
Queue Delay	0.0	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.1	41.0	75.3	15.9	125.4	58.3	0.8	108.1	64.6	30.7
Queue Length 50th (ft)	122	593	~259	99	~214	184	0	141	248	152
Queue Length 95th (ft)	m158	#692	m#324	193	#300	215	0	#225	276	211
Internal Link Dist (ft)		655		700		1075			548	
Turn Bay Length (ft)	164		235		264		202			125
Base Capacity (vph)	320	2775	465	2391	356	893	424	178	884	567
Starvation Cap Reductn	0	79	0	71	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	26	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.91	1.01	0.88	1.04	0.41	0.12	0.76	0.54	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary Phase 2 Mit 1
3: Oak Rd/Oak Rd. & Treat Blvd

6/19/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	144	1657	201	292	1877	93	259	448	174	128	354	445
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		0.98	1.00		0.94	1.00		0.95
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	1883	1900	1881	1882	1900	1900	1863	1881	1845	1827	1937
Adj Flow Rate, veh/h	160	1841	223	301	1935	96	282	487	189	147	407	511
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	1	0	2	1	3	4	2
Cap, veh/h	210	2239	271	325	2144	106	278	983	417	170	527	552
Arrive On Green	0.08	0.51	0.51	0.19	0.86	0.86	0.08	0.28	0.28	0.10	0.29	0.29
Sat Flow, veh/h	3442	5876	712	3476	5010	248	3510	3539	1500	1757	1827	1568
Grp Volume(v), veh/h	160	1522	542	301	1321	710	282	487	189	147	407	511
Grp Sat Flow(s),veh/h/ln	1721	1620	1729	1738	1713	1833	1755	1770	1500	1757	1827	1568
Q Serve(g_s), s	6.3	36.8	36.9	11.8	33.8	34.4	11.0	16.0	11.0	11.5	28.4	31.7
Cycle Q Clear(g_c), s	6.3	36.8	36.9	11.8	33.8	34.4	11.0	16.0	11.0	11.5	28.4	31.7
Prop In Lane	1.00		0.41	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	210	1851	659	325	1466	784	278	983	417	170	527	552
V/C Ratio(X)	0.76	0.82	0.82	0.93	0.90	0.90	1.02	0.50	0.45	0.86	0.77	0.93
Avail Cap(c_a), veh/h	297	1851	659	325	1466	784	278	983	417	189	539	562
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	0.09	0.09	0.09	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.9	30.3	30.3	56.1	8.2	8.2	64.0	42.1	24.0	61.9	45.3	24.2
Incr Delay (d2), s/veh	6.4	3.8	9.9	4.8	1.0	1.9	58.1	0.1	0.3	27.5	9.5	23.1
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	3.2	17.0	19.3	5.9	15.0	16.3	7.6	7.9	5.2	6.9	15.8	17.2
LnGrp Delay(d),s/veh	69.3	34.1	40.3	60.8	9.1	10.1	122.2	42.2	24.3	89.4	54.9	47.3
LnGrp LOS	E	C	D	E	A	B	F	D	C	F	D	D
Approach Vol, veh/h		2224			2332			958			1065	
Approach Delay, s/veh		38.1			16.1			62.2			56.0	
Approach LOS		D			B			E			E	

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	19.0	59.0	16.0	45.1	12.5	65.5	17.5	43.6
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	13.0	* 53	11.0	* 41	12.0	56.0	15.0	38.0
Max Q Clear Time (g_c+I1), s	13.8	38.9	13.0	33.7	8.3	36.4	13.5	18.0
Green Ext Time (p_c), s	0.0	13.6	0.0	5.1	0.2	18.7	0.0	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	36.7
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	160	2064	301	2031	282	487	189	147	407	511
v/c Ratio	0.58	0.85	0.84	1.01	0.97	0.50	0.34	0.85	0.76	0.72
Control Delay	75.3	42.4	33.2	24.1	109.4	44.8	6.9	100.4	55.6	25.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.3	42.4	33.2	24.1	109.4	44.8	6.9	100.4	55.6	25.0
Queue Length 50th (ft)	76	460	150	~742	134	198	0	133	338	231
Queue Length 95th (ft)	116	435	m112	m67	#228	255	60	#237	445	314
Internal Link Dist (ft)		655		700		1075			548	
Turn Bay Length (ft)	164		235		264		202			125
Base Capacity (vph)	294	2417	359	2001	290	979	551	181	535	718
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.85	0.84	1.01	0.97	0.50	0.34	0.81	0.76	0.71

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary Phase 2 Mit 2
3: Oak Rd/Oak Rd. & Treat Blvd

6/19/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	144	1657	201	292	1877	93	259	448	174	128	354	445
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		0.98	1.00		0.94	1.00		0.95
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	1883	1900	1881	1882	1900	1900	1863	1881	1845	1827	1937
Adj Flow Rate, veh/h	160	1841	223	301	1935	96	282	487	189	147	407	511
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	1	2
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	1	0	2	1	3	4	2
Cap, veh/h	177	2286	277	332	2243	111	283	936	396	170	500	753
Arrive On Green	0.10	0.78	0.78	0.19	0.90	0.90	0.08	0.26	0.26	0.10	0.27	0.27
Sat Flow, veh/h	3442	5877	712	3476	5011	248	3510	3539	1496	1757	1827	2752
Grp Volume(v), veh/h	160	1522	542	301	1321	710	282	487	189	147	407	511
Grp Sat Flow(s),veh/h/ln	1721	1620	1730	1738	1713	1833	1755	1770	1496	1757	1827	1376
Q Serve(g_s), s	6.3	25.4	25.4	11.6	24.1	24.5	10.9	16.0	11.0	11.2	28.4	18.9
Cycle Q Clear(g_c), s	6.3	25.4	25.4	11.6	24.1	24.5	10.9	16.0	11.0	11.2	28.4	18.9
Prop In Lane	1.00		0.41	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	177	1890	673	332	1533	821	283	936	396	170	500	753
V/C Ratio(X)	0.91	0.81	0.81	0.91	0.86	0.87	1.00	0.52	0.48	0.86	0.81	0.68
Avail Cap(c_a), veh/h	177	1890	673	332	1533	821	283	987	417	193	550	828
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	0.09	0.09	0.09	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.8	12.1	12.1	54.6	5.2	5.2	62.6	42.7	24.4	60.6	46.3	31.0
Incr Delay (d2), s/veh	38.4	3.4	8.9	3.7	0.7	1.2	52.0	0.2	0.3	26.1	12.3	4.1
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	3.9	11.5	13.4	5.7	10.4	11.3	7.3	7.9	5.2	6.7	16.1	7.6
LnGrp Delay(d),s/veh	99.2	15.4	21.0	58.2	5.9	6.5	114.6	42.9	24.7	86.7	58.5	35.2
LnGrp LOS	F	B	C	E	A	A	F	D	C	F	E	D
Approach Vol, veh/h		2224			2332			958			1065	
Approach Delay, s/veh		22.8			12.8			60.4			51.2	
Approach LOS		C			B			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	19.0	59.0	16.0	42.3	11.0	67.0	17.2	41.1
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	13.0	* 53	11.0	* 41	7.0	61.0	15.0	38.0
Max Q Clear Time (g_c+I1), s	13.6	27.4	12.9	30.4	8.3	26.5	13.2	18.0
Green Ext Time (p_c), s	0.0	24.0	0.0	6.9	0.0	32.1	0.0	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	29.3
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	160	2064	301	2031	282	487	189	147	407	511
v/c Ratio	0.86	0.84	0.84	0.94	0.93	0.51	0.35	0.85	0.79	0.53
Control Delay	103.7	39.9	37.4	12.7	99.2	45.5	7.0	100.4	58.5	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.7	39.9	37.4	12.7	99.2	45.5	7.0	100.4	58.5	27.7
Queue Length 50th (ft)	78	461	150	175	134	198	0	133	338	136
Queue Length 95th (ft)	#152	415	m112	m67	#228	255	60	#237	445	188
Internal Link Dist (ft)		655		700		1075			548	
Turn Bay Length (ft)	164		235		264		202			125
Base Capacity (vph)	187	2462	359	2160	303	960	544	181	535	996
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.84	0.84	0.94	0.93	0.51	0.35	0.81	0.76	0.51

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary Phase 2 Mit 3
3: Oak Rd/Oak Rd. & Treat Blvd

6/19/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	144	1657	201	292	1877	93	259	448	174	128	354	445
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		0.98	1.00		0.94	1.00		0.95
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	1883	1900	1881	1882	1900	1900	1863	1881	1845	1827	1937
Adj Flow Rate, veh/h	160	1841	223	301	1935	96	282	487	189	147	407	511
Adj No. of Lanes	2	4	0	2	3	0	2	2	1	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87
Percent Heavy Veh, %	2	1	1	1	1	1	0	2	1	3	4	2
Cap, veh/h	208	2239	271	325	2147	106	278	983	417	170	1001	551
Arrive On Green	0.12	0.76	0.76	0.19	0.86	0.86	0.08	0.28	0.28	0.10	0.29	0.29
Sat Flow, veh/h	3442	5876	712	3476	5010	248	3510	3539	1500	1757	3471	1568
Grp Volume(v), veh/h	160	1522	542	301	1321	710	282	487	189	147	407	511
Grp Sat Flow(s),veh/h/ln	1721	1620	1729	1738	1713	1833	1755	1770	1500	1757	1736	1568
Q Serve(g_s), s	6.3	27.8	27.8	11.8	33.6	34.2	11.0	16.0	11.0	11.5	13.1	31.7
Cycle Q Clear(g_c), s	6.3	27.8	27.8	11.8	33.6	34.2	11.0	16.0	11.0	11.5	13.1	31.7
Prop In Lane	1.00		0.41	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	208	1851	659	325	1468	785	278	983	417	170	1001	551
V/C Ratio(X)	0.77	0.82	0.82	0.93	0.90	0.90	1.02	0.50	0.45	0.86	0.41	0.93
Avail Cap(c_a), veh/h	297	1851	659	325	1468	785	278	983	417	189	1023	562
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	0.09	0.09	0.09	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.2	13.5	13.5	56.1	8.1	8.1	64.0	42.1	24.0	61.9	39.9	24.3
Incr Delay (d2), s/veh	6.6	3.8	9.9	4.8	1.0	1.9	58.1	0.1	0.3	27.5	1.0	23.3
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	3.1	12.6	14.6	5.9	14.7	16.4	7.6	7.9	5.2	6.9	6.5	17.3
LnGrp Delay(d),s/veh	66.8	17.3	23.5	60.8	9.1	10.0	122.3	42.2	24.3	89.4	40.9	47.5
LnGrp LOS	E	B	C	E	A	A	F	D	C	F	D	D
Approach Vol, veh/h		2224			2332			958			1065	
Approach Delay, s/veh		22.4			16.0			62.2			50.8	
Approach LOS		C			B			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	19.0	59.0	16.0	45.1	12.4	65.6	17.5	43.6
Change Period (Y+Rc), s	6.0	* 6	5.0	* 5	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	13.0	* 53	11.0	* 41	12.0	56.0	15.0	38.0
Max Q Clear Time (g_c+I1), s	13.8	29.8	13.0	33.7	8.3	36.2	13.5	18.0
Green Ext Time (p_c), s	0.0	21.9	0.0	5.0	0.2	18.9	0.0	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Queues Phase 2 Mit 3
3: Oak Rd/Oak Rd. & Treat Blvd

6/19/2015

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	160	2064	301	2031	282	487	189	147	407	511
v/c Ratio	0.50	0.72	0.84	0.90	0.66	0.66	0.41	0.85	0.64	0.91
Control Delay	67.1	33.3	33.2	13.9	66.0	54.8	8.1	100.4	57.0	44.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.1	33.3	33.2	13.9	66.0	54.8	8.1	100.4	57.0	44.3
Queue Length 50th (ft)	75	388	150	175	127	216	0	133	181	259
Queue Length 95th (ft)	116	434	m112	m67	174	257	61	#237	217	314
Internal Link Dist (ft)		655		700		1075			548	
Turn Bay Length (ft)	164		235		264		202			125
Base Capacity (vph)	335	2847	359	2263	427	960	544	181	1016	568
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.72	0.84	0.90	0.66	0.51	0.35	0.81	0.40	0.90

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Contra Costa County

To: Board of Supervisors

From: John Kopchik, Director, Conservation & Development Department

Date: May 1, 2018

Subject: Investigation on Waste Allegedly Sent to Keller Canyon Landfill

RECOMMENDATION(S):
ACCEPT report from the Director of Environmental Health and the Director of Conservation & Development regarding media coverage asserting that loads of material that may not have been adequately screened for radioactivity were trucked from Hunters Point Naval Shipyard site to multiple different landfills in the state, including Keller Canyon Landfill.

FISCAL IMPACT:
Acceptance of this report is not expected to impact the General Fund.

BACKGROUND:
Contra Costa Environmental Health and the Department of Conservation & Development are providing this report due to concerns resulting from recent media coverage alleging that potentially radioactive material was sent to landfills in the state not suitable for disposal of such material, including Keller Canyon Landfill. Attached is an article that was published in the San Francisco Chronicle on Sunday, April 22, 2018 (Exhibit A) asserting that loads of material may not have been adequately screened for radioactivity prior to being transported from the Hunter's Point Naval Shipyard to various landfills.

☐ APPROVE ☑ OTHER

☐ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes: See Addendum

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: 925-674-7825

cc: Marilyn Underwood, CCEH

BACKGROUND: (CONT'D)

Staff work to investigate these allegations and assess any threats to public health and safety is ongoing and will continue past the publishing deadline for the May 1, 2018 Board agenda. Staff from the two Departments will provide a verbal report to the Board on May 1 with addition detail on the status of the investigation as of that time.

CONSEQUENCE OF NEGATIVE ACTION:

If recommendation is not approved, this report regarding recent media assertions would not be accepted.

CLERK'S ADDENDUM

Speakers: Laura Wright, Environmental Affairs Manager, City of Pittsburg; Joe Sbranti, Pittsburg City Manager; Wolfgang Roskey, resident of Pittsburg; Nancy Parent, resident of Pittsburg; Lisa Della Rocca, resident of Pittsburg; Frank Aiello, Citizen United; Luis Arroyo, Citizens United; Jesus Hernandez; Citizens United; A.J. Fardella, Oak Hills Community Group; Russel Row, resident of Pittsburg, Rosa Fallon, resident of Pittsburg. The following did not wish to speak but left written comments for the Board's consideration (attached): Isvan G. Tolnay, resident of Pittsburg; Rosa Fallon, resident of Pittsburg; Jen Borcic, resident of Pittsburg. Rick King, General Manager of Keller Canyon Landfill provided a powerpoint presentation (attached).

Dr. Marilyn C. Underwood, Director of Environmental Health, presented an oral report. She said that regulatory agencies have found that a contractor hired by the U.S. Navy to clean up Hunter's Point shipyard in San Francisco misrepresented radiologic sampling data that was taken from soil at the shipyard. To date, these misrepresentations are tied to potentially contaminated soil and material being left on the site instead of being removed. The studies that have so far been published (U.S. Nuclear Regulatory Commission and the Environmental Protection Agency) reveal that data were falsified to allow potentially contaminated soil to remain in place at Hunter's Point shipyard.

Dr. Underwood said that at this point there is no evidence that radiological material was sent to Keller Canyon Landfill. She noted the investigation is ongoing.

Dr. Underwood made the following recommendations: 1) Formally request the Department of the Navy to make itself available for meetings with the community and all stakeholders as soon as possible to provide information on the soil date falsification incident and what further investigation(s) are ongoing; 2) Formally request the Navy to investigate whether the soil data falsification incident affected Keller Canyon Landfill, including whether any contaminated soil was transported from Hunter's Point shipyard to Keller Canyon Landfill; 3) Formally request the Navy to conduct a surface survey of Keller Canyon Landfill to determine if is there is any radiological hazard at the landfill.

Rick King, General Manager of Keller Canyon Landfill, provided the Board with a detailed explanation of how material was received from the site, the reporting responsibility of the source of the material, and procedures in place to inspect incoming material. He noted that immediately upon hearing of the false data issue, he suspended receipt of any material from Hunter's Point shipyard. He provided a PowerPoint presentation for reference (attached).

Having discussed the matter at length, and receiving public comment, the Board gave the following direction:

1. ***Implement all the recommendations put forth by Dr. Underwood;***

2. ***Dr. Underwood will return to the Board in 30 days with a written report and any updated information;***

3. ***Staff will seek answers on the notification process from the state and federal agencies to find out why the***

County, the City of Pittsburg, and Keller Canyon Landfill were not notified of the investigation into the soil data falsification;

4. Staff will examine its notification protocols and work with Keller Canyon landfill to ensure timely communication with the District Supervisor and the Board;

5. Staff will compose letters for the Chair of the Board to sign that will the assistance of state and federal legislative representatives in obtaining swift and appropriate help from the Navy and other applicable agencies with expertise in radiological matters;

6. Staff will seek information from consultant TetraTech regarding the incident;

7. Staff will research what, if any, mechanism is in place to hold the contractor hired by the Navy financially responsible for any third-party investigative and/or testing to be conducted at Keller Canyon Landfill;

8. Staff will provide further information for the Board on the history of alerts from the radiologic sensors located at Keller Canyon Landfill, and how those incidents are documented;

9. Staff will immediately look into the hiring of an expert consultant to assist the County on next steps and appropriate actions to be taken going forward with respect to this incident;

10. Staff will prepare a report addressing the effects of designating the City of Pittsburg as the Local Enforcement Agency (LEA) for the Keller Canyon Landfill site.

Dr. Underwood and John Kopchik will be in attendance at an emergency meeting of the Bay Point Municipal Advisory Committee at 7 p.m. this evening. Supervisor Glover said more community meetings will be arranged and the public notified as soon as is possible.

AGENDA ATTACHMENTS

Exhibit A - Newspaper Article

MINUTES ATTACHMENTS

Correspondence Received

Letter from City of Pittsburg

Powerpoint Presentation-Keller Canyon

Report from Environmental Health Services

Toxic soil went from SF's Hunters Point to state landfills, ex-workers say

By J.K. Dineen April 21, 2018 Updated: April 22, 2018 6:00am

5

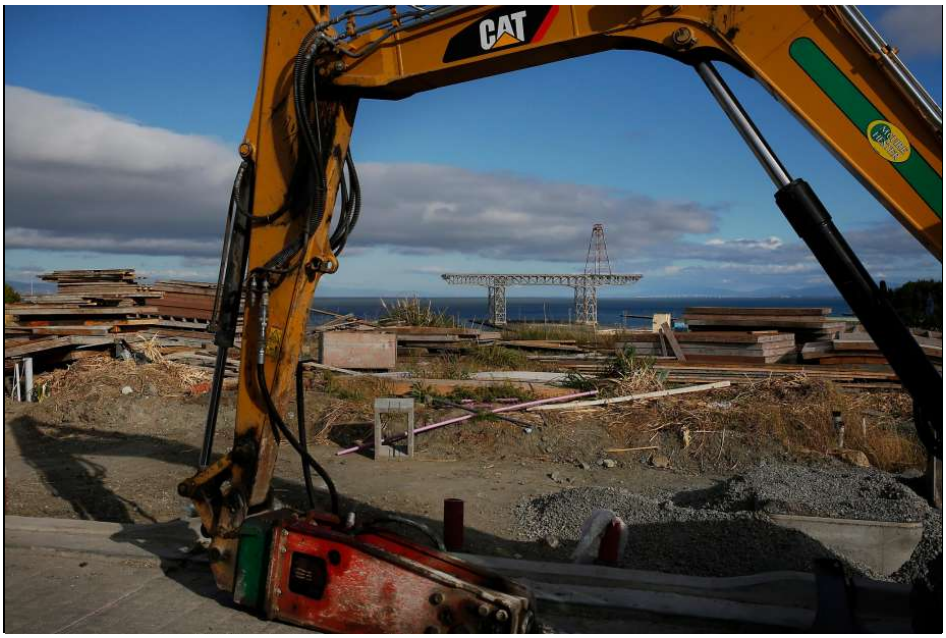


Photo: Leah Millis / The Chronicle 2016

IMAGE 1 OF 6
The San Francisco Shipyard development is under way at the former Hunters Point Naval Shipyard in 2016.

The scandal involving cheating in the $1 billion cleanup at the former Hunters Point Naval Shipyard has until now focused on allegations of what was left behind at the site: radioactive dirt dumped into trenches to save the time and expense of testing and disposing of it properly.

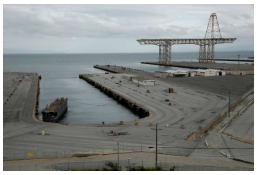
But former shipyard employees and environmentalists say that toxic waste removed from the site is of just as great a concern. Soil with potentially dangerous levels of radioactive waste, they contend, was trucked to

conventional landfills across California — the sort of dumps that typically fill up with tree branches, construction debris and old dishwashers, not radiological waste from a former nuclear test lab that handled uranium and plutonium.

The shipyard, home to the Naval Radiological Defense Laboratory from 1946 to 1969, is now the site of the San Francisco Shipyard development project, regarded as perhaps the most important development site in the city. It is to contain more than 10,500 housing units, 300 acres of open space, millions of square feet of retail, schools, a hotel and artists studios.

Before developer FivePoint starting building condominiums in 2013, former shipyard employees say that Tetra Tech, the company that was paid between $350 million and $450 million to lead the cleanup of the site,relaxed the standards for what was allowed to leave the property starting in 2011. The portal monitors — radiation detection scanners used to prevent trucks containing dangerous materials from exiting — were reset to be less sensitive. An area with scaffolding that allowed inspectors to get on top of the trucks to inspect shipments was taken down.

HUNTERS POINT



SF city panel OKs redesign of giant Hunters Point Shipyard

Editorial: SF deserves answers about falsified cleanup at Hunters

SF shipyard activists frustrated by naval officials on alleged

And whereas previously trucks that set off an alert from the portal monitor more than twice would be made to dump their soil loads back on a tarp to be retested and cleaned of dangerous materials, the new policy just required an employee to walk around the truck with a handheld monitor. Those monitors rarely detected anything because the truck bed made it tough to get readings, according to workers.

Former shipyard employee Susan Andrews, who operated portal monitors in 2010 and 2011, said Tetra Tech management went to extreme lengths to ensure trucks were allowed to exit, no matter how many times they set off the radiation detector.

"Before 2011 that dirt was never to leave until the radiation detected was found, contained and put in a secure lockup box," she said. "In 2011, they changed the way they did business."

Andrews said she saw trucks leaving the yard at night after the portal where they exited was supposed to be closed for the day — something she witnessed in January and February of 2012 from her condominium on Cleo Rand Lane, right above the shipyard entrance. She was one of nine former Tetra Tech employees to raise concerns with the Nuclear Regulatory Commission. She said she was laid off a short time later.

"I would be out with my dog about an hour after everyone had gone home, and I'd see these trucks full of dirt — 10 or 15 of them — going right by my condo," she said. "It was crazy. Where on the site the dirt was coming from or where it was going I don't know. But nothing should have been leaving after the portal monitor was shut down" for the night.

John Blanchard / The Chronicle

A recent review by the U.S. Environmental Protection Agency and state agencies found that as much as 97 percent of Tetra Tech's cleanup data for two parcels at the shipyard was found to be suspect and should be retested, according to John Chesnutt, manager of the EPA's local Superfund Division. A spokesman for Tetra Tech did not return a call seeking comment.

While the Navy has acknowledged the problems with the Tetra Tech work, it continues to insist that the materials were removed from the site properly and safely.

Derek Robinson, who is leading the cleanup for the Navy, said soil is stockpiled on-site and sampled to "to select the appropriate landfill for disposal." Soil that meets both radiological and chemical cleanup requirements is put back into trenches on the site, places where structures may later be built.

Soil that doesn't meet those standards is separated and either sent to a landfill that accepts specific types of contamination in the soil or to a low-level radioactive waste site.

Some batches of dirt hauled off Hunters Point were tested and deemed too "hot" for conventional dumps, meaning they contained unacceptably high levels of radionuclides like cesium 137 and strontium 90 — both can cause cancer. That dirt, at least 4,300 cubic yards, was transported in watertight steel bins to Clive, Utah, one of four disposal sites in the United States licensed to accept low-level radioactive waste.

The rest of the waste, the vast majority, about 7,800 truckloads carrying 156,000 cubic yards, was marked "nonhazardous" and went to conventional dumps.

It was hauled to Kirby Canyon in Morgan Hill, near San Jose. It was transported to Keller Canyon in Pittsburg. It went to a dump in Buttonwillow, near Bakersfield, and to facilities in Vacaville and Brisbane owned by Recology, which collects San Francisco's household trash. Most landfills also have portal monitors, although environmental experts say they are used sporadically and do not test for radiation. If soil contaminated with radioactive material left the shipyard site without being properly vetted, it is possible it landed in one of these landfills.

The timing of the changes Andrews observed at the portal is consistent with testimony from other whistle-blowers, who say the entire culture of the cleanup changed in early 2011 when Tetra Tech's contract was restructured from "time and material" to a "firm fixed-price model." Suddenly, the contractor had a financial incentive to complete the cleanup as quickly as possible because it was working for a specific dollar amount.

Shortly after that contract change, worker and whistle-blower Bert Bowers, who was in charge of monitoring compliance with Nuclear Regulatory Commission standards, said he started to see violations of industry standards — equipment left where it shouldn't be and employees working without proper oversight. He complained and was later fired.

"The incentive was there to cut corners and get bonuses, and I started to see the effect," he said. "The standards started to become compromised."

Anthony Smith, who worked as laborer and technician at the shipyard during that time, said he and his colleagues spent months taking soil from areas known to be clean — like the foundation of an old movie theater — and passing it off as coming from sections of the site known to be highly toxic.

"It came down from the higher-ups — 'We're gonna make this clean today. Go get a sample from the normal place, go get a clean sample,'" Smith said.

Lindsey Dillon, a professor of sociology at UC Santa Cruz who is writing a book about the cleanup and redevelopment of the shipyard, said it's ironic that the champions of the redevelopment project cast it as "the heroic story of cleaning up a toxic military base" while the waste taken off the property is "creating a new geography of toxic exposure."

Conventional landfills tend to be located in communities lacking economic or politic clout.

"It's a systemic issue, because these landfill sites are located in particularly vulnerable areas," said Dillon.

Don Wadsworth, a health physicist who specializes in radiation safety and radioactive waste management services, said the classified nature of Hunters Point's history makes it hard to know what is buried on the property. But the federal government allocated plenty of money to do the job correctly.

"The problem you have is that Tetra Tech was on a program of deceiving the client and the regulators about the conditions on the site and the conditions of the materials leaving the site," said Wadsworth. "In this case,

the safety guard rails were not only ignored, they were ripped up and thrown away."

Daniel Hirsch, retired director of the Environmental and Nuclear Policy Program at UC Santa Cruz, said the "release criteria" governing waste materials the Navy set at the shipyard were far lower than they should have been. And it is problematic that those standards may have been violated.

Hirsch said he has spent two years trying to find out what happened to the materials removed from the shipyard.

"The Navy have resisted and resisted and resisted," he said. "My impression is that they knew this was a potential problem and didn't want it exposed."

Landfills sell material as well as accept it so it's tough to say where all material from the shipyard wound up. Hunters Point soil could have ended up in rural roads, parks or building sites, Hirsch said. It could have been used as "cover" at landfills and ended up blown into nearby neighborhoods. It could contaminate water tables and irrigation used for crops.

In addition, waste and unwanted furnishings and metals such as pipes salvaged from razed buildings on the site could be recycled. Contaminated office furniture, fencing, metals and concrete from buildings all could have ended up in places where they could do harm to an unsuspecting public.

"I predict those communities will be up in arms, and they should be," Hirsch said. "They have converted one Superfund site into perhaps many."

Several of the waste removal and recycling companies that received soil and debris from the shipyard did not return

calls.

Recology, which owns facilities in Vacaville and Brisbane, said it would review all shipments from Hunters Point. Spokesman Eric Potashner said his facilities require customers to sign a guarantee that the soil doesn't contain contaminants that are not accepted, which would include anything radioactive.

"We have a robust sampling and acceptance criteria for all waste that comes into the site," he said.

Andrews, who is from West Virigina, said Tetra Tech should be responsible for conducting tests at the landfills where the shipyard soil ended up. She said that her co-workers went along with the program because the Hunters Point jobs were the most lucrative in the country for workers in the hazardous waste remediation field. They paid $42 an hour plus $1,500 a week in expenses. Most of the workers were from Southern states where that kind of money goes a long way.

"I was told to shut my mouth, that I didn't live there, had hit the lottery, that I should shut up and save my money. The more they said that, the madder I got," she said. "I did care, and I decided that the people of San Francisco were worth more than my salary."

J.K. Dineen is a San Francisco Chronicle staff writer. Email: jdineen@sfchronicle.com Twitter: @sfjkdineen

REQUEST TO SPEAK FORM (2 minute limit)

Complete this form and place it in the upright box near the speaker's podium, and wait to be called by the Chair.

Personal information is optional. This speaker's card will be incorporated into the public record of this meeting.

NAME (Print) JEN BORCIC

To ensure your name is announced correctly, you may include phonetic spelling.

Address: 2252 JACQUELINE DR

City: Pittsburg, CA 94565

Phone: [redacted]

I am speaking for: ☒ Myself + the Neighbors surrounding KELLER
☐ Organization: _____

I wish to speak on Agenda Item # D7 KELLER CANYON

Date: 5/1/18

My comments will be: ☒ General ☐ For ☐ Against

☐ I wish to speak on the subject of:

☒ I do not want to speak but would like to leave comments for the Board to consider. *(Use the back of this form.)*

Information for Speakers:

Deposit this form in the upright box next to the speaker's podium before the Board's consideration of your item.

Wait to be called by the Chair. Please speak into the microphone at the podium.

Begin by stating your name and your city or area of residence, and whether you are speaking for yourself or on behalf of an organization.

If you have handout materials, please give them to the Clerk.

Avoid repeating comments made by previous speakers.

In lieu of speaking, I wish to submit these comments:

PLEASE HAVE the NEighborhoods + KELLER CANYON TESTED by a third party. WE DO NOT believe KCL tested EACH and EVERY Truck Load for radiation.

REQUEST TO SPEAK FORM (2 minute limit)

Complete this form and place it in the upright box near the speaker's podium, and wait to be called by the Chair.

Personal information is optional. This speaker's card will be incorporated into the public record of this meeting.

NAME (Print) ISTVAN G. TOURY

To ensure your name is announced correctly, you may include phonetic spelling.

Address: 23 BEECHWOOD CT

City: PITTSBURG CA

Phone: [redacted]

I am speaking for: ☑ Myself
☐ Organization: _____

I wish to speak on Agenda Item # D7

Date: 05/01/12

My comments will be: ☑ General
☐ For
☐ Against

☐ I wish to speak on the subject of:

VENICE CANYON

☑ I do not want to speak but would like to leave comments for the Board to consider. *(Use the back of this form.)*

Information for Speakers:

Deposit this form in the upright box next to the speaker's podium before the Board's consideration of your item.

Wait to be called by the Chair. Please speak into the microphone at the podium.

Begin by stating your name and your city or area of residence, and whether you are speaking for yourself or on behalf of an organization.

If you have handout materials, please give them to the Clerk.

Avoid repeating comments made by previous speakers.

In lieu of speaking, I wish to submit these comments:

I MOVED to Pittsburg a few years ago. I am very concerned for my family & neighbors, and based off of everything I have read. I would like the County to hire a third party for deep core testing and all water wells tested to ensure our safety. I would also like just monitoring around the entire landfill site. The public health & safety outweighs the need for speed. Thank you.

National Priorities List for Superfund Sites

D7

NPL Site Narrative for Treasure Island Naval Air Station - Hunters Point Annex

TREASURE ISLAND NAVAL AIR STATION - HUNTERS POINT ANNEX
San Francisco, California

Conditions at proposal (July 14, 1989): Hunters Point Annex of Treasure Island Naval Station, formerly the Hunters Point Naval Shipyard, encompasses 936 acres (522 acres dry land and 414 acres submerged in San Francisco Bay) in the southeast corner of San Francisco, California. Established in 1869, the shipyard was the first privately owned dry dock on the Pacific Coast. The Navy first used the installation in 1919 to construct, maintain, and repair ships, and in 1939 purchased it from California Dry Dock Co. Triple A Machine Shop leased the facility from the Navy during 1976-87, subleasing numerous buildings to private tenants. The Navy regained possession of the shipyard from Triple A in 1987, but continues the subleasing. Operations of the facility over many decades generated a wide variety of solid and liquid wastes, including paints, solvents, fuels, acids, bases, metals, PCBs, and asbestos.

Hunters Point Annex is participating in the Installation Restoration Program (IRP), established in 1978. Under this program, the Department of Defense seeks to identify, investigate, and clean up contamination from hazardous materials. The Navy has identified a number of potentially contaminated areas, including Industrial Landfill, Bay Fill Area, Pickling and Plating Yard, Battery and Electroplating Shop, Old Transformer Storage Yard, Power Plant, Oil Reclamation Ponds, Tank Farm, numerous spill areas, and areas leased by Triple A. These areas are potential sources of contaminant migration into ground water and into San Francisco Bay. In the past, wastes and waste water were directly discharged into San Francisco Bay.

Benzene, PCBs, toluene, and phenols have been detected in on-site ground water in IRP tests conducted in 1987. A bottling company draws ground water from springs within 3 miles of hazardous substances on the annex. The company serves 19,000 people.

Sediments contain elevated levels of heavy metals and polyaromatic hydrocarbons. Area surface waters are used for recreational activities, commercial navigation, and fishing.

The Navy is continuing IRP studies and has undertaken some interim cleanup measures.

Status (November 21, 1989): Workplans for additional interim measures are being developed. Sampling is underway as part of a remedial investigation/feasibility study to determine the type and extent of contamination at the site and identify alternatives for remedial action. Sampling is scheduled to continue into 1991.

For more information about the hazardous substances identified in this narrative summary, including general information regarding the effects of exposure to these substances on human health, please see the Agency for Toxic Substances and Disease Registry (ATSDR) ToxFAQs. ATSDR ToxFAQs can be

over

LISA DELLA ROCCA
209 Havenwood Circle
Pittsburg, CA 94565
925 698 1551

ATSDR Agency for Toxic Substances & Disease Registry

Phenol

CAS ID #: 108-95-2

Affected Organ Systems: Dermal (Skin), Hematological (Blood Forming)

Cancer Classification: None

Please contact NTP (https://tools.niehs.nih.gov/webforms/index.cfm/main/formViewer/form_id/521/to/oroc), IARC (mailto:imo@iarc.fr), or EPA's IRIS Hotline (mailto:hotline.iris@epa.gov) with questions on cancer and cancer classification.

Chemical Classification: Phenols/phenoxy acids

Summary: Phenol is both a manufactured chemical and a natural substance. It is a colorless-to-white solid when pure. The commercial product is a liquid. Phenol has a distinct odor that is sickeningly sweet and tarry. You can taste and smell phenol at levels lower than those that are associated with harmful effects. Phenol evaporates more slowly than water, and a moderate amount can form a solution with water. Phenol can catch fire. Phenol is used primarily in the production of phenolic resins and in the manufacture of nylon and other synthetic fibers. It is also used in slimicides (chemicals that kill bacteria and fungi in slimes), as a disinfectant and antiseptic, and in medicinal preparations such as mouthwash and sore throat lozenges.

Community Members

ToxFAQs (/toxfaqs/tf.asp?id=147&tid=27)
Fact sheet that answers the most frequently asked questions about a contaminant and its health effects.

Public Health Statement (/phs/phs.asp?id=146&tid=27)
Summary about a hazardous substance taken from Chapter One of its respective ATSDR Toxicological Profile.

Emergency Responders

Medical Management Guidelines (MMG) for Acute Chemical Exposure (/mmg/mmg.asp?id=144&tid=27)
Publication intended to aid emergency department physicians and other emergency healthcare professionals who manage acute exposures resulting from chemical incidents.

Toxicological and Health Professionals

Toxicological Profile (/toxprofiles/tp.asp?id=148&tid=27)
Succinctly characterizes the toxicologic and adverse health effects information for a hazardous substance.

ToxGuide (PDF, 116KB*) (http://www.atsdr.cdc.gov/toxguides/toxguide-115.pdf)
Quick reference guide providing information such as chemical and physical properties, sources of exposure, routes of exposure, minimal risk levels, children's

health, and health effects for a substance.

Priority List of Hazardous Substances (/spl/)
Prioritization of substances based on a combination of their frequency, toxicity, and potential for human exposure at National Priorities List (NPL) sites.

Minimal Risk Levels (MRL) (/mrls/mrllist.asp#27tag)
The MRL is an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse, non-cancer health effects over a specified duration of exposure. The information in this MRL serves as a screening tool to help public health professionals decide where to look more closely to evaluate possible risk of adverse health effects from human exposure.

- Page last reviewed: March 3, 2011
- Page last updated: March 3, 2011
- Content source: Agency for Toxic Substances and Disease Registry (http://www.atsdr.cdc.gov)

Agency for Toxic Substances and Disease Registry, 4770 Buford Hwy NE, Atlanta, GA 30341
Contact CDC: 800-232-4636 / TTY: 888-232-6348

USA.gov Government Made Easy

Worker Health Study Summaries

On This Page

- BackgroundResultsConclusionsQuestions or Comments
- ReferencesAdditional InformationWeb Based Resources

Research on long-term exposure

Exposure to Polychlorinated Biphenyls and the Risk of Disease

2006

Study Background

Polychlorinated Biphenyls (PCBs) are synthetically produced chemicals formerly used to manufacture electrical capacitors.

Increasing concerns about PCBs' potential health and environmental effects led to a ban on PCB production and use in the U.S. in 1977.

The purpose of the NIOSH studies was to examine the long-term health risks to workers from PCB exposures.

Studies were undertaken examining causes of death among workers from three electrical-capacitor manufacturing plants located in Indiana, New York, and Massachusetts.

Study Results

Compared to the U.S. population, the overall number of deaths was not increased among workers at the study plants.

In the Indiana plant, the numbers of deaths from melanoma skin cancer) and brain cancer were higher than expected. We found deaths from brain cancer to be associated with PCB exposure.

In the New York and Massachusetts plants combined, deaths from myeloma (cancer of the bone marrow), and cancers of the liver, stomach in men, ovary and prostate were higher than expected among workers with greater cumulative PCB exposure.

A study of neurological diseases (amyotrophic lateral sclerosis [ALS], Parkinson's disease, and dementia) included everyone in the three plants who had worked 90 days or longer. Women in the study had excess deaths from ALS, compared to women in the U.S. population. Women with greater cumulative PCB exposure had more deaths from Parkinson's disease and dementia than women with lower cumulative PCB exposure.

Conclusions

From these studies, there is evidence that PCB exposure may be associated with some cancers and some neurological diseases.

Results were not entirely consistent across all three plants. This might be due to variations in exposure levels among the plants or due to other factors not measured.

Important: These studies evaluated workers as a group; therefore,we cannot predict the future health of any one individual.

Questions or Comments?

If you have any questions or comments, would like more information, or would like a copy of any of the four study reports (one study in Indiana, two studies in Massachusetts-New York, one study of all three plants):

Call our NIOSH toll-free 800 number: 800-356-4674 (800-35-NIOSH).

You may e-mail questions, comments, or suggestions to: nioshworkernotification@cdc.gov (mailto:nioshworkernotification@cdc.gov).

For other NIOSH publications write to

NIOSH Publications
4676 Columbia Parkway
Cincinnati, OH 45226-1996
Phone: 800-356-4674 (800-35-NIOSH)
Fax: 513-533-8573
E-mail: pubstaft@cdc.gov (mailto:pubstaft@cdc.gov)Web site: www.cdc.gov/niosh/

References – Published PCB Studies

Steenland K, Hein MJ, Cassinelli RT, et al. [2006]. Polychlorinated biphenyls and neurodegenerative disease mortality in an occupational cohort. Epidemiology 17(1):8-13.

Ruder AM, Hein MJ, Nilsen N, et al. [2006]. Mortality among workers exposed to polychlorinated biphenyls (PCBs) in an electrical capacitor manufacturing plant in Indiana: an update. Environ Health Perspectives 114(1): 18-23.

Prince MM, Ruder AM, Hein MJ, et al. [2006]. Mortality and exposure response among 14,458 electrical capacitor manufacturing workers exposed to polychlorinated biphenyls (PCBs). Environ Health Perspectives 11(10):1508-1514.

Prince MM, Hein MJ, Ruder AM, et al. [2006]. Update: cohort mortality study of workers highly exposed to polychlorinated biphenyls (PCBs) during the manufacture of electrical capacitors, 1940-1998. BMC Environmental Health, 5(13):1-10.

Additional Information about Cancer and Neurological Diseases

Polychlorinated Biphenyls (PCBs) may increase the risk for certain diseases. Below are agencies with their addresses, telephone numbers, and internet sites that may be helpful in answering any questions you may have regarding the cancers and neurological diseases mentioned in the studies.

Cancer

The American Cancer Society is a national, non-profit agency devoted to assist and answer questions one may have regarding cancers.

American Cancer Society
2970 Clairmont Road, NE
Suite 840
Atlanta, Georgia 30329
Toll Free: 800-227-2345
http://www.cancer.org (http://www.cancer.org)

The National Cancer Institute is a Federal agency for cancer research. They can answer questions you may have about cancer. They can also provide the names of doctors in your area who treat patients with cancer.

National Cancer Institute
Room 10A28
31 Center Drive, MSC 2580
Bethesda, Maryland 20892
Toll Free: 800-4-CANCER
http://www.cancer.gov (http://www.cancer.gov)

Neurological Diseases

National Parkinson Foundation, Inc.
1501 N.W. 9th Avenue / Bob Hope Road
Miami, Florida 33136-1494
Telephone: 305-243-6666
Toll Free: 800-327-4545
Fax: 305-243-5595
http://www.parkinson.org (http://www.parkinson.org)

National Parkinson Disease Association
135 Parkinson Avenue
Staten Island, New York 10305
Telephone: 718-981-8001

Toll Free: 800-223-2732
Fax: 718-981-4399
E-Mail: apda@apdaparkinson.org
http://www.apdaparkinson.org (http://www.apdaparkinson.org)

Alzheimer's Association National Office
225 N. Michigan Ave., Fl. 17
Chicago, Illinois 60601
24/7 Helpline: 800-272-3900
http://www.alz.org (http://www.alz.org)

The Amyotrophic Lateral Sclerosis (ALS) Association
27001 Agoura Road – Suite 150
Calabasas Hills, Califonia 91301
Telephone: 818-880-9007
http://www.alsa.org (http://www.alsa.org)

Web Based Resources

Cancer

Brain:
http://www.nlm.nih.gov/medlineplus/braincancer.html (http://www.nlm.nih.gov/medlineplus/braincancer.html)

Melanoma:
http://www.nlm.nih.gov/medlineplus/melanoma.html (http://www.nlm.nih.gov/medlineplus/melanoma.html)

Prostate:
http://www.nlm.nih.gov/medlineplus/prostatecancer.html
(http://www.nlm.nih.gov/medlineplus/prostatecancer.html)

Ovarian:
http://www.nlm.nih.gov/medlineplus/ovariancancer.html
(http://www.nlm.nih.gov/medlineplus/ovariancancer.html)

Neurological Diseases

ALS: http://www.nlm.nih.gov/medlineplus/amyotrophiclateralsclerosis.html
(http://www.nlm.nih.gov/medlineplus/amyotrophiclateralsclerosis.html)

Alzheimer's disease: http://www.nlm.nih.gov/medlineplus/alzheimersdisease.html
(http://www.nlm.nih.gov/medlineplus/alzheimersdisease.html)

Parkinson's disease: http://www.nlm.nih.gov/medlineplus/parkinsonsdisease.html
(http://www.nlm.nih.gov/medlineplus/parkinsonsdisease.html)

Follow NIOSH

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Flickr (http://www.flickr.com/photos/NIOSH)

Pinterest (http://www.pinterest.com/cdcgov/workplace-safety-and-health/)

Twitter (http://twitter.com/NIOSH)

YouTube (http://www.youtube.com/user/NIOSHSafetyVideos)

NIOSH Homepage

NIOSH A-Z

Workplace Safety & Health Topics

Publications and Products

Programs

Contact NIOSH

Page last reviewed: April 11, 2017

Page last updated: July 13, 2012

Content source: National Institute for Occupational Safety and Health (NIOSH) (/niosh) Division of Surveillance, Hazard Evaluations, and Field Studies.

ATSDR Agency for Toxic Substances & Disease Registry

Benzene

CAS ID #: 71-43-2

Affected Organ Systems: Hematological (Blood Forming), Immunological (Immune System), Neurological (Nervous System)

Cancer Classification: NTP: Known to be a human carcinogen. EPA: Known human carcinogen. IARC: Carcinogenic to humans

Please contact NTP (https://tools.niehs.nih.gov/webforms/index.cfm/main/formViewer/form_id/521/to/oroc), IARC (mailto:imo@iarc.fr), or EPA's IRIS Hotline (mailto:hotline.iris@epa.gov) with questions on cancer and cancer classification.

Chemical Classification: Hydrocarbons (contain hydrogen and carbon atoms), Volatile organic compounds

Summary: Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

Community Members

ToxFAQs (/toxfaqs/tf.asp?id=38&tid=14)

Fact sheet that answers the most frequently asked questions about a contaminant and its health effects.

Public Health Statement (/phs/phs.asp?id=37&tid=14)

Summary about a hazardous substance taken from Chapter One of its respective ATSDR Toxicological Profile.

ATSDR Camp Lejeune Site Information
(http://www.atsdr.cdc.gov/sites/lejeune/index.html)

U.S. Marine Corps Base Camp Lejeune, North Carolina was established in 1942. In 1982, the Marine Corps discovered specific volatile organic compounds (VOCs) in the drinking water provided by two of the eight water treatment plants on base.

Water from the Tarawa Terrace Treatment Plant was contaminated by PCE (perchloroethylene or tetrachloroethylene).

Midlothian (http://www.atsdr.cdc.gov/sites/midlothian/index.html)

ATSDR and Texas Department of State Health Services (DSHS) are conducting an extensive review of environmental health concerns raised by the community members in Midlothian, Texas to determine if chemical releases from local industries could or have affected the health of persons and animals in the area.

Emergency Responders

Medical Management Guidelines (MMG) for Acute Chemical Exposure (/mmg/mmg.asp?id=35&tid=14)

Medical Management Guideline (MMG) for Acute Chemical Exposure Publication intended to aid emergency department physicians and other emergency healthcare professionals who manage acute exposures

Toxicological and Health Professionals

Toxicological Profile (/toxprofiles/tp.asp?id=40&tid=14)

Succinctly characterizes the toxicologic and adverse health effects information for a hazardous substance.

Addendum to the Profile (PDF, 975KB*) (http://www.atsdr.cdc.gov/toxprofiles/Benzene_Addendum.pdf)

Addendum to the Toxicological Profile for Benzene (June 2015)

ToxGuide (PDF, 75KB*) (http://www.atsdr.cdc.gov/toxguides/toxguide-3.pdf)

Quick reference guide providing information such as chemical and physical properties, sources of exposure, routes of exposure, minimal risk levels, children's health, and health effects for a substance.

Priority List of Hazardous Substances (/spl/)

Prioritization of substances based on a combination of their frequency, toxicity, and potential for human exposure at National Priorities List (NPL) sites.

Minimal Risk Levels (MRL) (/mrls/mrllist.asp#14tag)

The MRL is an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse, non-cancer health effects over a specified duration of exposure. The information in this MRL serves as a screening tool to help public health professionals decide where to look more closely to evaluate possible risk of adverse health effects from human exposure.

Interaction Profiles (/interactionprofiles/index.asp)

Succintly characterizes the toxicologic and adverse health effects information for mixtures of hazardous substances.

- Page last reviewed: March 3, 2011
- Page last updated: March 3, 2011
- Content source: Agency for Toxic Substances and Disease Registry (http://www.atsdr.cdc.gov)

Population Surrounding 1,000 Superfund Remedial Sites

(Population data is from the Census Bureau's 20011-2015 ACS 5 year estimates; sites are as of FY16.)

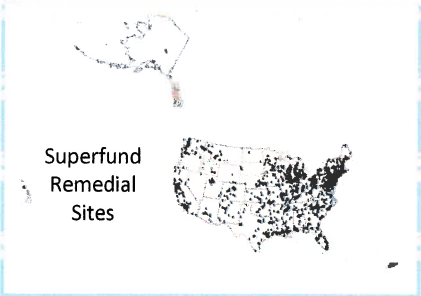
UPDATE: October 2017

Superfund Remedial sites exist in thousands of communities across the U.S. ranging from remote to large urban settings. Many of these sites are located in economically distressed communities. To help describe who benefits from EPA's Superfund Remedial Program's cleanup work, EPA collected data on the population living within 3 and 1 mile(s) of sites. These sites include Superfund final, deleted, and proposed National Priorities List (NPL) sites, as well as non-NPL Superfund Alternative Agreement sites.

Population within 3 Miles of Sites:

The 3-mile area surrounding sites was used because it is a good representation of the geographic area where people in a community live most of their lives – where they shop, work, go to school, go to restaurants, and participate in outdoor activities. As of the end of FY16, approximately 53 **million people** live within 3 miles of a Superfund site (roughly 16% **of the U.S. population**) including approximately:

- 17% of all children in the U.S. under the age of **5**
- 16% of all children in the U.S. under **18**
- 19% of all black people in the U.S.
- 23% of all Hispanics in the U.S.
- 21% of all minorities in the U.S.
- 19% of all households in the U.S. below the poverty level
- 19% of all people with less than a high school education in the U.S.
- 25% of the linguistically isolated households in the U.S.



Population within 1 Mile of Sites:

As of the end of FY16, approximately 15 **million people** live within 1 mile of Superfund sites (roughly 5% **of the U.S. population**) including approximately:

- 5% of all children in the U.S. under the age of **5**
- 5% of all children in the U.S. under **18**
- 5% of all black people in the U.S.
- 7% of all Hispanics in the U.S.
- 6% of all minorities in the U.S.
- 5% of all households in the U.S. below the poverty level
- 6% of all people with less than a high school education in the U.S.
- 8% of the linguistically isolated households in the U.S.

Demographics of Near-Site Population:

While there is no single way to characterize communities located near these sites, this population is more minority, low income, linguistically isolated, and less likely to have a high school education than the U.S. population as a whole (see Table 1). As a result, these communities may have fewer resources with which to address concerns about their health and environment.

TABLE 1: Proportions of Key Demographics in the Total Near Site Population and the Total U.S. Population

	Population within 1 mile of All Sites	Population within 3 miles of All Sites	U.S. Population
Minority	49.3%	49.7%	38.4%
Below poverty level	16.7%	16.7%	14.7%
Linguistically isolated	8.4%	8.1%	5.2%
Less than a High School Education	16.3%	15.8%	13.5%

TABLE 2: Detailed Data on the Population within 1 and 3 miles of Superfund Sites

(Sites include Superfund final, deleted, and proposed National Priorities List (NPL) sites, as well as non-NPL Superfund Alternative Agreement sites)

Below are data on the demographic characteristics of the population surrounding Superfund Remedial sites. The table indicates whether certain population demographics near sites are above (in **bold**) or below (in *italics*) the U.S. average.

	Population Within 1 Mile of Sites (Approximate)		Population Within 3 Miles of Sites (Approximate)		US Population (Approximate)	
Race	Percent	Number	Percent	Number	Percent	Number
White	*66.4%*	10,046,874	*65.5%*	34,470,332	73.6%	235,439,052
Black	*12.1%*	1,825,303	**14.7%**	7,742,082	12.6%	40,209,614
Asian	**8.3%**	1,253,681	**7.6%**	4,013,732	5.1%	16,245,464
Native American	*0.7%*	110,209	*0.6%*	325,960	0.8%	2,580,945
Hawaiian/Pacific Islander	**0.4%**	57,868	**0.3%**	146,067	0.2%	546,384
Other	**12.2%**	1,846,892	**11.3%**	5,960,305	7.8%	25,076,635
Ethnicity						
Hispanic (any race)	**26.1%**	3,944,432	**24.9%**	13,113,380	18.1%	57,779,493
Non-Hispanic (any race)	*73.9%*	11,196,395	*75.1%*	39,545,098	81.9%	262,318,601
Minority						
Minority (Includes all race & ethnicity categories except "non-Hispanic white")	**49.3%**	7,465,644	**49.7%**	26,165,579	38.4%	122,814,916
Income						
Households below the poverty level	**16.7%**	919,950	**16.7%**	3,219,925	14.7%	17,375,862
Households with a ratio of income to poverty level of two and over	*61.4%*	9,033,664	*62.1%*	31,871,549	65.3%	203,830,131
Education						
Less than a high school education	**16.3%**	1,637,451	**15.8%**	5,507,184	13.5%	28,879,991
Linguistically isolated						
Linguistically isolated households	**8.4%**	463,482	**8.1%**	1,549,407	5.2%	6,151,790
Age						
Under 5 years of age	**6.7%**	1,015,679	**6.6%**	3,462,879	6.3%	20,107,354
Under 18 years of age	*22.9%*	3,460,652	*22.9%*	12,074,107	23.3%	74,487,716
Over 64 years of age	*12.3%*	1,865,966	*12.7%*	6,711,160	14.1%	45,211,757
Total Population		15,140,827		52,658,478		300,000,001

City of Pittsburg
65 Civic Avenue • Pittsburg, California 94565

May 1, 2018

Clerk of the Board
Contra Costa County Board of Supervisors
Supervisor John M. Gioia, District I
Supervisor Candace Anderson, District II
Supervisor Diane Burgis, District III
Supervisor Karen Mitchoff, District IV
Supervisor Federal D. Glover, District V
651 Pine Street, Room 107
Martinez, CA 94553

Re: **May 1, 2018 Board of Supervisors Meeting, Agenda Item D7 – Report regarding media coverage asserting that loads of soil that may not have been adequately screened for radioactivity were trucked from Hunters Point site to multiple different landfills in the state, including Keller Canyon Landfill**

Honorable Members of the Board of Supervisors:

The City of Pittsburg is highly concerned about the articles regarding the contaminated radiological loads of soil that have been alleged to have been buried at Keller Canyon Landfill. The City and its residents have a right to know what has occurred since the original reports from 2014 and demands full disclosure of how the material accepted from Hunters Point Naval Shipyard has been managed.

Before the Board of Supervisors, April 11, 1995, there was a "Staff Report on the Scope and Nature of Special Waste Disposal at Keller Canyon Landfill," and from that report the Board of Supervisors requested a follow up report regarding the use of special waste and its acceptance. In addition, there was a critical item that was approved which county staff has not acted upon. It states:

> (3) Direct all county staff to *automatically* notify the City of Pittsburg and the Bay Point Municipal Advisory Council of all applications for special waste or any changes in operating conditions or permit conditions and <u>matters</u> related to Keller Canyon Landfill.

This did not occur as City staff had to contact county staff regarding this issue. At this point, based on the report in 1995 and issues today, the City demands that contaminated soil not be allowed to be used as cover at Keller Canyon Landfill immediately and in the future.

In addition, since there has been a lack of communication and no regard for the fears and concerns of residents especially with the offensive odor endured over the last two years with no resolve, the City demands that the Board of Supervisors direct county staff, in order to alleviate some discord with the City and residents in the community, the following:

- Close the landfill until the investigation is complete and the safety of the community is ensured to the satisfaction of the City

- Require US Nuclear Regulatory Commission / California Department of Public Health Radiological Branch perform swab testing in neighborhoods surrounding Keller Canyon Landfill to ensure that radiological material has not contaminated the community as well as the peripheral area and landfill itself
- Require US Navy / Tetra Tech have third party entity approved by City to perform core samples in the landfill where any and all Hunters Point material was buried to confirm or deny radiological material is present at Keller Canyon Landfill
- Provide the City a full report of all material accepted by Hunters Point Naval Shipyard indicating when loads were first accepted and how long this has been occurring, how many tons and what types of material, analytical associated with disposed material, and follow up samples of verification reports as well as profiles that occurred at Keller Canyon Landfill
- Provide the City with copies of all testing performed of the radiation monitor at Keller Canyon Landfill, all calibration reports, and verification of these actions by the county Local Enforcement Agency
- Require air monitoring throughout the surrounding community, as requested when the landfill was permitted, to monitor for PM 2.5 as well as other contaminates such as methane and hydrogen sulfide
- Require a community meeting to report back on all these issues and findings with a document for the City and its residents to review
- Provide the City and Board of Supervisors a report and protocol on how there will be better monitoring and accountability in the future to ensure this does not happen again
- Do not accept any future waste material from decommission military bases
- Designate City as Local Enforcement Agency as well as City Planning Department with oversight of Keller Canyon Landfill

The lack of trust and discord now about the oversight and management of the landfill has now caused irreputable harm. The City of Pittsburg's residents are directly adjacent to and subject to impacts from Keller Canyon Landfill. These reports, lack of responsibility and actions have not only caused duress and fear in the community but have also tainted the reputation of this City.

The City request swift action and follow through on the items noted in this letter.

Respectfully,

Joseph Sbranti
City Manager

cc. Mayor Pete Longmire
Vice-Mayor Salvatore Evola
Councilmember Marilyn Craft
Councilmember Juan Banalis
Councilmember Jelani Killings
Garrett Evans, Assistant City Manager
Laura Wright, Environmental Affairs Manager

WILLIAM B. WALKER, M.D.
HEALTH SERVICES DIRECTOR

RANDALL L. SAWYER
CHIEF ENVIRONMENTAL HEALTH & HAZMAT OFFICER

MARILYN C. UNDERWOOD, PHD. REHS
DIRECTOR OF ENVIRONMENTAL HEALTH

CONTRA COSTA
HEALTH SERVICES

cc: Laura

CONTRA COSTA
ENVIRONMENTAL HEALTH
2120 Diamond Blvd., Suite 200
Concord, California 94520
Ph (925) 692-2500
Fax (925) 692-2502
www.cchealth.org/eh/

February 24, 2015

Keller Canyon Landfill Company
Attn: Rick King
901 Bailey Road
Pittsburg, CA 94565

Subject: ***Facility Number – 07-AA-0032***
Keller Canyon Landfill – LEA Inspection Report

Dear Mr. King:

An inspection of the Keller Canyon Landfill was conducted on **February 23, 2015**, to ensure compliance with the Public Resources Code, Title 27 of the California Code of Regulations, the Solid Waste Facilities Permit, and other applicable codes and regulations within the purview of the Contra Costa Environmental Health Solid Waste Unit/Local Enforcement Agency (LEA). A copy of the inspection report is enclosed for your records.

Should you have any questions regarding the report, you may contact me at (925) 692-2549.

Sincerely,

Timothy R. Kraus, R.E.H.S.
Environmental Health Specialist II

Enclosure

cc: Lochlin Caffey, Keller Canyon Landfill Company
Keith Roberson, Regional Water Quality Control Board – SF Bay Region
Garrett Evans, City of Pittsburg
David Brockbank, Contra Costa Community Development

TRK:tf

CalRecycle

Disposal Facility Inspection Report (52)

Enforcement Agency:	County of Contra Costa				
SWIS Facility File Number (99-xx-9999)		Inspection Date		Program Code	
07-AA-0032		2/23/2015		LEA Periodic	
Time In	12:50 PM	Time Out	2:00 PM	Inspection Time	1 Hour 10 Min

Facility Name	Received By
Keller Canyon Landfill	Mail - Rick King, Keller Canyon Landfill
Facility Location	Owner Name
901 Bailey Road, Pittsburg 94565	Allied Waste Industries, Inc
Inspector	Also Present (Name)
Tim Kraus	T. Pattee - Allied Waste

THE ABOVE FACILITY WAS INSPECTED FOR COMPLIANCE WITH APPLICABLE SECTIONS OF THE DIVISION 30 OF THE PUBLIC RESOURCES CODE (PRC) AND TITLE 14 AND TITLE 27 CALIFORNIA CODE OF REGULATIONS (CCR)

X		No Violations or Areas of Concern
V	A	Regulations

Inspection Report Comments:

1) A review of records was conducted with Todd Pattee. Records reviewed included daily tonnage, special occurrences, manifests, radiation monitoring logs, load screening, site inspection, site inspection logs (daily, weekly, monthly), waste discrepancy logs, waste receipts, weather records, employee training, flare logs, fire pump house log, SWPPP, SPCC, wet season run off monitoring, ADC log, etc.
2) Monthly training conducted on forklift safety and the global harmonized system.
3) Hazardous waste storage accumulation dates: Waste oil - 1/20/2015, Antifreeze - 6/26/2015, Used Oil Filter Drums - 2/11/2015
4) No batteries in storage locker at time of inspection.
5) Radiation monitor calibrated on 1/31, 2/7, 2/14, 2/21

Keller Canyon Landfill

Screening Process
and
Waste Approval Protocol

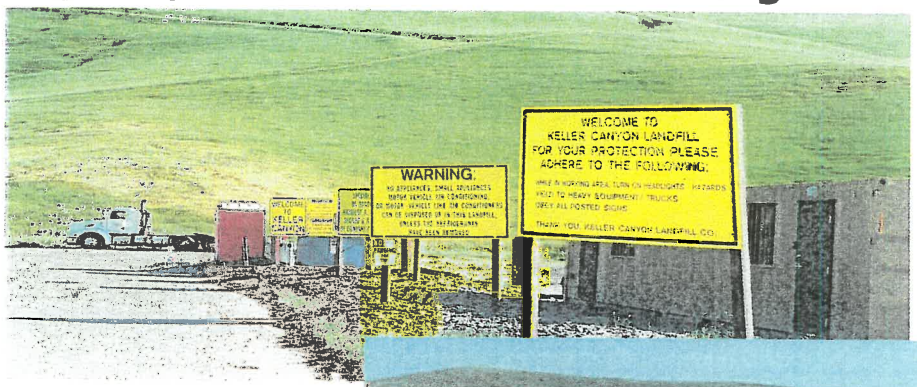
REPUBLIC SERVICES

Overview

- Republic is committed to an open dialogue to address concerns raised
- We have been providing information to your staff for review and analysis
- We believe it is essential to consider accurate and reliable information
- The facts are that no radiological waste has been received at Keller Canyon
- We have effective controls in place at facility to prevent acceptance, including monitors to detect such waste material
- We have extensive required processes for acceptance of materials from special projects
- These processes and protocols were followed for receipt of non-hazardous materials from Hunters Point

Screening Process

Signs posted at entrance to gatehouse



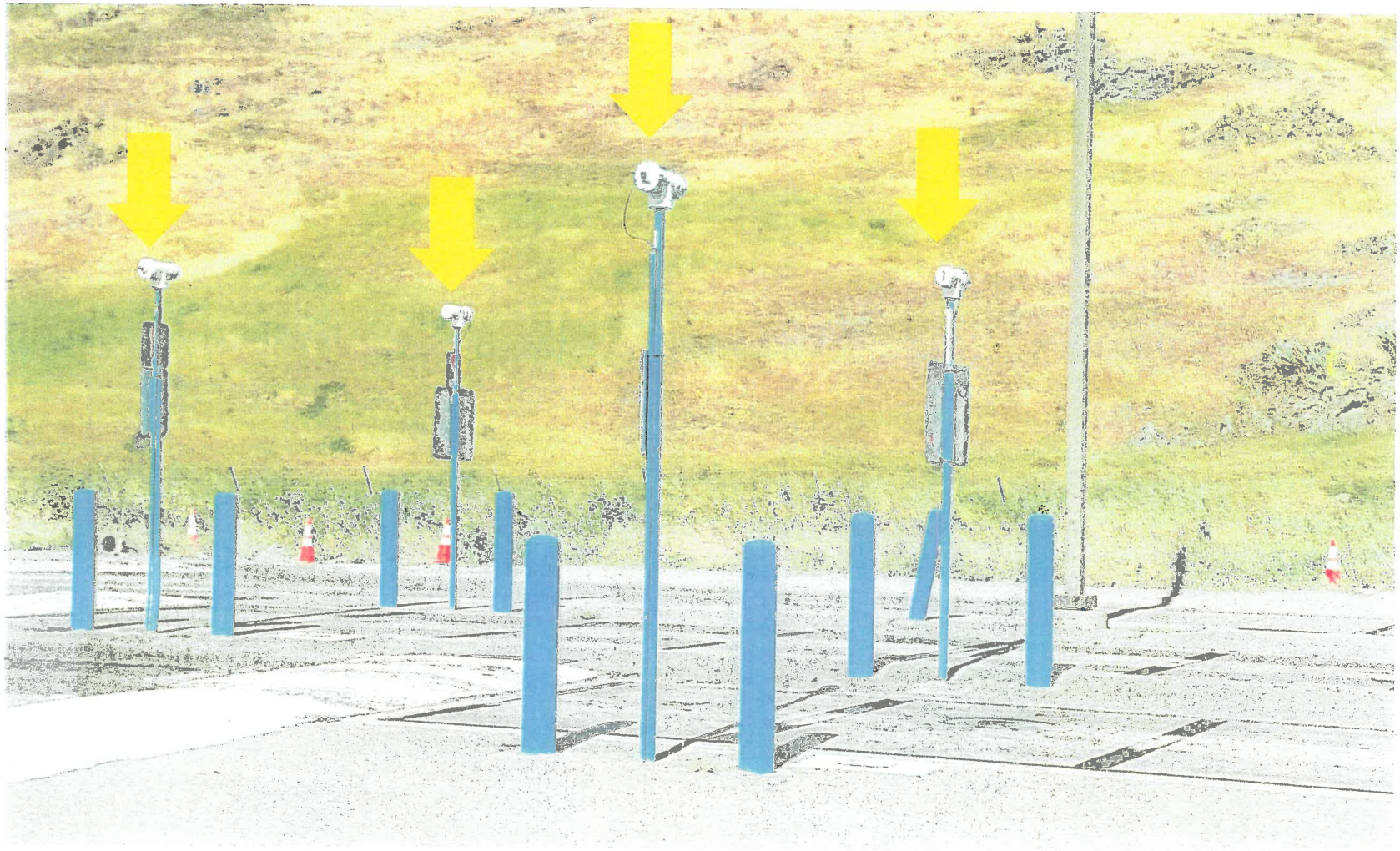
Screening Process (con't.)

- Every load must pass through set of radiation monitors
- Monitors are certified and calibrated annually
- Monitors are tested and logged weekly
- Load turned away if radiation alarm goes off and State of California Radiological Health Branch notified

KELLER CANYON LANDFILL
RADIATION MONITOR
WEEKLY LOG

DATE	TIME	SCALE #1		SCALE #2		INITIALS	COMMENTS
		PROBE #1	PROBE #2	PROBE #1	PROBE #2		

Screening Process (con't.)

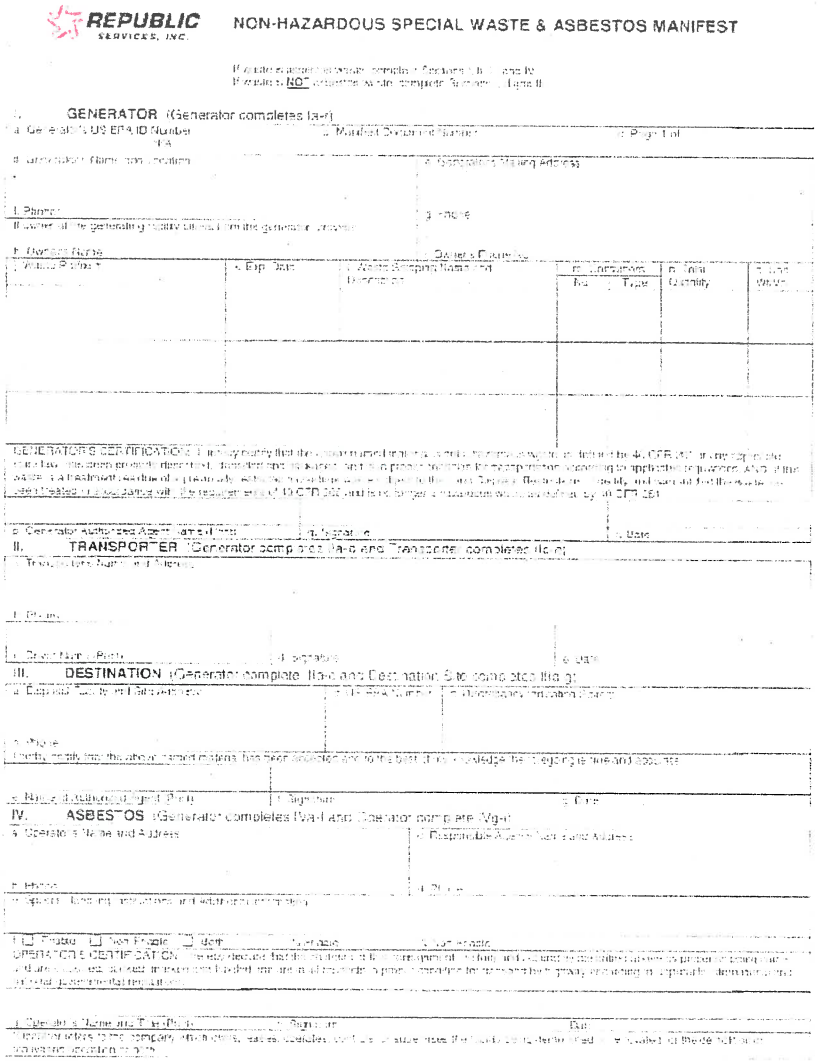


Radiation Monitors

Waste Approval Protocol

- Generator requests soil or debris come to facility
- Additional information requested
- Generator receives profile package
- Package requires material to be fully identified, analyzed, characterized and certified as to truth and accuracy by Generator
- Package must include all analytical data
- Entire package and data sent to corporate office
- If approved, package sent to site

Waste Approval Protocol (con't.)


REPUBLIC SERVICES, INC.

NON-HAZARDOUS SPECIAL WASTE & ASBESTOS MANIFEST

I. GENERATOR (Generator completes Ia-f)

II. TRANSPORTER (Generator completes IIa-c and Transporter completes IId-f)

III. DESTINATION (Generator complete IIIa-c and Destination Site completes IIId-g)

IV. ASBESTOS (Generator completes IVa-f and Operator completes IVg-n)

- Profile of data entered in scale computer system
- Required manifests sent to Generator
- Each load must have manifest with profile number.
- Each load compared to profile, inspected and unloaded.

Summary

- Extensive screening and waste approval process
- Has not received any radiological material from Hunters Point or any other location
- Did not receive material from Hunters Point after hours of operation
- Only accepted loads of material during our operating hours when the radiation monitors were operational and scale house personnel were present

Good morning Chair Mitchoff and Board,

I am here to summarize what I learned last week by reading and talking with many people familiar with the cleanup activities that have been occurring at the Hunters Point Naval Shipyard in San Francisco. My findings and recommendations for next steps are before you today because of concerns resulting from a San Francisco Chronicle newspaper article published on April 22nd in which there was an assertion that a Navy consultant's deliberate falsification of sampling data may have compromised adequacy of screening used to determine if soil should be accepted at Keller Canyon Landfill as well as several other landfills in California.

First, this is a serious implication, and so we immediately began researching this claim. And it is a complicated issue. Radiologic contamination is even more complex than chemical contamination.

Applicable state and federal regulatory agencies have found that there had been deliberate acts on the part of the Navy's selected consultant to misrepresent the radiological sampling data. To date these misrepresentations are tied to potentially contaminated soil/material being left on site instead of removing it. I want to repeat this, the reports released by the Nuclear Regulatory Commission and the USEPA reveal the falsification of data to allow soil to remain in place at the Hunters Point Naval Station.

At this point, we have no evidence that radiological material was sent to Keller Canyon; however there continue to be investigations by federal and state officials of the consultant's work. If some of the material that was sent to Keller Canyon, it was the same misrepresentations of the Navy consultant that allowed the material to be get to the landfill, and it almost no risk as it is either buried or dispersed and diluted in the roadway material. It is disappointing that the county nor Keller Canyon Landfill were contacted by any of the state or federal agencies about the possibility of Hunters Point waste being incorrectly sent to Keller Canyon.

As you are aware, Keller Canyon Landfill is a Class II landfill which primarily receives domestic garbage from Transfer Stations located in/near Martinez, North Richmond, City of Brentwood and Pittsburg. The landfill is not open to the public. In addition to domestic garbage Keller Canyon Landfill may accept Class II wastes, such as treated wood, soils with low levels of petroleum, and wastewater sludge. Approximately 10% of the material they receive is not domestic garbage (municipal solid waste). In order to be allowed to send Class II waste to the landfill, the responsible party must create an account with the landfill, attesting to the material that they will be sending, and providing specific information about the waste such as its characteristics and sampling data.

Keller Canyon is the most modern built landfill in the State with lining, a leachate and gas collection system and emissions and groundwater monitoring systems. It is not a landfill for the disposal of material deemed to be radioactive or hazardous. There is a radiation monitoring system that is on at all times when the facility is open. Each truck moves through the radiation monitoring system as it approaches the scales to weigh the load. The radiation monitor has been triggered in the past when higher levels of radioactive material were traced to a diaper of a child who had received a chemotherapy drug, in another instance the radiation monitor was activated with what ended up being a towel that a chemotherapy patient threw up in, and lastly another occasion when a driver of the truck set it off. The

truck driver had undergone a diagnostic procedure the day before that involved a radioactive tracer. However, the radiation monitor would not necessarily have been activated by low level radioactive waste that was buried in soil as the soil provides a shielding effect.

Keller Canyon has nearly 223 thousand tons of material on-site that came from Hunters Point Naval Shipyard. This material was deemed eligible for acceptance pursuant to the company's review and approval of 13 separate "special waste applications" for this waste, each one having its own data that was provided and certification stating it was not hazardous. Keller Canyon has never been notified that any of that data was falsified.

Along with my staff, we have found the following:

- The Shipyard which was closed in 1974 is being cleaned for chemical and radioactive material. The radioactive material is found at the shipyard because of the radium paint which glows in the dark and was used for ship deck markings and luminescent dials, gauges and signs; there was an animal testing lab; and from sandblasting ships that been part of the weapons testing in the South Pacific.
- The sewer line and storm drain system have been the focus of much of the radioactive investigation. Trenches have been dug over miles of the site to remove the pipes and the test the soil around it.
- The Navy identified in 2012 that there was some suspect soil data, and an investigation done by the consultant and provided to the Navy in 2014 supported this finding.
- An October 2016 report from the Nuclear Regulatory Commission found that as far back as 2011, the Navy consultant had misrepresented samples used to determine the need for soil removal.
- A December 2017 letter to the Navy from the USEPA commenting on a 2017 report from the Navy found the, "data analyzed demonstrate a widespread pattern of practices that appear to show deliberate falsification." The Navy is apparently in the process of designing a radiological assessment to follow-up on these falsifications.
- In 2015, 10 truck loads of material from Hunters Point was sent to Keller Canyon. A Navy engineer noticed that a trucking company was removing material from an area that had not yet been released. They contacted the California Department of Public Health who in turn contacted the landfill and indicated to them that the material had not yet been released for disposal. The landfill sent 20 truckloads back, gathering any material around where they had disposed of it. A subsequent investigation found that the material did contain several items that had low-level radioactivity which were removed from the material once it was back at Hunters Point. This is an example of when the system worked, the responsible party and the oversight agencies caught the mistake and took action to correct it. Our outstanding question is whether catching the mistake did not happen on other occurrences.

All of the studies and findings that I have reviewed and discussions I have had with state and federal point to contamination being left onsite as the concern. However, it is not clear how much effort has focused on understanding what was sent off-site, and in particular sent to Keller Canyon Landfill. and was that done correctly. So that leads us to recommend the following to the board.

- Formally ask the Navy to make itself available for meetings with interested community and stakeholders to better understand what might have occurred;
- Formally ask the Navy to investigate over a longer time period the quality of the data that was used to send the loads to Keller. Review the material that was provided to Republic Services to assert it could be disposed of safely at the landfill.
- Formally ask the Navy to conduct a surface survey of the site to see if there is any radiological hazard. Ask that this be done expediently to address our concerns, for instance within two months. Ask that the state Department of Public Health radiological experts, City of Pittsburgh, Republic Services, a community representative and the county be part of the planning of this effort. Doing this correctly is important as there is naturally occurring radioactive material and what will be done if a false positive occurs, how to interpret what is found. All of these issues take a knowledgeable person and a good plan. There is no acute health risk, so taking the time to do this correctly is important. I have talked with the California Department of Public Health and they too agree that the Navy should be asked to take the lead on the investigation. They offered to assist with the request of the Navy, and they offered their assistance with the planning of the investigation.
- Direct staff to return in 30 days with a follow-up status report for information and recommendations.

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: May 1, 2018

Subject: APPROVE the Camino Tassajara Bike Lane Gap Closure Project (Project) and take related actions under CEQA, San Ramon Valley area.

RECOMMENDATION(S):

APPROVE the Camino Tassajara Bike Lane Gap Closure Project and AUTHORIZE the Public Works Director, or designee, to advertise the Project, San Ramon Valley area. [Project No.0662-6R4010] DCD-CP# 17-49 (District III), and

FIND, on the basis of the whole record, including the proposed Initial Study/Mitigated Negative Declaration and any comments received and staff responses thereto, that there is no substantial evidence the Project may have significant effect on the environment, and that the Mitigated Negative Declaration reflects the independent judgment and analysis of the lead agency, Contra Costa County (County).

ADOPT the Mitigated Negative Declaration and Mitigation and Monitoring Reporting Program for the Project.

SPECIFY that the Contra Costa County Public Works Director is the custodian of the documents and other material that constitute the record

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd , Deputy

Contact: Matt Kawashima, 925 313-2161

cc: Ave Brown, Environmental Services, Matt Kawashima - Environmental Svs

RECOMMENDATION(S): (CONT'D)

of proceedings upon which the Board's decision is based, and that the record of proceedings is located at 255 Glacier Drive, Martinez, CA.

DIRECT the Director of Conservation and Development to file a Notice of Determination with the County Clerk, and,

AUTHORIZE the Public Works Director to arrange for payment of $2,280.75 for California Department of Fish and Wildlife fees, a $50 fee to the County Clerk for filing the Notice of Determination, and a $25 fee to Department of Conservation and Development for processing.

FISCAL IMPACT:

Estimated Project cost: $3,300,000. 40% Tri-Valley Transportation Council Funds, 30% Measure J Funds, and 30% South County Area of Benefit Funds.

BACKGROUND:

The Project will widen the existing roadway along four segments of Camino Tassajara from near Penny Lane to Windemere Parkway to provide two 12-foot travel lanes with up to 8-foot paved shoulders. The total length of roadway where the road will be widened and shoulders will be added is approximately 5,400 feet. The approximate roadway widening limits for each segment of Camino Tassajara are provided as follows: Segment 1 extends from 240 feet north of Penny Lane to 150 feet south of Johnston Road (approximately 1,500 feet long); Segment 2 extends from 1,300 feet north of Highland Road to (approximately 1,300 feet long); Segment 3 extends from 700 feet south of the bridge over Tassajara Creek to 2,050 feet south of the bridge over Tassajara Creek (approximately 1,350 feet long); Segment 4 extends from 1,600 feet north of Windemere Parkway to 350 feet north of Windemere Parkway (approximately 1,250 feet long). In addition, the Project will also apply a slurry seal along the entire roadway section from Lusitano Street to Windemere Parkway, which includes the four segments to be widened.

The purpose of this Project is to provide shoulders and connect the existing bike lanes resulting in a contiguous Class II bike lane along the entire County maintained portion of Camino Tassajara between Ballfields and Windemere Parkway. The Project goal is to bring the roadway along these segments up to current County standards, and provide drivers with a consistent roadway section and a wider area for recovery should they veer out of the travel lane. The Project will also contribute to the completion of the bikeway network proposed in the 2009 Contra Costa Countywide Bicycle and Pedestrian Plan.

CONSEQUENCE OF NEGATIVE ACTION:

Delay in approving the project may result in a delay of design, construction, and may jeopardize funding.

ATTACHMENTS

CEQA document

Letter from Governor's Office of Planning and Research

Department of Conservation and Development

30 Muir Road
Martinez, CA 94553

Phone:1-855-323-2626

Contra Costa County

FILED
MAR 07 2018
J.E. CANCIAMILLA COUNTY CLERK
CONTRA COSTA COUNTY
BY DEPUTY

John Kopchik
Director

Aruna Bhat
Deputy Director

Jason Crapo
Deputy Director

Maureen Toms
Deputy Director

Kara Douglas
Assistant Deputy Director

Kelli Zenn
Business Operations Manager

March 7, 2018

NOTICE OF PUBLIC REVIEW AND INTENT TO ADOPT A PROPOSED MITIGATED NEGATIVE DECLARATION

County File No. CP 17-49

Pursuant to the State of California Public Resources Code and the "Guidelines for Implementation of the California Environmental Quality Act of 1970" as amended to date, this is to advise you that the Department of Conservation and Development of Contra Costa County has prepared an Initial Study/Mitigated Negative Declaration for the following project:

PROJECT NAME: Camino Tassajara Bike Lane Gap

LEAD AGENCY: Contra Costa County Department of Conservation and Development

APPLICANT: Contra Costa County Public Works Department

LOCATION: The project is located in San Ramon Valley in unincorporated Contra Costa County on four segments of Camino Tassajara from near Penny Lane to Windermere Parkway as shown on Figures 1 and 2.

ZONING: A-80 (Exclusive Agriculture), A-2 (General Agriculture)

DESCRIPTION: The Project will widen the existing roadway along four segments of Camino Tassajara from near Penny Lane to Windemere Parkway to provide two 12-foot travel lanes with up to 8-foot shoulders as described below and shown. The total length of roadway where the road will be widened and shoulders will be added is approximately 5,400 feet. The approximate roadway widening limits for each segment of Camino Tassajara are provided as follows; Segment 1 extends from 240 feet north of Penny Lane to 150 feet south of Johnston Road (approximately 1,500 feet long). Segment 2 extends from 1,300 feet north of Highland Road to (approximately 1,300 feet long). Segment 3 extends from 700 feet south of the bridge over Tassajara Creek to 2,050 feet south of the bridge over Tassajara Creek (approximately 1,350 feet long). Segment 4 extends from 1,600 feet north of Windemere Parkway to 350 feet north of Windemere Parkway (approximately 1,250 feet long).

The Project will also apply a slurry seal along the entire roadway section from Lusitano Street to Windemere Parkway, which includes the four segments to be widened. The Project will provide consistent shoulders and will connect to the existing bike lanes resulting in a contiguous Class II bike lane along the entire County maintained portion of Camino Tassajara between Ballfields and Windemere Parkway. The Project will bring the roadway along these segments up to current County standards, and provide drivers

with a consistent roadway section and a wider area for recovery should they veer out of the travel lane. The Project will also contribute to the completion of the bikeway network proposed in the 2009 Contra Costa Countywide Bicycle and Pedestrian Plan.

To accommodate the widened roadway, excavation, grading, and/or embankment fill will be necessary on one or both sides of the roadway. The existing vertical alignment of the roadway will be retained. Slight localized variations in the horizontal alignment will result from and correspond to the road and shoulder widening. Existing striping will be removed and the roadway will be restriped. Roadway signage will be relocated and/or added as needed. Roadside obstacles, including utility poles, fences, drainage features, roadway signs, and/or mailboxes, will be relocated as necessary to accommodate the new roadway width. Additionally, roadside trees may need to be removed and modifications to roadside drainages will be necessary to accommodate the widening. This may include the replacement, extension, or relocation of culverts, the relocation or regrading of drainage ditches, and/or the modification of storm drain inlets. Real Property transactions may be necessary to accommodate the Project including temporary construction easements and right-of-way (ROW) acquisition from properties fronting Camino Tassajara. Standard lane closures and traffic control will be utilized during construction. No traffic detours are required. Project construction is anticipated to begin in April 2019 and conclude in October 2019. Construction would occur over approximately 45 working days for each segment while application of slurry seal and striping along the entire roadway would occur over approximately 10 days.

The Initial Study/Mitigated Negative Declaration (IS/MND) describes the proposed project; identifies, analyzes, and evaluates the potential significant environmental impacts, which may result from the Project; and identifies measures to mitigate adverse environmental impacts. Mitigation measures were identified in the areas of air quality, biological resources, cultural resources, geology and soils, and noise. Mitigation measures identified in this document will reduce impacts to a less-than-significant level.

A copy of the IS/MND may be reviewed at the Contra Costa County Public Works Department, 255 Glacier Drive, Martinez, during normal business hours. You may also view the IS/MND on the County's webpage: http://www.co.contra-costa.ca.us/4841/Public-Input. All documents referenced in the IS/MND are available on request.

PUBLIC COMMENT PERIOD: The 30-day public comment period for accepting comments on the adequacy of the environmental document is from **March 8, 2018 to April 6, 2018**. Any comments should be in writing and submitted to the following address and/or email address:

Matt Kawashima, Environmental Analyst II
Contra Costa County Public Works Department
255 Glacier Drive
Martinez, CA 94553
Matt.Kawashima@pw.cccounty.us

Any questions regarding the project itself should be directed to:

John Honey, PE, Staff Engineer
Contra Costa County Public Works Department
255 Glacier Drive
Martinez, CA 94553
925-313-2371
John.Honey@pw.cccounty.us

It is anticipated that the proposed IS/MND will be considered for adoption at the County Board of Supervisors meeting on **May 1, 2018**. To confirm the Board date, please contact Matt Kawashima at (925) 313-2161.

FIGURE 1: Regional Location Map

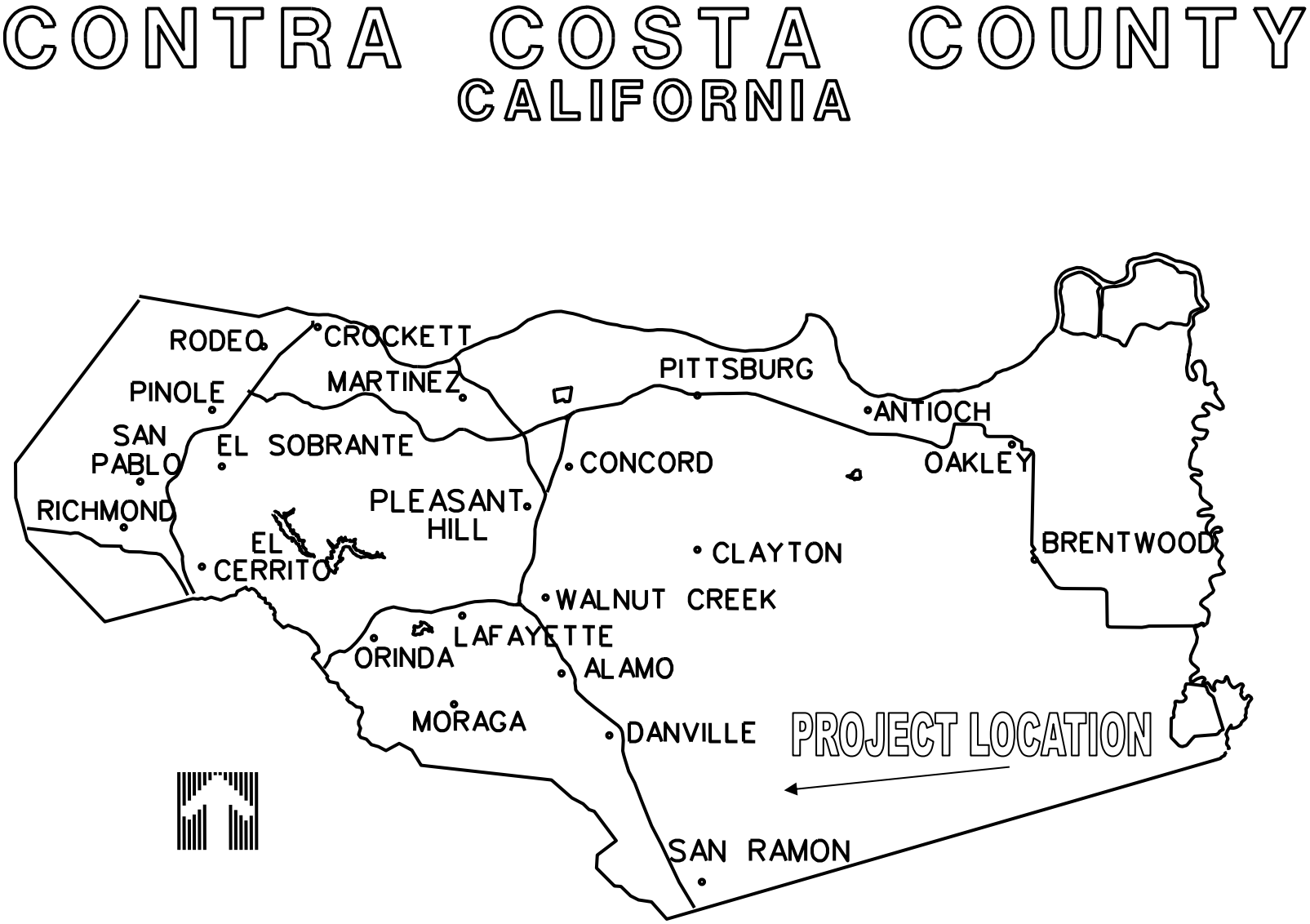


FIGURE 2: Project Vicinity Map

Contra Costa County

PUBLIC WORKS DEPARTMENT INITIAL STUDY OF ENVIRONMENTAL SIGNIFICANCE

PROJECT NUMBER: **0662-6R4010**
CP# **17-49**

PROJECT NAME: **Camino Tassajara Bike Lane Gap Closure Project**

PREPARED BY: Matt Kawashima MK DATE: February 7, 2018

APPROVED BY: [signature] DATE: 2-8-18

RECOMMENDATIONS:

☐ Categorical Exemption: 1530___ [Class___]
☒ Mitigated Negative Declaration
☐ Environmental Impact Report Required
☐ Conditional Negative Declaration

The project will not have a significant effect on the environment. The recommendation is based on the following: There is no substantial evidence that the Project or any of its aspects may cause a significant effect on the environment, pursuant to section 15063(b)(2) of the CEQA guidelines.

What changes to the project would mitigate the identified impacts: N/A

USGS Quad Sheet: **Tassajara**	**Base Map Sheet #:** **U19 & X20-23**	**Parcel #:** 206-030-022; 204-160-009; 203-030-065; 204-100-005 223-020-018; 205-090-010 205-050-008; 223-020-010; 223-030-006; 205-050-009; 223-030-013 223-041-021; 223-042-009; 223-042-008; 223-042-004; 223-042-007; 223-042-011; 223-041-022; 223-041-023; 223-041-014; 223-041-015; 223-041-013; 223-041-020

GENERAL CONSIDERATIONS:

1. **Location:** The Project is located within the San Ramon Valley, an unincorporated portion of Contra Costa County approximately 6 miles east of the City of San Ramon along Camino Tassajara from Lusitano Street to Windemere Parkway.

2. **Project Description:** The Project will widen the existing roadway along four segments of Camino Tassajara from near Penny Lane to Windemere Parkway to provide two 12-foot travel lanes with up to 8-foot shoulders as described below and shown. The total length of roadway where the road will be widened and shoulders will be added is approximately 5,400 feet. The approximate roadway widening limits for each segment of Camino Tassajara are provided below.

   1) Segment 1 extends from 240 feet north of Penny Lane to 150 feet south of Johnston Road (approximately 1,500 feet long).
   2) Segment 2 extends from 1,300 feet north of Highland Road to (approximately 1,300 feet long).
   3) Segment 3 extends from 700 feet south of the bridge over Tassajara Creek to 2,050 feet south of the bridge over Tassajara Creek (approximately 1,350 feet long).
   4) Segment 4 extends from 1,600 feet north of Windemere Parkway to 350 feet north of Windemere Parkway (approximately 1,250 feet long).

   The Project will also apply a slurry seal along the entire roadway section from Lusitano Street to Windemere Parkway, which includes the four segments to be widened. The Project will provide consistent shoulders and will connect to the existing bike lanes resulting in a contiguous Class II bike lane along the entire County maintained portion of Camino Tassajara between Ballfields and Windemere Parkway. The Project will bring the roadway along these segments up to current County standards, and provide drivers with a consistent roadway section and a wider area for recovery should they veer out of the travel lane. The Project will also contribute to the completion of the bikeway network proposed in the 2009 Contra Costa Countywide Bicycle and Pedestrian Plan.

   To accommodate the widened roadway, excavation, grading, and/or embankment fill will be necessary on one or both sides of the roadway. The existing vertical alignment of the roadway will be retained. Slight localized

variations in the horizontal alignment will result from and correspond to the road and shoulder widening. Existing striping will be removed and the roadway will be restriped. Roadway signage will be relocated and/or added as needed. Roadside obstacles, including utility poles, fences, drainage features, roadway signs, and/or mailboxes, will be relocated as necessary to accommodate the new roadway width. Additionally, roadside trees may need to be removed and modifications to roadside drainages will be necessary to accommodate the widening. This may include the replacement, extension, or relocation of culverts, the relocation or regrading of drainage ditches, and/or the modification of storm drain inlets.

Real Property transactions may be necessary to accommodate the Project including temporary construction easements and right-of-way (ROW) acquisition from properties fronting Camino Tassajara. Standard lane closures and traffic control will be utilized during construction. No traffic detours are required. Project construction is anticipated to begin in April 2019 and conclude in October 2019. Construction would occur over approximately 45 working days for each segment while application of slurry seal and striping along the entire roadway would occur over approximately 10 days.

3. Does it appear that any feature of the project will generate significant public concern?

☐ Yes ☒ **No** ☐ maybe (Nature of concern):

4. Will the project require approval or permits by other than a County agency?

☐ Yes ☒ **No**

5. Is the project within the Sphere of Influence of any city? Yes, San Ramon

Environmental Checklist Form

1. **Project Title:**
   Camino Tassajara Bike Lane Gap Closure Project

2. **Lead Agency Name and Address:**
   Contra Costa County Department of Conservation and Development
   30 Muir Road, Martinez, CA 94553

3. **Contact Person and Phone Number:**
   Matt Kawashima, Environmental Analyst II, (925) 313-2161
   Contra Costa County Public Works Department

4. **Project Location:**
   The Project is located within the San Ramon Valley, an unincorporated portion of Contra Costa County approximately 6 miles east of the City of San Ramon along Camino Tassajara from Lusitano Street to Windemere Parkway as shown in Figures 1, 2, and 3.

5. **Project Sponsor's Name and Address:**
   Contra Costa County Public Works Department
   255 Glacier Drive, Martinez CA 94553

6. **General Plan Designation:**
   AL (Agricultural Lands)

7. **Zoning:**
   A-2 (General Agriculture) and A-80 (Exclusive Agriculture)

8. **Project Description:**
   The Project will widen the existing roadway along four segments of Camino Tassajara from near Penny Lane to Windemere Parkway to provide two 12-foot travel lanes with up to 8-foot shoulders as described below and shown on Figures 4 through 7. The total length of roadway where the road will be widened and shoulders will be added is approximately 5,400 feet. The approximate roadway widening limits for each segment of Camino Tassajara are provided below.

   1. **Segment 1** extends from 240 feet north of Penny Lane to 150 feet south of Johnston Road (approximately 1,500 feet long).
   2. **Segment 2** extends from 1,300 feet north of Highland Road to (approximately 1,300 feet long).
   3. **Segment 3** extends from 700 feet south of the bridge over Tassajara Creek to 2,050 feet south of the bridge over Tassajara Creek (approximately 1,350 feet long).
   4. **Segment 4** extends from 1,600 feet north of Windemere Parkway to 350 feet north of Windemere Parkway (approximately 1,250 feet long).

   The Project will also apply a slurry seal along the entire roadway section from Lusitano Street to Windemere Parkway, which includes the four segments to be widened (Project).

The Project will provide consistent shoulders and will connect to the existing bike lanes resulting in a contiguous Class II bike lane along the entire County maintained portion of Camino Tassajara between Ballfields and Windemere Parkway. The Project will bring the roadway along these segments up to current County standards, and provide drivers with a consistent roadway section and a wider area for recovery should they veer out of the travel lane,. The Project will also contribute to the completion of the bikeway network proposed in the 2009 Contra Costa Countywide Bicycle and Pedestrian Plan (Contra Costa Transportation Authority 2009).

To accommodate the widened roadway, excavation, grading, and/or embankment fill will be necessary on one or both sides of the roadway. The existing vertical alignment of the roadway will be retained. Slight localized variations in the horizontal alignment will result from and correspond to the road and shoulder widening. Existing striping will be removed and the roadway will be restriped. Roadway signage will be relocated and/or added as needed. Roadside obstacles, including utility poles, fences, drainage features, roadway signs, and/or mailboxes, will be relocated as necessary to accommodate the new roadway width. Additionally, roadside trees may need to be removed and modifications to roadside drainages will be necessary to accommodate the widening. This may include the replacement, extension, or relocation of culverts, the relocation or regrading of drainage ditches, and/or the modification of storm drain inlets.

Real Property transactions may be necessary to accommodate the Project including temporary construction easements and right-of-way (ROW) acquisition from properties fronting Camino Tassajara. Standard lane closures and traffic control will be utilized during construction. No traffic detours are required. Project construction is anticipated to begin in April 2019 and conclude in October 2019. Construction would occur over approximately 45 working days for each segment while application of slurry seal and striping along the entire roadway would occur over approximately 10 days.

The roadway widening limits and any associated work will occur within the Area of Potential Impact shown on Figures 4 through 7. The Area of Potential Impact represents the maximum limit of work. As design of the Project is finalized, the actual area of impact will be reduced. The analysis in this document is based on the Area of Potential Impact and therefore represents a conservative analysis of potential impacts. Where applicable, the term "Project Site" will be used below to define the actual area of impact, any associated disturbance and staging areas as identified in the final plans. The Project Site will be located within the Area of Potential Impact shown on Figures 4 through 7.

9. **Surrounding Land Uses and Setting:**
Camino Tassajara is a two-lane arterial road with a 45 mile per hour speed limit along most of its length. The general Project area is rural in setting; with cattle grazing and equestrian facilities as common land uses. Camino Tassajara is located on the floor of the Camino Tassajara Valley. Topography within the vicinity of the Project Site is characterized by steeply to gently rolling hills to the east and west. Tassajara Creek meanders approximately parallel to the roadway crossing from the east side to the west south of Highland Road.

10. **Other public agencies whose approval is required** (e.g. permits, financing, approval, or participation agreement):
N/A

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:
The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials	☐ Hydrology/Water Quality
☐ Land Use/Planning	☐ Mineral Resources	☐ Noise
☐ Population/Housing	☐ Public Services	☐ Recreation
☐ Transportation/Traffic	☐ Tribal Cultural Resources	☐ Utilities/Service Systems
☐ Mandatory Findings of Significance		

DETERMINATION: (To be completed by the Lead Agency)
On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigations measures that are imposed upon the proposed project, nothing further is required.

Signature
Contra Costa County Department of Conservation and Development

2/28/17
Date

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EVALUATION OF ENVIRONMENTAL IMPACTS:

I. AESTHETICS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

According to the Contra Costa County General Plan 2005-2020 (General Plan), the County has two main scenic resources in addition to many localized scenic features: (1) scenic ridges, hillsides, and rock outcroppings; and (2) the San Francisco Bay/Delta estuary system. Throughout much of the County, there are significant topographic variations in the landscape. The largest and most prominent of these are the hills that form the backdrop for much of the developed portions of the area. Views of these major ridgelines help to reinforce the rural feeling of the County's rapidly growing communities. These major ridges provide an important balance to current and planned development (Contra Costa County 2005g).

Environmental Setting

Camino Tassajara is a two-lane arterial that runs from Danville through the Tassajara Valley to Dublin through single-family developments and rural residential areas. The general Project area is characterized by horse ranches, orchards, and pastureland flanked by grassy hills dotted with oak.

a) Would the project have a substantial adverse effect on a scenic vista?

The Project will not have a substantial adverse effect on a scenic vista. A scenic ridgeline identified on Figure 9-1 of the General Plan is located to the west of all Project segments and is visible in some part from all Project segments. However the Project is a simple shoulder-widening project that will not block or change views in any direction. Therefore, the Project will have **no impact**.

b) Would the project substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

The Project is not located within a state scenic highway (Caltrans 2011). The Project Site is identified as a scenic route on Figure 5-4 of the General Plan. No historic buildings, rock outcroppings or other potentially scenic resources would be impacted by the Project. Some tree removal may be necessary but would be limited to small trees in or adjacent to the road right-of-way and does not include large trees or groups of trees that would make a noticeable difference to the scenic quality of the route. Further, the Project will facilitate access to the route for bicyclists. Therefore, the Project impacts will be **less than significant**.

c) *Would the project substantially degrade the existing visual character or quality of the site and its surroundings?*

The Project will cause very little visual change to the existing roadway and surrounding area because of the limited scope and nature of the Project. The Project is limited to lane and shoulder widening and associated work including relocation of existing utility support poles, restriping, and re-grading of existing ditches. Once the Project is complete the roadway will not look substantially different from the existing condition. The Project will not remove elements that define the area, or introduce buildings, structures or other features that would not be compatible with the character of the area. Some tree and vegetation removal may be necessary; however, it will be minimal and would not affect the overall appearance or character of the area. Therefore, Project impacts will be **less than significant**.

d) *Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?*

The Project will not create a new permanent source of light or glare that would adversely affect day or nighttime views. No reflective surfaces or lights would be installed by the Project. Construction is expected to take place during the daylight hours. If unforeseen circumstances necessitate night work, it would be temporary and require approval by the Resident Engineer who will be available to address any concerns. Therefore Project impacts will be **less than significant**.

II. AGRICULTURE AND FOREST RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☒	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act Contract?	☐	☒	☐	☐
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment, which due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Regulatory Setting

Farmland Mapping and Monitoring Program (FMMP)

Maintained by the California Department of Conservation (DOC), the FMMP rates agricultural land in the state according to soil quality and irrigation status. The best quality land is called Prime Farmland, which has the best combination of physical and chemical features able to sustain long term agricultural production. Farmland of Statewide Importance is similar to Prime Farmland, but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Unique Farmland is farmland of lesser quality soils used for the production of the state's leading agricultural crops. Farmland of Local Importance is land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee. Maps and statistical data used for analyzing impacts on California's agricultural resources are updated every two years with the use of a computer mapping system, aerial imagery, public review, and field reconnaissance.

Williamson Act

The Williamson Act enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value.

Land Evaluation and Site Assessment

California DOC's Land Evaluation and Site Assessment (LESA) is an approach for rating the relative quality

of land resources based upon specific measurable features. When used for California Environmental Quality Act impact analysis, the LESA model provides "an optional methodology to ensure that significant effects on the environment of agricultural land conversions are quantitatively and consistently considered in the environmental review process" (Public Resources Code Section 21095).

Environmental Setting

The four segments are zoned General Agriculture (A-2) and/or Exclusive Agriculture (A-80) (Figure 8). According to the FMMP, portions of the four segments overlap with Farmland of Local Importance, Prime Farmland, and Unique Farmland (Figure 9). All four segments are located within an area identified as an "Important Agricultural Area" in the Conservation Element of the County General Plan (AWE 2017).

The following analysis is based on the Farmland Conversion Impact Analysis (Farmland Report) prepared for the Project by Area West Environmental, Inc. (AWE 2017)

a) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

The Project may require minimal takes of farmland adjacent to the road shoulder to accommodate the shoulder widening. The Farmland Report prepared for the Project was conducted prior to final design and was based on the estimated Area of Potential Impact. Therefore the analysis is conservative in nature and actual Project impacts are expected to be less than those analyzed in the Farmland Report. The Farmland Report used the LESA model, which takes into consideration several conditions to determine impacts. All segments score below the significance threshold for agricultural land conversion when evaluated using the LESA model using the maximum impact area. Further, given the very small impact areas and proximity of the impact (sliver takes along the road right of way), the viability of the farmland will not be affected nor will the conversion affect the viability of the agricultural use in the area. Therefore, impacts will be **less than significant**.

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act Contract?

The General Plan Conservation Element contains many goals and policies intended to protect agricultural land. These goals and policies primarily address conversion of agricultural land through urban development. Additional policies stress the economic importance of agriculture, strengthen the availability of agriculture support services and infrastructure, and facilitate cooperation between farmers and their urban neighbors. A review of General Plan policies pertaining to agriculture and the Contra Costa County zoning code for Land Use Districts A-2 and A-80 did not reveal inconsistencies with the provisions of these land use designations and districts that would result from implementation of the Project (Municode 2017, Contra Costa County 2005f).

A parcel along the eastern roadside along Segment 2 is under a Williamson Act contract (APN 205-090-010). Additionally, parcels along both the western and eastern roadside at Segment 3 are under a Williamson Act contract (APN 223-030-006, 205-050-009). As such, the Project may require right of way acquisition of a small area adjacent to the roadway that is currently under Williamson Act. When considering road alignment alternatives (to widen on one side of the existing road or another) every attempt will be made to avoid Williamson Act parcels where it doesn't result in a sub-standard road alignment. If necessary, the Contra Costa County Public Works Department (CCCPWD) would purchase necessary right of way in fee-title, which is not expected to affect the Williamson Act contract on the remainder of the parcel. Purchase of the right of way would not be influenced by the price of the land but

by necessity. There are no alternative sites that could be developed to provide the same public improvement without resulting in greater impacts to farmland and the environment. As such, the Project may require minimal takes of one or more parcels under a Williamson Act Contract. However, as required by Government Code Section 51291(b), if acquisition of land under a Williamson Act contract is necessary, the Director of the California Department of Conservation and the Contra Costa County Department of Conservation and Development will be notified of the proposed acquisition, and will be provided with a subsequent notification within 10 working days upon completion of the acquisition. Therefore, implementation of Mitigation Measure AGR-1 will reduce potentially significant impacts to **less than significant with mitigation incorporated**.

IMPACT AGR-1

Development of the Project may require right-of-way acquisition of a small roadside area that is currently under Williamson Act.

MITIGATION MEASURE AGR-1:

If right of way takes of land under a Williamson Act Contract is necessary, prior to construction the CCCPWD or its designated representative will notify the Director of the California Department of Conservation and the Contra Costa County Department of Conservation and Development of the property acquisition and will provide a subsequent notification within 10 working days upon completion of the acquisition.

c) Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)?

The zoning in the Area of Potential Impact is specific to agriculture A-2 (General Agriculture) and A-80 (Exclusive Agriculture), there is no forestland, or land zoned for timberland production in the Project vicinity. These conditions preclude impacts to forestland or timberland. Therefore, the Project will have **no impact**.

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

The Project will not result in the loss of forest land or conversion of forest land to non-forest use because forest land is not present within or adjacent to the Project Site. Therefore, the Project will have **no impact**.

e) Would the project involve other changes in the existing environment, which due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use?

The Project is located along an existing roadway, will not increase the capacity of the roadway, facilitate growth, or encourage development of other land uses that could indirectly result in the conversion of Farmland. Therefore, the Project will have **no impact**.

III. AIR QUALITY

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute to an existing or projected air quality violation?	☐	☒	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☒	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☒	☐	☐

Regulatory Setting

The Clean Air Act requires the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards for six common air pollutants known as criteria air pollutants. They are: particle pollution (often referred to as particulate matter or PM_{10} and $PM_{2.5}$), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. Of the six pollutants, particle pollution and ground-level ozone are the most widespread health threats (USEPA 2017). The San Francisco Bay Area Air Basin (SFBAAB) is currently designated as a nonattainment area for state ozone and particulate matter standards for air quality. In addition, the SFBAAB is designated as nonattainment for the national 8-hour ozone and $PM_{2.5}$ air quality standards (BAAQMD 2017b).

The Bay Area Air Quality Management District (BAAQMD) is the regional, government agency that regulates sources of air pollution within the nine San Francisco Bay Area Counties. In addition to criteria pollutants, the BAAQMD enforces the California Airborne Toxic Control Measure (ATCM) that regulates the Naturally-Occurring Asbestos (NOA) emissions from grading, quarrying, and surface mining operations at sites which contain ultramafic rock. According to the 2000 map "A General Location Guide for Ultramafic Rocks in California - Areas More Likely to Contain Naturally Occurring Asbestos", the Project is not in an area likely to contain ultramafic rocks (CDC 2000).

The BAAQMD periodically prepares and updates plans to establish rules and regulations for various emissions sources. In June 2010, the BAAQMD adopted new thresholds of significance and in 2011 updated its CEQA Guidelines. On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the 2010 thresholds. Subsequent proceedings may ultimately reinstate the 2010 thresholds. As such, the 2010 thresholds are not formally in place and have been pulled from the BAAQMD CEQA Guidelines which were updated to omit the thresholds to reflect the 2012 ruling. BAAQMD's Justification Report, found in Appendix D of BAAQMD's May 2017 CEQA Guidelines, explains the agency's reasoning and provides substantial

evidence for developing and adopting their 2017 thresholds (BAAQMD 2017a). As such, BAAQMD's thresholds are supported by substantial evidence and are used to evaluate the significance of air quality impacts associated with the Project.

The following analysis is based on the Camino Tassajara Bike Lane Gap Closure Construction Emissions Assessment and Air Quality Memo prepared for the Project by Nichols Consulting Engineers (NCE 2017).

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

The air quality plan applicable to the proposed project is the BAAQMD's 2017 Clean Air Plan (Clean Air Plan), which was adopted April 19, 2017.

Consistency with the Clean Air Plan can be determined if the project: 1) supports the goals of the Clean Air Plan; 2) includes applicable control measures from the Clean Air Plan; and 3) would not disrupt or hinder implementation of any control measures from the Clean Air Plan. If it can be concluded with substantial evidence that a project would be consistent with the above criteria, then the BAAQMD considers it to be consistent with air quality plans prepared for the region. An evaluation of the consistency of the Project with the Clean Air Plan is provided below.

Clean Air Plan Goals. The primary goals of the Clean Air Plan are to: attain air quality standards; reduce population exposure to air pollutants and protect public health in the Bay Area; and reduce greenhouse gas emissions and protect the climate. As indicated in the analysis that follows below, the Project will not cause significant air quality or greenhouse gas emissions impacts and will not increase exposure of the population to air pollutants. The Project will not hinder the region from attainment of the goals outlined in the Clean Air Plan. Therefore, the project supports the goals of the Clean Air Plan.

Clean Air Plan Control Measures. The control strategies of the Clean Air Plan include measures in the following categories: stationary sources measures, mobile source measures, transportation control measures, land use and local impact measures, and climate measures. The control strategies applicable to the project are the Transportation and Mobile Source Control Measures.

Transportation and Mobile Source Control Measures. The BAAQMD identifies transportation and mobile source control measures as part of the Clean Air Plan to reduce ozone precursor emissions from stationary, area, mobile, and transportation sources. The transportation control measures are applicable to the Project and are designed to reduce emissions from motor vehicles by reducing vehicle trips and vehicle miles traveled (VMT) in addition to vehicle idling and traffic congestion. The Project is a road widening project that would widen the existing shoulder to current County standards. The Project will not add lanes that would increase the capacity of the roadway for motorized vehicles and therefore will not result in a long-term increase in emissions. In addition, the Project will provide sufficient space for a signed and striped Class II bicycle lane, which would support the ability of individuals to use alternative modes of transportation. Therefore, the Project will not conflict with the identified transportation and mobile source control measures of the Clean Air Plan.

Clean Air Plan Implementation. As discussed above, implementation of the Project will not disrupt or hinder implementation of applicable measures outlined in the Clean Air Plan, including stationary sources measures, mobile source measures, transportation control measures, land use and local impact measures, and climate measures. Therefore, the Project will not hinder or disrupt implementation of any control measures from the Clean Air Plan.

As discussed above, the Project will not conflict with or obstruct implementation of the Clean Air Plan and this impact will be **less than significant**.

b) *Would the project violate any air quality standard or contribute to an existing or projected air quality violation?*

The Bay Area is under nonattainment status for State 1-hour and 8-hour ozone standards. In addition, the Bay Area was designated as a nonattainment area for the federal 8-hour ozone standard. The Bay Area is also considered a nonattainment area for $PM_{2.5}$ at the state level and an attainment area at the federal level.

As discussed above in (a), the Project will not result in long-term operational impacts. However, during construction, short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other activities particularly during site preparation. Emissions from construction equipment are also anticipated and would include CO, NO_x, ROG, directly-emitted particulate matter ($PM_{2.5}$ and PM_{10}), and toxic air contaminants (TACs) such as diesel exhaust particulate matter. Each segment would include utility relocation, clearing and grubbing, grading and excavation, saw cutting, compacting, paving, slurry seal application, and striping. In addition to dust-related PM_{10} emissions, construction equipment powered by gasoline and diesel engines would generate CO, SO_2, NO_x, VOCs and some soot particulate ($PM_{2.5}$ and PM_{10}) in exhaust emissions.

Construction emissions for the project were calculated using the Road Construction Emissions Model v. 8.1.0, developed by the Sacramento Metropolitan Air Quality Management District and the California Emissions Estimator Model (CalEEMod) Version 2016.3.1. Construction is anticipated to begin in April 2019 and conclude in October 2019 with each segment occurring over approximately 45 days. A summary of average daily constructions emissions is shown in Table 1. The analysis evaluated potential impacts from the following construction scenarios:

- Scenario A: No Segment Construction Overlap
- Scenario B: Two Segment Construction Overlap
- Scenario C: Three Segment Construction Overlap
- Scenario D: All Segment Construction Overlap

Table 1: Summary of Average Daily Construction Emissions By Segment

Segment	Emissions (lb/day)			
	ROG	**NO_x**	**PM_{10} (Exhaust)**	**$PM_{2.5}$ (Exhaust)**
Segment 1	1.6	15.1	1.0	0.8
Segment 2	1.6	15.4	1.0	0.9
Segment 3	2.4	23.1	1.4	1.2
Segment 4	2.1	20.4	1.2	1.1
Slurry Seal/Striping	35.6	3.6	0.2	0.2
BAAQMD Threshold of Significance	54	54	82	54

Source: Nichols Consulting Engineers, 2017

Exceed Thresholds of Significance?

- Scenario A: No Segment Construction Overlap: No
- Scenario B: Two Segment Construction Overlap: No
- Scenario C: Three Segment Construction Overlap: Yes, NO_x emissions (58.9 lbs/day)
- Scenario D: All Segment Construction Overlap: Yes, NO_x emissions (74.4 lbs/day)

Under all Scenarios the average daily construction emissions of $PM_{2.5}$ would not exceed the applicable thresholds adopted by BAAQMD during the construction period. However, the BAAQMD has established standard measures for reducing fugitive dust emissions (PM_{10}) that are recommended for all projects. With the implementation of standard construction measures fugitive dust emissions from construction activities would not result in adverse air quality impacts. Mitigation Measure AIR-1 would be implemented under all construction scenarios to further reduce fugitive dust emissions.

Scenarios C and D would result in NO_x emissions that exceed the applicable threshold of 54 pounds per day. It is anticipated that construction will not occur under Scenarios C and D however, if one of these option is chosen, Mitigation Measure AIR-2 would be implemented under construction scenarios C or D to reduce NO_x emissions to a less-than-significant level.

IMPACT AIR-1

Construction activities could result in fugitive dust emissions during Project construction.

MITIGATION MEASURE AIR-1:

Consistent with the Construction Mitigation Measures required by the BAAQMD, the construction contractor shall comply with the following:

1) All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2) All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3) All visible mud or dirt tracked-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4) All vehicle speeds on unpaved roads shall be limited to 15 mph.
5) All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible.
6) Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7) All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8) A publicly visible sign shall be posted with the telephone number and contact information for the designated on-site construction manager available to receive and respond to dust complaints. This person shall report all complaints to Contra Costa County and take immediate corrective action as soon as practical but not more than 48 hours after the complaint is received. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

IMPACT AIR-2
Construction of three or four segments simultaneously (Scenario C and D) will result in NO_x emissions that exceed the BAAQMD Thresholds of Significance.

MITIGATION MEASURE AIR-2:
Prior to construction, the construction contractor shall provide a written calculation to the County, demonstrating that the heavy-duty (> 50 horsepower) off-road vehicles to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a project wide fleet-average of at least 28 percent of NO_X and 45 percent of diesel PM reduction as compared to California Air Resources Board (CARB) statewide fleet average emissions. Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products (e.g., CARB approved High Performance Renewable Diesel), alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available. The Construction Emissions Mitigation Tool development by the Sacramento Metropolitan Air Quality Management District (SMAQMD) may be used to calculate compliance with this condition and shall be submitted to the approving agency as described above.

Localized CO Impacts. The BAAQMD has established a screening methodology that provides a conservative indication of whether implementation of a proposed project will result in significant CO emissions. According to the BAAQMD's CEQA Air Quality Guidelines, a proposed project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria are met:

1. The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, and the regional transportation plan and local congestion management agency plans.
2. The proposed project would be expected to alleviate congestion on roadways and not increase traffic volumes. Therefore, the project would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour, nor would it increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, or below-grade roadway).

The Project would not conflict with the Contra Costa County Transportation Authority's Congestion Management Program for designated roads or highways, a regional transportation plan, or other agency plans (CCTA 2015). Therefore, the Project will not result in localized CO concentrations that exceed state or federal standards. Further, the proposed Project will bring the current roadway up to current County standards and provide paved shoulders with sufficient width for a Class II bicycle lane. The Project will help alleviate congestion by providing opportunities for alternative forms of transportation and creating a safer roadway segment. Therefore, Project impacts will be **less than significant with mitigation incorporated**.

c) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

CEQA defines a cumulative impact as two or more individual effects, which when considered together, are considerable or which compound or increase other environmental impacts. According to the BAAQMD, air pollution is largely a cumulative impact and no single project is sufficient in size itself to result in nonattainment of ambient air quality standards. In developing the thresholds of significance for

air pollutants used in the analysis above, the BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. The BAAQMD CEQA Air Quality Guidelines (2012) indicate that if a project exceeds the identified significance thresholds, it's emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, if a project's daily average or annual emissions of operational-related criteria air pollutants exceed any applicable threshold established by the BAAQMD, the proposed Project will result in a cumulatively significant impact. As stated previously the Project will not result in operational impacts. Further, the Project will likely reduce operational emissions with new bicycle lanes and improved traffic flow. As such, the Project will not exceed established thresholds for regional emissions or make a cumulatively considerable contribution to regional air quality impacts. Mitigation Measures AIR-1 and potentially AIR-2 would be implemented to reduce construction impacts to less than significant levels. Therefore, project impacts will be **less than significant with mitigation incorporated**.

d) Would the project expose sensitive receptors to substantial pollutant concentrations?

Sensitive receptors are defined as residential uses, schools, daycare centers, nursing homes, and medical centers, and other high-risk receptors. Individuals particularly vulnerable to diesel particulate matter (DPM) are children, with lung tissue that is still developing, and the elderly, who may have serious health problems that can be aggravated by exposure to DPM. Health risks from toxic air contaminants (TACs) such as construction diesel emissions are a function of both concentration and duration of exposure. Construction diesel emissions are temporary, affecting an area for a period of days or perhaps weeks throughout the construction period. Additionally, construction-related sources are mobile and transient in nature and the emissions occur with the project site with concentration dispersing rapidly with distance. Implementation of Mitigation Measure AIR-1 and potentially AIR-2 would help to reduce construction pollutant concentrations.

The closest sensitive receptors in the Project vicinity are residences located adjacent to the roadway segments. Residents could be temporarily exposed to diesel engine exhaust during the construction period due to the operation of construction equipment. The BAAQMD CEQA significance threshold for potential effects of DPM applies to the hypothetical exposure of a person continuously for 70 years. The duration of the construction period is expected to be a total of 6 months which is relatively short when compared to the 70-year risk exposure period. Additionally, the 6 month period would cover each of the four roadway segments included as part of the Project. Therefore, emission concentrations at any one receptor location would have a much shorter duration. Due to the short duration of the construction period and the dispersion of project construction emissions, health risk impacts associated with Project construction would be less than significant. Additionally, with implementation of Mitigation Measure AIR-1 and potentially AIR-2, which is consistent with BAAQMD guidelines, health risks from construction emissions of DPM would be further reduced. Therefore, project impacts will be **less than significant with mitigation incorporated**.

e) Would the project create objectionable odors affecting a substantial number of people?

The operational aspects of the Project will not generate any objectionable odors. Construction equipment exhaust and asphalt paving operations may create objectionable odors in the vicinity of homes. However, these will be limited and temporary in nature and avoided with implementation of Mitigation Measures AIR-1 and potentially AIR-2. Therefore, the Project will have a **less than significant with mitigation incorporated**.

IV. BIOLOGICAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan?	☐	☐	☐	☒

Regulatory Setting

In 1973, the federal Endangered Species Act (ESA) was passed by Congress to protect ecosystems supporting special-status species to be administered by the U. S. Fish and Wildlife Service (USFWS). The California Endangered Species Act was passed as a parallel act to be administered by the California Department of Fish and Wildlife (CDFW). Special-status plant and wildlife species are defined as those species listed as Endangered, Threatened, or Proposed for listing or are designated as Fully Protected species under one or more of the following regulatory status:

- Federal Endangered Species Act, as amended (Code of Federal Regulations, Title 50, Section 17);

- California Endangered Species Act (California Code of Regulations Title 14, Section 670.5);
- California Fish and Game Code (Section 1901, 2062, 2067, 3511, 4700, 5050, and 5515);
- Species considered to be rare or endangered under the conditions of Section 15380 of the CEQA Guidelines such as those identified in the *Inventory of Rare and Endangered Vascular Plants of California* by the California Native Plant Society (CNPS) (Native Plant Protection Act of 1977); and
- Other species that are considered sensitive or of special concern due to limited distribution or lack of adequate information to permit listing, or rejection for state or federal status such as Species of Special Concern (SSC) designated by the CDFW as well as locally rare species defined by CEQA Guidelines 15125(c) and 15380, which may include species that are designated as sensitive, declining, rare, locally endemic or as having limited or restricted distribution by various federal, state, and local agencies, organizations, and watchlists such as those identified in the CDFW California Natural Diversity Database; as well as birds and raptors protected under the Federal Migratory Bird Treaty Act (16 U.S.C. 703-711) (Executive Order 13186) and bald and golden eagles protected under the Bald and Golden Eagle Protection Act of 1940.

Environmental Setting

The following analysis was based on the Biological Resources Assessment prepared for the Project in 2017 by Contra Costa County Public Works Department with the assistance of Area West Environmental Inc. (CCCPWD 2017). Area West conducted a biological resources assessment of the Project, which included a review of literature and databases, reconnaissance-level field surveys, a delineation of potentially jurisdictional areas. Because the exact alignments were not available at the time of the biological assessment, a conservative maximum area of effect identified as the Area of Potential Impact was used to analysis potential impacts. The Biological Study Area (BSA) represents the Area of Potential Impact and a 250-foot buffer. Vegetation communities or land cover types at the Project consist of the following: annual grassland, cropland, developed, orchard, ornamental, riparian, riverine, ruderal, and roadside ditch. These communities are described below and summarized in Table 2.

- **Annual Grassland**. The areas classified as annual grassland consist primarily of non-native annual grasses with a small forb component. Annual grassland occurs throughout the BSA for all four segments, with the majority used for livestock grazing. Where annual grassland abuts private property, it had been mowed prior to the site visit. Vegetation in this habitat is mostly herbaceous with a few valley oak (*Quercus lobata*) trees scattered throughout the annual grassland. This habitat is dominated by upland plant species, including soft chess brome (*Bromus hordeaceus*), yellow star thistle (*Centaurea solstitialis*), wild oat (*Avena fatua*), red-stem filaree (*Erodium cicutarium*), and Crane's bill geranium (*Geranium molle*).
- **Cropland**. Cropland is present along the sides of Camino Tassajara Road in Segment 1 on the eastern side of the BSA. These areas were recently tilled and consisted mostly of bare ground, with upland annual grasses and forbs along margins. The cropland is likely used for hay or other forage production.
- **Developed**. The developed vegetation community includes private residential homes, paved roadways, and shoulders. Roads consist of unvegetated sections of Camino Tassajara Road and associated shoulders. The private residential homes are scattered along the side of the road throughout the BSA. Vegetation, when present, is sparse and consists primarily of scattered upland annual grasses and forbs. Vegetation within the developed habitat is regularly mowed and/or sprayed with herbicide.
- **Orchard**. Orchard is present along the sides of Camino Tassajara Road in Segment 2 and Segment 3

on the eastern side of the BSA. Orchard habitat consists of flood-irrigated nut and olive orchards. The understory of orchard habitat was mostly barren or comprised of sparse weedy annuals. Two types of orchards were observed, one consisting of English walnut (*Juglans regia*) and the other consisting of olive (*Olea europea*).

- **Ornamental**. Ornamental vegetation includes landscaped areas adjacent to private residential homes, and other developed properties. A majority of the ornamental vegetation is irrigated. Some native species associated with other habitats, such as riparian or oak woodland, are present within this vegetation community. Ornamental vegetation consists primarily of fir (*Abies* spp.), coast redwood (*Sequoia semipervirens*), oleander (*Nerium oleander*), and blue grass (*Poa* spp.).
- **Riparian**. The riparian vegetation community is present within the BSAs for segments 2, 3 and 4, outside of the Project Site. These habitats are associated with Tassajara Creek (described below). Within the BSA, the riparian over story is dominated by California black walnut (*Juglans hindsii*), coast live oak (*Quercus agrifolia*), valley oak, and willow (Salix sp.), with an understory consistent with adjacent annual grassland, as well as coyote brush (*Baccharis pilularis*).
- **Riverine**. Tassajara Creek is a perennial stream within the BSAs for segments 2, 3 and 4, outside of the Project Site, that runs roughly parallel to the Project segments.
- **Ruderal**. Ruderal vegetation is present along roadsides and adjacent to developed areas throughout the BSA. Ruderal areas are frequently disturbed by routine maintenance that regularly remove and/or disturb vegetation, resulting in bare ground or weedy annual grasses and forbs. Within the BSA, these areas include horse paddocks and a baseball diamond. Vegetation in the ruderal areas is mostly herbaceous with a few valley oak, coast live oak, and coyote brush scattered throughout the BSA. The herbaceous layer of plants is dominant and consists of soft chess brome, yellow star thistle, wild oats, red-stem filaree, and Crane's bill geranium.
- **Roadside Ditch**. There are eight roadside ditches in the BSA. These roadside ditches were formed as the result of excavation conducted in uplands, and the hydrology of the features was designed to collect and convey stormwater from Camino Tassajara Road through a system of above ground and subsurface drainages to Tassajara Creek. All eight roadside ditches are stormwater control features that were excavated in uplands and that drain uplands.

Table 2: Vegetation Communities Within the Biological Study Area

Vegetation Community	Segment 1 (acres)	Segment 2 (acres)	Segment 3 (acres)	Segment 4 (acres)
Annual Grassland	10.927	11.409	7.337	10.388
Cropland	4.492	0	0	0
Developed	5.757	3.870	4.559	13.626
Orchard	0	7.876	10.819	0
Ornamental	1.522	0	0.310	2.819
Riparian	0	1.600	0.113	0.877
Riverine	0	0.246	0	0.104
Ruderal	5.727	0.256	4.469	5.800
Roadside Ditch	0.095	0.103	0.085	0.034
Total	28.520	25.360	27.761	34.643

Source: Contra Costa County, 2017

a) *Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*

There is potential for several special-status plant and animal species and their associated habitats to be present in the BSA. As shown in Table 3, using the maximum Area of Potential Impact, the Project will result in permanent impacts to approximately 17.903 acres and temporary impacts to approximately 0.893 acres. However, actual impacts will be much less as the exact alignments are defined. In any case, the Project will not have a substantial adverse effect on any species identified as a candidate, sensitive or special status species, because project-related impacts will be avoided, minimized, or appropriately mitigated. The following mitigation measures will reduce potential impacts to all special status species and their habitat. Impacts to specific species and associated habitat are discussed individually.

Although two segments are located on the edge of critical habitat for red-legged frog, the Project Site consists of mainly gravel road shoulder. Further, during similar County projects along Camino Tassajara, no evidence of California red-legged frog presence in road shoulder was found. As such, it is highly unlikely that California red-legged frog is using these areas. The term "Project Site" will be used below to define the area of work, any associated disturbance and staging areas as identified in the final plans. The Project Site will be located within the Area of Potential Impact shown on Figures 4 through 7.

Table 3: Summary of Maximum Potential Temporary and Permanent Effects by Habitat

Habitat Community	Permanent Impact (acres)	Temporary Impact (acres)	Total Impact (acres)
Annual Grassland	2.899	0.455	3.354
Cropland	0.261	0	0.261
Developed	9.767	0.246	10.013
Orchard	1.734	0	1.734
Ornamental	0.481	0	0.481
Riparian	0	0	0
Riverine	0	0	0
Roadside Ditch	0.280	0.022	0.302
Ruderal	2.481	0.170	2.651
Total	**17.903**	**0.893**	**18.796**

Source: Contra Costa County, 2017

IMPACT BIO IV(a)-1

Potential habitat for the special-status wildlife species is present within the Biological Study Area (BSA) and surrounding area. In addition, the BSA is located within California red-legged frog Critical Habitat Unit CCS-2B. Therefore, impacts to special status species and their habitats could occur as a result of Project implementation. The following mitigation measures will reduce potential impacts to all special status species and their habitat. Impacts to specific species and associated mitigation measures are discussed individually.

MITIGATION MEASURE BIO IV(a)-1a:

Before any Project work occurs, including installation of exclusion fencing, grading and equipment staging, all construction personnel will participate in an environmental awareness training given by a qualified biologist regarding special-status species and sensitive habitats present in the Biological Study Area (BSA). If new construction personnel are added to the Project, they must receive the

mandatory training before starting work. As part of the training, an environmental awareness handout will be provided to all personnel that describes and illustrates sensitive resources (i.e., special-status plant populations and special-status wildlife habitat) to be avoided during Project construction and lists applicable permit conditions required to protect these resources. New construction personnel will receive the training from a qualified biologist or from staff deemed adequate to give the training by the qualified biologist.

MITIGATION MEASURE BIO IV(a)-1b:
Before any Project equipment staging or ground-disturbing activity occurs, the County will ensure that appropriately sized temporary wildlife barrier fencing, buffer fencing, and/or silt fencing will be installed between the Project Site and adjacent habitats and any environmentally sensitive habitat areas (i.e., special-status plants, special-status wildlife habitat, active bird nests), as appropriate.

Wildlife barrier fencing will be a minimum of 4 feet tall and made of suitable wildlife exclusion material (such as ERTECH E-Fence). As appropriate, the lower portion of barrier fence will be buried such that 6 inches of the fence is below ground and at least 48 inches is above ground. Wildlife exclusion fencing will contain wildlife funnels that allow animals to leave the Project Site but not to enter it. Temporary silt fencing installed for erosion control will be 24 inches tall.

Fencing will be installed in a manner that is consistent with applicable water quality requirements contained within the Project's Stormwater Pollution Prevention Plan (SWPPP) or Water Pollution Control Program (WPCP). Construction personnel and construction activity will avoid areas outside the fencing. The exact location of the fencing will be determined by the resident engineer coordinating with a qualified biologist, with the goal of protecting sensitive biological habitat and water quality. Installation of fencing will occur under the supervision of a qualified biologist. The fencing will be checked regularly and maintained until all construction is complete. No grading, clearing, storage of equipment or machinery, or other disturbance or activity may occur until the County has inspected and approved all temporary construction fencing. The fencing and a note reflecting this condition will be shown on the final construction documents.

MITIGATION MEASURE BIO IV(a)-1c:
A representative from the County will make weekly monitoring visits to construction areas occurring in or adjacent to environmentally sensitive habitat areas, (i.e., waters of the U.S. and State, special-status plants, special-status wildlife habitat). The County will be responsible for ensuring that the contractor maintains the construction barrier fencing protecting sensitive biological resources. Additionally, the County will retain a qualified biologist on-call to assist the County and the construction crew in complying with all Project implementation restrictions and guidelines.

MITIGATION MEASURE BIO IV(a)-1d:
All temporarily disturbed areas will be returned to pre-Project conditions upon completion of Project construction. These areas will be properly protected from washout and erosion using appropriate erosion control devices.

MITIGATION MEASURE BIO IV(a)-1e:
The following Best Management Practices will be implemented during construction to protect water quality within the watershed:

1) Final construction plans will depict the designated construction footprint as well as habitat to

be avoided.

2) Before October 15 and/or immediately after construction is complete, stabilize exposed surfaces.
3) Temporarily affected areas will be restored to pre-Project conditions.
4) All exposed soils will be stabilized with an erosion control tackifier and will be seeded with a native seed mix with a sterilized nurse crop to reduce the effects of erosion.
5) Avoid construction within ponded or saturated areas to the maximum extent possible.
6) Staging areas will be contained within silt fencing or lined and bermed areas such that no leaks, runoff, or construction liquids could enter any drainage facilities.
7) No refueling, storage, servicing, or maintenance of equipment will take place within 50 feet of Tassajara Creek, its tributaries, or other adjacent wetland features.
8) All machinery used during construction of the Project will be properly maintained and cleaned to prevent spills and leaks that could contaminate soil or water.
9) Any spills or leaks from construction equipment (i.e., fuel, oil, hydraulic fluid, and grease) will be cleaned up in accordance with applicable local, state, and/or federal regulations.

MITIGATION MEASURE BIO IV(a)-1f:
The County will comply with the National Pollution Discharge Elimination System (NPDES) requirements associated with construction activity as required under Section 402 of the Clean Water Act. As part of this requirement, the County will require the contractor to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP). If the project qualifies for an erosivity waiver, a Water Pollution Control Program (WPCP) will be prepared. In either case, the document will include erosion control measures and construction-waste containment measures to ensure that waters of the U.S. and State are protected during and after Project construction. The SWPPP or WPCP will include measure to minimize offsite stormwater runoff. Components of the SWPP or WPCP will include but not be limited to:

1) A comprehensive erosion and sediment control plan, depicting areas to remain undisturbed, and providing specifications for revegetation of disturbed areas.
2) A list of potential pollutants from building materials, chemicals, and maintenance practices used during construction, and the specific control measures to be implemented to minimize release and transport of these constituents in runoff.
3) Specifications and designs for the appropriate BMPs for controlling drainage and treating runoff in the construction phase.
4) A program for monitoring all control measures that includes schedules for inspection and maintenance, and identifies the party responsible for monitoring.
5) A site map that locates all water quality control measures and restricted areas to be left undisturbed.

MITIGATION MEASURE BIO IV(a)-1g:
To prevent the accidental introduction of new invasive species into the Project Site during construction, the County will require that the Project contractor implement the following control measures:

1) Only certified noxious weed-free erosion control materials will be used. All straw and seed

material will be certified as weed-free prior to being used at the Project Site.

2) Contractor will wash all construction equipment prior to bringing it onto the job site. Inspection will ensure that equipment arrives on site free of mud and seed-bearing material.

3) Any reseeding of disturbed soil areas and newly constructed slopes will use an appropriate native seed mix.

Special-Status Plant Species

A total of 55 special status plants were initially identified as potentially occurring in the BSA. All but one was ruled out because of lack of habitat, the Project occurs outside the plants range, or it was confirmed absent during focused surveys conducted in November, April, and July of 2017. No federally or state listed species have potential to occur. The one plant identified within the BSA is Condon's tarplant (*Centromadia parryi* ssp. *congdonii*) a California Rare Plant Rank Class 1B.1 species that is protected by CEQA. During the July 6, 2017 botanical survey, scattered patches of Congdon's tarplant were identified along Segment 3 primarily outside the Work Area. In total, approximately 136 Congdon's tarplant individuals were observed within the BSA, of which three individuals are growing within the Project Site. San Joaquin spearscale (*Extriplex joaquiniana*) has been recorded along Camino Tassajara north of the Project segments but was not observed during botanical surveys.

Implementation of Mitigation Measures BIO IV(a)-1a through BIO IV(a)-1e, Mitigation Measure BIO IV(a)-1g, and Mitigation Measure BIO IV(a)-2a and BIO IV(a)-2b, identified below, will ensure that the Project minimizes disturbance to special-status plant populations. In addition, the County will compensate for unavoidable impacts to Congdon's tarplant as described under Mitigation Measure BIO IV(a)-3. This would not constitute a substantial adverse effect to the species and the impact would be less than significant with mitigation.

IMPACT BIO IV(a)-2

If present in the Project Site, the Project could impact Congdon's tarplant individuals.

MITIGATION MEASURE BIO IV(a)-2a:

The following measures will be implemented to avoid impacts to special-status plants:

- The County will minimize impacts to populations of Congdon's tarplant in Segment 3 by establishing a work zone that avoids special-status plants to the greatest extent possible. To accomplish this measure, final design will focus on minimizing the Project footprint within areas that contain these special-status plants, as feasible. Anticipated locations of special status plants will be represented on final plans.

MITIGATION MEASURE BIO IV(a)-2b:

Prior to any unavoidable excavation work in any areas identified during botanical surveys that support Congdon's tarplant, seeds will be collected from plants located in the Project footprint. After finished grades generally have been achieved, the collected seeds will be redistributed within areas disturbed by the Project that provide appropriate habitat for the species. Specific actions that will be employed to ensure successful establishment of Congdon's tarplant include the following:

1) Prior to construction, all accessible areas of permanent disturbance that are within 100 feet of Congdon's tarplants will be flagged for seed salvage.

2) Prior to other earthwork, at the appropriate time when seeds have developed but just before seeds drop, typically late summer and early fall, seeds will be collected and stored in a cool, dry location.
3) Once construction is complete in an area, seeds will be evenly spread over areas of exposed soil and raked in.
4) In areas where seed has been spread, equipment traffic will be limited, to the extent practicable, to minimize compaction.
5) Post construction, areas where seed was spread will be protected from wind and water erosion until after the next growing season (spring/summer) using typical stabilization methods. If hydroseeding is used, hydroseed will be comprised of a native seed mix with a sterilized nurse crop.

Special-Status Wildlife Species

Of the 34 special-status wildlife species with potential to occur in the general Project area, 18 wildlife species will not occur in the BSA or will not have the potential to be affected by the Project because the BSA lacks suitable habitat for the species or is outside the species' known range. Four of the wildlife species (tricolored blackbird [*Agelaius tricolor*], peregrine falcon [*Falco peregrinus anatum*], pallid bat [*Antrozous pallidus*], and Townsend's big-eared bat [*Corynorhinus townsendii*]) may forage in the BSA but would not breed or roost in the BSA due to the lack of suitable habitat.

The remaining 12 wildlife species (California red-legged frog [*Rana draytonii*], California tiger salamander [*Ambystoma californiense*], Alameda whipsnake [*Masticophis lateralis euryxanthus*], western pond turtle [*Actinemys marmorata*], burrowing owl [*Athene cunicularia*], golden eagle [*Aquila chrysaetos*], northern harrier [*Circus cyaneus*], white-tailed kite [*Elanus leucurus*], loggerhead shrike [*Lanius ludovicianus*], western red bat [*Lasiurus blossevillii*], American badger [*Taxidea taxus*], and San Joaquin kit fox [*Vulpes macrotis mutica*]) were determined to have suitable habitat present in the BSA; however none of these species were observed during the November 10, 2016 and February 10, 2017 wildlife surveys. A description of these species is included below and measures to further avoid and minimize impacts are identified.

California Red-legged Frog: Tassajara Creek is located outside of the Project Site, but within the BSA for segments 2, 3, and 4. Potential indirect effects to California red-legged frog breeding habitat in Tassajara Creek will be prevented through implementation of Mitigation Measures BIO IV(a)-1a through BIO IV(a)-1e. Annual grassland, riparian, and roadside ditch habitats in the BSA for each of the four segments represent suitable upland aestivation and foraging habitat. Additionally, it is possible that California red-legged frog could disperse through any of the vegetation types within the general Project area.

Mortality or injury of California red-legged frogs in upland habitat could occur if burrows containing frogs are crushed by construction equipment or frogs are displaced from burrows, exposing them to predators and desiccation. However, this is considered unlikely because most activities will be completed in the existing disturbed roadside, where frogs may be less likely to burrow. Additionally, although the general Project area represents potential habitat for this species, the likelihood of their presence in the Project Site is considered extremely unlikely.

Trenches left open during the night could trap frogs moving through the construction area. Also, construction activities could temporarily impede the movement of juvenile and adult California red-legged frogs dispersing between breeding areas and upland refuge sites. However, these impacts will be mitigated with implementation of mitigations measures described previously. In addition, implementation of the following mitigation measures, prior to and during construction, will further avoid impacts to California red-legged frog.

IMPACT BIO IV(a)-3

Project construction could directly and indirectly impact California red-legged frog, California red-legged frog Critical Habitat, and California tiger salamander and its habitat.

MITIGATION MEASURE BIO IV(a)-3a:

All ground-disturbing activities associated with construction of the Project will be restricted to the dry season (estimated between April 15 and October 15) to avoid the period when listed amphibians (California red-legged frog and California tiger salamander) could be actively dispersing through upland habitats. If construction will need to continue past October 15, to avoid potential impacts to these species a qualified biologist will be present during any work conducted after October 15 and no work will occur during rain events. Also refer to Mitigation Measure BIO IV(a)-1d.

MITIGATION MEASURE BIO IV(a)-3b:

To avoid entrapment of wildlife, all excavated steep-walled holes or trenches more than 2 feet deep will be provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each workday. If escape ramps cannot be provided, then holes or trenches will be covered with plywood or similar materials. Providing escape ramps or covering open trenches will prevent injury or mortality of wildlife resulting from falling into trenches and becoming trapped. The trenches will be thoroughly inspected for the presence of wildlife species at the beginning of each workday. If wildlife is discovered in the trenches work will not occur within 50-feet and the qualified biologist will be called immediately to determine if it is a special status species. Special status species will be left to leave the area on its own. Non-special status species may be removed by a qualified biologist and may require consultation with CDFW prior to removal as determined by the qualified biologist. Also refer to Mitigation Measure BIO IV(a)-3d.

MITIGATION MEASURE BIO IV(a)-3c:

A preconstruction survey will be conducted immediately preceding initial ground disturbing activities. A qualified biologist will carefully search all suitable habitat areas within the Project Site for California red-legged frogs, California tiger salamanders, or Alameda whipsnakes.

A qualified biologist will monitor all initial ground disturbance and habitat removal e.g. grading, removal of vegetation, removal of culverts or rocks that could provide habitat for California red-legged frogs, California tiger salamanders, or Alameda whipsnakes.

If any California red-legged frogs, California tiger salamanders, or Alameda whipsnakes are found during these surveys, work will stop within that segment and they will be allowed to move outside the Project Site on their own. Work may resume on approval by the County Environmental Division Project Manager.

MITIGATION MEASURE BIO IV(a)-3d:
Following preconstruction surveys and Project initiation, it is possible that wildlife species could subsequently enter or return to the Project Site. The following measures shall be implemented to avoid disturbance or harm to these species:

1) If any special-status species or other wildlife species, alive or dead, are observed in the Project Site during construction, construction shall cease in that segment until the qualified biologist can determine if it is a special status species and/or that it is safe to continue.
2) Non-special status species may be relocated by a qualified biologist, CDFW coordination may be required as determined by the qualified biologist. Work may resume when the wildlife is a safe distance away as determined by the qualified biologist.
3) A living special status species will be allowed to leave the site on its own and work will not resume in that segment until approved by the County Environmental Division Project Manager.
4) Any special status species found in the work area, alive or dead will be documented and reported to the wildlife agencies as appropriate by the County Environmental Division Project Manager.

MITIGATION MEASURE BIO IV(a)-3e:
During construction, tightly woven fiber netting (no monofilament netting) or similar material will be used for erosion control or other purposes within the Project Site to ensure that wildlife are not trapped. Coconut coir matting and burlap contained fiber rolls are an example of acceptable erosion control materials.

MITIGATION MEASURE BIO IV(a)-3f:
During construction, all food-related garbage will be placed in tightly sealed containers at the end of each workday to avoid attracting predators. Containers will be emptied and garbage removed from the construction site at the end of each work week. If sealed containers are not available, garbage will be removed from the construction site upon completion of daily activities. All garbage removed from the construction site will be disposed of at an appropriate offsite refuse location.

California Tiger Salamander: The Project will not affect potential breeding habitat for California tiger salamander because no suitable breeding habitat is present within the BSA for any of the four segments. However, the BSA does provide suitable upland habitat within annual grassland, riparian, and roadside ditch habitats. Mortality or injury of California tiger salamanders in upland habitat could occur if burrows containing salamanders are crushed by construction equipment or salamanders are displaced from burrows, exposing them to predators and desiccation. However, this is considered unlikely for the following reasons. Most activities will be completed in the existing disturbed roadside, where California tiger salamanders are less likely to burrow. Additionally, although the general Project area represents potential habitat for this species, the likelihood of their presence in the Project Site is considered extremely unlikely.

Trenches left open during the night could trap California tiger salamanders moving through the construction area. Also, construction activities could temporarily impede the movement of juvenile and adult California tiger salamanders dispersing between breeding areas and upland refuge sites. However, these impacts will be avoided with implementation of Mitigation Measure BIO IV(a)-1a

through BIO IV(a)-1e and BIO IV(a)-3a through BIO IV(a)-3f, which require that trenches are covered or equipped with wildlife escape ramps at the end of each workday and that work is restricted to the dry season to avoid the period when this species could be actively dispersing through upland habitats.

Alameda Whipsnake: If Alameda whipsnake and/or active burrows are present in the Project Site, excavation, grading, and movement of equipment within grassland habitat could result in mortality or disturbance of adults or young and destruction of burrows containing eggs. However, this is considered unlikely for the following reasons. Most activities will be completed in the existing disturbed roadside. Additionally, although the general Project area theoretically represents potential habitat for this species, the likelihood of their presence in the Project Site is considered extremely unlikely. Implementation of Mitigation Measures BIO IV(a)-1a through BIO IV(a)-1d and BIO IV(a)-3b through BIO IV(a)-3e would ensure that impacts to Alameda whipsnake are avoided.

Western Pond Turtle: Marginal habitat for western pond turtle is present within the general Project area. Road widening activities associated with the Project could permanently remove and temporarily disturb potential upland annual grassland habitat. If western pond turtles are present within proposed work areas during construction, the movement of equipment could crush pond turtles or nests containing eggs or young. Implementation of Mitigation Measures BIO IV(a)-1a through BIO IV(a)-1e, BIO IV(a)-3b, BIO IV(a)-3c, and BIO IV(a)-15, described below, would ensure that impacts to western pond turtles are avoided.

IMPACT BIO IV(a)-4

The Project has the potential to affect Western Pond Turtle habitat. Project construction could directly and indirectly impact western pond turtle individuals and will temporarily disturb western pond turtle habitat.

MITIGATION MEASURE BIO IV(a)-4:

A qualified biologist will conduct a preconstruction clearance survey for western pond turtles immediately preceding initial ground disturbing activities within the Project Site. Any western pond turtles found within the Project Site will be allowed to voluntarily move out of this area or will be captured and held by a qualified biologist for the minimum amount of time necessary to release them in suitable habitat outside the Project Site.

Burrowing Owl: Although no burrowing owls were found in the BSA during field surveys, suitable habitat for the species is present within short annual grassland containing ground squirrel burrows. If burrowing owls are wintering or breeding within or adjacent to the Project Site, construction activities could disturb nesting burrowing owls or remove active burrowing owl burrows containing eggs, young, or adults. Disturbance or loss of wintering or nesting burrowing owls would violate the MBTA and CFGC. Implementation of mitigation measures BIO IV(a)-1a through BIO IV(a)-1d and BIO IV(a)-5, included below, will avoid potential impacts on burrowing owl and will avoid violation of the MBTA and CFGC.

IMPACT BIO IV(a)-5

The Project could impact the burrowing owl. Project construction could directly and indirectly impact burrowing owl individuals and will permanently and temporarily impact burrowing owl habitat.

MITIGATION MEASURE BIO IV(a)-5:
The County will retain a qualified biologist to conduct a one-day preconstruction survey to locate any active burrowing owl burrows within the Project Site or within a 500-foot-wide buffer around the Project Site, if feasible. The preconstruction survey will be conducted in accordance with recommendations provided in CDFW's Staff Report on Burrowing Owl Mitigation (CDFW 2012) and no more than 14 days before the start of construction activities (including grading and equipment staging). If no burrowing owls or burrows exhibiting burrowing owl use (i.e., whitewash, owl pellets, feathers, or egg fragments) are detected, then construction may proceed. Preconstruction surveys must be reinitiated if more than 30 days lapse between the survey dates and construction activities.

If active burrowing owls or occupied burrows are detected in the survey area, the following measures will be implemented.

1) Occupied burrows will not be disturbed during the nesting season (generally February 1–August 30). A no-disturbance buffer will be established around the burrow to avoid disturbance of nesting burrowing owls until a qualified biologist, coordinating with CDFW, determines that the young have fledged and are foraging on their own. The extent of these buffers will be determined by the biologist (coordinating with the CDFW) and will depend on the level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers.
2) If the survey finds an active burrowing owl nest in an area of permanent or temporary impact including staging areas, that cannot be avoided due to spatial restrictions, burrowing owls may be passively relocated in accordance with the CDFW Staff Report on Burrowing Owl Mitigation (2012). This recommends that passive relocation occur following approval from the agencies, outside of the nesting season, and after an agency-approved biologist determined that owls have not begun laying eggs or there is not young of the year present. Per CDFW 2012, passive relocation will include the installation of one-way doors within the burrow to let owls escape, but not allow them to re-enter the burrow. Once the owls have been excluded from the burrow, it will be collapsed by hand by an agency-approved biologist. If passive relocation is necessary, artificial or natural burrows should be in close proximity (100 meters) from the eviction site.

Golden Eagle: The BSA is in the foraging range of a known golden eagle nesting territory and a portion of Segment 3 is located within the line of sight of a golden eagle nest. If nesting golden eagles are present in the vicinity of the BSA, noise and human activity associated with the Project could cause disturbance, potentially resulting in the loss of active nests with eggs or young, which would violate the Bald and Golden Eagle Protection Act, MBTA, and CFGC. Implementation of Mitigation Measures BIO IV(a)-1a through BIO IV(a)-1c and BIO IV(a)-6, described below, will avoid impacts to golden eagles and violation of the MBTA and CFGC.

IMPACT BIO IV(a)-6
The Project could impact nesting birds and raptors. The BSA provides habitat for nesting raptors and other birds that are protected under the MBTA.

MITIGATION MEASURE BIO IV(a)-6:
The following will be completed to avoid potential impacts to nesting birds:

1) If construction (including utility pole relocation, equipment staging, and vegetation removal) will occur during the breeding season for migratory birds and raptors (generally January through August), the County will retain a qualified biologist to conduct pre-construction nesting bird and raptor surveys prior to construction activities.
2) The pre-construction nesting bird and raptor surveys will be conducted prior to the start of construction within suitable habitat in and near (within half a mile for golden eagle and 500 feet for all other raptors) the Project Site. For raptor surveys outside the Project Site where property access has not been granted, the surveying biologist will use binoculars to scan any suitable nesting substrate for potential raptor nests.
3) The surveys will be conducted no more than 14 days before the initiation of construction activities in the Project Area.
4) The known golden eagle nesting territory near Segments 3 and 4 will be observed adequately to determine if it is active. If nesting behavior is observed and the nest is determined to be active, no construction will occur within the line of site of the nest until a qualified biologist coordinating with CDFW determines that the young have fledged and are foraging on their own.
5) If an active bird nest is identified within the Project Area or an active raptor nest is identified in or within 500 feet from the Project Area, then a no-disturbance buffer will be established around the nest to avoid disturbance of the nesting birds or raptors until a qualified biologist coordinating with CDFW determines that the young have fledged and are foraging on their own. The extent of these buffers will be determined by the biologist (coordinating with the CDFW) and will depend on the species identified, level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers (generally 50 feet for passerine, 500 feet for raptors, or as agreed on during coordination with CDFW). In addition to the establishment of buffers, other avoidance measures (determined during CDFW coordination) may include monitoring of the nest during construction and restricting the type of work that can be conducted near the nest site. If no active nests are found during the preconstruction surveys, then no additional mitigation is required.

Loggerhead Shrike: Trees and shrubs within the Project area provide potential nesting habitat for loggerhead shrikes. Removal of trees or shrubs during the breeding season (generally February through August) could result in the destruction and/or loss of active nests with eggs or young and would violate the MBTA and CFGC. Implementation of mitigation measures BIO IV(a)-1a through BIO IV(a)-1c and BIO IV(a)-6 will avoid impacts to loggerhead shrikes and violation of the MBTA and CFGC.

White-Tailed Kite: Trees and shrubs within the Project area provide potential nesting habitat for white-tailed kite. Removal of trees or shrubs during the breeding season (generally March through August) could result in the destruction and/or loss of active nests with eggs or young and would violate the MBTA and CFGC. Implementation of Mitigation Measures BIO IV(a)-1a through BIO IV(a)-1c and BIO IV(a)-6 will avoid impacts to white-tailed kites and violation of the MBTA and

CFGC.

Northern Harrier: Annual grassland provides nesting habitat and cropland, ruderal, and riparian habitats in the Project Area provides potential foraging habitat for northern harriers. Grubbing activities in the Project Area and the movement of construction equipment within annual grassland habitat could result in the destruction and/or loss of active nests with eggs or young, which would violate the MBTA and CFGC. Implementation of Mitigation Measures BIO IV(a)-1a through BIO IV(a)-1c and BIO IV(a)-6 will avoid impacts to northern harriers and violation of the MBTA and CFGC.

Western Red Bat: Annual grassland, cropland, and ruderal habitats in the Project Area provides potential foraging habitat for western red bat. Trees in the Project area provide potential roosting habitats. If present, roosting individuals could be injured or killed during tree removal. Implementation of Mitigation Measures BIO IV(a)-1a, BIO IV(a)-1b, and BIO IV(a)-7 will avoid and minimize impacts on roosting bats.

IMPACT BIO IV(a)-7
The Project could impact the western red bat and its habitat during project construction.

MITIGATION MEASURE BIO IV(a)-7:
A qualified biologist will conduct a preconstruction survey of all trees proposed for removal or trimming within the Project Site for the presence of bat roosts. Surveys will entail direct inspection of trees, including around the base within piles of leaf litter, or nocturnal surveys (if not conducted during the hibernation period for bats). The survey will occur no more than 2 weeks prior to the removal or trimming of trees within the Project Site. If bats are not found and there is no evidence of use by bats, construction may proceed. If roosting habitat is present and occupied, then a qualified biologist will determine the type of roost. If roosting bats are present, measures shall be implemented to avoid or minimize disturbance to the colony. Measures may include excluding bats from the tree before their hibernation period (mid-October to mid-March) and before construction begins. Alternatively a phased approach to removal may be used: small branches and non-habitat features will be carefully removed from the tree under the supervision of a qualified biologist. The next day larger features will be carefully removed under the supervision of a qualified biologist. On the third day a qualified biologist will inspect the tree for the presence of roosting bats, if no bats are present removal can commence.

American Badger: Ground disturbing activities within annual grassland, cropland, orchard habitats, and ruderal habitats in the Project Site have the potential to unearth an American badger den resulting in the mortality of adults and/or young. In general, excavation and fill associated with Project construction will only occur along the existing roadway, with some minor ground disturbance occurring from equipment access and staging. To minimize impacts to American badger, implementation of Mitigation Measures BIO IV(a)-8 will be implemented to identify potential badger burrows and either avoid them or exclude nonbreeding badgers. Because American badgers have very large home ranges and typically utilize a large number of burrows, exclusion of nonbreeding badgers from the Project Site will not adversely affect the local population of American badgers.

IMPACT BIO IV(a)-8

The Project could impact the American badger. Project construction could directly and indirectly impact American badger individuals and will temporarily impact American badger habitat. Noise and disturbance from construction activities could indirectly disrupt foraging and/or denning activities.

MITIGATION MEASURE BIO IV(a)-8:

A preconstruction survey for the American badger will be conducted within the BSA no more than 14 days prior to initial ground disturbing activities. The surveys will be conducted by a qualified wildlife biologist with experience identifying badger burrows. Any potential badger burrow identified should be clearly marked in the field and avoided if feasible. If avoidance is not feasible, the biologist will determine if the burrow is being used as a natal den (young rearing generally occurs between April and September). If young are determined to be present, the burrow will be avoided until the young vacate the burrow. If the biologist determines that the burrow is not being used for breeding, then a one way door will be installed on the burrow (upon approval by CDFW) to passively exclude the badger from the burrow. Once the badger has been excluded the burrow will be collapsed.

San Joaquin Kit Fox: There is a very low likelihood that the species will occur in the general Project area and be affected by Project construction. If present, ground disturbing activities within the Project Site could directly affect San Joaquin Kit Fox. Additionally, noise associated with construction activities involving heavy equipment operation could disturb individuals if present near these activities. However, these potentially adverse effects are considered unlikely because most activities will be completed in the existing disturbed roadside. Additionally, although the general Project area theoretically represents potential habitat for this species, the likelihood of their presence is considered extremely unlikely. Furthermore, to ensure that the Project does not adversely affect San Joaquin kit fox, implementation of Mitigation Measures BIO IV(a)-1a through BIO IV(a)-1d, BIO IV(a)-3b, BIO IV(a)-3d, BIO IV(a)-3f, and BIO IV(a)-9 will be implemented prior to and during construction.

IMPACT BIO IV(a)-9

The Project has the potential to affect San Joaquin kit fox. Project construction could directly and indirectly impact San Joaquin kit fox individuals and will temporarily impact San Joaquin kit fox habitat. Noise and disturbance from construction activities could indirectly disrupt foraging and/or denning activities.

MITIGATION MEASURE BIO IV(a)-9:

A qualified biologist will conduct a preconstruction survey no more than 30 days before the beginning of ground disturbance or any activity likely to affect San Joaquin kit fox. Where accessible, or using binoculars in inaccessible areas, the biologist will survey the proposed Project Site and a 200-foot buffer area around the Project Work Area to identify suitable dens (e.g., burrow, pipe, or culvert approximately 5 to 8 inches in diameter). The biologist will conduct den searches by systematically walking transects spaced 30–100 feet apart through the survey area. Transect distance should be determined on the basis of the height of vegetation such that 100% visual coverage of the Project Area is achieved. If dens are found during the survey, the biologist will map the location of each den as well as record the size and shape of the den entrance; the presence of tracks, scat, and prey remains; and if the den was recently excavated. The biologist will also record information on prey availability (e.g., ground squirrel colonies). The status of the den will also be determined and recorded. Dens may be classified in one of the following four den

status categories.

Potential den: Any subterranean hole within the species' range that has entrances of appropriate dimensions for which available evidence is sufficient to conclude that it is being used or has been used by a kit fox.

Known den: Any existing natural den or artificial structure that is used or has been used at any time in the past by a San Joaquin kit fox. Evidence of use may include historical records; past or current radiotelemetry or spotlighting data; kit fox sign such as tracks, scat, and/or prey remains; or other reasonable proof that a given den is being or has been used by a kit fox.

Natal or pupping den: Any den determined to be used by kit foxes to whelp and/or rear their pups. Natal/pupping dens may be larger with more numerous entrances than dens occupied exclusively by adults. These dens typically have more kit fox tracks, scat, and prey remains in the vicinity of the den, and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A natal den, defined as a den in which kit fox pups are actually whelped but not necessarily reared, is a more restrictive version of the pupping den. In practice, however, it is difficult to distinguish between the two; therefore, for purposes of this definition either term applies.

Atypical den: Any artificial structure that has been or is determined to be used by a San Joaquin kit fox. Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings.

After preconstruction den searches and before the commencement of construction activities, a qualified biologist will establish and maintain exclusion zones (varying between 50 and 200 feet) measured in a radius outward from the entrance or cluster of entrances of each mapped den.

Construction activities will be prohibited or greatly restricted within these exclusion zones throughout the construction period. Only essential vehicular operation on existing roads and foot traffic should be permitted. All other construction activities, vehicle operation, material and equipment storage, and other surface-disturbing activities will be prohibited in the exclusion zones.

Other Protected Migratory Birds and Raptors: Grubbing (including tree removal) or ground disturbance that occurs during the breeding season (generally February through August) could result in take of migratory birds and/or raptors. Suitable raptor nesting habitat is present within riparian trees along nearby Tassajara Creek. Noise and disturbance associated with construction activities that occurs during the breeding season could disturb nesting raptors if an active nest is located near these activities. Any disturbance that causes migratory bird or raptor nest abandonment and/or loss of eggs or developing young at active nests located at or near the Project Site would violate the MBTA and CFGC. However, implementation of Mitigation Measures BIO IV(a)-1a through BIO IV(a)-1c and BIO IV(a)-6 will avoid impacts to migratory birds and raptors and violation of the MBTA and CFGC.

The project is not anticipated to substantially impact any special-status species with implementation of the mitigation and Mitigation Measures described above. Therefore, project impacts will **be less**

than significant with mitigation incorporated.

b) *Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*

There are eight roadside ditches in the Area of Potential Impact, totaling 0.302 acre. However, these roadside ditches do not qualify as waters of the U.S. according to verification by the U.S. Army Corps of Engineers. There are no other Natural Communities of Special Concern in the BSA. Permanent and temporary impacts to habitat types located within the BSA are summarized in Table 3, above. The Project will not have a substantial adverse effect on any riparian habitat or other sensitive natural communities identified in local or regional plans, policies, or CDFW and USFWS regulations, including critical habitat. For these reasons, implementation of the proposed Project will have a **less than significant impact** on these types of habitats.

c) *Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

Refer to response IV.b, above. There are no Waters of the U.S., including wetlands, in the Project Site. As such, there will be **no impact**.

d) *Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

There is no habitat for native resident or migratory fish in the Project area. Common and special-status wildlife species could potentially disperse through the Project area. Migratory birds and raptors could potentially nest in the general Project area and native mammals could potentially roost or den in the general Project area. However, the Project is limited to shoulder widening and will not increase capacity of the roadway or create new permanent barriers to wildlife movement. With limited exceptions, Project improvements will occur in the existing road right-of-way. As such, impacts to wildlife breeding habitat will be negligible. Temporary barriers will be installed during construction to limit wildlife passage through the Project Site. These barriers are designed to avoid impacts to wildlife and will be completely removed at the end of construction. Moreover, implementation of Mitigation Measures BIO IV(a)-1a through BIO IV(a)-9 will ensure that the Project will have less-than-significant impacts to the movement or reproduction of wildlife species. As such, this impact will be **less than significant with mitigation incorporated**.

e) *Would the project conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy or ordinance?*

The Project will not conflict with any local policies or ordinances protecting biological resources. There will be **no impact**.

f) *Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan?*

The Project is not located within an adopted Habitat Conservation Plan or other approved local, regional, or state habitat conservation plan. Therefore, the Project will have **no impact**.

V. CULTURAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Regulatory Setting

CEQA requires lead agencies to determine if a project will have an adverse impact on a significant cultural resource (includes historical and archaeological) (Public Resources Code Sections 21084, 21084.1, 21083.2). A resource is considered significant if it 1) is listed in or has been determined eligible for listing in the California Register of Historic Resources (CRHR); 2) is included in a local register of historical resources, as defined in Public Resources Code 5020.1(k); 3) has been identified as significant in an historical resources survey, as defined in Public Resources Code 5024.1(g); or 4) is determined to be historically significant by the CEQA lead agency [CCR Title 14, Section 15064.5(a)]. The following CRHR eligibility criteria need to be considered when making a significance determination.

1. Associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

To be considered a historical resource for the purpose of CEQA, the resource must also have integrity, which is the authenticity of a resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance.

However, because a resource does not appear in the CRHR does not mean that it is not a historical resource. A historical resource includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript that is historically or archaeologically significant (PRC Section 5020.1).

California Public Resources Code Section 21083.2 also addresses the identification and protection of unique archaeological resources. A "unique archaeological resource" is an archaeological artifact, object, or site for which there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality, such as being the oldest of its type or the best available example of its type.
3. Is associated with a scientifically recognized important prehistoric or historic person or event.

In most situations, resources that meet the definition of a unique archaeological resource also meet the definition of historical resource. As a result, it is current professional practice to evaluate cultural resources for significance based on their eligibility for listing in the CRHR.

Environmental Setting

While the western border of Contra Costa County approaches the San Francisco Bay, and the northern border lies along the southern banks of the Carquinez Strait and Suisun Bay, this Project's Area of Potential Effect (APE) lies about 18 miles east of the Bay and 17 miles south of the Strait in a narrow inland valley. The topography of the Project APE includes relatively gently sloping terrain within a natural valley, with elevations within the APE ranging from about 520 feet to about 670 feet above mean sea level. Hills rise to the east and west of the Project area, in terrain common over much of the area between the San Francisco Bay and the Coastal Ranges. Tassajara Creek meanders through the valley, roughly parallel to Camino Tassajara Road, and is a persistent source of water. The main ecological zone in this area is currently Foothill Grassland. The environment of this area, like much of California, has changed dramatically since the 1800s. Historical accounts describe large portions of the County as a rolling open grassland environment, but the composition of the grasses in this area changed drastically with the introduction of foxtail, wild oat, and other non-native species. While tule elk and pronghorn antelope are no longer present in the environment, deer, raccoon, foxes, skunks, rabbits, gophers, rats, mice, and a wide variety of bird species do remain.

Cultural Resource Assessment Report

A Cultural Resources Assessment was prepared for the Project by Condor Country (Condor Country 2017). The following analysis is based on that report. Condor conducted a records search within 0.25 miles around the project segments. The records search included review at the Northwest Information Center (NWIC) of the California Historical Resource Information System (CHRIS) located in Rohnert Park, California. In addition, the Native American Heritage Commission (NAHC) was contacted for a Sacred Lands File search to determine if any recorded Native American sites occur within the project area. The NAHC provided a list of Native American tribal representatives and organizations that may have knowledge of unrecorded sites within the vicinity of the sites. A field survey was also conducted of the sites to determine if any cultural resources are present. Section XVII discusses Tribal Cultural Resources under Assembly Bill 52.

a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

Two historical resources were identified within a 0.5-mile radius of the APE. The two resources were the remains of a ranch complex located near the intersection of Tassajara Road and Finley Road, and part of the Rasmussen Ranch Complex located east of Tassajara Road between Segments 2 and 3 of the Project. However, these resources were identified outside of the APE and would therefore, not be affected by the Project. Nevertheless, the potential for subsurface resources cannot be completely ruled out and Project construction may unearth unanticipated historic or pre-historic resources; therefore, the following Mitigation Measures will be followed in the event subsurface resources are discovered during Project construction. In addition, Project contract specifications stipulate that construction shall stop in the area if historical resources (i.e. structure/building remains, bottle glass, ceramics, etc.) are encountered until a qualified archaeologist evaluates the findings. With implementation of Mitigation Measure CUL-1, Project impacts on historical resources would **be less than significant with mitigation incorporated**.

IMPACT CUL-1

Development of the Project could disturb unanticipated historic or pre-historic, archaeological, or paleontological resources.

MITIGATION MEASURE CUL-1:

The following Best Management Practices will be implemented during Project construction to protect unanticipated historic or pre-historic, archaeological, or paleontological resources.

1) Contractor will be notified of the possibility of encountering historic, pre-historic, archaeological, or paleontological materials during ground-disturbing activities and will be educated on the types of historic and pre-historic Native American period archaeological materials that may be encountered.
2) If an inadvertent discovery is made, the Contractor will cease all ground-disturbing activities in the area of discovery.
3) The Contractor will immediately notify the County Public Works Department Resident Engineer who will then request a qualified archaeologist to evaluate the finding(s).
4) If the finding(s) is determined to be potentially significant, the archaeologist in consultation with the appropriate Native American tribal representative or historical society will develop a research design and treatment plan outlining management of the resource, analysis, and reporting of the find.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

The records search and field study did not identify archaeological resources within the APE. While no archaeological resources were identified, there is the potential of encountering unrecorded archaeological resources. Project contract specifications stipulate that construction shall stop in the area if potential archaeological resources (i.e., unusual amounts of shell, stone tools, animal bone, etc.) are encountered until a qualified archaeologist evaluates the findings. In addition, Mitigation Measure CUL-1, will be followed in the event subsurface resources are discovered during project construction. As such, Project impacts on archaeological would be **less than significant with mitigation incorporated**.

c) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?

The records search results and the field survey found no evidence of unique paleontological resources (i.e., fossil remains) or geologic features have within the APE. While no paleontological resources were identified, there is the potential for encountering unrecorded paleontological resources during Project construction. However, Project contract specifications would stipulate that construction shall stop in the area if such potential resources are discovered. In addition, Mitigation Measure CUL-1 will be followed in the event subsurface resources are discovered during project construction. Therefore, Project impacts on paleontological resources would be **less than significant with mitigation incorporated**.

d) Would the project disturb any human remains, including those interred outside of formal cemeteries?

No formal cemeteries are present within or adjacent to the Project site. As part of the cultural review conducted for the Project, the NAHC was contacted to determine if there are any recorded Native American burial grounds and/or sacred land sites in the Project vicinity. The NAHC reported that no recorded sites occur in the Project APE. In accordance with California Health and Safety Code (Section 7050.5), if human remains are uncovered during ground disturbances, Project contract specifications stipulate that the Contractor stop work in the area and immediately notify the CCCPWD Resident Engineer. CCCPWD will immediately notify the County Coroner and a qualified archaeologist. The County Coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of discovery. If the County Coroner believes, or has reason to believe, that the human remains are those of a Native American, the County Coroner is required to contact the NAHC within 24 hours of making that determination. The archaeologist and NAHC designated Most Likely Descendent will determine the ultimate treatment and disposition of the remains. In addition, Mitigation Measure CUL-2, will be followed in the event subsurface resources are discovered during project construction. As such, Project impacts on archaeological would be **less than significant with mitigation incorporated**.

IMPACT CUL-2
The Project could impact previously undiscovered human remains.

MITIGATION MEASURE CUL-2:
If human remains are encountered, work within 25 feet of the discovery shall be redirected and the Contra Costa County Coroner notified immediately. At the same time, an archaeologist shall be contacted to assess the situation. If the human remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of this identification. The Native American Heritage Commission will identify a Most Likely Descendant (MLD) to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods.

Upon completion of the assessment, the archaeologist shall prepare a report documenting the methods and results, and provide recommendations for the treatment of the human remains and any associated cultural materials, as appropriate and in coordination with the recommendations of the MLD. The report shall be submitted to the project applicant, Contra Costa County, and the Northwest Information Center.

VI. GEOLOGY AND SOILS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
1 Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☐	☐	☐	☒
2 Strong seismic ground shaking?	☐	☐	☒	☐
3 Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
4 Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

Environmental Setting

The geology of Contra Costa County is dominated by several northwest trending fault systems, which divide the County into large blocks of rock. The County is subject to seismic events originating on faults within the County and in other parts of the region.

Seismic Hazards

Contra Costa County is located within a region of high seismicity; the San Francisco Bay Region has been impacted by severe earthquakes during historic time (Contra Costa County 2005h). In order to provide safety of structures for human occupancy, the Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazards. The law requires the state Geologist to establish regulatory zones (known as Earthquake Fault Zones) around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for their use in planning and controlling new or renewed construction. The Project site is not located in an Alquist-Priolo Fault Zone (SCDC 2017). However, faults occur in the general area (Contra Costa County 2005h).

a) Would the project expose people or structures to potential substantial adverse effects, including the risk of

loss, injury, or death involving?

1 *Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.*

The Project Site is not within an Alquist-Priolo Fault Zone and no known faults cross the Project site. The Project does not include elements that would increase risk to people or structures, as it is limited to shoulder widening of an existing roadway. Therefore, the Project will have **no impact**.

2 *Strong seismic ground shaking?*

Faults occur in the area that could potentially cause seismic ground shaking. The duration and intensity of shaking will depend upon both the magnitude of the earthquake, distance from the epicenter, and ground conditions. The Project design and construction will take the existing seismic conditions into account and the Project will be designed in accordance with local design practice. Further, because the Project is limited to lane and shoulder widening, the risk of loss of and the risk of injury or death resulting from implementation of the Project is unlikely. Therefore, Project impacts will be **less than significant**.

3 *Seismic-related ground failure, including liquefaction?*

According to Figure 10-5 of the General Plan, the general Project area has potential for liquefaction. The Project design and construction will take existing soil conditions into account and the Project will be designed in accordance with local design practice. Further, because the Project is limited to lane and shoulder widening, the risk of loss of and the risk of injury or death resulting from implementation of the Project is unlikely. Therefore, Project impacts will be **less than significant**.

4 *Landslides?*

According to Figure 10-6 of the General Plan, there is some evidence of landslide deposits in the general Project area. The Project is located in a valley therefore landslides could occur on associated hills. Segments 2 and 3 are located some distance from slopes and Segments 1 and 4 have slopes that are close to the roadway. Further, because the Project is limited to lane and shoulder widening, the risk of loss of and the risk of injury or death resulting from implementation of the Project is unlikely. Therefore, Project impacts will be **less than significant**.

b) *Would the project result in substantial soil erosion or the loss of topsoil?*

Grading and excavation will disturb soils and create the potential for soil erosion. The Project will incorporate Mitigation Measures BIO IV(a)-1e and BIO IV(a)-1f that require adherence to standard dust control and erosion control practices during construction and preparation of a Stormwater Pollution Prevention Plan (SWPPP) or Water Pollution Control Program (WPCP) will identify appropriate erosion control measures to be implemented, after approval by the CCCPWD. Upon Project completion, all areas left exposed will be re-seeded or stabilized in order to prevent erosion. In addition, the Project will implement Mitigation Measure AIR-1 during construction which would further ensure that soil erosion impacts are reduced. Implementation of these measures will minimize soil erosion and loss of topsoil to the extent possible. Therefore, Project impacts will be **less than significant with mitigation incorporated**.

c) *Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?*

According to Figure 10-5 of the General Plan, the general Project area has generally high or generally moderate to low potential for liquefaction depending on the precise location (Contra Costa County 2005h). The Project design and construction will take the existing soil conditions into consideration and the Project will be designed in accordance with local design practice. Further, the Project is limited to lane and shoulder widening of an existing road and will not introduce new land uses that could be impacted by unstable soils. Therefore, Project impacts will be **less than significant**.

d) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

The Project Site is located on clay type soils, which tend to be expansive soils. The Project will be engineered according to standard industry practice, which includes design considerations for soil type. Moreover, the Project is limited to lane and shoulder widening of an existing road, which will not create substantial risk to life or property from expansive soils. Therefore, Project impacts will be **less than significant**.

e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste disposal systems where sewers are not available for the disposal of wastewater?

Septic tanks and alternative wastewater disposal systems are not part of the Project. Therefore, the Project will have **no impact**.

VII. GREENHOUSE GAS EMISSIONS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☒	☐	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Regulatory Setting

Climate change refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time. (California Office of Planning and Research [OPR] 2008).

Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, recognized that California is the source of substantial amounts of GHG emissions which poses a serious threat to the economic well-being, public health, natural resources, and the environment of California (OPR 2008). This bill directed the California Air Resources Board to begin developing discrete early actions to reduce GHGs to reach the GHG reduction goals by 2020.

In order to address global climate change associated with air quality impacts, CEQA statutes were amended to require evaluation of GHG emissions. In developing the threshold of significance for GHG emissions included in the BAAQMD CEQA Guidelines, the BAAQMD identified the emissions level for which a project would conflict with existing California legislation adopted to reduce Statewide GHG emissions. While the BAAQMD does not have an adopted threshold of significance for construction-related GHG emissions, sources of construction-related GHGs include exhaust (carbon dioxide, nitrous oxide) for which the same detailed guidance as described for criteria air pollutants and precursors should be followed (BAAQMD 2012).

In December 2008, CARB adopted its Climate Change Scoping Plan, which contains the main strategies California will implement to achieve reduction of approximately 118 million metric tons (MMT) of CO_2- equivalent (CO_2e) emissions, or approximately 21.7 percent from the State's projected 2020 emission level of 545 MMT of CO_2e under a business-as-usual scenario (this is a reduction of 47 MMT CO_2e, or almost 10 percent, from 2008 emissions) (CARB 2008). In May 2014, CARB released and has since adopted the First Update to the Climate Change Scoping Plan to identify the next steps in reaching AB 32 goals and evaluate the progress that has been made between 2000 and 2012 (CARB 2014). Per the update, California is on track to meet the near-term 2020 GHG limit and is well positioned to maintain and continue reductions beyond 2020 (CARB 2014). The update also reports the trends in GHG emissions from various emission sectors (e.g., transportation, building energy, agriculture).

On January 20, 2017, CARB released its proposed 2017 Climate Change Scoping Plan Update (2017 Scoping Plan Update), which lays out the framework for achieving the 2030 reductions as established in

more recent legislation (CARB 2017). The proposed 2017 Scoping Plan Update identifies the GHG reductions needed by each emissions sector to achieve a statewide emissions level that is 40 percent below 1990 levels before 2030.

In December 2015, the Contra Costa County Board of Supervisors adopted the Contra Costa Climate Action Plan (CAP). The CAP identifies how the County will achieve the AB 32 GHG emissions reduction target of 15 percent below baseline levels by the year 2020, in addition to supporting other public health, energy efficiency, water conservation, and air quality goals identified in the County's general plan and other policy documents.

An emissions assessment was prepared for the Project by Nichols Consulting Engineers (NCE 2017). The following analysis is based on the results of that assessment.

a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Construction activities, such as site preparation, site grading, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, and motor vehicles transporting the construction crew would produce combustion emissions from various sources. During construction of the Project, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O. Furthermore, CH_4 is emitted during the fueling of heavy equipment. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change.

The operational aspect of the Project will not result in an increase of GHG emissions; however, construction activities will generate GHG through vehicle exhaust. The BAAQMD does not have an adopted Threshold of Significance for construction related GHG emissions but states that lead agencies should quantify and disclose GHG emissions that would occur during construction, and make a determination on the significance of these construction-generated impacts. Using the Road Construction Emissions Model, it is estimated that the Project will generate approximately 265 metric tons of CO_2e during construction of the Project. The Project's emissions will be short term and the Project will implement standard best management practices (BMPs) stated in Mitigation Measure AIR-1 which include measures to reduce emissions from construction vehicles such as minimizing idling times and requiring properly maintained and tuned equipment which will further reduce GHG emissions. Therefore, Project impacts will be **less than significant with mitigation incorporated**.

b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Contra Costa County adopted the Contra Costa County Climate Action Plan in December 2015, developed for the purpose of reducing the County's GHG emissions and contribution to climate change. Most of the measures identified in the Climate Action Plan consist of programs and incentives to be implemented by the County and are not applicable to the Project (CCCDCD 2015).

As indicated in the analysis presented above, the Project will not generate emissions that would exceed the project-level significance criteria established by the BAAQMD and, therefore, the Project will not conflict with plans adopted for the purpose of reducing GHG emissions. Therefore, Project impacts will be **less than significant**.

VIII. HAZARDS AND HAZARDOUS MATERIALS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area.	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wild land fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

Regulatory Setting

A material is considered hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local agency, or if it has characteristics defined as hazardous by such an agency. The release of hazardous materials into the environment could potentially contaminate soils, surface water, and groundwater supplies. The California Environmental Protection Agency (Cal EPA) which consists of the Air Resources Board, Department of Pesticides Regulation, Department of Resources and Recycling and Recovery, Department of Toxic Substance Control (DTSC), Office of Environmental Health Hazard Assessment, and State Water Resources Control Board (SWRCB) regulates hazardous materials and waste (CalEPA 2017a). Under Government Code Section 65962.5, the DTSC maintains a list of hazardous substance sites (Cortese List) which includes leaking underground storage tank sites, hazardous material sites, and landfills with evidence

of groundwater contamination (CalEPA 2017b; DTSC 2017). The Contra Costa County Health Services, Hazardous Materials Program (2016) serves area residents by responding to emergencies and monitoring hazardous materials.

a) Would the project create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?

During construction, trucks will travel to and from the Project Site. Vehicles would include diesel-powered trucks, backhoes, graders, dump trucks, excavators, water trucks, compactors, skid steers, pick-up trucks, pavers, and hoppers. This equipment may require the use of fuels and other common liquids that have hazardous properties (e.g., fuels, oils, fluids that are flammable) but they would be handled in small quantities that would not create a substantial hazard for construction workers and/or the public. Compliance with federal, State, and local hazardous materials regulations would minimize the risk to the public presented by these potential hazards during construction of the Project. Completion of the shoulder widening would not involve routine transport, use, or disposal of hazardous materials or involve potential releases of hazardous materials into the environment. Therefore, construction and operation of the Project will result in less-than-significant impacts associated with hazardous materials, and no mitigation is required. Therefore, this impact would be **less than significant**.

b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

As discussed in further detail below in Section VIII.d, the Project Site is not located on a list of hazardous material sites and is not expected to create a significant hazard to the public or the environment. Project construction could cause an unforeseen release of hazardous materials such as a hazardous materials spill or equipment leak. In addition, the Project will remove existing striping that could contain traces of lead. However, the Project contract specifications will require the contractor to implement BMPs such as hazardous materials spill management and regular maintenance of vehicles to minimize potential impacts from accidental spills associated with Project construction or construction equipment. The Contractor will also be required to submit a lead compliance plan for approval by CCCPWD. Therefore, Project impacts will be **less than significant**.

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?

Tassajara Hills Elementary School is located approximately one mile to the northeast of Segment 1 and is the closest school to the Project site. Moreover, the Project does not propose land uses that are associated with hazardous substances. Therefore, the Project will have **no impact**.

d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

A database search of the Regional Water Quality Control Board's GeoTracker and Contra Costa County Department of Toxic Substance Control's EnviroStore was conducted on September 11, 2017 and revealed no record of hazardous materials release or other potential for contamination on any of the Project segments. The closest record was a Leaking Underground Storage Tank (LUST) approximately 650 feet north of Segment 2. That site is closed and cleanup is complete. No other potential sources of contamination were indicated. Further, land use in the Project area (primarily ranching and residential) is not associated with hazardous materials so possibility of contamination is low. Therefore, Project

impacts will be **less than significant**.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area.

The Project site is not within two miles of an airport. According to Figure 3-1 of the Livermore Executive Airport Land Use Compatibility Plan the Project is not within the Livermore Executive Airport Influence Area nor are any Project segments within two miles of any public airport. Therefore, the Project will have **no impact**.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

No Project segments are located in the vicinity of a private airstrip. Therefore, the Project will have **no impact**.

g) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The Project will not result in significant changes to existing roadways, change traffic patterns, or interfere with emergency access. Emergency vehicles will have access at all times during construction. Therefore, Project impacts will be **less than significant**.

h) Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

The Project site is not located in an area identified as at risk for wildland fires (ABAG 2016). Moreover, no residences, gathering places, or structures are proposed by the Project and the Project does not propose uses that would put residences in danger or increase the risk of wildland fire hazards. Therefore, the Project will have **no impact**.

IX. HYDROLOGY AND WATER QUALITY

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☒	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface run-off in a manner which would result in flooding on-or off-site?	☐	☐	☒	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☒	☐

Environmental Setting

The Project site is located within the southern foothills of Mount Diablo within the Tassajara Creek drainage corridor. Slopes within the Project site range from 0 to 5 percent and fall toward Tassajara Creek. Tassajara Creek originates within the Black Hills to the north of the Project site and flows in a southerly direction past the Project site towards Arroyo de la Laguna Creek. Arroyo de la Laguna Creek empties into Alameda

Creek. Roadside ditches in the project area drain to Tassajara Creek.

Flood Hazard Areas

100-year Floodplains

The Federal Emergency Management Agency (FEMA) produced a Flood Insurance Study (FIS) and printed Flood Insurance Rate Maps (FIRMs). These maps show watershed areas which are re-studied and re-mapped periodically and show areas with a one percent chance of flooding each year. These areas are commonly referred to as 100-year floodplains, and are shown as Special Flood Hazard Areas (SFHAs) on the FIRM maps (FEMA 2009). According to the FIRM associated with the Project sites, portions of Segment 4 are located within a Zone A 100-year flood zone area.

a) Would the project violate any water quality standards or waste discharge requirements?

The Project will not create wastewater discharge. Tassajara Creek parallels the Project site (varying from 30 to 70 feet away) and is not listed as an impaired water body in the SWRCB 303(d) list. There will be no in-creek work or discharge into the creek. The Project does not add additional lanes and therefore is not trigger County C.3 requirements. As stated in Mitigation Measures BIO IV(a)-1e and BIO IV(a)-1f, a SWPPP or WPCP will be prepared for the Project and standard BMPs will be implemented during construction activities to minimize sediment or pollutants from construction activities from accidentally entering the creek. Therefore, Project impacts will be **less than significant with mitigation incorporated**.

b) Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

The Project will not require any withdrawals from an aquifer or groundwater table and will have a negligible effect on groundwater recharge. Project impacts will be **less than significant**.

c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

The Project will include widening the existing roadway along four segments of Camino Tassajara between Finley Road and Windemere Parkway to provide two 12-foot travel lanes with 8-foot shoulders. The Project will widen approximately 5,050 feet of the existing roadway. All drainage improvements are designed to collect and convey storm water to Tassajara Creek consistent with the existing conditions. Minor modifications to the planned design may occur during the final design phase. Any changes resulting from the Project will be negligible and would not change overall drainage patterns or hydrology of the area or result in erosion or siltation on or off site. Therefore, Project impacts will be **less than significant**.

d) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface run-off in a manner which would result in flooding on-or off-site?

The Project will create additional impervious surface area as a result of the pavement widening. However, as discussed above in Section IX.c, the Project will not substantially alter the existing drainage pattern of the area. The area surrounding Camino Tassajara Road primarily consists of grasslands, orchards, and other pervious surfaces. The surrounding area will remain pervious, vegetated and

unpaved, which will provide opportunity for stormwater to percolate into the ground. In addition, the amount of new impervious surface relative to the surrounding area is negligible.

The Project will extend culverts and modify inlets as necessary to accommodate the road widening and will re-grade ditches to maintain the existing drainage patterns. In addition, all drainage will be designed to collect and convey stormwater to Tassajara Creek consistent with the existing conditions. The Project will not construct new obstacles that could block or redirect stormwater flows. The Project will not substantially alter the existing drainage or flooding pattern of the Project sites. Therefore, Project impacts will be **less than significant**.

e) Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

The Project will not create or contribute runoff water that would exceed the capacity of the existing stormwater drainage system in the area. As stated above in Section IX.d, the proposed Project will not substantially alter the existing drainage pattern of the area. The surrounding area will remain pervious, vegetated and unpaved, which will provide opportunity for stormwater to percolate into the ground. Stormdrain modifications will be limited to those necessary to accommodate the new pavement width. The Project will not add additional travel lanes and is therefore does not trigger C.3 requirements. Further, the Project does not increase capacity of the roadway for vehicle traffic so there will be no additional sources of polluted runoff. Increased safety for bicyclists may encourage alternative modes of transportation which could reduce potential for polluted runoff from vehicles. Re-graded ditches will remain pervious and will be seeded with a native seed mix and sterile nurse crop. Therefore, Project impacts will be **less than significant**.

f) Would the project otherwise substantially degrade water quality?

No potential impacts to water quality other than those discussed above are anticipated. Therefore, Project impacts will be **less than significant**.

g) Would the project place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

The Project does not include the construction of housing. Therefore, the Project will have **no impact**.

h) Would the project place within a 100-year flood hazard area structures that would impede or redirect flood flows?

The Project does not include the construction of structures that would impede or redirect flows. Therefore, the Project will have **no impact**.

i) Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

A small portion of the Project site within Segment 4 is located within a Zone A 100-year flood zone area identified on the FIRM for the area, however the Project will not construct structures or provide places for people to gather or linger that might expose them to danger of flooding. The Project does not include the construction or alteration of any levees or dams and according to Contra Costa County Flood Control and Water Conservation District maps. In addition, the Project is not located within an area that would be inundated by failure of an existing dam. Therefore, Project impacts will be **less than significant**.

j) Would the project the expose people or structures to risk of inundation by seiche, tsunami, or mudflow?

The Project site is located in an inland area and is therefore not subject to seiches or tsunamis. Mudslides and debris flows are characterized by fast moving saturated earth. They develop when water rapidly accumulates in the ground, during heavy rainfall or rapid snowmelt, changing the earth into a flowing river of mud or "slurry" (FEMA 2017). Areas identified by ABAG as Debris Flow Areas occur approximately one quarter mile to the east and west of the Project site, on the slopes of hillsides (ABAG 2017). However, the Project is limited to lane and shoulder widening of an existing road and will not introduce new land uses that could be impacted by mudslides. Therefore, Project impacts will be **less than significant**.

X. LAND USE AND PLANNING

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or the regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Regulatory Setting

General planning policies and provisions are contained in the General Plan and the Contra Costa County Zoning Ordinance. The Contra Costa County Transit Authority is a public agency that manages the County's transportation sales tax program and is responsible for countywide transportation planning. The East Bay Regional Park District manages open space and trails near the Camino Tassajara Valley. The County has an adopted Habitat Conservation Plan/Natural Community Conservation Plan however the Project is not within the plan's inventory area.

a) Would the project physically divide an established community?

The Project is limited to lane and shoulder widening of an existing road and will not physically divide a community. Therefore, the Project will have **no impact**.

b) Would the project conflict with any applicable land use plan, policy, or the regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

The proposed project does not conflict with any applicable land use plan, policy or regulation. The project is consistent with the Transportation and Circulation Element goals and policies of the County General Plan including (Contra Costa County 2005c):

- Roadway and Transit Goal #5-A: To provide a safe, efficient and balanced transportation system
- Roadway and Transit Goal #5-D: To maintain and improve air quality above air quality standards.
- Roadway and Transit Goal #5-J: To reduce single-occupant auto commuting and encourage walking and bicycling.
- Roadway and Transit Goal #5-L: To reduce greenhouse gas emissions from transportation sources through provision of transit, bicycle, and pedestrian facilities.
- Roadway and Transit Policy # 5-9: Existing circulation facilities shall be improved and

maintained by eliminating structural and geometric design deficiencies.

- Roadway and Transit Policy #5-13: The use of pedestrian and bicycle facilities shall be encouraged. Proper facilities shall be designed to accommodate bikes, pedestrians, and transit.
- Roadway and Transit Policy #5-14: Physical conflicts between pedestrians, bicyclists, and vehicular traffic, bicyclists, and pedestrians shall be minimized.
- Roadway and Transit Policy #5-18: The design and the scheduling of improvements to arterials and collectors shall give priority to intermodal safety over other factors including capacity.
- Roadway and Transit Policy #5-23: All efforts to develop alternative transportation systems to reduce peak period traffic congestion shall be encouraged.
- Roadway and Transit Policy #5-24: Use of alternative forms of transportation, such as transit, bike and pedestrian modes, shall be encouraged in order to provide basic accessibility to those without access to a personal automobile and to help minimize automobile congestion and air pollution.

According to the Contra Costa County Countywide Bicycle and Pedestrian Plan, a Class II bicycle lane has been proposed for the Project segments of Camino Tassajara. The Project will provide the desirable pavement width for a Class II bike lane; therefore, the Project is consistent with this plan. According to the East Bay Regional Park District 2013 Master Plan Map, no Parklands or Trails are planned for Camino Tassajara along the Project length (EBRPD 2013). Other potential impacts associated with specific topical sections are discussed in those sections.

Based on the analysis above, the Project is consistent with environmental land use policies or plans. Therefore, Project impacts will be **less than significant**.

c) Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

The Project does not fall within the inventory area of the Contra Costa County Habitat Conservation/Natural Community Conservation Plan. Therefore, the Project will have **no impact**.

XI. MINERAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss or availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

Environmental Setting

Mineral resources such as crushed rock, sand, and other resources, are important minerals in the region as they provide the necessary components for construction materials including asphalt and concrete for current and future development in the region. The most important mineral resources that are currently mined in the County include diabase near Mt. Zion on the north side of Mt. Diablo, which provides crushed rock primarily for roadbase and streambank stabilizations; domengine sandstone, located in the eastern portion of the County just south of Camino Diablo and east of Vasco Road in the Byron area, which is the sole deposit in the state; and shale in the Port Costa area, which has been designated for protection by the County General Plan (Contra Costa County 2005f).

a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

There are no mapped mineral resource areas near the Project. Therefore, the Project will have **no impact**.

b) Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

There are no mapped mineral resource areas near the Project. Therefore, the Project will have **no impact**.

XII. NOISE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
b) Exposure of persons to or generation of, excessive ground borne vibration or ground borne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Background

Section 65302(f) of the California Government Code requires that a noise element be prepared as a part of all city and county general plans. The Contra Costa County General Plan Noise Element follows the guidelines established by the California Department of Health Services entitled *Guidelines for the Preparation and Content of the Noise Element of the General Plan,* which defines noise metrics, discusses the process of noise element development, and presents land use compatibility guidelines based on various noise levels and provides goals, policies, and implementation measures for consideration (Contra Costa County 2005h).

Contra Costa County does not have a noise ordinance and therefore, does not specify operational or construction noise level limits. The Noise Element of the General Plan does specify that construction activities shall be concentrated during the hours of the day that are not noise-sensitive for adjacent land uses and should be commissioned to occur during normal work hours of the day to provide relative quiet during the more sensitive evening and early morning periods. Construction activities are generally limited to the hours between 7 a.m. to 5 p.m. (Contra Costa County 2005h).

a) Would the project cause exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Operational Impacts

The Project will not increase capacity of the road and no significant changes to topography would occur. Shoulder widening on either side of the roadway will result in small changes (increases and decreases) in the distance of the travel way from nearby receptors although related changes in roadway noise will be negligible.

Construction Impacts

The Project will result in an increase in ambient noise associated with project construction. However, these impacts would be short-term and temporary in nature. In general, construction equipment generates noise levels ranging from approximately 74 to 90 dBA at 50 feet from the noise source, with higher levels up to 101 dBA for less typical equipment such as pile drivers and rock drills (USDOT 2006). Construction activities for this Project will fall within a typical range between 74 to 90 dBA at 50 feet.

There are numerous residences and other sensitive land uses located within the vicinity of the four roadway segments included as part of the Project. At Segment 1, there are approximately six residences located within 500 feet east of the site and another residence located approximately 250 feet northwest of the segment. In some areas along this segment, existing vegetation provides a buffer against roadway noise. At Segment 2, an equestrian center and swimming facility are located within 500 feet north of the segment. A single residence is located approximately 500 feet south. Segment 3 contains a variety of agricultural operations within the vicinity of the site. Two residences are located north of the segment within 400 feet. Segment 4 contains a variety of residences and agricultural operations immediately to the east and west of the segment.

As stated above, Contra Costa County does not have a noise ordinance but the General Plan specifies that construction activities shall be concentrated during the hours of the day that are not noise-sensitive for adjacent land uses. Construction activities will be generally limited to the hours between 7:00 a.m. to 5:00 p.m. Although unanticipated, if work is necessary outside of these hours, the Resident Engineer shall approve the work and will be available to address any noise concerns during all construction activities. In addition, implementation of Mitigation Measure NOI-1 would further ensure that potentially significant impacts are reduced to a less-than-significant level.

IMPACT NOI-1

Development of the Project will result in a temporary increase in ambient noise levels during Project construction.

MITIGATION MEASURE NOI-1:

The project contractor shall employ the following noise-reducing practices during project construction:

1. Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
2. Unnecessary idling of internal combustion engines within 100 feet of residences should be strictly prohibited.
3. Locate stationary noise generating equipment as far as possible from sensitive receptors.
4. Utilize ‘quiet’ air compressors and other ‘quiet’ equipment where such technology exists.
5. Avoid staging of construction equipment within 200 feet of residences and locate all stationary

noise-generating construction equipment as far as practical from noise sensitive receptors.

6. Require all construction equipment to conform to Section 14-8.02 Noise Control, of the latest Standard Specifications.
7. Provide notification to the adjacent noise-sensitive receptors including the specific construction schedule for major noise-generating construction activities.

Therefore, Project impacts will be **less than significant with mitigation incorporated**.

b) Would the project cause exposure of persons to or generation of, excessive ground borne vibration or ground borne noise levels?

Excessive ground borne vibration from construction activities results from equipment such as pile drivers, which will not be used to construct the Project. Some ground borne vibration may result from construction but will not be excessive based on the types of construction equipment that will be used and will be short term in nature. Therefore, Project impacts will be **less than significant**.

c) Would the project cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

The Project will not increase the capacity of the roadway and no significant changes in topography will occur from Project implementation. As stated above, any changes in perceptible roadway noise will be negligible. Therefore, Project impacts will be **less than significant**.

d) Would the project cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

As discussed in Section XII.a, the Project will result in temporary construction noise. Construction noise sources would be temporary and short-term in nature. With implementation of Mitigation Measure NOI-1, project impacts would be reduced to a less-than-significant level. Therefore, Project impacts will be **less than significant with mitigation incorporated.**

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

There is no public airport located within two miles of the project area. Therefore, the Project will have **no impact**.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

The Project is not located in the vicinity of a private airstrip. Therefore, the Project will have **no impact**.

XIII. POPULATION AND HOUSING

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Regulatory Setting

Section 15126.2(d) of the CEQA Guidelines requires a lead agency discuss ways in which the Project could foster economic or population growth, either directly by construction of businesses or housing, or indirectly by removing obstacles to population growth; for example, extending infrastructure into previously un-serviced areas. Increases in population may stress existing community service facilities, requiring construction of new facilities that could cause significant environmental effects.

a) Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

The Project does not include new homes or businesses that could directly induce population growth. The Project will not increase the capacity of the roadway. Drainage modifications are limited to that which is necessary to accommodate the new pavement width and storm drain capacity will not be increased. No other infrastructure is proposed that could indirectly induce population growth. Therefore, the Project will have **no impact**.

b) Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

The Project will not displace any existing housing; as such, no replacement housing is necessary. Therefore, the Project will have **no impact**.

c) Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

The Project will not displace any people; as such, no replacement housing construction is necessary. Therefore, the Project will have **no impact**.

XIV. PUBLIC SERVICES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services?				
1 Fire Protection?	☐	☐	☐	☒
2 Police Protection?	☐	☐	☐	☒
3 Schools?	☐	☐	☐	☒
4 Parks?	☐	☐	☐	☒
5 Other public facilities?	☐	☐	☐	☒

Environmental Setting

The San Ramon Valley Fire Protection District provides fire protection services and emergency services to the Tassajara Valley and the Contra Costa County Sheriff's Department provides general public safety and law enforcement services in unincorporated areas of Contra Costa County (Contra Costa County 2005e). The Project is located in the San Ramon Valley Unified School District. (SRVSD 2017)

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services?

The Project will not result in new development that could increase demand on public services and therefore will not necessitate the construction of new facilities or the alteration of facilities that could result in environmental impacts. Because the Project will not result in population growth, nor does it propose land uses that increase demand on police and fire services, the Project will not impact service ratios, response times or other performance objectives for fire protection, police protection, schools, parks, or other public facilities. Therefore, the Project will have **no impact**.

XV. RECREATION

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

The Project does not include new development that could increase use of existing parks or recreational facilities that could result in deterioration of facilities. Therefore the Project will have **no impact**.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

As noted above, the Project does not include new development that could require construction of existing recreational facilities. Therefore, the Project will have **no impact**.

XVI. TRANSPORTATION/TRAFFIC

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☒	☐
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☒	☐

Regulatory Setting

The Contra Costa Transportation Authority (CCTA) is a public agency formed to manage the County's transportation sales tax program and to conduct countywide transportation planning. CCTA is responsible for maintaining and improving the County's transportation system by planning, funding, and delivering critical transportation infrastructure projects and programs that connect the communities safely and efficiently including bicycle and pedestrian projects as described in the *2009 Countywide Bike and Pedestrian Plan* (CCTA 2009). In addition, the Transportation and Circulation Element of the County General Plan includes transportation goals and policies (Contra Costa County 2005c).

a) Would the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

The Project does not include elements that could increase traffic on local roadways (for example residential

or commercial construction). Changes to the roadway are limited to lane and shoulder widening to bring the road up to current County standards and will not substantially change the configuration of the road or increase capacity. As such, the Project will not conflict with plans, ordinances or policies that establish measures of effectiveness for roadway performance.

According to the County Connection website, there are no County Connection bus routes along the Project length of Camino Tassajara. According to the Livermore Amador Valley Transit Authority, Wheels, System Maps does not identify bus routes along the Project length of Camino Tassajara. As such, no public transit routes will be affected. According to the Contra Costa County Countywide Bicycle and Pedestrian Plan, a Class II bicycle lane has been proposed for the Project segment of Camino Tassajara. The Project will provide the desirable pavement width for a Class II bike lane. Therefore, the Project is consistent with this plan. According to the East Bay Regional Park District 2013 Master Plan Map, no Parklands or Trails are planned for Camino Tassajara along the Project length.

Through Project implementation, the roadway would be signed and striped for a Class II bike lane. This use is consistent with General Plan Policy 5-L, which encourages increased opportunity for bicycle use for recreation as well as transportation. For the reasons stated, the Project does not conflict with applicable plans and Project impacts will be **less than significant**.

b) *Would the project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?*

As discussed above, the Project does not include elements that could increase traffic on roadways nor does it propose significant changes to the road. The Project would not increase the capacity of the road or result in any permanent impacts to any level of service or other roadway standards. The Project is estimated to take approximately 45 working days per segment to construct and during certain items of work, the Project may require a full or partial lane closure for short durations. As such, temporary traffic disruptions will occur along segments of the Project roadway where work is taking place.

It is anticipated that no more than two segments would be constructed at a time. During short-term lane closures, traffic control measures such as flaggers and signage are expected to minimize significant congestion or delays. In addition, at least one lane will be open at all times to accommodate vehicles and to the extent feasible, any lane closure will be conducted during off-peak hours. Messaging boards will also be utilized to inform roadway users of upcoming construction delays. At the end of each workday, any lane closures will be re-opened to traffic. Full road closure is not anticipated and no detours will be necessary. Therefore, Project impacts will be **less than significant**.

c) *Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?*

The Project is not located near an airport nor does it propose creation of structures or land uses that could affect air traffic patterns. Therefore, the Project will have **no impact**.

d) *Would the project substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?*

The Project will not increase hazards due to a design feature as the purpose of the Project is to provide safer roadway conditions along the roadway by bringing these segments up to current County standards. During construction, the Project contract specifications will require the contractor to implement measures

to minimize potential construction impacts. Therefore project impacts will be **less than significant**.

e) Would the project result in inadequate emergency access?

Emergency vehicles will have access through the Project site at all times. Contract specifications will require the Contractor to notify local authorities of the Contractor's intent to begin work at least 5 days before work is scheduled to begin. The Contractor will be required to cooperate with local authorities relative to handling traffic through the Project area and will make arrangements relative to keeping the work area clear of parked vehicles. Therefore, Project impacts will be **less than significant**.

f) Would the project conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

As stated above, the roadway would be signed and striped for a Class II bike lane, which is consistent with the goals and policies contained in the General Plan and the 2009 Countywide Bicycle and Pedestrian Plan. In addition, no public transit routes are located along the Project segment of Camino Tassajara. Therefore, Project impacts will be **less than significant**.

XVII. TRIBAL CULTURAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of Historical Resources as defined in Public Resources Code section 5020.1(k), or	☐	☒	☐	☐
ii) A resourced determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

Regulatory Setting

Assembly Bill 52, which became law on January 1, 2015, provides for consultation with California Native American tribes during the CEQA environmental review process, and equates significant impacts to "tribal cultural resources" with significant environmental impacts. Section 21074 of the Public Resources Code defines California Native American tribes as "a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of the Statutes of 2004." This includes both federally and non-federally recognized tribes. Section 21074(a) of the Public Resource Code defines Tribal Cultural Resources for the purpose of CEQA as:

1. Sites, features, places, cultural landscapes (geographically defined in terms of the size and scope), sacred places, and objects with cultural value to a California Native American tribe that are any of the following:
    a. included or determined to be eligible for inclusion in the California Register of Historical Resources; and/or
    b. included in a local register of historical resources as defined in subdivision (k) of Section 5020.1; and/or
    c. a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

A “historical resource” (PRC Section 21084.1), a “unique archaeological resource” (PRC Section 21083.2(g)), or a “nonunique archaeological resource” (PRC Section 21083.2 (h)) may also be a tribal cultural resource if it is included or determined to be eligible for inclusion in the California Register of Historical Resources. Tribal Cultural Resources may or may not exhibit archaeological, cultural, or physical indicators. The consultation provisions of the law require that a public agency consult with local Native American tribes that have requested placement on that agency’s notification list for CEQA projects.

Recognizing that California tribes are experts in their tribal cultural resources and heritage, AB 52 requires that CEQA lead agencies carry out consultation with tribes at the commencement of the CEQA process to identify Tribal Cultural Resources. Furthermore, because a significant effect on a Tribal Cultural Resource is considered a significant impact on the environment under CEQA, consultation is required to develop appropriate avoidance, impact minimization, and mitigation measures. Consultation is concluded when either the lead agency and tribes agree to appropriate mitigation measures to mitigate or avoid a significant effect, if a significant effect exists, or when a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached (PRC Section 21080.3.2(b)), whereby the lead agency uses its best judgement in requiring mitigation measures that avoid or minimize impact to the greatest extent feasible.

a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of Historical Resources as defined in Public Resources Code section 5020.1(k); or ii) A resourced determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

The Wilton Rancheria Tribe has submitted a general request letter to be notified of Projects within Contra Costa County under AB52. On May 25, 2016 an offer to consult was sent to the AB52 contact indicated in the Wilton Rancheria general request letter. No response was received in the 30-day response period. Therefore the consultation period under AB52 closed with no response from the Tribe regarding presence of potential resources. As noted in Section V, Cultural Resources, a cultural resource assessment was completed and did not identify any historical resources within the APE.

As in typical for general cultural resource investigations, throughout all stages of Project planning and archaeological investigations, Condor Country Consulting, Inc. (Condor) conducted consultations with local Native American representatives. On November 15, 2016, Condor faxed a letter to the NAHC requesting a search of the Sacred Lands File for the Project area, and program analysts conducted the records search on November 21, 2016. According to the NAHC, the search of the Sacred Lands File failed to identify any culturally sensitive locations within the Project APE. As per California Public Resources Code §5097.98, the NAHC provided Condor with a list of Native American contacts for further consultation regarding the Project. Six Native American tribal representatives and/or organizations were identified as possibly having information relevant to the Project area or concerns regarding proposed Project activities.

On May 25, 2017, Condor mailed letters and Project maps through the United States Post Service (Priority Mail) to the contacts provided by the NAHC. In addition to the maps, the letters included a description of the Project and the Project location, as well as the negative results of the records search and archaeological

reconnaissance survey. The letters' purpose was to inform the individuals and organizations representing the Native American community of the Project and to seek information regarding any areas of concern within or adjacent to the APE. In soliciting comments, questions, and concerns with regard to the Project, Condor specifically requested any information on Traditional Cultural Properties or places, such as traditional plant gathering sites, and whether any other sites of historic interest were in or immediately adjacent to the Project area, particularly those that may not have been previously recorded. The following contacts received letters:

- Chairperson Irene Zwierlein (Amah Mutsun Tribal Band of Mission San Juan Bautista)
- Chairperson Ann Marie Sayers (Indian Canyon Mutsun Band of Costanoan)
- Chairperson Rosemary Cambra (Muwekma Ohlone Indian Tribe of the SF Bay Area)
- Chairperson Katherine Erolinda Perez (North Valley Yokuts Tribe)
- Representative Andrew Galvan (The Ohlone Indian Tribe)
- Chairperson Raymond Hitchcock (Wilton Rancheria)

Subsequent attempts to reach the representatives were made by telephone on June 5, 2017 to solicit comments, questions, or concerns regarding the Project. Chairperson Sayers, expressed her confidence in the archaeological assessment and asked to be notified if any Native American cultural resources are encountered during construction. Detailed messages were left with Ms. Cambra, Mr. Galvan, and Mr. Hitchcock. These messages referenced the previously sent letters, described the nature and location of the Project, and asked that the representatives call to discuss any concerns or additional information that they may have regarding cultural resources in the vicinity of the APE. Calls to Ms. Zwierlein and Ms. Perez went unanswered. Ms. Zwierlein's voicemail box was full, and Ms. Perez had not made voicemail available. Second attempts to reach the remaining representatives were made on June 7, 2017, but no new responses were received. Voice messages were again left with Ms. Cambra, Mr. Galvan, and Mr. Hitchcock, but voicemail was still unavailable for Ms. Zwierlein and Ms. Perez.

A written reply was received from Mr. Antonio Ruiz, Jr. Cultural Resources Officer for the Wilton Rancheria of Wilton California on June 19, 2017. The reply did not contain information regarding cultural resources. Mr. Ruiz requested that all Wilton Rancheria correspondences be kept confidential and only shared between the Tribe and County and as such, their specific requests do not appear in this document.

None of the other Native American representatives identified by the NAHC has voiced any concerns with regard to the potential for discovery of Native American cultural resources within APE, Mitigation Measures CUL-1 AND CUL-2 will be implemented to minimize unanticipated impacts to previously undiscovered resources. Therefore, Project impacts will be **less than significant with mitigation incorporated**.

XVIII. UTILITIES AND SERVICE SYSTEMS	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state and local statutes and regulations related to solid waste?	☐	☐	☒	☐

a) Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

The Project will not exceed wastewater requirements because the completed Project will not result in the need for wastewater treatment. Therefore, the Project will have **no impact**.

b) Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

The Project does not include nor will it require construction of new water or wastewater treatment facilities or expansion of existing facilities. Therefore, the Project will have **no impact**.

c) Would the project require or result in the construction of new storm water drainage facilities, the construction of which could cause significant environmental effects?

Drainage modifications will be limited to those necessary to accommodate shoulder widening. Capacity

would not be increased. The impacts associated with minor drainage modifications are analyzed in this document and were found to be less than significant. No other storm water drainage facilities are proposed or will be necessary for implementation of the Project. Therefore, the Project's impacts will be **less than significant.**

d) Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

The completed Project will not require water service, and any water needed during project construction would be provided by water trucks from off-site water sources. Therefore, the Project will have **no impact**.

e) Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

The Project does not require wastewater treatment services. Therefore, the Project will have **no impact**.

f) Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's waste disposal needs?

The Project will not generate operational waste and will not result in the need for a new solid waste facility. However, a small amount of construction waste including vegetative matter, asphalt, and concrete may be generated. The County has active solid waste facilities with capacity to accommodate any construction waste that may be generated (CalRecycle, 2017). In addition, Project contract specifications will require that the contractor dispose of solid waste in accordance with all federal, state and local regulations. Therefore, the Project impacts will be **less than significant**.

g) Would the project comply with federal, state and local statutes and regulations related to solid waste?

As stated above, Project contract specifications will require that the contractor dispose of solid waste in accordance with all federal, state and local regulations. Therefore, Project impacts will be **less than significant**.

XVIV. MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish and wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish and wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

As discussed in Section IV, implementation of Mitigation Measures BIO IV(a)-1a through BIO IV(a)-9 would ensure that development of the Project would not: 1) substantially reduce the habitat of a fish or wildlife species; 2) cause a fish or wildlife species population to drop below self-sustaining levels; 3) threaten to eliminate a plant or animal community; or 4) reduce the number or restrict the range of a rare or endangered plant or animal. Specifically, implementation of Mitigation Measures BIO IV(a)-1a through BIO IV(a)-9 would ensure that potentially significant impacts would be reduced to less-than-significant levels. As discussed in Section V, the Project would not impact on- and/or off-site historic resources with implementation of Mitigation Measures CUL-1 and CUL-2. As such, the proposed Project will result in **less-than-significant with mitigation incorporated**.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

All project impacts were found to be less than significant or less than significant with mitigation

measures incorporated. No other known projects that could result in cumulative construction impacts are currently planned. Therefore, the impacts will be **less than significant**.

c) *Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?*

The Project will not cause substantial adverse direct or indirect effects on human beings as impacts will be avoided and minimized where possible and mitigated when necessary. Mitigation measures will be implemented as described in the Air Quality, Agriculture and Forest Resources, Biological Resources, Cultural Resources, and Noise sections. Therefore, project impacts will be **less than significant with mitigation incorporated**.

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FIGURE 1: Regional Location Map

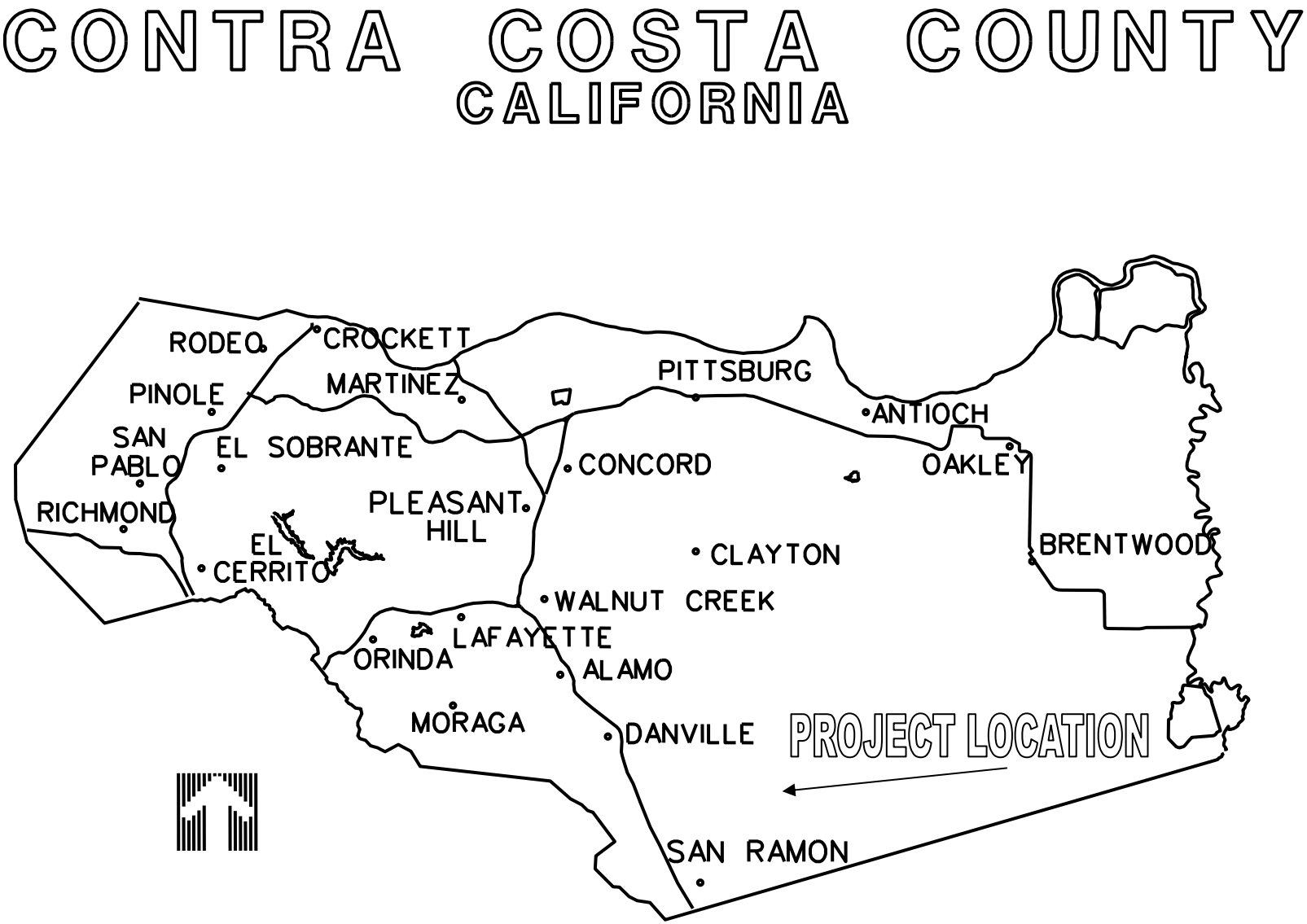


FIGURE 2: Project Vicinity Map

FIGURE 3: Aerial View of the Project Sites

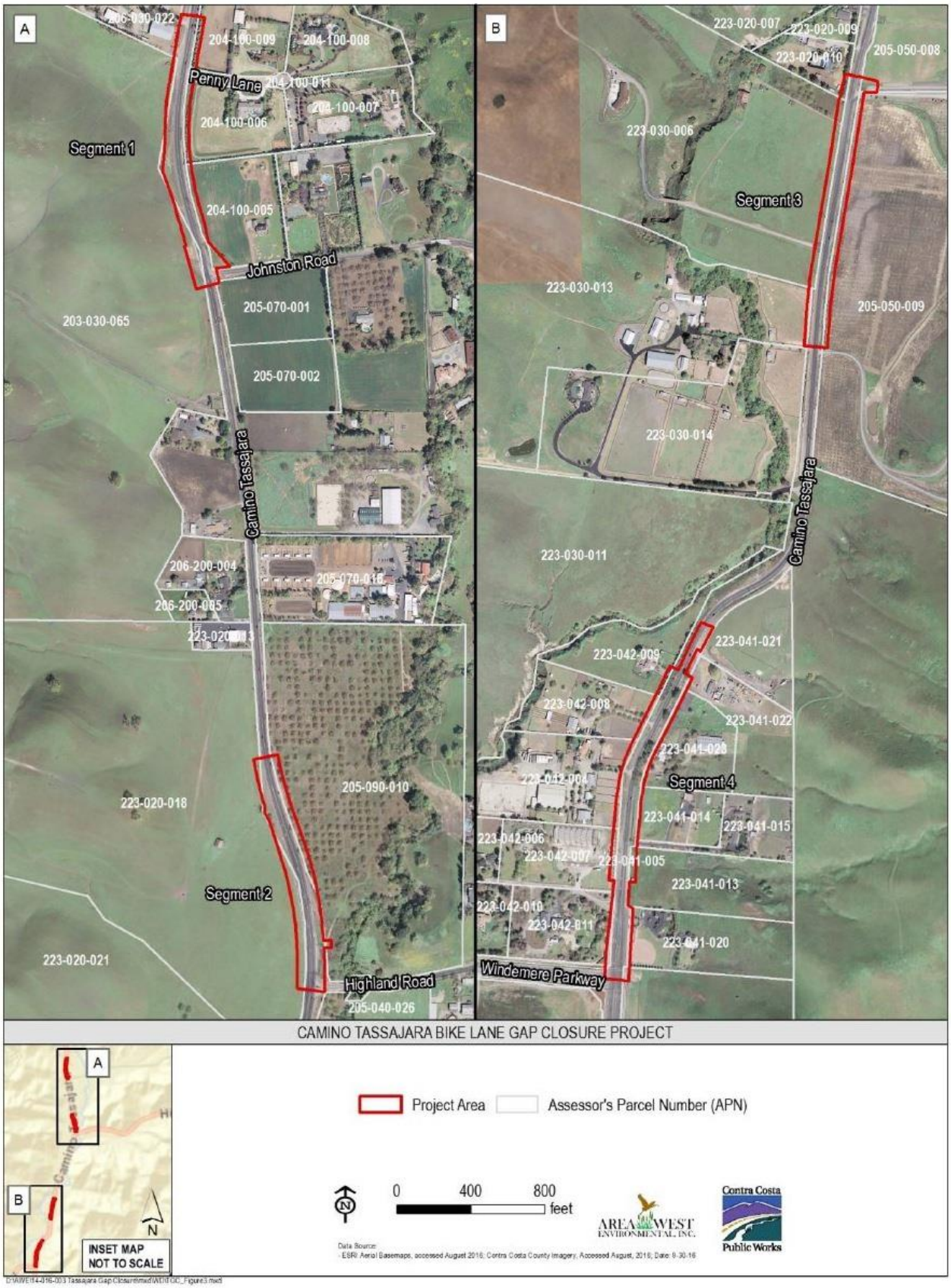


FIGURE 4: Segment 1 Area of Maximum Effect Map

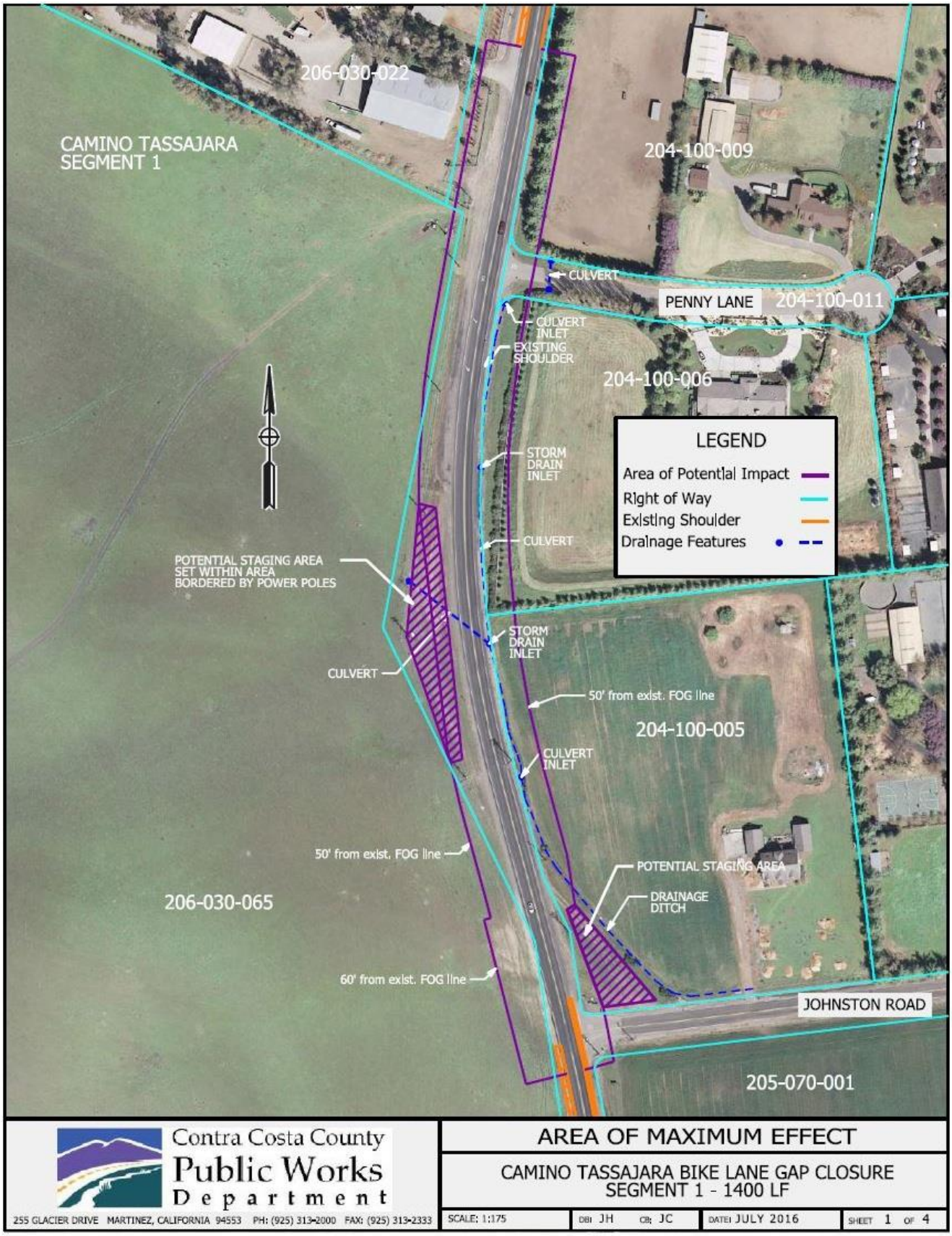


FIGURE 5: Segment 2 Area of Maximum Effect Map

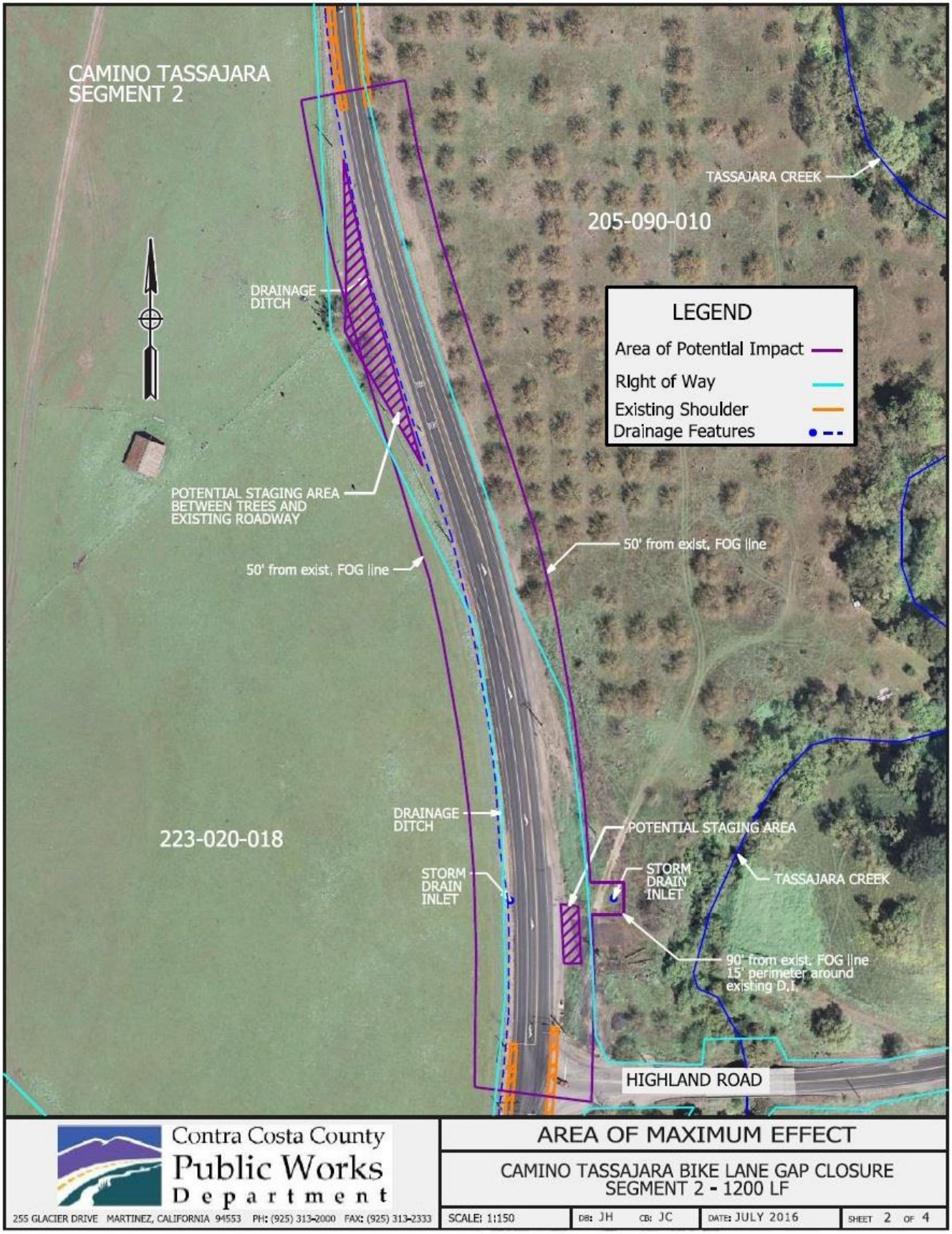


FIGURE 6: Segment 3 Area of Maximum Effect Map

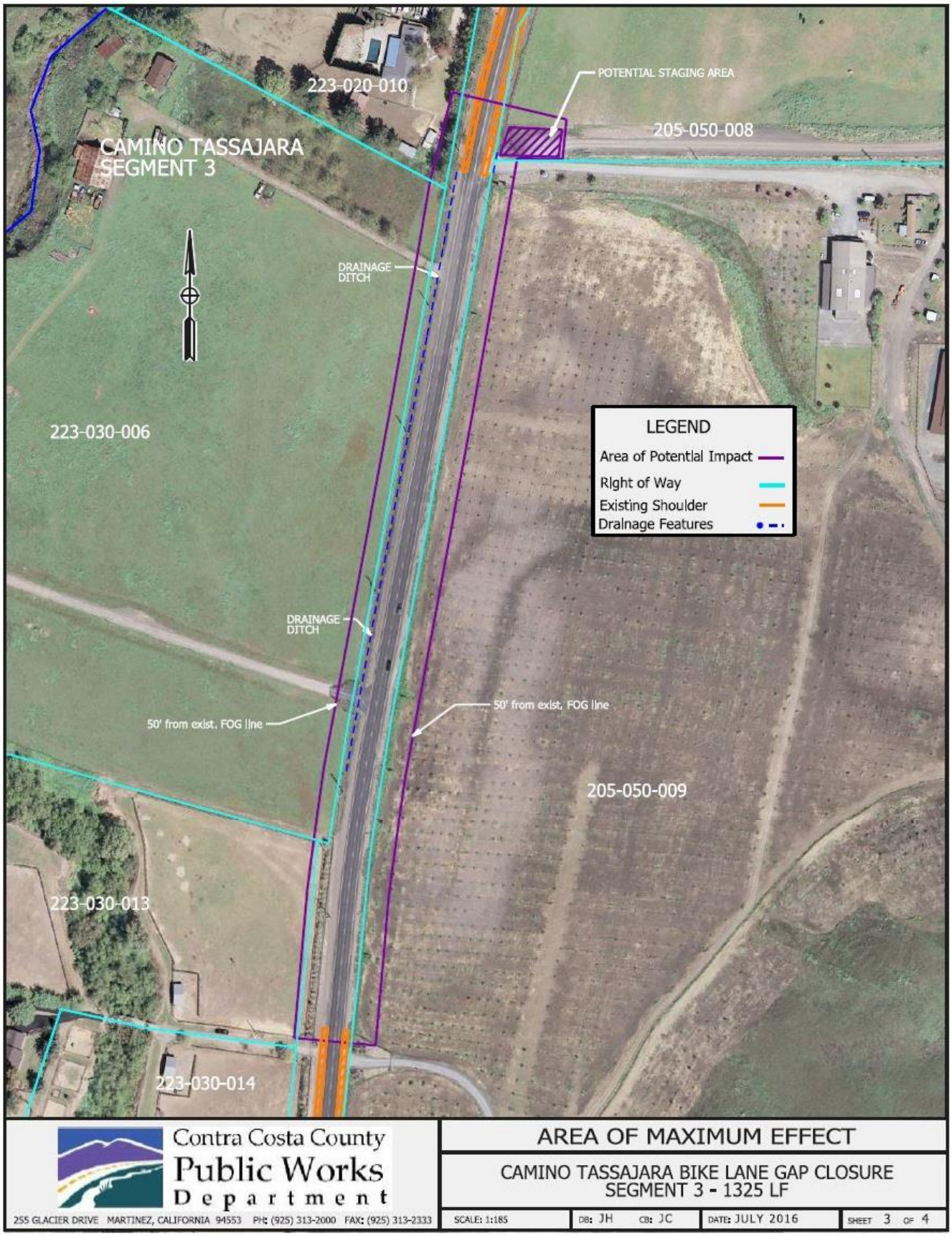


FIGURE 7: Segment 4 Area of Maximum Effect Map

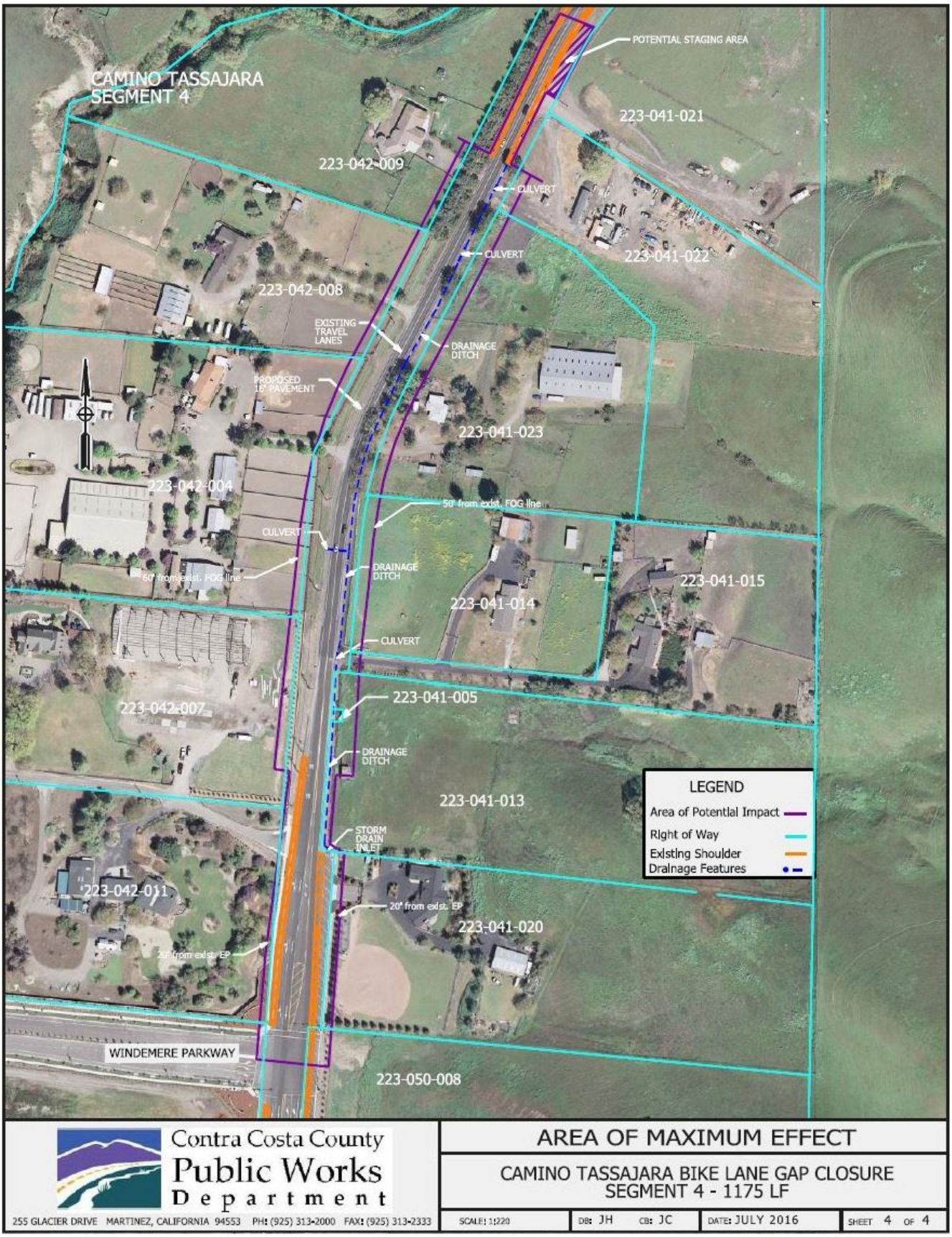


FIGURE 8: Zoning within the Project Area

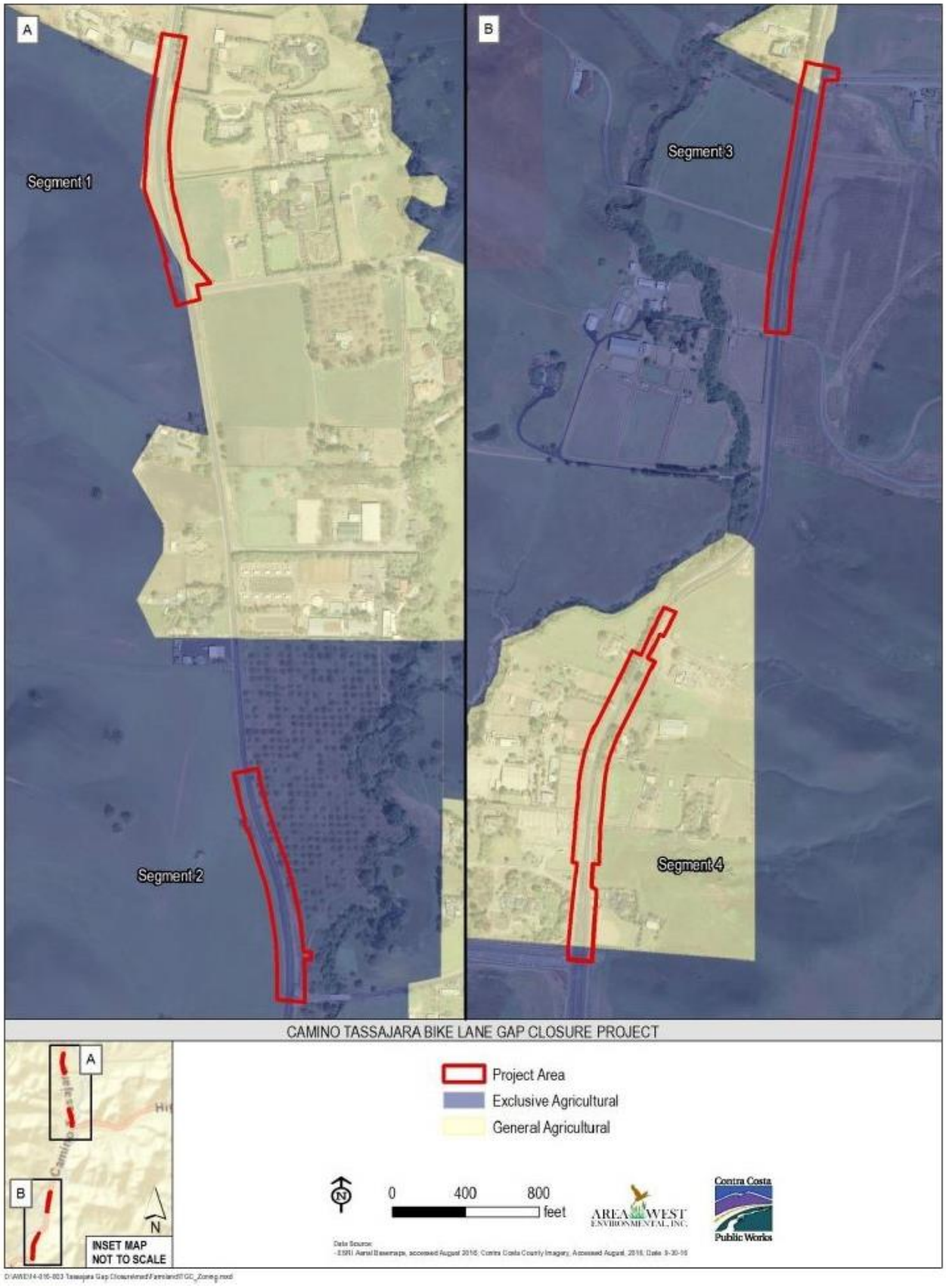
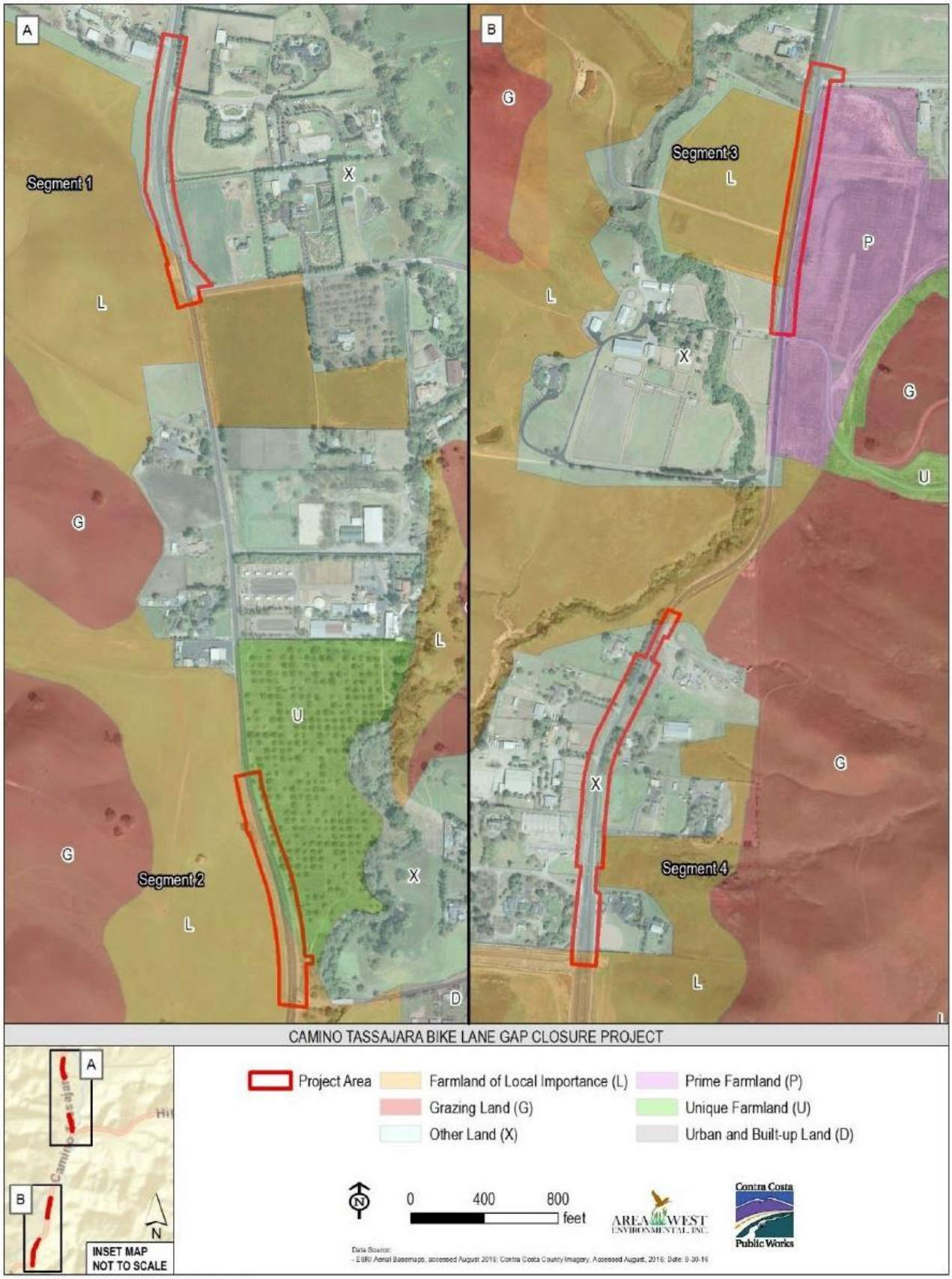


FIGURE 9: Farmland Mapping and Monitoring Program Classifications within the Project Area



Mitigation Monitoring and Reporting Program

The following Mitigation Monitoring and Reporting Program (MMRP) identifies the Mitigation Measures that will be implemented as part of the Camino Tassajara Bike Lane Gap Closure Project. The Contra Costa County Public Works Department (CCCPWD) or its Contractors under the supervision of CCCPWD will be responsible for implementing the following measures. CCCPWD will be responsible for monitoring to ensure the following measures are implemented.

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
II. AGRICULTURE AND FORESTRY RESOURCES				
IMPACT AGR-1 Development of the Project may require right of way acquisition of a small roadside area that is currently under Williamson Act.	AGR-1: If right of way takes of land under a Williamson Act Contract is necessary, prior to construction the CCCPWD or its designated representative will notify the Director of the California Department of Conservation and the Contra Costa County Department of Conservation and Development of the property acquisition and will provide a subsequent notification within 10 working days upon completion of the acquisition.	Prior to Construction	CCCPWD Environmental Services Division	CCCPWD
II. AIR QUALITY				
IMPACT AIR-1 Construction activities could result in fugitive dust emissions during Project construction.	AIR-1: Consistent with the Construction Mitigation Measures required by the Bay Area Air Quality Management District (BAAQMD), the construction contractor shall comply with the following: 1) All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. 2) All haul trucks transporting soil, sand, or other loose material off-site shall be covered. 3) All visible mud or dirt tracked-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. 4) All vehicle speeds on unpaved roads shall be limited to 15 mph. 5) All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible.	During Construction	CCCPWD Contractor	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
	6) Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. 7) All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. 8) A publicly visible sign shall be posted with the telephone number and contact information for the designated on-site construction manager available to receive and respond to dust complaints. This person shall report all complaints to Contra Costa County and take immediate corrective action as soon as practical but not more than 48 hours after the complaint is received. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.			
IMPACT AIR-2 Construction of three or four segments simultaneously (Scenario C and D) will result in NOx emissions that exceed the BAAQMD Thresholds of Significance.	AIR-2: Prior to construction, the construction contractor shall provide a written calculation to the County, demonstrating that the heavy-duty (> 50 horsepower) off-road vehicles to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a project wide fleet-average of at least 28 percent of NOX and 45 percent of diesel PM reduction as compared to (CARB) statewide fleet average emissions. Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products (e.g., CARB approved High Performance Renewable Diesel), alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available. The Construction Emissions Mitigation Tool development by the Sacramento Metropolitan Air Quality Management District (SMAQMD) may be used to calculate compliance with this condition and shall be submitted to the approving agency as described above.	Prior to Construction	CCCPWD Contractor	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
IV. BIOLOGICAL RESOURCES				
IMPACT BIO IV(a)-1 Potential habitat for the special-status wildlife species is present within the Biological Study Area (BSA) and surrounding area. In addition, the BSA is located within California red-legged frog Critical Habitat Unit CCS-2B. Therefore, impacts to special status species and their habitats could occur as a result of Project implementation. The following mitigation measures will reduce potential impacts to all special status species and their habitat. Impacts to specific species and associated mitigation measures are discussed individually.	BIO IV(a)-1a: Before any Project work occurs, including installation of exclusion fencing, grading and equipment staging, all construction personnel will participate in an environmental awareness training given by a qualified biologist regarding special-status species and sensitive habitats present in the Biological Study Area (BSA). If new construction personnel are added to the Project, they must receive the mandatory training before starting work. As part of the training, an environmental awareness handout will be provided to all personnel that describes and illustrates sensitive resources (i.e., special-status plant populations and special-status wildlife habitat) to be avoided during Project construction and lists applicable permit conditions required to protect these resources. New construction personnel will receive the training from a qualified biologist or from staff deemed adequate to give the training by the qualified biologist.	Prior to and during Construction	CCCPWD Contractor and Qualified Biologist	CCCPWD
	BIO IV(a)-1b: Before any Project equipment staging or ground-disturbing activity occurs, the County will ensure that appropriately sized temporary wildlife barrier fencing, buffer fencing, and/or silt fencing will be installed between the Project Site and adjacent habitats and any environmentally sensitive habitat areas (i.e., special-status plants, special-status wildlife habitat, active bird nests), as appropriate. Wildlife barrier fencing will be a minimum of 4 feet tall and made of suitable wildlife exclusion material (such as ERTECH E-Fence). As appropriate, the lower portion of barrier fence will be buried such that	Prior to Construction	CCCPWD Contractor and Qualified Biologist	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
	6 inches of the fence is below ground and at least 48 inches is above ground. Wildlife exclusion fencing will contain wildlife funnels that allow animals to leave the Project Site but not to enter it. Temporary silt fencing installed for erosion control will be 24 inches tall. Fencing will be installed in a manner that is consistent with applicable water quality requirements contained within the Project's Stormwater Pollution Prevention Plan (SWPPP) or Water Pollution Control Program (WPCP). Construction personnel and construction activity will avoid areas outside the fencing. The exact location of the fencing will be determined by the resident engineer coordinating with a qualified biologist, with the goal of protecting sensitive biological habitat and water quality. Installation of fencing will occur under the supervision of a qualified biologist. The fencing will be checked regularly and maintained until all construction is complete. No grading, clearing, storage of equipment or machinery, or other disturbance or activity may occur until the County has inspected and approved all temporary construction fencing. The fencing and a note reflecting this condition will be shown on the final construction documents.			
	BIO IV(a)-1c: A representative from the County will make weekly monitoring visits to construction areas occurring in or adjacent to environmentally sensitive habitat areas, (i.e., waters of the U.S. and State, special-status plants, special-status wildlife habitat). The County will be responsible for ensuring that the contractor maintains the construction barrier fencing protecting sensitive biological resources. Additionally, the County will retain a qualified biologist on-call to assist the County and the construction crew in complying with all Project implementation restrictions and guidelines.	Prior to Construction	CCCPWD Qualified Biologist	CCCPWD
	BIO IV(a)-1d: All temporarily disturbed areas will be returned to pre-project conditions upon completion of Project construction. These areas will be properly protected from washout and erosion using appropriate erosion control devices.	Following Construction Construction	CCCPWD Contractor	CCCPWD
	BIO IV(a)-1e: The following Best Management Practices will be implemented during construction to protect water quality within the	Prior to, During, and	CCCPWD Contractor	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
	watershed: 1) Final construction plans will depict the designated construction footprint as well as habitat to be avoided. 2) Before October 15 and/or immediately after construction is complete, stabilize exposed surfaces. 3) Temporarily affected areas will be restored to pre-Project conditions. 4) All exposed soils will be stabilized with an erosion control tackifier and will be seeded with a native seed mix with a sterilized nurse crop to reduce the effects of erosion. 5) Avoid construction within ponded or saturated areas to the maximum extent possible. 6) Staging areas will be contained within silt fencing or lined and bermed areas such that no leaks, runoff, or construction liquids could enter any drainage facilities. 7) No refueling, storage, servicing, or maintenance of equipment will take place within 50 feet of Tassajara Creek, its tributaries, or other adjacent wetland features. 8) All machinery used during construction of the Project will be properly maintained and cleaned to prevent spills and leaks that could contaminate soil or water. 9) Any spills or leaks from construction equipment (i.e., fuel, oil, hydraulic fluid, and grease) will be cleaned up in accordance with applicable local, state, and/or federal regulations.	Following Construction		
	BIO IV(a)-1f: The County will comply with the National Pollution Discharge Elimination System (NPDES) requirements associated with construction activity as required under Section 402 of the Clean Water Act. As part of this requirement, the County will require the contractor to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP). If the project qualifies for an erosivity waiver, a Water Pollution Control Program (WPCP) will be prepared. In either case, the document will include erosion control measures and construction-waste containment measures to ensure that waters of the U.S. and State are protected during and after Project construction.	Prior to Construction	CCCPWD Contractor	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
	The SWPPP or WPCP will include measure to minimize offsite stormwater runoff. Components of the SWPP or WPCP will include but not be limited to: 1) A comprehensive erosion and sediment control plan, depicting areas to remain undisturbed, and providing specifications for revegetation of disturbed areas. 2) A list of potential pollutants from building materials, chemicals, and maintenance practices used during construction, and the specific control measures to be implemented to minimize release and transport of these constituents in runoff. 3) Specifications and designs for the appropriate BMPs for controlling drainage and treating runoff in the construction phase. 4) A program for monitoring all control measures that includes schedules for inspection and maintenance, and identifies the party responsible for monitoring. 5) A site map that locates all water quality control measures and restricted areas to be left undisturbed.			
	BIO IV(a)-1g: To prevent the accidental introduction of new invasive species into the Project Site during construction, the County will require that the Project contractor implement the following control measures: 1) Only certified noxious weed-free erosion control materials will be used. All straw and seed material will be certified as weed-free prior to being used at the Project Site. 2) Contractor will wash all construction equipment prior to bringing it onto the job site. Inspection will ensure that equipment arrives on site free of mud and seed-bearing material. 3) Any reseeding of disturbed soil areas and newly constructed slopes will use an appropriate native seed mix.	During Construction	CCCPWD Contractor	CCCPWD
IMPACT BIO IV(a)-2 If present in the Project Site, the Project could impact	BIO IV(a)-2a: The following measures will be implemented to avoid impacts to special-status plants: ▪ The County will minimize impacts to populations of	Prior to and During Construction	CCCPWD	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
Congdon's tarplant individuals.	Congdon's tarplant in Segment 3 by establishing a work zone that avoids special-status plants to the greatest extent possible. To accomplish this measure, final design will focus on minimizing the Project footprint within areas that contain these special-status plants, as feasible. Anticipated locations of special status plants will be represented on final plans.			
	BIO IV(a)-2b: Prior to any unavoidable excavation work in any areas identified during botanical surveys that support Congdon's tarplant, seeds will be collected from plants located in the Project footprint. After finished grades generally have been achieved, the collected seeds will be redistributed within areas disturbed by the Project that provide appropriate habitat for the species. Specific actions that will be employed to ensure successful establishment of Congdon's tarplant include the following: 1) Prior to construction, all areas of permanent disturbance that are within 100 feet of Congdon's tarplants will be flagged for seed salvage. 2) Prior to other earthwork, at the appropriate time when seeds have developed but just before seeds drop, typically late summer and early fall, seeds will be collected and stored in a cool, dry location. 3) Once construction is complete in an area, seeds will be evenly spread over areas of exposed soil and raked in. 4) In areas where seed has been spread, equipment traffic will be limited, to the extent practicable, to minimize compaction. 5) Post construction, areas where seed was spread will be protected from wind and water erosion until after the next growing season (spring/summer) using typical stabilization methods. If hydroseeding is used, hydroseed will be comprised of a native seed mix with a sterilized nurse crop.	Prior to, During, and Following Construction	CCCPWD	CCCPWD
IMPACT BIO IV(a)-3 Project construction could directly and indirectly impact California red-legged frog,	BIO IV(a)-3a: All ground-disturbing activities associated with construction of the Project will be restricted to the dry season (estimated between April 15 and October 15) to avoid the period when listed amphibians (California red-legged frog and California	During Construction	CCCPWD Contractor	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
California red-legged frog Critical Habitat, and California tiger salamander and its habitat.	tiger salamander) could be actively dispersing through upland habitats. If construction will need to continue past October 15, to avoid potential impacts to these species a qualified biologist will be present during any work conducted after October 15 and no work will occur during rain events. Also refer to Mitigation Measure BIO IV(a)-1d.			
	BIO IV(a)-3b: To avoid entrapment of wildlife, all excavated steep-walled holes or trenches more than 2 feet deep will be provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each workday. If escape ramps cannot be provided, then holes or trenches will be covered with plywood or similar materials. Providing escape ramps or covering open trenches will prevent injury or mortality of wildlife resulting from falling into trenches and becoming trapped. The trenches will be thoroughly inspected for the presence of wildlife species at the beginning of each workday. If wildlife is discovered in the trenches work will not occur within 50-feet and the qualified biologist will be called immediately to determine if it is a special status species. Special status species will be left to leave the area on its own. Non-special status species may be removed by a qualified biologist and may require consultation with CDFW prior to removal as determined by the qualified biologist. Also refer to Mitigation Measure BIO IV(a)-3d.	Prior to and During Construction	CCCPWD Contractor and Qualified Biologist	CCCPWD
	BIO IV(a)-3c: A preconstruction survey will be conducted immediately preceding initial ground disturbing activities. A qualified biologist will carefully search all suitable habitat areas within the Project Site for California red-legged frogs, California tiger salamanders, or Alameda whipsnakes. A qualified biologist will monitor all initial ground disturbance and habitat removal e.g. grading, removal of vegetation, removal of culverts or rocks that could provide habitat for California red-legged frogs, California tiger salamanders, or Alameda whipsnakes. If any California red-legged frogs, California tiger salamanders, or Alameda whipsnakes are found during these surveys, work will stop	Prior to Construction	CCCPWD Contractor and Qualified Biologist	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
	within that segment and they will be allowed to move outside the Project Site on their own. Work may resume on approval by the County Environmental Division Project Manager.			
	BIO IV(a)-3d: Following preconstruction surveys and Project initiation, it is possible that wildlife species could subsequently enter or return to the Project Site. The following measures shall be implemented to avoid disturbance or harm to these species: 1) If any special-status species or other wildlife species, alive or dead, are observed in the Project Site during construction, construction shall cease in that segment until the qualified biologist can determine if it is a special status species and/or that it is safe to continue. 2) Non-special status species may be relocated by a qualified biologist, CDFW coordination may be required as determined by the qualified biologist. Work may resume when the wildlife is a safe distance away as determined by the qualified biologist. 3) A living special status species will be allowed to leave the site on its own and work will not resume in that segment until approved by the County Environmental Division Project Manager. 4) Any special status species found in the work area, alive or dead will be documented and reported to the wildlife agencies as appropriate by the County Environmental Division Project Manager.	Prior to and During Construction	CCCPWD Contractor and Qualified Biologist	CCCPWD
	BIO IV(a)-3e: During construction, tightly woven fiber netting (no monofilament netting) or similar material will be used for erosion control or other purposes within the Project Site to ensure that wildlife are not trapped. Coconut coir matting and burlap contained fiber rolls are an example of acceptable erosion control materials.	During Construction	CCCPWD Contractor	CCCPWD
	BIO IV(a)-3f: During construction, all food-related garbage will be placed in tightly sealed containers at the end of each workday to avoid attracting predators. Containers will be emptied and garbage removed from the construction site at the end of each work week. If sealed containers are not available, garbage will be removed from the	During Construction	CCCPWD Contractor	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
	construction site upon completion of daily activities. All garbage removed from the construction site will be disposed of at an appropriate offsite refuse location.			
IMPACT BIO IV(a)-4 The Project has the potential to affect Western Pond Turtle habitat. Project construction could directly and indirectly impact western pond turtle individuals and will temporarily disturb western pond turtle habitat.	BIO IV(a)-4: A qualified biologist will conduct a preconstruction clearance survey for western pond turtles immediately preceding initial ground disturbing activities within the Project Site. Any western pond turtles found within the Project Site will be allowed to voluntarily move out of this area or will be captured and held by a qualified biologist for the minimum amount of time necessary to release them in suitable habitat outside the Project Site.	Prior to Construction	CCCPWD Qualified Biologist	CCCPWD
IMPACT BIO IV(a)-5 The Project could impact the burrowing owl. Project construction could directly and indirectly impact burrowing owl individuals and will permanently and temporarily impact burrowing owl habitat.	BIO IV(a)-5: The County will retain a qualified biologist to conduct a one-day preconstruction survey to locate any active burrowing owl burrows within the Project Site or within a 500-foot-wide buffer around the Project Site, if feasible. The preconstruction survey will be conducted in accordance with recommendations provided in CDFW's Staff Report on Burrowing Owl Mitigation (CDFW 2012) and no more than 14 days before the start of construction activities (including grading and equipment staging). If no burrowing owls or burrows exhibiting burrowing owl use (i.e., whitewash, owl pellets, feathers, or egg fragments) are detected, then construction may proceed. Preconstruction surveys must be reinitiated if more than 30 days lapse between the survey dates and construction activities. If active burrowing owls or occupied burrows are detected in the survey area, the following measures will be implemented. 1) Occupied burrows will not be disturbed during the nesting season (generally February 1–August 30). A no-disturbance buffer will be established around the burrow to avoid disturbance of nesting burrowing owls until a qualified biologist, coordinating with CDFW, determines that the young have fledged and are foraging on their own. The extent of these buffers will be determined by the biologist (coordinating with the CDFW) and will depend on the level	Prior to Construction	CCCPWD	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
	of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. 2) If the survey finds an active burrowing owl nest in an area of permanent or temporary impact including staging areas, that cannot be avoided due to spatial restrictions, burrowing owls may be passively relocated in accordance with the CDFW Staff Report on Burrowing Owl Mitigation (2012). This recommends that passive relocation occur following approval from the agencies, outside of the nesting season, and after an agency-approved biologist determined that owls have not begun laying eggs or there is not young of the year present. Per CDFW 2012, passive relocation will include the installation of one-way doors within the burrow to let owls escape, but not allow them to re-enter the burrow. Once the owls have been excluded from the burrow, it will be collapsed by hand by an agency-approved biologist. If passive relocation is necessary, artificial or natural burrows should be in close proximity (100 meters) from the eviction site.			
IMPACT BIO IV(a)-6 The Project could impact nesting birds and raptors. The BSA provides habitat for nesting raptors and other birds that are protected under the MBTA.	BIO IV(a)-6: The following will be completed to avoid potential impacts to nesting birds: 1) If construction (including utility pole relocation, equipment staging, and vegetation removal) will occur during the breeding season for migratory birds and raptors (generally January through August), the County will retain a qualified biologist to conduct pre-construction nesting bird and raptor surveys prior to construction activities. 2) The pre-construction nesting bird and raptor surveys will be conducted prior to the start of construction within suitable habitat in and near (within half a mile for golden eagle and 500 feet for all other raptors) the Project Site. For raptor surveys outside the Project Site where property access has not been granted, the surveying biologist will use binoculars	Prior to Construction	CCCPWD Contractor and Qualified Biologist	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
	to scan any suitable nesting substrate for potential raptor nests. 3) The surveys will be conducted no more than 14 days before the initiation of construction activities in the Project Area. 4) The known golden eagle nesting territory near Segments 3 and 4 will be observed adequately to determine if it is active. If nesting behavior is observed and the nest is determined to be active, no construction will occur within the line of site of the nest until a qualified biologist coordinating with CDFW determines that the young have fledged and are foraging on their own. 5) If an active bird nest is identified within the Project Area or an active raptor nest is identified in or within 500 feet from the Project Area, then a no-disturbance buffer will be established around the nest to avoid disturbance of the nesting birds or raptors until a qualified biologist coordinating with CDFW determines that the young have fledged and are foraging on their own. The extent of these buffers will be determined by the biologist (coordinating with the CDFW) and will depend on the species identified, level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers (generally 50 feet for passerine, 500 feet for raptors, or as agreed on during coordination with CDFW). In addition to the establishment of buffers, other avoidance measures (determined during CDFW coordination) may include monitoring of the nest during construction and restricting the type of work that can be conducted near the nest site. If no active nests are found during the preconstruction surveys, then no additional mitigation is required.			
IMPACT BIO IV(a)-7 The Project could impact the western red bat and its habitat	BIO IV(a)-7: A qualified biologist will conduct a preconstruction survey of all trees proposed for removal or trimming within the Project Site for the presence of bat roosts. Surveys will entail direct	Prior to Construction	CCCPWD Contractor and Qualified	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
during project construction.	inspection of trees, including around the base within piles of leaf litter, or nocturnal surveys (if not conducted during the hibernation period for bats). The survey will occur no more than 2 weeks prior to the removal or trimming of trees within the Project Site. If bats are not found and there is no evidence of use by bats, construction may proceed. If roosting habitat is present and occupied, then a qualified biologist will determine the type of roost. If roosting bats are present, measures shall be implemented to avoid or minimize disturbance to the colony. Measures may include excluding bats from the tree before their hibernation period (mid-October to mid-March) and before construction begins. Alternatively a phased approach to removal may be used: small branches and non-habitat features will be carefully removed from the tree under the supervision of a qualified biologist. The next day larger features will be carefully removed under the supervision of a qualified biologist. On the third day a qualified biologist will inspect the tree for the presence of roosting bats, if no bats are present removal can commence.		Biologist	
IMPACT BIO IV(a)-8 The Project could impact the American badger. Project construction could directly and indirectly impact American badger individuals and will temporarily impact American badger habitat. Noise and disturbance from construction activities could indirectly disrupt foraging and/or denning activities.	BIO IV(a)-8: A preconstruction survey for the American badger will be conducted within the BSA no more than 14 days prior to initial ground disturbing activities. The surveys will be conducted by a qualified wildlife biologist with experience identifying badger burrows. Any potential badger burrow identified should be clearly marked in the field and avoided if feasible. If avoidance is not feasible, the biologist will determine if the burrow is being used as a natal den (young rearing generally occurs between April and September). If young are determined to be present, the burrow will be avoided until the young vacate the burrow. If the biologist determines that the burrow is not being used for breeding, then a one way door will be installed on the burrow (upon approval by CDFW) to passively exclude the badger from the burrow. Once the badger has been excluded the burrow will be collapsed.	Prior to Construction	CCCPWD Contractor and Qualified Biologist	CCCPWD
IMPACT BIO IV(a)-9 The Project has the potential to affect San Joaquin kit fox. Project construction could	BIO IV(a)-9: A qualified biologist will conduct a preconstruction survey no more than 30 days before the beginning of ground disturbance or any activity likely to affect San Joaquin kit fox. Where accessible, or using binoculars in inaccessible areas, the biologist will	Prior to Construction	CCCPWD Contractor and Qualified Biologist	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
directly and indirectly impact San Joaquin kit fox individuals and will temporarily impact San Joaquin kit fox habitat. Noise and disturbance from construction activities could indirectly disrupt foraging and/or denning activities.	survey the proposed Project Site and a 200-foot buffer area around the Project Work Area to identify suitable dens (e.g., burrow, pipe, or culvert approximately 5 to 8 inches in diameter). The biologist will conduct den searches by systematically walking transects spaced 30–100 feet apart through the survey area. Transect distance should be determined on the basis of the height of vegetation such that 100% visual coverage of the Project Area is achieved. If dens are found during the survey, the biologist will map the location of each den as well as record the size and shape of the den entrance; the presence of tracks, scat, and prey remains; and if the den was recently excavated. The biologist will also record information on prey availability (e.g., ground squirrel colonies). The status of the den will also be determined and recorded. Dens may be classified in one of the following four den status categories. **Potential den**: Any subterranean hole within the species' range that has entrances of appropriate dimensions for which available evidence is sufficient to conclude that it is being used or has been used by a kit fox. **Known den**: Any existing natural den or artificial structure that is used or has been used at any time in the past by a San Joaquin kit fox. Evidence of use may include historical records; past or current radiotelemetry or spotlighting data; kit fox sign such as tracks, scat, and/or prey remains; or other reasonable proof that a given den is being or has been used by a kit fox. **Natal or pupping den**: Any den determined to be used by kit foxes to whelp and/or rear their pups. Natal/pupping dens may be larger with more numerous entrances than dens occupied exclusively by adults. These dens typically have more kit fox tracks, scat, and prey remains in the vicinity of the den, and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A natal den, defined as a den in which kit fox pups are actually whelped but not necessarily reared, is a more restrictive version of the pupping den. In practice,			

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
	however, it is difficult to distinguish between the two; therefore, for purposes of this definition either term applies. **Atypical den**: Any artificial structure that has been or is determined to be used by a San Joaquin kit fox. Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings. After preconstruction den searches and before the commencement of construction activities, a qualified biologist will establish and maintain exclusion zones (varying between 50 and 200 feet) measured in a radius outward from the entrance or cluster of entrances of each mapped den. Construction activities will be prohibited or greatly restricted within these exclusion zones throughout the construction period. Only essential vehicular operation on existing roads and foot traffic should be permitted. All other construction activities, vehicle operation, material and equipment storage, and other surface-disturbing activities will be prohibited in the exclusion zones.			
V. CULTURAL RESOURCES				
IMPACT CUL-1 Development of the Project could disturb unanticipated historic or pre-historic, archaeological, or paleontological resources.	CUL-1: The following Best Management Practices will be implemented during Project construction to protect unanticipated historic or pre-historic, archaeological, or paleontological resources. 1) Contractor will be notified of the possibility of encountering historic, pre-historic, archaeological, or paleontological materials during ground-disturbing activities and will be educated on the types of historic and pre-historic Native American period archaeological materials that may be encountered. 2) If an inadvertent discovery is made, the Contractor will cease all ground-disturbing activities in the area of discovery. 3) The Contractor will immediately notify the County Public Works Department Resident Engineer who will then request a qualified archaeologist to evaluate the finding(s). 4) If the finding(s) is determined to be potentially significant, the archaeologist in consultation with the appropriate Native	Prior to and during Construction	CCCPWD Contractor and Qualified Archaeologist	CCCPWD

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
	American tribal representative or historical society will develop a research design and treatment plan outlining management of the resource, analysis, and reporting of the find.			
IMPACT CUL-2 The Project could impact previously undiscovered human remains.	CUL-2: If human remains are encountered, work within 25 feet of the discovery shall be redirected and the Contra Costa County Coroner notified immediately. At the same time, an archaeologist shall be contacted to assess the situation. If the human remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of this identification. The Native American Heritage Commission will identify a Most Likely Descendant (MLD) to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods. Upon completion of the assessment, the archaeologist shall prepare a report documenting the methods and results, and provide recommendations for the treatment of the human remains and any associated cultural materials, as appropriate and in coordination with the recommendations of the MLD. The report shall be submitted to the project applicant, Contra Costa County, and the Northwest Information Center.	During Construction	CCCPWD Contractor and Qualified Archaeologist	CCCPWD
XII. NOISE				

Impact	Mitigation Measures	Implementation Timing	Implementation Responsibility	Verification Responsibility
IMPACT NOI-1 Development of the Project will result in a temporary increase in ambient noise levels during Project construction.	NOI-1: The project contractor shall employ the following noise-reducing practices during project construction: 1) Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment. 2) Unnecessary idling of internal combustion engines within 100 feet of residences should be strictly prohibited. 3) Locate stationary noise generating equipment as far as possible from sensitive receptors. 4) Utilize 'quiet' air compressors and other 'quiet' equipment where such technology exists. 5) Avoid staging of construction equipment within 200 feet of residences and locate all stationary noise-generating construction equipment as far as practical from noise sensitive receptors. 6) Require all construction equipment to conform to Section 14-8.02 Noise Control, of the latest Standard Specifications. 7) Provide notification to the adjacent noise-sensitive receptors including the specific construction schedule for major noise-generating construction activities.	During Construction	CCCPWD Contractor	CCCPWD

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

RECEIVED
APR 12 2018
Environmental

April 9, 2018

Matt Kawashima
Contra Costa County
255 Glacier Dr
Martinez, CA 94553

Subject: Camino Tassajara Bike Lane Gap Closure
SCH#: 2018032023

Dear Matt Kawashima:

The State Clearinghouse submitted the above named Mitigated Negative Declaration to selected state agencies for review. The review period closed on April 6, 2018, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely,

Scott Morgan
Director, State Clearinghouse

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
1-916-445-0613 FAX 1-916-558-3164 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2018032023
Project Title Camino Tassajara Bike Lane Gap Closure
Lead Agency Contra Costa County

Type MND Mitigated Negative Declaration

Description The project will widen the existing roadway along four segments of Camino Tassajara from near Penny Lane to Windemere Parkway to provide two 12-ft travel lanes with up to 8-ft shoulders. The total length of roadway where the road will be widened and shoulders will be added is approx 5,400 ft.

Lead Agency Contact

Name Matt Kawashima
Agency Contra Costa County
Phone 925-313-2161 **Fax**
email
Address 255 Glacier Dr
City Martinez **State** CA **Zip** 94553

Project Location

County Contra Costa
City San Ramon
Region
Lat / Long 37° 47' 13.4" N / 121° 51' 50.1" W
Cross Streets Camino Tassajara and Penny Lane
Parcel No.
Township 2S **Range** 1E **Section** 4 **Base** MD

Proximity to:

Highways
Airports
Railways
Waterways Tassajara Creek
Schools
Land Use Z: Exclusive ag and Gen ag/GP: AG lands

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Cumulative Effects; Drainage/Absorption; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Landuse; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Water Quality; Water Supply; Wetland/Riparian

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Reviewing Agencies Resources Agency; Department of Fish and Wildlife, Region 3; Department of Conservation; Cal Fire; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources; Caltrans, District 4; Regional Water Quality Control Board, Region 2; Air Resources Board, Transportation Projects; Department of Toxic Substances Control; Delta Protection Commission; Delta Stewardship Council; Native American Heritage Commission

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Date Received 03/08/2018 **Start of Review** 03/08/2018 **End of Review** 04/06/2018

Note: Blanks in data fields result from insufficient information provided by lead agency.

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: May 1, 2018

Subject: CSA with Dynamic Dzyne Associates, Inc., for the Marsh Creek Road Bridge Replacement Project, Clayton area

RECOMMENDATION(S):

APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a Consulting Services Agreement (CSA) with Dynamic Dzyne Associates, Inc., (dba Substrate, Inc.) (Substrate), in an amount not to exceed $600,000, for construction management services for the Marsh Creek Road Bridge Replacement Project (Project), for the period of May 1, 2018, through June 30, 2019, Clayton area. (District III) County Project No. 0662-6R4079 / Federal Project No.: BRLS 5928 (107)

FISCAL IMPACT:

This project, including this CSA, is funded by 11.47% Local Road Funds and 88.53% Federal Highway Bridge Program Funds.

BACKGROUND:

The Marsh Creek Road Bridge Replacement project consists of removing an existing bridge and construction of a new bridge, pavement reconstruction, temporary and permanent waterlines, drainage improvements, erosion control, signing and striping.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Kevin Emigh - 925-313-2233

cc:

BACKGROUND: (CONT'D)

Substrate was selected to provide construction management services for the Project because they were determined to be the best fit of available interested construction management consultants to provide these services as determined by County staff in charge of the Project through an open consultant selection process. Public Works has successfully negotiated with Substrate to provide the construction management services.

CONSEQUENCE OF NEGATIVE ACTION:

Without Board of Supervisors' approval, this CSA will not be in effect. A delay in the construction of the Marsh Creek Road Bridge Replacement will occur, ultimately delaying the completion of the Project. The Project delay may also result in substantial additional Project costs and jeopardize the funding.

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: May 1, 2018

Subject: APPROVE and AUTHORIZE a Right of Way Contract for Pedestrian Crossing Enhancement Project, Walnut Creek area.

RECOMMENDATION(S):

APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a Right of Way Contract (Contract) and ACCEPT a Grant of Perpetual Maintenance Easement (Easement) dated April 27, 2018, on a portion of property located at 425 Castle Rock Road, Walnut Creek and identified as Assessor's Parcel Number 139-090-001, from Mt. Diablo Unified School District (District), in connection with the Pedestrian Crossing Enhancement Project (Project), pursuant to Government Code Section 25350, in the Walnut Creek area. (Project No.: 0662-6R4112 [CP #14-36])

APPROVE payment of $2,000 for said property rights and AUTHORIZE the Auditor-Controller to issue a check in said amount, payable to Mount Diablo Unified School District, 1936 Carlotta Drive, Concord, CA 94519 to be forwarded to the Real Estate Division for delivery.

DIRECT the Real Estate Division of the Public Works Department to have the above referenced Easement recorded in the office of the County Clerk-Recorder.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Angela Bell, (925) 313-2337

cc:

FISCAL IMPACT:

28% Transportation Development Act Grant, 72% Local Road Funds.

BACKGROUND:

The County intends to construct the Project in order to improve pedestrian safety and accessibility, as well as increase driver awareness at existing crosswalks in East and Central Contra Costa County.

This Contract and Easements are required to allow Contra Costa County (County) to work within approximately 800 feet of property owned by the District as a work space during the Project and in order to maintain County-owned facilities in the future. As a condition of the Contract, the District has requested indemnification from the County. The indemnification language has been reviewed by County Counsel.

On February 10, 2015, the Board of Supervisors approved the Project and determined the Project is exempt from CEQA (CP #14-36).

CONSEQUENCE OF NEGATIVE ACTION:

The Public Works Department will not have sufficient access rights to allow construction in accordance with approved plans and specifications.

ATTACHMENTS

Perpetual Maintenance Easement

ROW Contract and Exhibits

RECORDING REQUESTED BY AND WHEN RECORDED RETURN TO:

Contra Costa County
Public Works Department
Real Estate Division
255 Glacier Drive
Martinez, CA 94553
Attn: Angela Ball

With a copy to:

Mt. Diablo Unified School District
1936 Carlotta Dr.
Concord, CA 94519
Attn: Chief Business Official

(Above Space for Recorder's Use Only)

The undersigned grantor(s) declare(s):
This conveyance is exempt from the payment of a documentary transfer tax pursuant to Revenue and Taxation Code Section 11922.

This conveyance is exempt from the payment of a recordation fee pursuant to Government Code Section 6103.

PERPETUAL MAINTENANCE EASEMENT FROM THE MT. DIABLO UNIFIED SCHOOL DISTRICT TO THE COUNTY OF CONTRA COSTA RELATIVE TO THE CONSTRUCTION AND MAINTENANCE OF PEDESTRIAN CROSSWALK ENCHANTMENTS

THIS GRANT OF EASEMENT ("Easement") is made and entered into and to be performed in the County of Contra Costa, California, between the MT. DIABLO UNIFIED SCHOOL DISTRICT, a California public school district duly organized and existing under Chapter 1 of Division 3 of Title 2 of the Education Code of the State of California, hereinafter referred to as "Grantor" and CONTRA COSTA COUNTY, a political subdivision of the State of California, hereinafter referred to as "Grantee."

RECITALS

WHEREAS, Grantor is the owner of certain real property located at 425 Castle Rock Rd., Walnut Creek, CA 94598, APN 139-090-001, commonly referred to as the Northgate High School site ("Grantor's Property");

WHEREAS, Grantee intends to perform the construction of pedestrian crosswalk enchantments directly on, and adjacent to, Grantor's Property (the "Project");

WHEREAS, Grantee desires to obtain from Grantor, and Grantor is willing to grant, a non-exclusive perpetual easement and right of way for ingress and egress over a portion of the District Property for maintenance purposes (the "Easement"). A legal description of the Easement is attached hereto as Exhibit "A", and a map depicting the location of the Easement as "Parcel One" is attached hereto as Exhibit "B". (the "Easement Area").

AGREEMENT

In consideration of the mutual covenants and conditions hereinafter set forth, the receipt and sufficiency of which are hereby acknowledged, the parties hereby agree as follows:

1. GRANT OF EASEMENT.

   A. Maintenance Easement. Grantor does hereby grant to Grantee, to the extent Grantor has any right, title or interest in the Easement Area, a perpetual non-exclusive easement upon, in, over, and across the Easement Area described in Exhibit "A" and shown as in Exhibit "B," to be used by Grantee at the Grantee's sole expense for the purpose of maintaining, operating, altering, adding to, repairing, replacing, reconstructing, inspecting, and removing the Project or any portion thereof.

   B. This Easement is subject to all easements, covenants, conditions, and restrictions recorded against Grantor's Property existing as of the date this Easement is granted.

2. TERM AND TERMINATION. This Easement shall be effective June 1, 2018, and it shall continue in perpetuity. However, notwithstanding the foregoing, if Grantor believes

that Grantee is in default of any of its obligations hereunder, Grantor may deliver to Grantee a written notice of default ("Default Notice"), stating with specificity the nature of Grantee's default and the actions required to cure the default. Grantor may terminate this Easement if (i) Grantee fails to cure such breach within thirty (30) days after receipt of the Default Notice ("Cure Period"), or (ii) in the case of a breach that cannot reasonably be cured within the Cure Period, Grantee fails to commence to cure such breach within the Cure Period and to continuously thereafter undertaking reasonable efforts to cure said breach.

3. LIMITATIONS ON EASEMENT. It is understood and agreed that this Easement does not constitute a conveyance of a fee interest in Grantor's Property or of the minerals therein and thereunder, but grants only the limited easement as provided in Section 1. The Easement granted herein is on an "AS-IS" basis and Grantor makes no representation or warranty of any kind, express or implied, regarding the condition of the Grantor's Property or the Easement Area, the suitability of the Easement Area for Grantee's intended use or as to any matter. Prior to utilizing the Easement or entering upon the Easement Area, Grantee shall coordinate with the Grantor, either telephonically or in writing, in order to ensure that Grantor activities are not disrupted. Grantee shall notify the Grantor contact at least 24 hours prior to commencing any work on the Easement Area by contacting Michael McAlister, Northgate High School Principal (925-938-0900) or Rich Jackson, Mt. Diablo Unified School District Direct of Maintenance & Operations (925-825-7440). Grantor retains for its successors and assigns all rights and uses that do not unreasonably interfere with the use of the rights granted herein to Grantee.

4. GRANTEE'S OBLIGATIONS. Grantee shall conduct its activities on the Easement Area in a safe, good, and workmanlike manner, to avoid causing any damage to, or interference with, any activities and improvements on or near the Easement Area or any adjacent property owned by the Grantor. Grantee shall comply with all laws, ordinances, rules, and regulations applicable to Grantee's use of the Easement Area. Grantee, including its contractors, shall comply with requirements of state law regarding fingerprinting and background checks, if applicable. Grantee shall maintain any existing

landscaping, hardscaping, irrigation and related improvements in the Easement Area in good condition and repair, and replace said hardscaping, irrigation and related improvements to the same condition as it was prior to any excavation or work by Grantee, reasonable wear and tear accepted. During any excavation, Grantee shall install temporary fencing to provide a barrier between the Easement Area and the rest of the Grantor's Property. The use or possession of any controlled substance, alcoholic beverages or tobacco products on the Grantor's Property, including the Easement Area, at any time is strictly prohibited.

5. LIENS AND CLAIMS. Grantee will not permit any mechanics', materialmen's, or similar liens or claims to stand against the Grantor's Property for labor or material furnished in connection with any work performed by Grantee. Upon reasonable and timely notice of any such lien or claim delivered to Grantee by Grantor, Grantee may bond and contest the validity and the amount of such lien, but Grantee will immediately pay any judgment rendered, will pay all proper costs and charges, and will have the lien or claim released at its sole expense. This Section 5 shall not apply to (i) stop payment notices filed with Grantee pursuant to Civil Code sections 8000 through 9566, and the resolution thereof, (ii) payment bond claims and the resolution of those claims, and (iii) performance bond claims and the resolution of those claims.

6. INDEMNITY. Grantee, and its successors and assigns, shall indemnify, protect, defend and hold harmless Grantor, and its successors and assigns, from and against any and all actual or potential claims, liens, actions, demands, proceedings, lawsuits, liabilities, damages, losses, fines, penalties, judgments, awards, costs and expenses (including, without limitation, reasonable attorneys' fees, litigation expenses and court costs) of every kind and character including, without limitation, on account of death, injury or damage to persons or property (collectively, "Liabilities"), to the extent that the Liabilities arise from Grantee's use of the Easement Area, or the exercise by Grantee of any rights under this Easement; provided, however, that Grantee shall not be liable for that portion of Liabilities that arise from Grantor's willful misconduct or active or passive negligence. The provisions of this Section 6 shall survive the termination or expiration of this Easement.

7. INSURANCE. Grantee agrees to maintain in full force and effect throughout the duration of the Easement a suitable policy or policies of automobile liability insurance, workers' compensation insurance and comprehensive general liability and property damage insurance, insuring against all bodily injury, property damage, personal injury, and other loss or liability caused by or connected with Grantee's use, including use by Grantee's agents, officers, employees, contractors, guests and invitees, of the Easement Area under this Easement in an amount acceptable and approved by the Grantor. All insurance required under this Easement shall be issued by a company or companies lawfully authorized to do business in California as admitted carriers. In lieu of commercial insurance, Grantee shall retain the right to self-insure all or any portion of its insurance obligations herein. Grantor shall be designated as an additional named insured. Prior to entry, Grantee shall provide Grantor with Certificates of Insurance, or proof of self-insurance.

8. SUCCESSORS, MISCELLANEOUS. The terms and provisions of this Easement shall be binding upon and inure to the benefit of the heirs, successors and assigns of Grantor and Grantee. Grantee shall not assign, transfer or convey any of its rights and/or obligations under this Easement. This Easement shall remain in effect until it is released by Grantor and Grantee by recordable instrument. This Easement contains the entire agreement between the parties relating to the rights granted herein and the obligations assumed hereby and may only be modified by a written agreement executed by all parties hereto and recorded in the official records of the County of Contra Costa.

9. NOTICE. Any notice which a party is required or may desire to give the other shall be in writing and shall be sent either (a) by United States registered or certified mail, return receipt requested, postage prepaid, or (b) by a generally recognized overnight carrier providing proof of delivery. Any such notice shall be addressed to a party at the party's address appearing below. Any party may change its address for notice at any time by written notice in accordance with this Section 9.

MT. DIABLO UNIFIED SCHOOL DISTRICT
1936 Carlotta Dr.
Concord, CA 94519
Attn: Chief Business Official

CONTRA COSTA COUNTY
Public Works Department
Real Estate Division
255 Glacier Drive
Martinez, CA 94553
Attn: Angela Bell

10. ATTORNEY'S FEES. In the event any action or suit is brought by a party against another party by reason of the breach of any of the covenants or agreements set forth in this Easement or any other dispute between the parties concerning this Easement, each party shall be responsible for its own attorney's fees and costs.

11. GOVERNING LAW. This Easement shall be governed and construed in accordance with the laws of the State of California.

12. AUTHORITY. Each of the undersigned represents and warrants that he or she is duly authorized to execute and deliver this Easement and that such execution is binding upon the entity or which he or she is executing this document.

13. HEADINGS. The headings of this Easement are for purposes of reference only and shall not limit or define the meaning of the provisions of this Easement.

14. SEVERABILITY. If any paragraph, section, sentence, clause or phrase contained in the Easement shall become illegal, null or void, against public policy, or to otherwise unenforceable, for any reason, or shall be held by any court of competent jurisdiction to be illegal, null or void, against public policy, or otherwise unenforceable, the remaining

paragraphs, sections, sentences, clauses or phrases contained in the Easement shall not be affected thereby.

15. WAIVER. The waiver of any breach of any provision hereunder by Grantor or Grantee shall not be deemed to be a waiver of any preceding or subsequent breach hereunder. No failure or delay of any party in the exercise of any right given hereunder shall constitute a waiver thereof nor shall any partial exercise of any right preclude further exercise thereof.

16. COUNTERPARTS. This Easement may be executed in any number of counterparts, each of which shall be an original but all of which shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties hereto have executed this Grant of Easement this _____ day of _____, 2018.

MT. DIABLO UNIFIED SCHOOL DISTRICT

_____

_____

Its _____

Recommended for Approval:

By_____
Angela Bell
Associate Real Property Agent

By_____
Karen A. Laws
Principal Real Property Agent

APPROVED: By_____
Brian M. Balbas
Public Works Director

[NOTARY BLOCK ON NEXT PAGE]

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy or validity of that document

State of California
County of _____)

On _____ before me, _____
(insert name and title of the officer)

personally appeared _____
who provided to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ **(Seal)**

Mount Diablo Unified School District (Northgate High School) to
Contra Costa County
Portion of APN 139-090-001

EXHIBIT "A"

Real property in the City of Walnut Creek, County of Contra Costa, State of California, being a portion of the Rancho San Miguel, and being a portion of the parcel of land granted to the Mount Diablo Unified School District (MDUSD) in the Grant Deed recorded May 12, 1964 in Book 4615 of Official Records at page 581, Contra Costa County records, described as follows:

Parcel One- Maintenance Easement

Commencing at the southwest corner of Lot 56 as shown on Subdivision 3601 Brooktree Unit 7, filed July 13, 1967 in Book 116 of Maps at page 27; thence westerly on the westerly prolongation of the southerly line of said Lot 56, north 87°25'34" west 42.04 feet to a point on the easterly line of said MDUSD parcel (4615 OR 581), said point located thereon south 0°05'26" west distant 588.76 feet from the northeast corner of said parcel (4615 OR 581); thence southerly along said easterly line south 0°05'26" west 69.15 feet; thence leaving said line south 89°54'34 west 20.00 feet to a point on the westerly right of way of Castle Rock Road and the Point of Beginning; thence from said Point of Beginning southerly along said westerly right of way line south 0°05'26" west 10.00 feet; thence leaving said line north 89°54'34" west 14.00 feet; thence north 0°05'26 east 10.00 feet; thence south 89°54'34" east 14.00 feet to the Point of Beginning.

Containing an area of 140 square feet of land, more or less.

Bearings are based on the California Coordinate System of 1983 (CCS83), Zone III.

Exhibit "B" (Drawing number A-4164E-2018) is attached hereto and by this reference made a part hereof.

This real property description has been prepared by me or under my direction, in conformance with the Professional Land Surveyors Act.

Signature: _____

Licensed Land Surveyor

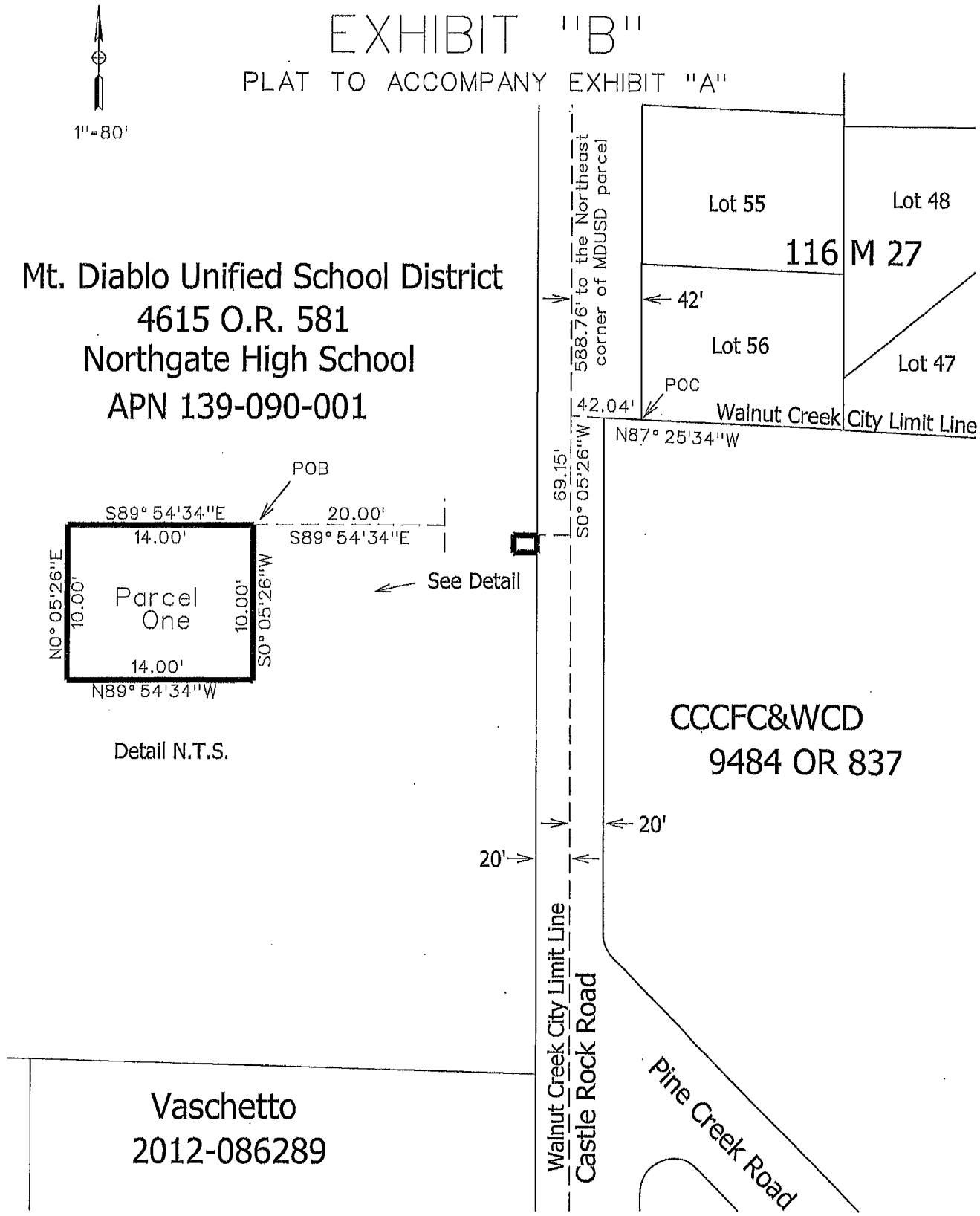
Date: 3/14/18

LICENSED LAND SURVEYOR
JAMES A. STEIN
L.S. 6571
STATE OF CALIFORNIA

G:\Surveys\Legals\Exhibits2017\MDUSD to County (Northgate High) maintenance esmt.doc
KT:js March 14, 2018

EXHIBIT "B"

PLAT TO ACCOMPANY EXHIBIT "A"



Mt. Diablo Unified School District Maintenance Easement

Instrument : Easement		Scale	1"=80'	Date	March 2018
		Drawn By	KT	File No.	A-4164E-2018
Series No.	Recorded	Checked By	JS	Cad File	Exhibit A for the Northgate High School Pal 1 on Castle Rock Road 4164E.dgn

Project Name: Pedestrian Crossing Enhancements-East and Central County
County Project No.: 0662-6R4112

Grantor: Mt. Diablo Unified School District
Portion of Parcel No.: 139-090-001
425 Castle Rock Road, Walnut Creek, CA 94598

RIGHT OF WAY CONTRACT

In consideration of the mutual covenants set forth, and for other valuable consideration receipt of which is hereby acknowledged, Contra Costa County, a political subdivision of the State of California, and Mt. Diablo Unified School District, a California public school district duly organized and existing under Chapter 1 of Division 3 of Title 2 of the Education Code of the State of California, agree as follows:

1. The parties have herein set forth the whole of their agreement. The performance of this agreement constitutes the entire consideration for said document and shall relieve the County of all further obligation or claims on this account, or on account of the location, grade or construction of the proposed public improvement.

2. The County shall:

   a. Within Fourteen (14) days after the County records the fully-executed grant of perpetual maintenance easement in the form attached hereto as Attachment 3 ("Maintenance Easement"), the County will pay the undersigned Grantor the sum of Two Thousand Dollars and 00/100 ($2,000.00) for the value of the Maintenance Easement and the value of the temporary construction easement described in Attachment 1 and depicted in Attachment 2 hereto (the "TCE"; together the "Easements"). The County will take title to the Easements subject to Grantor's underlying fee title and:

      (1) Covenants, conditions, restrictions, and reservations of record, if any.

(2) Easements or rights of way of record over said property.

3. The Grantor warrants that there are no oral or written leases on all or any portion of the property exceeding a period of one month, and the grantor further agrees to hold the County harmless and reimburse the County for any and all of its losses and expenses occasioned by reason of any lease of said property held by any tenant of grantor for a period exceeding one month.

4. To the extent the Grantor has any right, title, or interest in the TCE area, by executing this agreement the Grantor does hereby grant to the County, a non-exclusive TCE upon, in, over, and across the real property described in Attachment 1, and depicted as "Parcel Two" in Attachment 2, attached hereto and made a part hereof, for the purpose of a work space in order to construct project improvements in connection with the County's Pedestrian Crossing Enhancements-Central and East County Project ("Project"). The term of the TCE shall begin on the effective date of this agreement, and it shall end December 31, 2018 ("Termination Date"), unless it is extended under Section 6. The Project will consist of constructing pedestrian crosswalk enhancements to improve pedestrian safety and accessibility, as well as increase driver awareness at existing crosswalks located on or near Grantor's Property. The Project will also involve the installation of detectable warning surfaces, poles, pedestrian buttons, activated double-faced rectangular rapid flash beacons, and advanced warning signage, and an ADA compliant curb ramp on the west side of the crosswalk, north of the Pine Creek Road; restripe crosswalk; install an asphalt landing, detectable warning surface treatment, and an asphalt path (approximately 6 feet by 300 feet) on east side of crosswalk for trail access to neighborhoods, near Grantor's Property.

5. It is understood and agreed that the conveyance of the TCE does not constitute a conveyance of a fee interest in Grantor's Property or of the minerals therein and thereunder, but grants only the limited easements as provided herein. The TCE granted herein is granted on an "AS-IS" basis and the Grantor makes no representation or warranty of any kind, express or implied, regarding the condition of the Grantor's Property subject to the TCE , the suitability of the TCE area for the

County's intended use, or as to any matter. Prior to utilizing the TCE , the County shall coordinate with the Grantor, either telephonically or in writing, in order to ensure that Grantor activities are not disrupted. The County shall notify the following Grantor contact at least 24 hours prior to commencing any work on the TCE: Michael McAlister, Northgate High School Principal (925-938-0900) or Rich Jackson, Mt. Diablo Unified School District Direct of Maintenance & Operations (925-825-7440). Grantor retains for its successors and assigns all rights and uses that do not unreasonably interfere with the use of the rights granted herein to the County.

6. The County shall conduct its activities in the TCE area in a safe, good, and workmanlike manner, to avoid causing any damage to, or interference with, any activities and improvements on or near the TCE or any adjacent property owned by the Grantor. Grantee shall comply with all laws, ordinances, rules, and regulations applicable to Grantee's use of the TCE. The County, including its contractors, shall comply with requirements of state law regarding fingerprinting and background checks, if applicable. The County shall maintain any existing landscaping, hardscaping, irrigation, and related improvements in the TCE area in good condition and repair, and replace said hardscaping, irrigation, and related improvements to the same condition as it was prior to any excavation or work by Grantee, reasonable wear and tear accepted. During any excavation, Grantee shall install temporary fencing to provide a barrier between the TCE area and the rest of the Grantor's Property. The use or possession of any controlled substance, alcoholic beverages or tobacco products on the Grantor's Property, including the TCE, at any time is strictly prohibited.

   In case of unpredictable delays in construction, as determined by the County, the County may extend the TCE Termination Date in Section 4 by giving the Grantor written notice prior to the Termination Date. The County's notice shall specify a new Termination Date, and said notice shall be deemed to be an amendment to the Termination Date in Section 4. Within 30 days after the new Termination Date stated in the County's notice, the County shall pay the Grantor $204.60 per month, for each month or portion thereof that the Termination Date is extended beyond December 31, 2018.

7. Within 14 days after the full execution of this agreement, the County will cause the Maintenance Easement to be recorded in the Official Records of the Contra Costa County Clerk-Recorder. With respect to the Maintenance Easement, the parties' rights and obligations are set forth solely in the Maintenance Easement attached hereto as Attachment 3. In the event of any conflict or ambiguity between this Agreement and the Maintenance Easement, the terms of the Maintenance Easement shall prevail.

7. The County, and its successors and assigns, shall indemnify, protect, defend, and hold harmless the Grantor, and its successors and assigns, from and against any and all actual or potential claims, liens, actions, demands, proceedings, lawsuits, liabilities, damages, losses, fines, penalties, judgments, awards, costs and expenses (including, without limitation, reasonable attorneys' fees, litigation expenses and court costs) of every kind and character including, without limitation, on account of death, injury, or damage to persons or property (collectively, "Liabilities"), to the extent those Liabilities arise from County's use of the TCE or the exercise by the County of any rights under the TCE; provided, however, that the County shall not be liable for that portion of any Liabilities that arise from the Grantor's willful misconduct or active or passive negligence. The provisions of this Section 7 shall survive the termination or expiration of the TCE.

8. The undersigned Grantor hereby agrees and consents to the dismissal of any eminent domain action in the Superior Court wherein the herein described land is included and also waives any and all claims to any money that may now be on deposit in said action.

9. The County will not permit any mechanics', materialmen's, or similar liens or claims to stand against the Grantor's Property for labor or material furnished in connection with any work performed by the County. Upon reasonable and timely notice of any such lien or claim delivered to County by Grantor, the County may bond and contest the validity and the amount of such lien, but the County will immediately pay any judgment rendered, will pay all proper costs and charges, and will have the lien or

claim released at its sole expense. This Section 9 shall not apply to (i) stop payment notices filed with Grantee pursuant to Civil Code sections 8000 through 9566, and the resolution thereof, (ii) payment bond claims and the resolution of those claims, and (iii) performance bond claims and the resolution of those claims.

10. The County agrees to maintain in full force and effect throughout the duration of the TCE a suitable policy or policies of automobile liability insurance, workers' compensation insurance and comprehensive general liability and property damage insurance, insuring against all bodily injury, property damage, personal injury, and other loss or liability caused by or connected with the County's use, including use by the County's agents, officers, employees, contractors, guests and invitees, of the TCE area under this agreement in an amount acceptable and approved by the Grantor. All insurance required under this agreement shall be issued by a company or companies lawfully authorized to do business in California as admitted carriers. In lieu of commercial insurance, the County shall retain the right to self-insure all or any portion of its insurance obligations herein. Grantor shall be designated as an additional named insured. Prior to entry into the TCE area, the County shall provide Grantor with Certificates of Insurance, or proof of self-insurance.

11. The terms and provisions of this agreement shall be binding upon and inure to the benefit of the heirs, successors and assigns of Grantor and the County. The County shall not assign, transfer or convey any of its rights and/or obligations under this agreement without first obtaining the express written consent of the Grantor. This agreement contains the entire agreement between the parties relating to the rights granted herein and the obligations assumed hereby and may only be modified by a written agreement executed by all parties hereto.

11. It is agreed and confirmed by the parties hereto that notwithstanding other provisions in this agreement, the right of possession and use of the TCE shall commence on June 1, 2018. The County shall complete the Project before August 20, 2018, to prevent impacts to parking and traffic during regular school hours.

CONTRA COSTA COUNTY

Recommended to the Board of Supervisors for Approval:

By_____
Angela Bell
Associate Real Property Agent

By_____
Karen A. Laws
Principal Real Property Agent

APPROVED:

By _____
Brian M. Balbas
Public Works Director

Date: _____
(Date of Approval)

GRANTOR

Mt. Diablo Unified School District

_____
Dr. Nellie Meyer
District Superintendent

Date:_____

NO OBLIGATION OTHER THAN THOSE SET FORTH HEREIN WILL BE RECOGNIZED

AB:

Mount Diablo Unified School District (Northgate High School) to
Contra Costa County
Portion of APN 139-090-001

Attachment 1

Real property in the City of Walnut Creek, County of Contra Costa, State of California, being a portion of the Rancho San Miguel, and being a portion of the parcel of land granted to the Mount Diablo Unified School District (MDUSD) in the Grant Deed recorded May 12, 1964 in Book 4615 of Official Records at page 581, Contra Costa County records, described as follows:

Parcel Two- Temporary Construction Easement to expire on December 31, 2018

Commencing at the southwest corner of Lot 56 as shown on Subdivision 3601 Brooktree Unit 7, filed July 13, 1967 in Book 116 of Maps at page 27; thence westerly on the westerly prolongation of the southerly line of said Lot 56, north 87°25'34" west 42.04 feet to a point on the easterly line of said MDUSD parcel (4615 OR 581), said point located thereon south 0°05'26" west distant 588.76 feet from the northeast corner of said parcel (4615 OR 581); thence southerly along said easterly line south 0°05'26" west 69.15 feet; thence leaving said line south 89°54'34 west 20.00 feet to a point on the westerly right of way of Castle Rock Road; thence southerly along said westerly right of way line south 0°05'26" west, 10.00 feet to the Point of Beginning; thence from said Point of Beginning southerly along the westerly right of way line of Castle Rock Road south 0°05'26" west 25.00 feet; thence leaving said line north 89°54'34" west 20.00 feet; thence north 0°05'26" east 40.00 feet; thence south 89°54'34" east 20.00 feet to a point on the westerly right of way line of Castle Rock Road; thence southerly along said line south 0°05'26" west 5.00 feet; thence north 89°54'34" west 14.00 feet; thence south 0°05'26" west 10.00 feet; thence south 89°54'34" east 14.00 feet to the Point of Beginning.

Containing an area of 660 square feet of land, more or less.

Bearings are based on the California Coordinate System of 1983 (CCS83), Zone III.

Attachment 2, a plat (Drawing number A-4164E-2017) is attached hereto and by this reference made a part hereof.

This real property description has been prepared by me or under my direction, in conformance with the Professional Land Surveyors Act.

Signature: _____

Licensed Land Surveyor

Date: 4/24/2018

LICENSED LAND SURVEYOR
JAMES A. STEIN
L.S. 6571
STATE OF CALIFORNIA

G:\Surveys\Legals\Exhibits2017\MDUSD to County (Northgate High) tce (rev).doc
KT:js April 24, 2018

Attachment 2

PLAT TO ACCOMPANY DESCRIPTION

1"=80'

Mt. Diablo Unified School District
4615 O.R. 581
Northgate High School
APN 139-090-001

588.76' to the Northeast corner of MDUSD parcel

Lot 55

Lot 48

116 M 27

42'

Lot 56

Lot 47

POC

42.04'

Walnut Creek City Limit Line

N87° 25'34"W

69.15'

S0° 05'26"W

S89° 54'34"E 20.00'

POB Parcel One

5.00'

20.00'

S89° 54'34"E

L3

L2

Parcel One

10.00'

POB Parcel Two

See Detail

L1

40.00'

N0° 05'26"E

Parcel Two

25.00'

S0° 05'26"W

20.00'

N89° 54'34"W

Detail N.T.S.

CCCFC&WCD
9484 OR 837

20'

20'

Data Table

No.	Bearing	Distance
L1	N89° 54'34"W	14.00'
L2	N0° 05'26"E	10.00'
L3	S89° 54'34"E	14.00'

Walnut Creek City Limit Line

Castle Rock Road

Pine Creek Road

Vaschetto
2012-086289

Mt. Diablo Unified School District, Maintenance and Temporary Easements

Instrument : Easements	Scale 1"=80'	Date	April 2018
	Drawn By KT	File No.	A-4164E-2018
Series No. Recorded	Checked By JS	Cad File	Attachment 2 for the Northgate High School on Castle Rock Road 4164E.dgn

ATTACHMENT 3

RECORDING REQUESTED BY AND WHEN RECORDED RETURN TO:

Contra Costa County
Public Works Department
Real Estate Division
255 Glacier Drive
Martinez, CA 94553
Attn: Angela Ball

With a copy to:

Mt. Diablo Unified School District
1936 Carlotta Dr.
Concord, CA 94519
Attn: Chief Business Official

(Above Space for Recorder's Use Only)

The undersigned grantor(s) declare(s):
This conveyance is exempt from the payment of a documentary transfer tax pursuant to Revenue and Taxation Code Section 11922.

This conveyance is exempt from the payment of a recordation fee pursuant to Government Code Section 6103.

PERPETUAL MAINTENANCE EASEMENT FROM THE MT. DIABLO UNIFIED SCHOOL DISTRICT TO THE COUNTY OF CONTRA COSTA RELATIVE TO THE CONSTRUCTION AND MAINTENANCE OF PEDESTRIAN CROSSWALK ENCHANTMENTS

THIS GRANT OF EASEMENT ("Easement") is made and entered into and to be performed in the County of Contra Costa, California, between the MT. DIABLO UNIFIED SCHOOL DISTRICT, a California public school district duly organized and existing under Chapter 1 of Division 3 of Title 2 of the Education Code of the State of California, hereinafter referred to as "Grantor" and CONTRA COSTA COUNTY, a political subdivision of the State of California, hereinafter referred to as "Grantee."

RECITALS

WHEREAS, Grantor is the owner of certain real property located at 425 Castle Rock Rd., Walnut Creek, CA 94598, APN 139-090-001, commonly referred to as the Northgate High School site ("Grantor's Property");

WHEREAS, Grantee intends to perform the construction of pedestrian crosswalk enchantments directly on, and adjacent to, Grantor's Property (the "Project");

WHEREAS, Grantee desires to obtain from Grantor, and Grantor is willing to grant, a non-exclusive perpetual easement and right of way for ingress and egress over a portion of the District Property for maintenance purposes (the "Easement"). A legal description of the Easement is attached hereto as Exhibit "A", and a map depicting the location of the Easement as "Parcel One" is attached hereto as Exhibit "B". (the "Easement Area").

AGREEMENT

In consideration of the mutual covenants and conditions hereinafter set forth, the receipt and sufficiency of which are hereby acknowledged, the parties hereby agree as follows:

1. GRANT OF EASEMENT.

   A. Maintenance Easement. Grantor does hereby grant to Grantee, to the extent Grantor has any right, title or interest in the Easement Area, a perpetual non-exclusive easement upon, in, over, and across the Easement Area described in Exhibit "A" and shown as in Exhibit "B," to be used by Grantee at the Grantee's sole expense for the purpose of maintaining, operating, altering, adding to, repairing, replacing, reconstructing, inspecting, and removing the Project or any portion thereof.

   B. This Easement is subject to all easements, covenants, conditions, and restrictions recorded against Grantor's Property existing as of the date this Easement is granted.

2. TERM AND TERMINATION. This Easement shall be effective June 1, 2018, and it shall continue in perpetuity. However, notwithstanding the foregoing, if Grantor believes

that Grantee is in default of any of its obligations hereunder, Grantor may deliver to Grantee a written notice of default ("Default Notice"), stating with specificity the nature of Grantee's default and the actions required to cure the default. Grantor may terminate this Easement if (i) Grantee fails to cure such breach within thirty (30) days after receipt of the Default Notice ("Cure Period"), or (ii) in the case of a breach that cannot reasonably be cured within the Cure Period, Grantee fails to commence to cure such breach within the Cure Period and to continuously thereafter undertaking reasonable efforts to cure said breach.

3. LIMITATIONS ON EASEMENT. It is understood and agreed that this Easement does not constitute a conveyance of a fee interest in Grantor's Property or of the minerals therein and thereunder, but grants only the limited easement as provided in Section 1. The Easement granted herein is on an "AS-IS" basis and Grantor makes no representation or warranty of any kind, express or implied, regarding the condition of the Grantor's Property or the Easement Area, the suitability of the Easement Area for Grantee's intended use or as to any matter. Prior to utilizing the Easement or entering upon the Easement Area, Grantee shall coordinate with the Grantor, either telephonically or in writing, in order to ensure that Grantor activities are not disrupted. Grantee shall notify the Grantor contact at least 24 hours prior to commencing any work on the Easement Area by contacting Michael McAlister, Northgate High School Principal (925-938-0900) or Rich Jackson, Mt. Diablo Unified School District Direct of Maintenance & Operations (925-825-7440). Grantor retains for its successors and assigns all rights and uses that do not unreasonably interfere with the use of the rights granted herein to Grantee.

4. GRANTEE'S OBLIGATIONS. Grantee shall conduct its activities on the Easement Area in a safe, good, and workmanlike manner, to avoid causing any damage to, or interference with, any activities and improvements on or near the Easement Area or any adjacent property owned by the Grantor. Grantee shall comply with all laws, ordinances, rules, and regulations applicable to Grantee's use of the Easement Area. Grantee, including its contractors, shall comply with requirements of state law regarding fingerprinting and background checks, if applicable. Grantee shall maintain any existing

landscaping, hardscaping, irrigation and related improvements in the Easement Area in good condition and repair, and replace said hardscaping, irrigation and related improvements to the same condition as it was prior to any excavation or work by Grantee, reasonable wear and tear accepted. During any excavation, Grantee shall install temporary fencing to provide a barrier between the Easement Area and the rest of the Grantor's Property. The use or possession of any controlled substance, alcoholic beverages or tobacco products on the Grantor's Property, including the Easement Area, at any time is strictly prohibited.

5. LIENS AND CLAIMS. Grantee will not permit any mechanics', materialmen's, or similar liens or claims to stand against the Grantor's Property for labor or material furnished in connection with any work performed by Grantee. Upon reasonable and timely notice of any such lien or claim delivered to Grantee by Grantor, Grantee may bond and contest the validity and the amount of such lien, but Grantee will immediately pay any judgment rendered, will pay all proper costs and charges, and will have the lien or claim released at its sole expense. This Section 5 shall not apply to (i) stop payment notices filed with Grantee pursuant to Civil Code sections 8000 through 9566, and the resolution thereof, (ii) payment bond claims and the resolution of those claims, and (iii) performance bond claims and the resolution of those claims.

6. INDEMNITY. Grantee, and its successors and assigns, shall indemnify, protect, defend and hold harmless Grantor, and its successors and assigns, from and against any and all actual or potential claims, liens, actions, demands, proceedings, lawsuits, liabilities, damages, losses, fines, penalties, judgments, awards, costs and expenses (including, without limitation, reasonable attorneys' fees, litigation expenses and court costs) of every kind and character including, without limitation, on account of death, injury or damage to persons or property (collectively, "Liabilities"), to the extent that the Liabilities arise from Grantee's use of the Easement Area, or the exercise by Grantee of any rights under this Easement; provided, however, that Grantee shall not be liable for that portion of Liabilities that arise from Grantor's willful misconduct or active or passive negligence. The provisions of this Section 6 shall survive the termination or expiration of this Easement.

7. INSURANCE. Grantee agrees to maintain in full force and effect throughout the duration of the Easement a suitable policy or policies of automobile liability insurance, workers' compensation insurance and comprehensive general liability and property damage insurance, insuring against all bodily injury, property damage, personal injury, and other loss or liability caused by or connected with Grantee's use, including use by Grantee's agents, officers, employees, contractors, guests and invitees, of the Easement Area under this Easement in an amount acceptable and approved by the Grantor. All insurance required under this Easement shall be issued by a company or companies lawfully authorized to do business in California as admitted carriers. In lieu of commercial insurance, Grantee shall retain the right to self-insure all or any portion of its insurance obligations herein. Grantor shall be designated as an additional named insured. Prior to entry, Grantee shall provide Grantor with Certificates of Insurance, or proof of self-insurance.

8. SUCCESSORS, MISCELLANEOUS. The terms and provisions of this Easement shall be binding upon and inure to the benefit of the heirs, successors and assigns of Grantor and Grantee. Grantee shall not assign, transfer or convey any of its rights and/or obligations under this Easement. This Easement shall remain in effect until it is released by Grantor and Grantee by recordable instrument. This Easement contains the entire agreement between the parties relating to the rights granted herein and the obligations assumed hereby and may only be modified by a written agreement executed by all parties hereto and recorded in the official records of the County of Contra Costa.

9. NOTICE. Any notice which a party is required or may desire to give the other shall be in writing and shall be sent either (a) by United States registered or certified mail, return receipt requested, postage prepaid, or (b) by a generally recognized overnight carrier providing proof of delivery. Any such notice shall be addressed to a party at the party's address appearing below. Any party may change its address for notice at any time by written notice in accordance with this Section 9.

MT. DIABLO UNIFIED SCHOOL DISTRICT
1936 Carlotta Dr.
Concord, CA 94519
Attn: Chief Business Official

CONTRA COSTA COUNTY
Public Works Department
Real Estate Division
255 Glacier Drive
Martinez, CA 94553
Attn: Angela Bell

10. ATTORNEY'S FEES. In the event any action or suit is brought by a party against another party by reason of the breach of any of the covenants or agreements set forth in this Easement or any other dispute between the parties concerning this Easement, each party shall be responsible for its own attorney's fees and costs.

11. GOVERNING LAW. This Easement shall be governed and construed in accordance with the laws of the State of California.

12. AUTHORITY. Each of the undersigned represents and warrants that he or she is duly authorized to execute and deliver this Easement and that such execution is binding upon the entity or which he or she is executing this document.

13. HEADINGS. The headings of this Easement are for purposes of reference only and shall not limit or define the meaning of the provisions of this Easement.

14. SEVERABILITY. If any paragraph, section, sentence, clause or phrase contained in the Easement shall become illegal, null or void, against public policy, or to otherwise unenforceable, for any reason, or shall be held by any court of competent jurisdiction to be illegal, null or void, against public policy, or otherwise unenforceable, the remaining

paragraphs, sections, sentences, clauses or phrases contained in the Easement shall not be affected thereby.

15. WAIVER. The waiver of any breach of any provision hereunder by Grantor or Grantee shall not be deemed to be a waiver of any preceding or subsequent breach hereunder. No failure or delay of any party in the exercise of any right given hereunder shall constitute a waiver thereof nor shall any partial exercise of any right preclude further exercise thereof.

16. COUNTERPARTS. This Easement may be executed in any number of counterparts, each of which shall be an original but all of which shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties hereto have executed this Grant of Easement this _____ day of _____, 2018.

MT. DIABLO UNIFIED SCHOOL DISTRICT

_____

_____

Its _____

Recommended for Approval:

By_____
Angela Bell
Associate Real Property Agent

By_____
Karen A. Laws
Principal Real Property Agent

APPROVED: By_____
Brian M. Balbas
Public Works Director

[NOTARY BLOCK ON NEXT PAGE]

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy or validity of that document

State of California
County of _____)

On _____ before me, _____
(insert name and title of the officer)

personally appeared _____
who provided to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ **(Seal)**

Mount Diablo Unified School District (Northgate High School) to
Contra Costa County
Portion of APN 139-090-001

EXHIBIT "A"

Real property in the City of Walnut Creek, County of Contra Costa, State of California, being a portion of the Rancho San Miguel, and being a portion of the parcel of land granted to the Mount Diablo Unified School District (MDUSD) in the Grant Deed recorded May 12, 1964 in Book 4615 of Official Records at page 581, Contra Costa County records, described as follows:

Parcel One- Maintenance Easement

Commencing at the southwest corner of Lot 56 as shown on Subdivision 3601 Brooktree Unit 7, filed July 13, 1967 in Book 116 of Maps at page 27; thence westerly on the westerly prolongation of the southerly line of said Lot 56, north 87°25'34" west 42.04 feet to a point on the easterly line of said MDUSD parcel (4615 OR 581), said point located thereon south 0°05'26" west distant 588.76 feet from the northeast corner of said parcel (4615 OR 581); thence southerly along said easterly line south 0°05'26" west 69.15 feet; thence leaving said line south 89°54'34 west 20.00 feet to a point on the westerly right of way of Castle Rock Road and the Point of Beginning; thence from said Point of Beginning southerly along said westerly right of way line south 0°05'26" west 10.00 feet; thence leaving said line north 89°54'34" west 14.00 feet; thence north 0°05'26 east 10.00 feet; thence south 89°54'34" east 14.00 feet to the Point of Beginning.

Containing an area of 140 square feet of land, more or less.

Bearings are based on the California Coordinate System of 1983 (CCS83), Zone III.

Exhibit "B" (Drawing number A-4164E-2018) is attached hereto and by this reference made a part hereof.

This real property description has been prepared by me or under my direction, in conformance with the Professional Land Surveyors Act.

Signature: _____

Licensed Land Surveyor

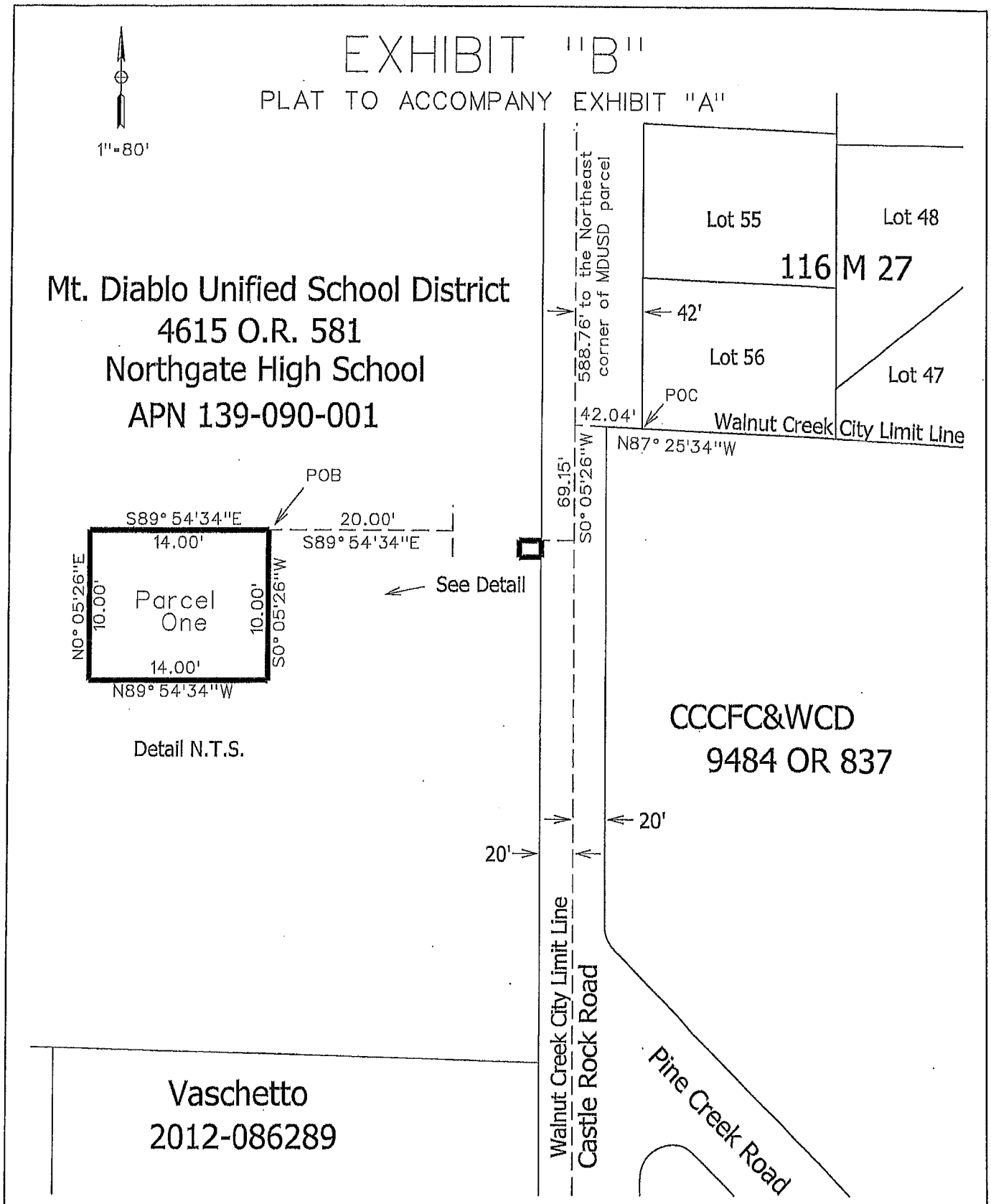
Date: 3/14/18

LICENSED LAND SURVEYOR
JAMES A. STEIN
L.S. 6571
STATE OF CALIFORNIA

G:\Surveys\Legals\Exhibits2017\MDUSD to County (Northgate High) maintenance esmt.doc
KT:js March 14, 2018

EXHIBIT "B"

PLAT TO ACCOMPANY EXHIBIT "A"



Mt. Diablo Unified School District Maintenance Easement

Instrument : Easement		Scale	1"=80'	Date	March 2018
		Drawn By	KT	File No.	A-4164E-2018
Series No.	Recorded	Checked By	JS	Cad File	Exhibit A for the Northgate High School Pdl on Castle Rock Road 4164E.dgn

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: May 1, 2018

Subject: Close portion of Willow Pass Road between Marin Avenue and Manor Drive, on May 28, 2018, from 10:00 AM through 11:00 AM, Bay Point area.

RECOMMENDATION(S):
ADOPT Resolution No. 2018/153 approving and authorizing the Public Works Director, or designee, to fully close a portion of Willow Pass Road between Marin Avenue and Manor Drive, on May 28, 2018, from 10:00 AM through 11:00 AM, for the purpose of Bay Point Spring Derby Parade, Bay Point area. (District V)

FISCAL IMPACT:
No fiscal impact.

BACKGROUND:
Applicant shall follow guidelines set forth by the Public Works Department.

CONSEQUENCE OF NEGATIVE ACTION:
Applicant will be unable to close the road for planned activities.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Bob Hendry (925) 674-7744

cc: Jocelyn LaRocque- Engineering Services, Bob Hendry -Engineering Services, CHP, Sheriff - Patrol Division Commander

AGENDA ATTACHMENTS

Resolution No. 2018/153

MINUTES ATTACHMENTS

Signed: Resolution No. 2018/153

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

and for Special Districts, Agencies and Authorities Governed by the Board

Adopted this Resolution on 05/01/2018 by the following vote:

AYE:	5	**John Gioia** **Candace Andersen** **Diane Burgis** **Karen Mitchoff** **Federal D. Glover**
NO:		
ABSENT:		
ABSTAIN:		
RECUSE:		

Resolution No. 2018/153

IN THE MATTER OF Approving and Authorizing the Public Works Director, or designee, to fully close a portion of Willow Pass Road between Marin Avenue and Manor Drive, on May 28, 2018, from 10:00 AM through 11:00 AM, for the purpose of Bay Point Spring Derby Parade, Bay Point area. (District V)

RC18-6

NOW, THEREFORE, BE IT RESOLVED that permission is granted to Bay Point Garden Club to fully close Willow Pass Road between Marin Avenue and Manor Drive, except for emergency traffic, on May 28, 2018, for the period of 10:00 AM through 11:00 AM, subject to the following conditions:

1. Traffic will be detoured via per traffic control plan reviewed by Public Works.

2. All signing to be in accordance with the California Manual on Uniform Traffic Control Devices.

3. Bay Point Garden Club shall comply with the requirements of the Ordinance Code of Contra Costa County.

4. Provide the County with a Certificate of Insurance in the amount of $1,000,000.00 for Comprehensive General Public Liability which names the County as an additional insured prior to permit issuance.

5. Obtain approval for the closure from the Sheriff's Department, the California Highway Patrol and the Fire District.

Contact: Bob Hendry (925) 674-7744

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

cc: Jocelyn LaRocque- Engineering Services, Bob Hendry -Engineering Services, CHP, Sheriff - Patrol Division Commander

C.4

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

and for Special Districts, Agencies and Authorities Governed by the Board

Adopted this Resolution on 05/01/2018 by the following vote:

AYE:	5	**John Gioia** **Candace Andersen** **Diane Burgis** **Karen Mitchoff** **Federal D. Glover**
NO:		
ABSENT:		
ABSTAIN:		
RECUSE:		

Resolution No. 2018/153

IN THE MATTER OF Approving and Authorizing the Public Works Director, or designee, to fully close a portion of Willow Pass Road between Marin Avenue and Manor Drive, on May 28, 2018, from 10:00 AM through 11:00 AM, for the purpose of Bay Point Spring Derby Parade, Bay Point area. (District V)

RC18-6

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1. Traffic will be detoured via per traffic control plan reviewed by Public Works.

2. All signing to be in accordance with the California Manual on Uniform Traffic Control Devices.

3. Bay Point Garden Club shall comply with the requirements of the Ordinance Code of Contra Costa County.

4. Provide the County with a Certificate of Insurance in the amount of $1,000,000.00 for Comprehensive General Public Liability which names the County as an additional insured prior to permit issuance.

5. Obtain approval for the closure from the Sheriff's Department, the California Highway Patrol and the Fire District.

Contact: Bob Hendry (925) 674-7744

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

Stacey M Boyd

By: Stacey M. Boyd, Deputy

cc: Jocelyn LaRocque- Engineering Services, Bob Hendry -Engineering Services, CHP, Sheriff - Patrol Division Commander

Contra Costa County

To: Board of Supervisors

From: David Twa, County Administrator

Date: May 1, 2018

Subject: Claims

RECOMMENDATION(S):
DENY claims filed by Ernest F. Broussal Jr., Tommie Clayton, Deandre Antoine Lewis, Doug MacMaster, and Precision Risk Management Inc., DENY late claims filed by Wali Jahangiri (2), Nadieh Kakar, and Mario Torres.

FISCAL IMPACT:
No fiscal impact.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Scott Selby
925.335.1400

cc:

BACKGROUND: (CONT'D)

Ernest F. Broussal Jr.: Property claim for damage to vehicle in the amount of $537.42
Tommie Clayton: Property claim for damage to vehicle in an amount TBD
Deandre Antoine Lewis: Personal injury claim for emotional distress in an amount to exceed $10,000.
Doug MacMaster: Claim for wage deduction and vacation wages in the amount of $38,222.68
Precision Risk Management Inc.: Property claim for fire damage in the amount of $1,000,000.
Wali Jahangiri: Request that Board of Supervisors accept a late claim
Nadieh Kakar: Request that Board of Supervisors accept a late claim
Mario Torres: Request that Board of Supervisors accept a late claim

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: May 1, 2018

Subject: Proclaim May as Community Action Month

RECOMMENDATION(S):
ADOPT Resolution No. 2018/147 recognizing the month of May as Community Action Month, as recommended by the Employment and Human Services Director.

FISCAL IMPACT:
None.

BACKGROUND:
The Community Action Agencies were created when the Economic Opportunities Act of 1964 was signed into law. The Contra Costa County Employment and Human Services Department, Community Services Bureau, is the Community Action Agency for Contra Costa County. The Community Services Bureau with all its community partnerships has made an essential contribution to individuals and families in Contra Costa County, by providing them with innovative and cost-effective programs to help those with limited income to become self-sufficient.

CONSEQUENCE OF NEGATIVE ACTION:
The Community Action Agency will not be recognized for its contributions to helping low income residents become self-sufficient.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Christina Reich, 681-6345

cc: Nancy Sparks, Christina Reich

AGENDA ATTACHMENTS

Resolution No. 2018/147

MINUTES ATTACHMENTS

Signed: Resolution No. 2018/147

The Board of Supervisors of
Contra Costa County, California

In the matter of: **Resolution No. 2018/147**

Declaring the month of May 2018 as Community Action Month.

WHEREAS, Community Action Agencies were created when the Economic Opportunity Act of 1964 was signed into law; and
WHEREAS, Community Action Agencies have a 54-year history of promoting self-sufficiency for those with limited income; and
WHEREAS, The Contra Costa County Employment and Human Services Department, Community Services Bureau is the Community Action Agency for Contra Costa County; and
WHEREAS, The Contra Costa County Employment and Human Services, Community Services Bureau and with all its community partnerships has made an essential contribution to individuals and families in Contra Costa County, by providing them with innovative and cost-effective programs; and
WHEREAS, the Economic Opportunity Council has served as the Advisory Body to the Costa County Employment and Human Services Department, Community Services Bureau and the Contra Costa County Board of Supervisors; and
WHEREAS, low income residents of Contra Costa County continue to need opportunities to improve their lives and their living conditions, thus ensuring that all residents are able to live in dignity; and
WHEREAS, Community Services Block Grant funding, administered by the Community Action Program in collaboration with the Economic Opportunity Council continues to support safety net services that alleviate poverty in Contra Costa County; and
WHEREAS, Contra Costa County and the entire United States must continue to promote economic security by providing support and opportunities for all citizens in need of assistance; and
WHEREAS, every year in May, the Community Action Agencies and Economic Opportunity Councils across the country celebrate National Community Action Month.

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of Contra Costa County hereby declares May 2018 COMMUNITY ACTION MONTH in Contra Costa County.

KAREN MITCHOFF
Chair, District IV Supervisor

JOHN GIOIA
District I Supervisor

CANDACE ANDERSEN
District II Supervisor

DIANE BURGIS
District III Supervisor

FEDERAL D. GLOVER
District V Supervisor

I hereby certify that this is a true and correct copy of an action taken
and entered on the minutes of the Board of Supervisors on the date
shown.

ATTESTED: May 1, 2018

David J. Twa,

By: _____, Deputy

The Board of Supervisors of Contra Costa County, California

In the matter of declaring the month of May 2018 as Community Action Month

Resolution No. 2018/147

WHEREAS, Community Action Agencies were created when the Economic Opportunity Act of 1964 was signed into law; and

WHEREAS, Community Action Agencies have a 54-year history of promoting self-sufficiency for those with limited income; and

WHEREAS, The Contra Costa County Employment and Human Services Department, Community Services Bureau is the Community Action Agency for Contra Costa County; and

WHEREAS, The Contra Costa County Employment and Human Services, Community Services Bureau and with all its community partnerships has made an essential contribution to individuals and families in Contra Costa County, by providing them with innovative and cost-effective programs; and

WHEREAS, the Economic Opportunity Council has served as the Advisory Body to the Costa County Employment and Human Services Department, Community Services Bureau and the Contra Costa County Board of Supervisors; and

WHEREAS, low income residents of Contra Costa County continue to need opportunities to improve their lives and their living conditions, thus ensuring that all residents are able to live in dignity; and

WHEREAS, Community Services Block Grant funding, administered by the Community Action Program in collaboration with the Economic Opportunity Council continues to support safety net services that alleviate poverty in Contra Costa County; and

WHEREAS, Contra Costa County and the entire United States must continue to promote economic security by providing support and opportunities for all citizens in need of assistance; and

WHEREAS, every year in May, the Community Action Agencies and Economic Opportunity Councils across the country celebrate National Community Action Month.

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of Contra Costa County hereby declares May 2018 COMMUNITY ACTION MONTH in Contra Costa County.

PASSED by a unanimous vote of the Board of Supervisors members present this 1st day of May 2018.

KAREN MITCHOFF
Chair,
District IV Supervisor

JOHN GIOIA
District I Supervisor

CANDACE ANDERSEN
District II Supervisor

DIANE BURGIS
District III Supervisor

FEDERAL D. GLOVER
District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown:

ATTESTED: May 1, 2018

DAVID TWA, Clerk of the Board of Supervisors and County Administrator

By _____, Deputy

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: May 1, 2018

Subject: Recognizing the Intergenerational Network of All-Age Friendly Cities and Communities

---

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Elaine Burres, 608-4960

cc:

AGENDA ATTACHMENTS

Resolution No. 2018/164

MINUTES ATTACHMENTS

Signed: Resolution No. 2018/164

The Board of Supervisors of
Contra Costa County, California

In the matter of: **Resolution No. 2018/164**

Recognizing the Intergenerational Network of All-Age Friendly Cities and Communities

WHEREAS, the global population of people aged 60 and over is expected to grow from 600 million in 2000 to almost 2 billion by 2050; and
WHEREAS, people over 65 years of age will outnumber children by the year 2035; and
WHEREAS, this projected growth has accelerated with the increasing number of boomers moving into their senior years; and
WHEREAS, this shift deepens challenges for fiscal policy and economic growth decisions; and
WHEREAS, in California, the population of people aged 60 and over is expected to grow from 16.4% in 2012, to 18.3% in 2020 to 22% in 2030, leading the nation in number of residents over age 60; and
WHEREAS, in Contra Costa County, the population of people aged over 60 currently is 20.4%, and if following growth projections of California, will be at 25% in 2030; and
WHEREAS, research shows that older Californians overwhelmingly want to remain in their homes and communities as they age; and
WHEREAS, access to quality health care and long-term services and supports is essential for individuals to live in their homes and communities; and
WHEREAS, 21% of adults age 65 and older do not drive, and more than half of these non-drivers do not leave home on a given day, in part because they lack accessible transportation; and
WHEREAS, reduced mobility for older non-drivers leads to 15% fewer trips to the doctor, 59% fewer shopping trips and visits to restaurants, and 65% fewer trips for social, family and religious activities; and
WHEREAS, the World Health Organization (WHO) has developed a Global Network of Age-Friendly Cities and Communities to encourage and promote public policies to increase the number of cities and communities that support healthy aging and thereby improve the health, well-being, satisfaction, and quality of life for older Americans; and
WHEREAS, deliberate and meaningful intergenerational programs can help communities truly become age-friendly and thereby improve the wellbeing of all; and
WHEREAS, it has been proven that healthy aging also is created when that population cohabitates with children of all ages; and
WHEREAS, making cities and communities all age friendly is one of the most effective policy approaches for responding to demographic aging; and
WHEREAS, the WHO has developed eight domains of community life that influence the health and quality of life of older people;

Now, Therefore, Be It Resolved: that the Board of Supervisors does hereby support initiatives and opportunities to engage in the WHO Age-Friendly and the Intergenerational Network of All-Age Friendly Cities and Communities efforts. **Be It Further Resolved**: that the Board of Supervisors supports collaborative efforts to promote and expand all-age friendly communities in Contra Costa County, working with Aging and Adult Services of Contra Costa County, Advisory Council on Aging, Contra Costa Public Health, Choice in Aging, Ombudsman Services of Contra Costa, and Meals on Wheels Diablo Region, in their efforts to promote intergenerational and all-age friendly communities.

_____

KAREN MITCHOFF

Chair, District IV Supervisor

_____

JOHN GIOIA

District I Supervisor

_____

CANDACE ANDERSEN

District II Supervisor

_____

DIANE BURGIS

District III Supervisor

_____

FEDERAL D. GLOVER

District V Supervisor

I hereby certify that this is a true and correct copy of an action taken
and entered on the minutes of the Board of Supervisors on the date
shown.

ATTESTED: May 1, 2018

David J. Twa,

By: _____, Deputy

The Board of Supervisors of Contra Costa County, California

In the matter of recognizing the Intergenerational Network of All-Age Friendly Cities and Communities

Resolution No. 2018/164

WHEREAS, the global population of people aged 60 and over is expected to grow from 600 million in 2000 to almost 2 billion by 2050; and

WHEREAS, people over 65 years of age will outnumber children by the year 2035; and

WHEREAS, this projected growth has accelerated with the increasing number of boomers moving into their senior years; and

WHEREAS, this shift deepens challenges for fiscal policy and economic growth decisions; and

WHEREAS, in California, the population of people aged 60 and over is expected to grow from 16.4% in 2012, to 18.3% in 2020 to 22% in 2030, leading the nation in number of residents over age 60; and

WHEREAS, in Contra Costa County, the population of people aged over 60 currently is 20.4%, and if following growth projections of California, will be at 25% in 2030; and

WHEREAS, research shows that older Californians overwhelmingly want to remain in their homes and communities as they age; and

WHEREAS, access to quality health care and long-term services and supports is essential for individuals to live in their homes and communities; and

WHEREAS, 21% of adults age 65 and older do not drive, and more than half of these non-drivers do not leave home on a given day, in part because they lack accessible transportation; and

WHEREAS, reduced mobility for older non-drivers leads to 15% fewer trips to the doctor, 59% fewer shopping trips and visits to restaurants, and 65% fewer trips for social, family and religious activities; and

WHEREAS, the World Health Organization (WHO) has developed a Global Network of Age-Friendly Cities and Communities to encourage and promote public policies to increase the number of cities and communities that support healthy aging and thereby improve the health, well-being, satisfaction, and quality of life for older Americans; and

WHEREAS, deliberate and meaningful intergenerational programs can help communities truly become age-friendly and thereby improve the wellbeing of all; and

WHEREAS, it has been proven that healthy aging also is created when that population cohabitates with children of all ages; and

WHEREAS, making cities and communities all age friendly is one of the most effective policy approaches for responding to demographic aging; and

WHEREAS, the WHO has developed eight domains of community life that influence the health and quality of life of older people;

Now, Therefore, Be It Resolved that the Board of Supervisors does hereby support initiatives and opportunities to engage in the WHO Age-Friendly and the Intergenerational Network of All-Age Friendly Cities and Communities efforts.

Be It Further Resolved that the Board of Supervisors supports collaborative efforts to promote and expand all-age friendly communities in Contra Costa County, working with Aging and Adult Services of Contra Costa County, Advisory Council on Aging, Contra Costa Public Health, Choice in Aging, Ombudsman Services of Contra Costa, and Meals on Wheels Diablo Region, in their efforts to promote intergenerational and all-age friendly communities.

PASSED by a unanimous vote of the Board of Supervisors members present this 1st day of May 2018.

KAREN MITCHOFF
Chair,
District IV Supervisor

JOHN GIOIA
District I Supervisor

CANDACE ANDERSEN
District II Supervisor

DIANE BURGIS
District III Supervisor

FEDERAL D. GLOVER
District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown:

ATTESTED: May 1, 2018

DAVID TWA, Clerk of the Board of Supervisors and County Administrator

By _____, Deputy

Contra Costa County

To: Board of Supervisors

From: Karen Mitchoff, District IV Supervisor

Date: May 1, 2018

Subject: Honoring Meals on Wheels Diablo Region on its 50th Anniversary

---

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Lia Bristol, (925) 521-7100

cc:

AGENDA ATTACHMENTS

Resolution No. 2018/169

MINUTES ATTACHMENTS

Signed: Resolution No. 2018/169

The Board of Supervisors of
Contra Costa County, California

In the matter of: **Resolution No. 2018/169**

In the Matter of Honoring Meals on Wheels Diablo Region on its 50th Anniversary

Whereas, Meals on Wheels Diablo Region has been serving the needs of Contra Costa seniors for 50 years; and

Whereas, starting in 1968 as a meal delivery service, the organization has evolved, adding programs to address the full range of seniors' most pressing life issues; and

Whereas, in 1971 the Friendly Visitors program was established to help fight senior isolation; and

Whereas, a year later, C.C. Cafes opened, providing lunches and companionship at six senior center locations; and

Whereas, the Home Care Registry was created in 1975 to provide respite care and training for low-income older adults and their caregivers; and

Whereas, in 1996 Meals on Wheels Diablo Region created a Care Management team to address the special issues of low-income seniors; and

Whereas, this vital safety net focused on mental health, nutrition, mobility, housing, and companionship- areas often overlooked by society; and

Whereas, in 2008 they launched the Fall Prevention Program as a county-wide coalition to address this frequently fatal epidemic; and

Whereas, to create a holistic approach, they adopted a Coordinated Care model in 2014; and

Whereas, they have also added Elder Abuse Prevention outreach and training services; and

Whereas, over the course of 50 years, Meals on Wheels Diablo Region has expanded and created a new model to effectively meet the changing needs of the population; and

Whereas, they recently rebranded and changed their name to Meals on Wheels Diablo Region which closely aligns them with the national senior advocacy movement and their broader focus in the county; and

Whereas, uncertain government priorities, the aging population, and the changing healthcare landscape require Meals on Wheels Diablo Region to remain strong, innovative, and collaborative; and

Whereas, in Contra Costa County 81,080 are isolated and living alone, 37,211 are threatened by hunger, and 29,037 are living in or near poverty; and

Whereas, Meals on Wheels Diablo Region delivers the support that keeps seniors in their own homes, out of hospitals and nursing homes, saving millions in Medicare and Medicaid costs while also offering better care for seniors in our community; and

Whereas, Meals on Wheels Diablo Region decreases the rate of falls among seniors, which cost our county $100 million each year; and

Whereas, they can provide meals for 1 year for a senior for about the same cost as 1 day in a hospital; and

Whereas, investing in the preventive care that Meals on Wheels Diablo Region provides is a win-win for our seniors, our families, and our community; and

Whereas, in partnership with public and private agencies in Contra Costa, provide solutions that keep the best interests of our senior population at heart.

Now, Therefore, Be It Resolved that the Board of Supervisors of Contra Costa County do hereby congratulate Meals on Wheels Diablo Region on its 50 years of empowering seniors through a holistic, comprehensive approach and commend them on their vital services to seniors in our community.

_____

KAREN MITCHOFF

Chair, District IV Supervisor

_____

JOHN GIOIA

District I Supervisor

_____

CANDACE ANDERSEN

District II Supervisor

_____

DIANE BURGIS

District III Supervisor

_____

FEDERAL D. GLOVER

District V Supervisor

I hereby certify that this is a true and correct copy of an action taken
and entered on the minutes of the Board of Supervisors on the date
shown.

ATTESTED: May 1, 2018

David J. Twa,

By: _____, Deputy

The Board of Supervisors of Contra Costa County, California

In the Matter of honoring Meals on Wheels Diablo Region on its 50th Anniversary

Resolution No. 2018/169

WHEREAS, Meals on Wheels Diablo Region has been serving the needs of Contra Costa seniors for 50 years;
WHEREAS, starting in 1968 as a meal delivery service, the organization has evolved, adding programs to address the full range of seniors' most pressing life issues; and
WHEREAS, in 1971 the Friendly Visitors program was established to help fight senior isolation; and
WHEREAS, a year later, C.C. Cafes opened, providing lunches and companionship at six senior center locations; and
WHEREAS, the Home Care Registry was created in 1975 to provide respite care and training for low-income older adults and their caregivers; and
WHEREAS, in 1996 Meals on Wheels Diablo Region created a Care Management team to address the special issues of low-income seniors; and
WHEREAS, this vital safety net focused on mental health, nutrition, mobility, housing, and companionship- areas often overlooked by society; and
WHEREAS, in 2008 they launched the Fall Prevention Program as a county-wide coalition to address this frequently fatal epidemic; and
WHEREAS, to create a holistic approach, they adopted a Coordinated Care model in 2014; and
WHEREAS, they have also added Elder Abuse Prevention outreach and training services; and
WHEREAS, over the course of 50 years, Meals on Wheels Diablo Region has expanded and created a new model to effectively meet the changing needs of the population; and
WHEREAS, they recently rebranded and changed their name to Meals on Wheels Diablo Region which closely aligns them with the national senior advocacy movement and their broader focus in the county; and
WHEREAS, uncertain government priorities, the aging population, and the changing healthcare landscape require Meals on Wheels Diablo Region to remain strong, innovative, and collaborative; and
WHEREAS, in Contra Costa County 81,080 are isolated and living alone, 37,211 are threatened by hunger, and 29,037 are living in or near poverty; and
WHEREAS, Meals on Wheels Diablo Region delivers the support that keeps seniors in their own homes, out of hospitals and nursing homes, saving millions in Medicare and Medicaid costs while also offering better care for seniors in our community; and
WHEREAS, Meals on Wheels Diablo Region decreases the rate of falls among seniors, which cost our county $100 million each year; and
WHEREAS, they can provide meals for 1 year for a senior for about the same cost as 1 day in a hospital; and WHEREAS, investing in the preventive care that Meals on Wheels Diablo Region provides is a win-win for our seniors, our families, and our community; and
WHEREAS, in partnership with public and private agencies in Contra Costa, provide solutions that keep the best interests of our senior population at heart.

NOW, THEREFORE BE IT RESOLVED that the Board of Supervisors of Contra Costa County do hereby congratulate Meals on Wheels Diablo Region on its 50 years of empowering seniors through a holistic, comprehensive approach and commend them on their vital services to seniors in our community.

PASSED by a unanimous vote of the Board of Supervisors members present this 1st day of May 2018.

KAREN MITCHOFF
Chair,
District IV Supervisor

JOHN GIOIA
District I Supervisor

CANDACE ANDERSEN
District II Supervisor

DIANE BURGIS
District III Supervisor

FEDERAL D. GLOVER
District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown:

ATTESTED: May 1, 2018

DAVID TWA, Clerk of the Board of Supervisors and County Administrator

By _____, Deputy

Contra Costa County

To: Board of Supervisors

From: Beth Ward, Animal Services Director

Date: May 1, 2018

Subject: ADOPT Ordinance No. 2018-13 to require the humane treatment of roosters

RECOMMENDATION(S):
ADOPT Ordinance No. 2018-13 to require the humane treatment of roosters.

FISCAL IMPACT:
There is no anticipated impact to the County General Fund. The enforcement activities proposed by the ordinance would be funded by administrative fines and other revenues.

BACKGROUND:
On December 6, 2016, the Board of Supervisors referred to the Internal Operations Committee (IOC) development of an ordinance to authorize administrative penalties for barking dogs and other noisy animals, and to limit the number of roosters on private property in the County's unincorporated areas. After receiving feedback from Contra Costa County residents, the Animal Services Department (ASD) also determined that the County lacks regulations enabling ASD to effectively combat illegal rooster fighting activities.

In April 2017, after reviewing a draft ordinance, the IOC chose to recommend to the Board for adoption an ordinance only addressing barking dogs and other noisy animal concerns.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Steve Burdo, 925-608-8470

cc:

BACKGROUND: (CONT'D)

The IOC directed ASD staff to work with the Department of Conservation and Development (DCD) to incorporate the provisions addressing the keeping of roosters into the urban farm animal ordinance. The noisy animal ordinance was subsequently adopted by the Board on June 6, 2017.

ASD staff has continued to partner and work with DCD to prepare and present Ordinance No. 2018-13. This ordinance would amend the County Ordinance Code by adding Article 416-12.10 to regulate the keeping of roosters in unincorporated areas of the County by prohibiting the tethering of roosters and including other specific requirements to ensure rooster health, safety, and well-being. In addition, the proposed ordinance would authorize the Animal Services Director to enforce the rooster keeping regulations.

A separate urban farm animal ordinance amending Title 8 of the County Ordinance Code has been prepared by DCD and includes provisions limiting the number of roosters that may be kept on a lot. The Board will consider adopting the urban farm animal ordinance after a public hearing on May 1, 2018. Staff recommends that the Board adopt Ordinance No. 2018-13.

CONSEQUENCE OF NEGATIVE ACTION:

The County will not have specific provisions in its ordinance code regulating the keeping of roosters to ensure rooster health, safety, and well-being.

CHILDREN'S IMPACT STATEMENT:

ATTACHMENTS

Ordinance No. 2018-13 Rooster Keeping

ORDINANCE NO. 2018-13

ROOSTER KEEPING

The Contra Costa County Board of Supervisors ordains as follows (omitting the parenthetical footnotes from the official text of the enacted or amended provisions of the County Ordinance Code):

SECTION I. SUMMARY. This ordinance adds Article 416-12.10 to the County Ordinance Code to require humane treatment of roosters.

SECTION II. Article 416-12.10 is added to the County Ordinance Code, to read:

Article 416-12.10
Roosters

416-12.1002 Definition. For the purposes of this article, "rooster" means any male chicken that: (1) is six months or older, (2) has full adult plumage, or (3) is capable of crowing. (Ord. 2018-13 § 2).

416-12.1004 Rooster keeping.

(a) Notwithstanding any other provisions of law, no person may maintain any rooster by means of a tether attached to an object.

(b) At all times, roosters must be provided all of the following:

(1) Access to water.

(2) Shelter from the elements, including rain, wind, and direct sun.

(3) Sufficient room to spread both wings fully and to be able to turn in a complete circle without any impediment and without touching the side of an enclosure.

(4) Clean and sanitary premises that are maintained in good repair. (Ord. 2018-13 § 2).

416-12.1006 Enforcement In addition to any other remedy allowed by this code or applicable law, the animal services director may issue an administrative penalty under Article 416-4.8 to any responsible person for a violation of this article. (Ord. 2018-13 § 2).

SECTION III. EFFECTIVE DATE. This ordinance becomes effective 30 days after passage, and within 15 days after passage shall be published once with the names of supervisors voting for or against it in the Contra Costa Times, a newspaper published in this County.

PASSED on _____, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

ATTEST: DAVID J. TWA,
Clerk of the Board of Supervisors
and County Administrator

_____
Board Chair

By: _____
Deputy

[SEAL]

KCK:
H:\Client Matters\2018\DCD\Ordinance No. 2018-13 Rooster Keeping.wpd

Contra Costa County

To: Board of Supervisors

From: Federal D. Glover, District V Supervisor

Date: May 1, 2018

Subject: Re-Appoint Walter Fields to the Contra Costa Fire Protection District Advisory Commission - District V Alternate

RECOMMENDATION(S):
APPOINT the following individual to the District V Representative Alternate Seat of the Contra Costa Fire Protection District Advisory Commission with a term to expire June 30, 2021, as recommended by Supervisor Federal D. Glover:

Walter "Dub" Fields

FISCAL IMPACT:
None.

BACKGROUND:
The Contra Costa Fire Protection District Advisory Commission responsibility is to review and advise on annual operations and capital budgets; to review district expenditures; to review and advise on long-range capital improvement plans; pursuant to district ordinance to serve as the Appeals Board on weed abatement matters; to advise the Fire Chief on district service matters; to meet jointly with the Board of Supervisors and provide advice to the board as needed; to communicate with the other fire district advisory commissions on services and functional integration; to assist in the Fire Chief's selection process as required; to serve as liaison between the Board of Supervisors and the community served by each district; to perform such other duties and responsibilities as may be assigned and as directed by the Board of Supervisors.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Vincent Manuel, (925) 608-4200

cc:

CONSEQUENCE OF NEGATIVE ACTION:
The position would remain vacant.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Medical Staff Appointments and Reappointments – April, 2018

RECOMMENDATION(S):
APPROVE the medical staff appointments and reappointments, department changes, additional privileges, advancements, voluntary resignations, and changes to the anesthesiology privileges, as recommended by the Medical Staff Executive Committee, at their April 16, 2018 meeting, and by the Health Services Director.

FISCAL IMPACT:
Not applicable.

BACKGROUND:
The Joint Commission on Accreditation of Healthcare Organizations has requested that evidence of Board of Supervisors' approval for each medical staff member will be placed in his or her credentials file. The above recommendations for appointment/reappointment were reviewed by the Credentials Committee and approved by the Medical Executive Committee.

CONSEQUENCE OF NEGATIVE ACTION:
If this action is not approved, the Contra Costa Regional Medical and Health Centers' medical staff would not be appropriately credentialed and in compliance with the Joint Commission on Accreditation of Healthcare Organizations.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Jaspreet Benepal, 925-370-5101

cc: Tasha Scott, Marcy Wilhelm, Tami Sloan

ATTACHMENTS

Attachment

Anesthesiology Privilege Change

A. New Medical Staff Members

Cheng, Jennifer, DO	Internal Medicine
Ubhayakar, Kiran, MD	Internal Medicine

B. Request for Additional Privileges

Requested by	Department	Requesting
Bhatt, Veda, MD	Family Medicine	OB/GYN
Bliss, Judy, MD	OB/GYN	OB/GYN
Dao, Huy, MD	OB/GYN	OB/GYN
Feierabend, Susan, MD	OB/GYN	OB/GYN
Graham, Oliver, MD	Internal Medicine	Hospitalist
Keller, Lisa, MD	OB/GYN	OB/GYN
Kompaniez, Kari, MD	Family Medicine	Hospitalist
Longstroth, David, MD	Hospitalist	OB/GYN
Newman, Allison, MD	OB/GYN	OB/GYN
Rodelo, Lisa, MD	OB/GYN	OB/GYN
Sinclair, Barbara, MD	Family Medicine	OB/GYN
Vanjani, Rachna, MD	OB/GYN	OB/GYN
Wong, Christina, MD	Family Medicine	OB/GYN
Wright, Courtney, MD	OB/GYN	OB/GYN

C. Request for Primary Department Change

Requested by	Original Department	Requesting Department
Graham, Oliver, MD	Internal Medicine	Hospitalist
Kompaniez, Kari, MD	Family Medicine	Hospitalist

D. Advance to Non-Provisional

Belknap, Kaya, MD	Family Medicine
Hirschtritt, Matthew, MD	Psychiatry/Psychology
Jackson, Neil, MD	Obstetrics & Gynecology
Kompaniez, Kari, MD	Family Medicine
Larson, Kimberly, MD	Pediatrics
Sorokin, Jeffrey, MD	Family Medicine

E. Biennial Reappointments

Bajpai-Pillai, Urmila, MD	Internal Medicine-Rheumatology	A
Barnett, Charles MD	Diagnostic Imaging	C
Brandeis, Judson, MD	Surgery	C
Curtis, Brett, MD	Family Medicine	C
Duque-Silva, Alexandra, MD	Pediatrics	A
Fraser-Hulthage, Anna, MD	Family Medicine	A
Hinman, Priscilla, MD	Family Medicine	C
Hopkins, Brian, MD	Surgery	C
Keyashian, Peyman, MD	Anesthesia	A
Khan, Ahmed, MD	Psychiatry/Psychology	C
Kogan, Mark, MD	Internal Medicine-Gastro	C

Mbanugo, Ogo, MD	Family Medicine	A
McCall, Mariposa, MD	Psychiatry/Psychology	A
McIlroy, Richard, MD	Family Medicine	A
McNeil, Sarah, MD	Family Medicine	A
Morrissey, Ellen, MD	Internal Medicine-Nephrology	C
Pap, Diane, MD	Diagnostic Imaging	C
Patil, Shilpa, MD	Pediatrics	A
Radhakrishna, Rohan, MD	Family Medicine	A
Randles, Bradley, MD	Family Medicine	C
Reinking, Jason, MD	Emergency Medicine	C
Shey, Jason, MD	Internal Medicine (Nephrology)	C
Shratter, Lee, MD	Diagnostic Imaging	C
Slauson, Dana, MD	Family Medicine	A
Su, Gigi, MD	Family Medicine	A
Weinreich, Don, MD	Family Medicine	A
Wong, Samuel, DO	Internal Medicine Nephrology	C

***No Hospital affiliations, requires MEC waiver**

F. <u>Biennial Renew of Privileges</u>

Kirkpatrick, Haley, NP	Family Medicine	AFF
Splivalo, Lesley, NP	Pediatrics	AFF

G. <u>Voluntary Resignations</u>

Colwell, Kate, MD	Hospitalist
Littlefield, Matthew, MD	Psychiatry/Psychology
Sidhartha, Tanuj, MD	Psychiatry/Psychology

H. <u>Attachments</u>

Change to Anesthesiology Privilege Packet

Removal of ANE2 from the Anesthesiology Privilege Packet

Departments (s)	Number	Privilege Descriptions D= With Direct Supervision C= With Consultation U= Unrestricted	D/C/U	Training/ Education	Experience	Current Competence	Requested	Granted	D= Denied P= Pending CNM=Criteria Not Met
		Anesthesia							
ANE	ANE 2	**<u>Pediatric Anesthesia</u>*** Children 6 months to 6 years.	D	AN and "U" ANE1	N/A	N/A			
			U	AN and "U" ANE1	25	10 cases in last 2 years			

Contra Costa County

To: Board of Supervisors

From: Diane Burgis, District III Supervisor

Date: May 1, 2018

Subject: Vacancy on the Alcohol and Other Drugs Advisory Board

RECOMMENDATION(S):
ACCEPT resignation of Lanita Mims, DECLARE a vacancy in the District 3-A seat on the Alcohol and Other Drugs Advisory Board, and DIRECT the Clerk of the Board to post the vacancy, as recommended by Supervisor Diane Burgis.

FISCAL IMPACT:
None.

BACKGROUND:
The mission of the Contra Costa County Alcohol and Other Drugs Advisory Board is to assess family and community needs regarding treatment and prevention of alcohol and drug abuse problems. They report their findings and recommendations to the Contra Costa Health Services Department, the Board of Supervisors and the communities they serve.

The Alcohol and Other Drugs Advisory Board works in collaboration with the Alcohol and Other Drugs Services Division of Contra Costa Health Services. They provide input and recommendations as they pertain to alcohol and other drugs prevention, intervention, and treatment services.

Ms. Mims notified the District 3 office of her resignation on March 28, 2018, effective immediately.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Lea Castleberry, (925) 252-4500

cc:

AGENDA
ATTACHMENTS
MINUTES
ATTACHMENTS
Vacancy Notice

Contra Costa County

Notice

The Board of Supervisors will make appointments to fill existing advisory body vacancies. Interested citizens may submit written applications for vacancies to the following address:

Clerk of the Board of Supervisors
651 Pine Street, Rm. 106
Martinez, CA 94553

Advisory Body and Title of Seat
Alcohol and Other Drugs Advisory Board
Seat: District III-A Seat

Appointments will be made after
May 15, 2018

I, David J. Twa, Clerk of the Board of Supervisors and the County Administrator, hereby certify that, in accordance with Section 54974 of the Government Code, the above notice of vacancy will be posted on May 1, 2018.

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

Attested May 1, 2018:

David J. Twa, Clerk of the Board of Supervisors
And County Administrator

By: Evelyn Stratton
Deputy Clerk

Contra Costa County

To: Board of Supervisors

From: Karen Mitchoff, District IV Supervisor

Date: May 1, 2018

Subject: BOARD OF SUPERVISORS REPRESENTATION ON THE CONTRA COSTA LOCAL AGENCY FORMATION COMMISSION

RECOMMENDATION(S):

1. ACKNOWLEDGE that the Board of Supervisors adopted a policy on Board Member Committee Assignments on March 21, 2000.

2. ACKNOWLEDGE that adoption of a new Master Resolution with a complete roster of all appointments is required by Board policy whenever terms expire or new appointments are made.

3. REAPPOINT Supervisor Candace Andersen and Supervisor Federal D. Glover as the Board of Supervisors' representatives to the Contra Costa Local Agency Formation Commission to new four-year terms ending on May 2, 2022.

4. ADOPT Resolution No. 2018/170 appointing Board members and other individuals to serve on Board committees, special county committees, and regional boards/ committees/ commissions for 2018, some of which include additional compensation in the form of stipend.

5. INDICATE that this Resolution No. 2018/170 supersedes in its entirety Resolution No. 2018/1, which was adopted by the Board of Supervisors on January 9, 2018.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Julie DiMaggio Enea
925.335.1077

cc: LAFCo Executive Officer, CAO

RECOMMENDATION(S): (CONT'D)

6. RESOLVE that Board Members as named are APPOINTED to serve on Board committees, special county committees and regional boards/ committees/ commissions as specified on Attachment II to Resolution No. 2017/413 as Internal Standing Committees (Type I), Other Internal Committees, (Type II), Regional Bodies (Type III), Special/Restricted Seats (Type IV), and Ad Hoc Committees (Type V).

7. DIRECT staff to update, if necessary, the County website a single Fair Political Practices Commission (FPPC) Form 806, which lists all the paid appointed positions on committees, boards, or commissions for members of the Board of Supervisors.

FISCAL IMPACT:
There is no fiscal impact to the County from this action.

BACKGROUND:
The recommended appointments to the Local Agency Formation Commission will ensure continued representation of the Board of Supervisors on the myriad issues of significance to Contra Costa County.

The terms of office of the Board's appointees to the LAFCo will expire on May 7, 2018. LAFCo is a regulatory agency charged by the State legislature with “discouraging urban sprawl and encouraging the orderly formation and development of local agencies” based on “local circumstances and conditions.” To meet its responsibilities, LAFCO reviews and approves or denies proposals to:

- Annex land to cities or special districts,
- Detach land from cities or special districts,
- Consolidate two or more cities or two or more special districts,
- Form new special districts and incorporate new cities,
- Dissolve special districts and disincorporate cities,
- Merge cities and special districts,
- Allow cities or special districts to provide services outside of their boundaries.

LAFCo is also charged by the State Legislature to determine and update at least every five years the “sphere of influence” of each city and special district.

FPPC Form 806

In April 2012, the Fair Political Practices Commission (FPPC) adopted Regulation § 18705.5, which permits a Supervisor to vote on his/her own appointment to a body or board paying a salary or stipend for service if all of the following conditions are met:

1. the appointment is to a committee, board, or commission of a public agency, a special district, a joint powers agency or authority, or a metropolitan planning organization; and
2. State law, a local ordinance, or a joint powers agreement requires the Board to appoint; and
3. the Board adopts and posts on its website, a list of each appointed position for which compensation is paid, the salary or stipend for the position, the name of the appointee, the name of the alternate, if any, and the term of the appointment.

Form 806 is used to report additional compensation that officials receive when appointing themselves to positions on committees, boards, or commissions of a public agency, special district, and joint powers

agency or authority. Each agency must post on its website a single Form 806, listing all of the paid appointed positions. When there is a change in compensation or a new appointment, the Form 806 is updated to reflect the change. The form must be updated promptly as changes occur.

Staff of the County Administrator's Office has prepared the Form 806 and has posted it to the County's website. Staff will update the form, if necessary, after the Board of Supervisors acts to adopt the revised Master List of Board Member Committee Assignments for 2018.

AGENDA ATTACHMENTS

Resolution No. 2018/170

Attachment I to Resolution No. 2018/170 - LAFCO Appointments

MINUTES ATTACHMENTS

Signed: Resolution No. 2018/170

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

and for Special Districts, Agencies and Authorities Governed by the Board

Adopted this Resolution on 05/01/2018 by the following vote:

AYE:	5	**John Gioia** **Candace Andersen** **Diane Burgis** **Karen Mitchoff** **Federal D. Glover**
NO:		
ABSENT:		
ABSTAIN:		
RECUSE:		

Resolution No. 2018/170

IN THE MATTER OF ENSURING CONTINUED REPRESENTATION ON THE CONTRA COSTA LOCAL AGENCY FORMATION COMMISSION AND UPDATING BOARD MEMBER ASSIGNMENTS TO 2018 BOARD COMMITTEES, SPECIAL COUNTY COMMITTEES, AND REGIONAL ORGANIZATIONS

WHEREAS the Local Agency Formation Commission (LAFCo) is a regulatory agency charged by the State legislature with "discouraging urban sprawl and encouraging the orderly formation and development of local agencies" based on "local circumstances and conditions."; and
WHEREAS, the LAFCo is also charged by the State Legislature to determine and update at least every five years the "sphere of influence" of each city and special district; and

WHEREAS, the terms of office of the Board's appointees to the LAFCo will expire on May 7, 2018; and

WHEREAS, the recommended appointments will ensure continued representation of the Board of Supervisors on the myriad issues of significance to Contra Costa County; and

WHEREAS adoption of a new Master Resolution with a complete roster of all appointments is required by Board policy whenever terms expire or new appointments are made; and

WHEREAS, after any new appointments or reappointments are made, when there is a change in compensation for any appointment, or where there is a change in the number of meetings of the board or committee to which an appointment is made, the Fair Political Practices Commission requires the County to update and post on the County's website the County's Report of Public Official Appointments, Form 806;

NOW, THEREFORE, THE BOARD OF SUPERVISORS RESOLVES TO:

1. REAPPOINT Supervisor Candace Andersen and Supervisor Federal D. Glover to the Contra Costa Local Agency Formation Commission to new terms ending on May 2, 2022.

2. APPOINT the Board members and other individuals to serve on Board committees, special county committees and regional boards / committees / commissions as specified in the Master List (see Attachment II) as Type I for Board Standing Committees, Type II for Other Internal Committees, Type III for Regional Bodies, Type IV for Special/Restricted seats, and Type V for Board Ad Hoc Committees.

3. INDICATE that this Resolution No. 2018/170 supersedes in its entirety Resolution No. 2018/1, which was adopted by the Board of Supervisors on January 9, 2018.

4, UPDATE the County's Report of Public Official Appointments, Form 806, if necessary, to reflect the appointments on the adopted Master List for 2018 and post it on the County's website.

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

Contact: June DiMaggio Enea 925.335.1077

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

cc: LAFCo Executive Officer, CAO

C.13

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

and for Special Districts, Agencies and Authorities Governed by the Board

Adopted this Resolution on 05/01/2018 by the following vote:

AYE:	5	**John Gioia** **Candace Andersen** **Diane Burgis** **Karen Mitchoff** **Federal D. Glover**
NO:		
ABSENT:		
ABSTAIN:		
RECUSE:		

Resolution No. 2018/170

IN THE MATTER OF ENSURING CONTINUED REPRESENTATION ON THE CONTRA COSTA LOCAL AGENCY FORMATION COMMISSION AND UPDATING BOARD MEMBER ASSIGNMENTS TO 2018 BOARD COMMITTEES, SPECIAL COUNTY COMMITTEES, AND REGIONAL ORGANIZATIONS

WHEREAS the Local Agency Formation Commission (LAFCo) is a regulatory agency charged by the State legislature with "discouraging urban sprawl and encouraging the orderly formation and development of local agencies" based on "local circumstances and conditions."; and

WHEREAS, the LAFCo is also charged by the State Legislature to determine and update at least every five years the "sphere of influence" of each city and special district; and

WHEREAS, the terms of office of the Board's appointees to the LAFCo will expire on May 7, 2018; and

WHEREAS, the recommended appointments will ensure continued representation of the Board of Supervisors on the myriad issues of significance to Contra Costa County; and

WHEREAS adoption of a new Master Resolution with a complete roster of all appointments is required by Board policy whenever terms expire or new appointments are made; and

WHEREAS, after any new appointments or reappointments are made, when there is a change in compensation for any appointment, or where there is a change in the number of meetings of the board or committee to which an appointment is made, the Fair Political Practices Commission requires the County to update and post on the County's website the County's Report of Public Official Appointments, Form 806;

NOW, THEREFORE, THE BOARD OF SUPERVISORS RESOLVES TO:

1. REAPPOINT Supervisor Candace Andersen and Supervisor Federal D. Glover to the Contra Costa Local Agency Formation Commission to new terms ending on May 2, 2022.

2. APPOINT the Board members and other individuals to serve on Board committees, special county committees and regional boards / committees / commissions as specified in the Master List (see Attachment II) as Type I for Board Standing Committees, Type II for Other Internal Committees, Type III for Regional Bodies, Type IV for Special/Restricted seats, and Type V for Board Ad Hoc Committees.

3. INDICATE that this Resolution No. 2018/170 supersedes in its entirety Resolution No. 2018/1, which was adopted by the Board of Supervisors on January 9, 2018.

4, UPDATE the County's Report of Public Official Appointments, Form 806, if necessary, to reflect the appointments on the adopted Master List for 2018 and post it on the County's website.

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: June DiMaggio Enea 925.335.1077

cc: LAFCo Executive Officer. CAO

ATTACHMENT I TO RESOLUTION NO. 2018/170
CONTRA COSTA COUNTY BOARD OF SUPERVISORS COMMITTEE ASSIGNMENTS
(Sorted by Committee Type)

Type*	Committee Name	2018 Appointee	Term Expiration	Stipend Information
I	Airport Committee, Chair	Diane Burgis	12/31/2018	NO STIPEND
I	Airport Committee, Vice Chair	Karen Mitchoff	12/31/2018	NO STIPEND
I	Family & Human Services Committee, Chair	Candace Andersen	12/31/2018	NO STIPEND
I	Family & Human Services Committee, Vice Chair	John Gioia	12/31/2018	NO STIPEND
I	Finance Committee, Chair	Karen Mitchoff	12/31/2018	NO STIPEND
I	Finance Committee, Vice Chair	John Gioia	12/31/2018	NO STIPEND
I	Hiring Outreach & Oversight Committee, Chair	Candace Andersen	12/31/2018	NO STIPEND
I	Hiring Outreach & Oversight Committee, Vice-Chair	Federal D. Glover	12/31/2018	NO STIPEND
I	Internal Operations Committee, Chair	Diane Burgis	12/31/2018	NO STIPEND
I	Internal Operations Committee, Vice Chair	Candace Andersen	12/31/2018	NO STIPEND
I	Legislation Committee, Chair	Karen Mitchoff	12/31/2018	NO STIPEND
I	Legislation Committee, Vice Chair	Diane Burgis	12/31/2018	NO STIPEND
I	Public Protection, Chair	John Gioia	12/31/2018	NO STIPEND
I	Public Protection, Vice Chair	Federal D. Glover	12/31/2018	NO STIPEND
I	Transportation, Water & Infrastructure Committee, Chair	Karen Mitchoff	12/31/2018	NO STIPEND

Note: Type I: Internal Standing Committees; Type II: Internal Appointments; Type III: Regional Appointments; Type IV: Special/Restricted Appointments; Type V: Ad Hoc Committees

ATTACHMENT I TO RESOLUTION NO. 2018/170
CONTRA COSTA COUNTY BOARD OF SUPERVISORS COMMITTEE ASSIGNMENTS
(Sorted by Committee Type)

Type*	Committee Name	2018 Appointee	Term Expiration	Stipend Information
I	Transportation, Water & Infrastructure Committee, Vice Chair	Candace Andersen	12/31/2018	NO STIPEND
II	Bay Area Counties Caucus	Karen Mitchoff	12/31/2018	NO STIPEND
II	Bay Area Counties Caucus, Alternate	Candace Andersen	12/31/2018	NO STIPEND
II	Bay Area Regional Interoperable Communications System (BayRICS) Authority	Mike Casten	12/31/2018	NO STIPEND
II	BayRICS Authority, Alternate	Elise Warren	12/31/2018	NO STIPEND
II	California Identification System Remote Access Network Board (Cal-ID RAN Board)	Diane Burgis	12/31/2018	NO STIPEND
II	Central Contra Costa Solid Waste Authority	Candace Andersen	Unspecified	STIPEND of $50/meeting; max of 2 paid/month
II	Central Contra Costa Solid Waste Authority	Karen Mitchoff	Unspecified	STIPEND of $50/meeting; max of 2 paid/month
II	Contra Costa Family Justice Alliance	Diane Burgis	12/31/2018	NO STIPEND
II	Contra Costa Health Plan Joint Conference Committee	Diane Burgis	12/31/2018	NO STIPEND
II	Contra Costa Health Plan Joint Conference Committee	Federal D. Glover	12/31/2018	NO STIPEND
II	Dougherty Valley Oversight Committee	Diane Burgis	12/31/2018	NO STIPEND
II	Dougherty Valley Oversight Committee	Candace Andersen	12/31/2018	NO STIPEND
II	East Bay Regional Communication System (EBRCS) Authority Governing Board	Candace Andersen	12/31/2018	NO STIPEND
II	East Bay Regional Communication System (EBRCS) Authority Governing Board, Alternate	Karen Mitchoff	12/31/2018	NO STIPEND

Note: Type I: Internal Standing Committees; Type II: Internal Appointments; Type III: Regional Appointments; Type IV: Special/Restricted Appointments; Type V: Ad Hoc Committees

ATTACHMENT I TO RESOLUTION NO. 2018/170
CONTRA COSTA COUNTY BOARD OF SUPERVISORS COMMITTEE ASSIGNMENTS
(Sorted by Committee Type)

Type*	Committee Name	2018 Appointee	Term Expiration	Stipend Information
II	East Contra Costa County Habitat Conservancy, Governing Board	Diane Burgis	12/31/2018	NO STIPEND
II	East Contra Costa County Habitat Conservancy, Governing Board, Alternate	Federal D. Glover	12/31/2018	NO STIPEND
II	East Contra Costa Regional Fee & Finance Authority	Diane Burgis	12/31/2018	NO STIPEND
II	East Contra Costa Regional Fee & Finance Authority, Alternate	Federal D. Glover	12/31/2018	NO STIPEND
II	East County Water Management Association	Diane Burgis	12/31/2018	STIPEND of $170/meeting; max 6 per month
II	East County Water Management Association, Alternate	Federal D. Glover	12/31/2018	STIPEND of $170/meeting; max 6 per month
II	eBART (Bay Area Rapid Transit) Partnership Policy Advisory Committee	Federal D. Glover	12/31/2018	NO STIPEND
II	eBART (Bay Area Rapid Transit) Partnership Policy Advisory Committee	Diane Burgis	12/31/2018	NO STIPEND
II	First 5 Children and Families Commission Member	Diane Burgis	12/31/2018	NO STIPEND
II	First 5 Children and Families Commission Alternate Member	Candace Andersen	12/31/2018	NO STIPEND
II	Hazardous Waste Management Facility Allocation Committee	Candace Andersen	Unspecified	STIPEND of $150 per meeting.
II	Hazardous Waste Management Facility Allocation Committee, Alternate	Karen Mitchoff	Unspecified	STIPEND of $150 per meeting.
II	Medical Services Joint Conference Committee, Chair	Federal D. Glover	12/31/2018	NO STIPEND
II	Medical Services Joint Conference Committee, Vice Chair	John Gioia	12/31/2018	NO STIPEND
II	North Richmond Waste and Recovery Mitigation Fee Committee	John Gioia	12/31/2018	NO STIPEND

Note: Type I: Internal Standing Committees; Type II: Internal Appointments; Type III: Regional Appointments; Type IV: Special/Restricted Appointments; Type V: Ad Hoc Committees

ATTACHMENT I TO RESOLUTION NO. 2018/170
CONTRA COSTA COUNTY BOARD OF SUPERVISORS COMMITTEE ASSIGNMENTS
(Sorted by Committee Type)

Type*	Committee Name	2018 Appointee	Term Expiration	Stipend Information
II	North Richmond Waste and Recovery Mitigation Fee Committee, Alternate	Robert Rogers	12/31/2018	NO STIPEND
II	Open Space/Parks & East Bay Regional Parks District Liaison Committee, Chair	Diane Burgis	12/31/2018	NO STIPEND
II	Open Space/Parks & East Bay Regional Parks District Liaison Committee, Vice Chair	Federal D. Glover	12/31/2018	NO STIPEND
II	Pleasant Hill BART/Contra Costa Centre Joint Powers Authority Board of Trustees	Karen Mitchoff	Unspecified	NO STIPEND
II	Pleasant Hill BART/Contra Costa Centre Joint Powers Authority Board of Trustees	Candace Andersen	Unspecified	NO STIPEND
II	State Route 4 Bypass Authority	Diane Burgis	12/31/2018	NO STIPEND
II	State Route 4 Bypass Authority, Alternate	Federal D. Glover	12/31/2018	NO STIPEND
II	SWAT (Southwest Area Transportation Committee)	Candace Andersen	12/31/2018	NO STIPEND
II	SWAT, Alternate	Karen Mitchoff	12/31/2018	NO STIPEND
II	TRAFFIX (Measure J Traffic Congestion Relief Agency)	Candace Andersen	12/31/2018	NO STIPEND
II	TRAFFIX (Measure J Traffic Congestion Relief Agency), Alternate	Karen Mitchoff	12/31/2018	NO STIPEND
II	TRANSPAC (Central County Transportation Partnership and Cooperation)	Karen Mitchoff	12/31/2018	NO STIPEND
II	TRANSPAC, Alternate	Candace Andersen	12/31/2018	NO STIPEND
II	TRANSPLAN (East County Transportation Planning)	Diane Burgis	12/31/2018	NO STIPEND
II	TRANSPLAN, Alternate	Federal D. Glover	12/31/2018	NO STIPEND

Note: Type I: Internal Standing Committees; Type II: Internal Appointments; Type III: Regional Appointments; Type IV: Special/Restricted Appointments; Type V: Ad Hoc Committees

ATTACHMENT I TO RESOLUTION NO. 2018/170
CONTRA COSTA COUNTY BOARD OF SUPERVISORS COMMITTEE ASSIGNMENTS
(Sorted by Committee Type)

Type*	Committee Name	2018 Appointee	Term Expiration	Stipend Information
II	Tri-Valley Transportation Council	Candace Andersen	12/31/2018	NO STIPEND
II	Urban Counties of California	Federal D. Glover	12/31/2019	NO STIPEND
II	Urban Counties of California, Alternate	Karen Mitchoff	12/31/2019	NO STIPEND
II	WCCTAC (West County Transportation Advisory Committee)	John Gioia	12/31/2018	NO STIPEND
II	WCCTAC, Alternate	Federal D. Glover	12/31/2018	NO STIPEND
II	West Contra Costa Integrated Waste Management Authority	John Gioia	Unspecified	STIPEND of $50 per meeting.
II	West Contra Costa Integrated Waste Management Authority, Alternate	Federal D. Glover	Unspecified	STIPEND of $50 per meeting.
III	Bay Area Air Quality Management District Board of Directors	Karen Mitchoff	1/20/2020	Per diem of $100/meeting + travel exp; max $6,000
III	Bay Area Air Quality Management District Board of Directors	John Gioia	6/17/2021	Per diem of $100/meeting + travel exp; max $6,000
III	Central Contra Costa Transit Authority (CCCTA) Board of Directors	Candace Andersen	5/1/2019	STIPEND of $100 per meeting; up to $200 month
III	Central Contra Costa Transit Authority (CCCTA) Board of Directors, Alternate	Karen Mitchoff	5/1/2019	STIPEND of $100 per meeting; up to $200 month
III	Contra Costa Transportation Authority Board of Commissioners (Seat 1)	Federal D. Glover	1/31/2019	STIPEND of $100 per meeting; up to $400 month
III	Contra Costa Transportation Authority Board of Commissioners (Seat 2)	Karen Mitchoff	12/31/2018	STIPEND of $100 per meeting; up to $400 month
III	Contra Costa Transportation Authority Board of Commissioners, Alternate (Seat 1)	Candace Andersen	1/31/2019	STIPEND of $100 per meeting; up to $400 month
III	Contra Costa Transportation Authority Board of Commissioners, Alternate (Seat 2)	John Gioia	12/31/2018	STIPEND of $100 per meeting; up to $400 month

Note: Type I: Internal Standing Committees; Type II: Internal Appointments; Type III: Regional Appointments; Type IV: Special/Restricted Appointments; Type V: Ad Hoc Committees

ATTACHMENT I TO RESOLUTION NO. 2018/170
CONTRA COSTA COUNTY BOARD OF SUPERVISORS COMMITTEE ASSIGNMENTS
(Sorted by Committee Type)

Type*	Committee Name	2018 Appointee	Term Expiration	Stipend Information
III	Contra Costa Transportation Authority Board of Commissioners, Second Alternate (Seat 1)	John Gioia	1/31/2019	STIPEND of $100 per meeting; up to $400 month
III	Contra Costa Transportation Authority Board of Commissioners, Third Alternate (Seat 1)	Diane Burgis	1/31/2019	STIPEND of $100 per meeting; up to $400 month
III	Local Agency Formation Commission	Candace Andersen	5/2/2022	STIPEND of $150 per meeting.
III	Local Agency Formation Commission	Federal D. Glover	5/2/2022	STIPEND of $150 per meeting.
III	Local Agency Formation Commission, Alternate	Diane Burgis	5/4/2020	STIPEND of $150 per meeting.
III	Marin Energy Authority (MCE) Board of Directors	Federal D. Glover	12/31/2020	NO STIPEND
III	Marin Energy Authority (MCE) Board of Directors, Alternate	John Gioia	12/31/2020	NO STIPEND
III	Metropolitan Transportation Commission	Federal D. Glover	2/1/2019	STIPEND of $100/meeting; up to $500/month per agency.
III	Tri Delta Transit Authority, Board of Directors (Seat 1)	Federal D. Glover	12/31/2018	STIPEND of $100/month
III	Tri Delta Transit Authority, Board of Directors (Seat 2)	Diane Burgis	12/31/2019	STIPEND of $100/month
IV	ABAG Executive Board (Seat 1)	Karen Mitchoff	6/30/2018	STIPEND of $150 per meeting.
IV	ABAG Executive Board (Seat 2)	Candace Andersen	6/30/2018	STIPEND of $150 per meeting.
IV	ABAG Executive Board, Alternate 1	John Gioia	6/30/2018	STIPEND of $150 per meeting.
IV	ABAG Executive Board, Alternate 2	Diane Burgis	6/30/2018	STIPEND of $150 per meeting.
IV	ABAG Finance Authority for Nonprofit Corporations Board of Directors and its Executive Committee	Karen Mitchoff	12/31/2018	NO STIPEND

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ATTACHMENT I TO RESOLUTION NO. 2018/170
CONTRA COSTA COUNTY BOARD OF SUPERVISORS COMMITTEE ASSIGNMENTS
(Sorted by Committee Type)

Type*	Committee Name	2018 Appointee	Term Expiration	Stipend Information
IV	ABAG Finance Authority for Nonprofit Corporations Board of Directors and its Executive Committee, First Alternate	Russell Watts	12/31/2018	NO STIPEND
IV	ABAG Finance Authority for Nonprofit Corporations Board of Directors and its Executive Committee, Second Alternate	Belinda Zhu	12/31/2018	NO STIPEND
IV	ABAG General Assembly	Karen Mitchoff	12/31/2018	NO STIPEND
IV	ABAG General Assembly, Alternate	Diane Burgis	12/31/2018	NO STIPEND
IV	ABAG Regional Planning Committee	Karen Mitchoff	Unspecified	STIPEND of $150 per meeting.
IV	Bay Conservation & Development Commission	John Gioia	Unspecified	STIPEND of $100 per meeting; max of 4 meetings.
IV	Bay Conservation & Development Commission, Alternate	Federal D. Glover	Unspecified	STIPEND of $100 per meeting; max of 4 meetings.
IV	CCCERA (Contra Costa County Employees Retirement Association) Board of Trustees	Candace Andersen	6/30/2020	STIPEND of $100 per meeting.
IV	Clayton Redevelopment Successor Agency Oversight Board	Karen Mitchoff	Unspecified	NO STIPEND
IV	Concord Redevelopment Successor Agency Oversight Board	Karen Mitchoff	Unspecified	NO STIPEND
IV	Contra Costa County Redevelopment Successor Agency Oversight Board	Federal D. Glover	Unspecified	NO STIPEND
IV	Contra Costa County Redevelopment Successor Agency Oversight Board	Karen Mitchoff	Unspecified	NO STIPEND
IV	CSAC (California State Association of Counties) Board of Directors	John Gioia	11/26/2018	NO STIPEND
IV	CSAC Board of Directors, Alternate	Karen Mitchoff	11/26/2018	NO STIPEND
IV	Delta Diablo Sanitation District Governing Board	Federal D. Glover	12/31/2018	STIPEND of $170 per meeting; max of 6 meetings.

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ATTACHMENT I TO RESOLUTION NO. 2018/170
CONTRA COSTA COUNTY BOARD OF SUPERVISORS COMMITTEE ASSIGNMENTS
(Sorted by Committee Type)

Type*	Committee Name	2018 Appointee	Term Expiration	Stipend Information
IV	Delta Diablo Sanitation District Governing Board, Alternate	Karen Mitchoff	12/31/2018	STIPEND of $170 per meeting; max of 6 meetings.
IV	Delta Protection Commission	Diane Burgis	12/31/2018	NO STIPEND
IV	Delta Protection Commission, Alternate	Karen Mitchoff	12/31/2018	NO STIPEND
IV	Law Library Board of Trustees	Nolan Armstrong	12/31/2018	NO STIPEND
IV	Mental Health Commission	Diane Burgis	12/31/2018	NO STIPEND
IV	Mental Health Commission, Alternate	Candace Andersen	12/31/2018	NO STIPEND
IV	Pittsburg Redevelopment Successor Agency Oversight Board	Federal D. Glover	Unspecified	NO STIPEND
IV	Pleasant Hill Redevelopment Successor Agency Oversight Board	Karen Mitchoff	Unspecified	NO STIPEND
IV	Sacramento-San Joaquin Delta Conservancy Board	Karen Mitchoff	Unspecified	NO STIPEND
IV	Sacramento-San Joaquin Delta Conservancy Board, Alternate	Ryan Hernandez	Unspecified	NO STIPEND
IV	San Pablo Redevelopment Successor Agency Oversight Board	VACANT	Unspecified	NO STIPEND
IV	Walnut Creek Redevelopment Successor Agency Oversight Board	Karen Mitchoff	Unspecified	NO STIPEND
V	Industrial Safety Ordinance/Community Warning System Ad Hoc Committee	John Gioia	Unspecified	NO STIPEND
V	Industrial Safety Ordinance/Community Warning System Ad Hoc Committee	Federal D. Glover	Unspecified	NO STIPEND
V	Northern Waterfront Economic Development Ad Hoc Committee	Federal D. Glover	Unspecified	NO STIPEND

Note: Type I: Internal Standing Committees; Type II: Internal Appointments; Type III: Regional Appointments; Type IV: Special/Restricted Appointments; Type V: Ad Hoc Committees

ATTACHMENT I TO RESOLUTION NO. 2018/170
CONTRA COSTA COUNTY BOARD OF SUPERVISORS COMMITTEE ASSIGNMENTS
(Sorted by Committee Type)

Type*	Committee Name	2018 Appointee	Term Expiration	Stipend Information
V	Northern Waterfront Economic Development Ad Hoc Committee	Diane Burgis	Unspecified	NO STIPEND
V	Sustainability Ad Hoc Committee, Chair	John Gioia	Unspecified	NO STIPEND
V	Sustainability Ad Hoc Committee, Vice Chair	Federal D. Glover	Unspecified	NO STIPEND

Note: Type I: Internal Standing Committees; Type II: Internal Appointments; Type III: Regional Appointments; Type IV: Special/Restricted Appointments; Type V: Ad Hoc Committees

Contra Costa County

To: Board of Supervisors

From: LEGISLATION COMMITTEE

Date: May 1, 2018

Subject: "Support" on the Water Supply and Water Quality Act of 2018

RECOMMENDATION(S):
CONSIDER adopting a position of "Support" on the Water Supply and Water Quality Act of 2018, a citizens initiative water bond that may appear on the November 2018 statewide California ballot, as recommended by the Legislation Committee.

FISCAL IMPACT:
See Attachment C.

BACKGROUND:
The California Water Infrastructure and Watershed Conservation Bond Initiative (#17-0010) may appear on the ballot in California as an initiated state statute on November 6, 2018.

The measure would issue $8.877 billion in general obligation bonds for water infrastructure, groundwater supplies and storage, surface water storage and dam repairs, watershed and fisheries improvements, and habitat protection and restoration.

On March 13, 2018, the Secretary of State announced that signatures had been filed for the ballot initiative. As of March 22, 601,535 signatures had been filed. At least 365,880 of those signatures—about 60.8 percent—need to be valid. Counties have until April 24, 2018, to conduct a random sample of

☑ APPROVE ☐ OTHER

☐ RECOMMENDATION OF CNTY ADMINISTRATOR ☑ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: L. DeLaney, 925-335-1097

cc:

BACKGROUND: (CONT'D)
signatures.

The request for the Board of Supervisors' support for the State Water Supply Infrastructure, Water Conveyance, Ecosystem and Watershed Protection and Restoration, and Drinking Water Protection act of 2018 was considered by the Legislation Committee at their April 9, 2018 meeting and unanimously approved.

Attached is a comparison provided by the California Urban Streams Partnership of the anticipated Fall 2018 bond and Proposition 68, which is set for the June 2018 ballot. (Attachment B.)

Attachment A is the Water Supply and Water Quality Act of 2018.

More information can be found at: https://waterbond.org/

CONSEQUENCE OF NEGATIVE ACTION:
The Board will not have an official position on the initiative if one is not adopted.

ATTACHMENTS
Attachment A
Attachment B
Attachment C

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

SECTION 1.

Division 38 (commencing with Section 86000) is added to the Water Code, to read:

DIVISION 38. State water supply infrastructure, water conveyance, ecosystem and watershed protection and restoration, and drinking water protection act of 2018.

CHAPTER 1. Short Title.

86000. This division shall be known and may be cited as the Water Supply and Water Quality Act of 2018.

CHAPTER 2. Findings and Declarations.

86001. The people find and declare the following:

(a) In our frequently very dry state, our high-tech, agricultural and urbanized economy relies on an uninterrupted and high-quality water supply. By making water use more efficient, reducing the demand for water, providing new and diverse water supplies, improving the quality of our source watersheds, and protecting key environmental uses of water, this measure will assure that the economic and environmental engines of California are not derailed by a shortage of water.

(b) California's recent historic drought raises serious questions about the long-term reliability of our current water supplies. The drought underscores the need to use our existing water supplies more efficiently, increase investments in our water infrastructure, and more effectively integrate our water system from the headwaters to the end user.

(c) California's water situation requires implementation of the Governor's Water Action Plan to provide for the water needs of people, agriculture and the environment. This division will help provide a more reliable water supply by reducing waste, increasing the amount of water available to meet our needs, and improving water quality. This division also provides additional protection for our communities from floods.

(d) This division will implement cost effective methods of water development and conservation to meet California's present and future water needs in a changing climate, including capture of urban drainage and stormwater runoff, groundwater and brackish water desalting, groundwater storage, water recycling, water conservation, and watershed management, restoration, enhancement and protection.

(e) Many of the water supply and water quality investments provided by this division will be matched by agencies and grant recipients, more than doubling the effectiveness of the funding provided.

(f) Agencies implementing this division will give high priority to cost-effective projects, and to the most durable and most environmentally beneficial projects. Funding will go to projects that contribute to implementation of the Governor's Water Action Plan, the goal of which is to increase the resiliency of the California water system and the ability of California communities to cope with drought conditions.

(g) Every Californian has a right to safe, clean, affordable, and accessible drinking water. By complying with Section 106.3, agencies providing funds for safe drinking water pursuant to this division will help achieve the intent of that Section.

(h) This division provides a fair and reasonable distribution of funds directly and indirectly benefitting every region of the state.

(i) This division provides short and long-term cost-effective actions to address the water shortages caused by the recent drought, and will help prepare local communities for future droughts. Droughts reduce water supplies for people, agriculture and the environment. This division will help meet the water needs of people, agriculture, and the environment and make California more resilient in the face of a changing climate.

(j) By improving the health and water productivity of watersheds, communities will become more self-reliant with respect to water supply, and local environmental quality will be increased.

(k) By removing invasive plants such as yellow starthistle, giant reed (*Arundo donax*) and tamarisk, water supply will be increased and habitat for fish and wildlife will be improved.

(l) Flooding can devastate communities and infrastructure. We can make better use of floodwaters by capturing waters and putting them to use in our communities, on our farms, and by recharging groundwater basins. By providing funds to intelligently manage our watersheds and floodplains, this division will also help avoid flood damage, improve fish and wildlife habitat, remove pollutants from our water supply, enhance groundwater, remediate aquifers and improve the environment. Better floodplain management may allow improved operation of upstream reservoirs for water supply purposes.

(m) Severe fire conditions can lead to significant erosion, reduced water quality and impacts on water infrastructure. This division provides funding to manage forests and watersheds to reduce fire danger, mitigate the effects of wildfires on water supply and quality, and enhance water supplies.

(n) This division funds the following programs, which respond to human and environmental water needs in California:

(1) Improvement of water supply and water quality utilizing cost effective methods, including water conservation, desalting of groundwater and other inland saline water, stormwater management, wastewater recycling, and similar water management measures.

(2) Better management of forest and rangeland watersheds, such as through the Sierra Nevada Watershed Improvement Program to improve the pattern, quantity and quality of water runoff and groundwater recharge. Improving soil health improves the ability of the ground to better contain groundwater and moderate the rate of water runoff.

(3) Better groundwater management, including faster implementation of the Sustainable Groundwater Management Act, and better recognition of the connection between surface and groundwater.

(4) Provision of water for fish and wildlife, including restoration of the Pacific Flyway and management of habitat in a dynamic way to respond to changing environmental conditions.

(5) Increased capacity to convey water resulting in greater groundwater recharge and improved conveyance and utilization of floodwaters for use in drought years.

(o) The State Water Resources Control Board, the Department of Fish and Wildlife, and many other agencies have recognized that providing funding for fish habitat enhancement is vital to restoring native California fish populations, and that relying solely on flow to restore those populations will not be sufficient. Providing funding for fish habitat enhancement is a vital complement to reasonable flows to protect fish.

(p) California has lost ninety-five percent (95%) of its historical wetlands. These wetlands provide food, water and cover for migratory and other birds, fish, mammals, reptiles, amphibians and a vast number of plant species. Many species may become endangered or threatened without wetlands and many more survive only due to wetlands available today. This division combines work to sustain and protect current wetlands with the potential to increase wetlands in California to support a thriving flora and fauna.

(q) The implementation of this division will result in cost savings to local governments immediately by substantially more than one billion dollars, and reduce local government operating costs by hundreds of millions of dollars per year. This division will provide funding that displaces local government funding, resulting in the implementation of projects in the following areas. These projects would have eventually been implemented by local government.

(1) Safe Drinking Water. State direct and matching funds will reduce the cost to local government of implementing drinking water and wastewater treatment systems, and to some extent the operation of those systems.

(2) Wastewater recycling. State funds will reduce the cost of these plants, reducing the capital cost of the projects for local governments. By reducing local government capital costs, the cost of water from these plants will also be reduced. Implementation of wastewater recycling plants will defer the need for more expensive alternative sources of water supply, thus further reducing local capital and operating costs.

(3) Groundwater desalting. State funds will reduce the cost of these plants, reducing the capital cost of the projects for local governments. By reducing local government capital costs, the cost of water from these plants will also be reduced. Implementation of groundwater desalting plants will defer the need for more expensive alternative sources of water supply, thus further reducing local capital and operating costs.

(4) Water Conservation. State funds will reduce the cost of these projects, reducing costs to local government. More importantly, reduced water demand resulting from these projects will reduce operating costs, and will temporarily or permanently defer the construction and operating costs of more expensive capital outlay projects needed to provide new water.

(5) Repairing flood control reservoirs. State funds will reduce the costs of these projects for local government.

(6) San Francisco Bay Restoration Authority funds. State investment in wetlands projects providing flood protection around San Francisco Bay will reduce flood risk associated with climate change. This will reduce the cost of other flood control measures, and more importantly will reduce flood damage which often results in tremendous costs to local government for facility repair.

(7) Stormwater funding. Regulations imposed by the State Water Resources Control Board and various regional water quality control boards will result in the construction of various capital outlay projects costing billions of dollars. Providing funds through this measure will reduce the cost of these projects to local government.

(8) Fisheries restoration. This division provides hundreds of millions of dollars for fisheries restoration. Local and regional water agencies are voluntarily undertaking many of these projects. By providing state funds, this division will reduce local costs. In addition, the resulting increase in fish populations will make it possible to improve local water supplies, avoiding local government costs to provide replacement water supplies costing hundreds of millions or even billions of dollars.

(9) Bay Area Regional Reliability. Bay Area water districts are undertaking extensive improvements in their water distribution systems to interconnect their water supplies for greater drought water supply reliability and other benefits. By providing funds for this program, this division will reduce their costs by two hundred and fifty million dollars ($250,000,000).

(10) Friant Kern Canal Repair. Groundwater overdraft has caused subsidence of the Friant Kern Canal. State funds to repair the canal will reduce the cost of repairing the canal to local water districts. Avoiding the cost to finance this project will also save tens of millions of dollars per year in interest costs which would have to be paid by these districts.

(11) Oroville Dam Repair. Although the costs of repairing Oroville Dam should be covered by the federal government either through the Federal Emergency Management Agency or the Corps of Engineers, the federal government may not fulfill this obligation. If the State Water Resources Development System contractors, all local agencies, are forced to cover all or part of these costs, this division will reduce their costs by two hundred million dollars ($200,000,000). Interest costs would also be reduced.

(r) Substantial funds remain to be allocated to storage projects pursuant to Division 26.7. For this reason, and so as not to interfere with the work of the California Water Commission in awarding these funds, this measure does not include funding for the construction of specific storage projects.

CHAPTER 3. Definitions.

86002. Unless the context otherwise requires, the definitions set forth in this section govern the construction of this division, as follows:

(a) “Conservation” means rehabilitation, stabilization, restoration, reduced water use, development, and reconstruction, or any combination of those activities.

(b) “Conservation actions on private lands" means projects implemented with willing landowners that involve the adaptive and flexible management of natural resources in response to changing conditions and threats to habitat and wildlife. These investments and actions are specifically designed to create habitat conditions on private lands which, when managed dynamically over time, contribute to the long-term health and resiliency of vital ecosystems and enhance wildlife populations.

(c) “Delta” means the Sacramento-San Joaquin Delta as defined in Section 12220.

(d) “Department” means the Department of Water Resources.

(e) “Desalination” means removing salt and other contaminants from polluted groundwater or other inland sources of water containing salts, including brackish water.

(f) “Disadvantaged community” has the meaning set forth in subdivision (a) of Section 79505.5, as it may be amended.

(g) “Economically distressed area” has the meaning set forth in subdivision (k) of Section 79702, as it may be amended.

(h) “Finance committee” means the Water Supply Reliability and Drought Protection Finance Committee created by Section 86182.

(i) “Fund” means the Water Supply Reliability and Drought Protection Fund of 2018 created by Section 86169.

(j) “Groundwater sustainability agency” means an agency defined in subdivision (j) of Section 10721.

(k) “Integrated Regional Water Management Plan” means a comprehensive plan for a defined geographic area that meets the requirements of Part 2.2 (commencing with Section 10530) of Division 6, as that part may be amended.

(l) “Invasive plant” means a terrestrial or aquatic plant not native to California of no or negligible agricultural value which does any of the following: displaces native plants, threatens native plant biodiversity, harms agricultural or rangeland productivity, degrades wildlife habitat, contributes to fire hazard, or uses more water than the plants it displaces.

(m) “Multi-benefit project” means a project that serves more than one purpose, including but not limited to flood management, water supply, water quality improvement, environmental enhancement, recreation, energy conservation, reduction of emission of climate-changing gases, and fish and wildlife improvement.

(n) “Nonprofit organization” means an organization qualified to do business in California and exempt under Section 501(c)(3) or Section 501(c)(6) of Title 26 of the United States Code, to the extent permitted by state and federal law.

(o) “Protection” means those actions necessary to prevent harm or damage to persons, property or natural resources or those actions necessary to allow the continued use and enjoyment of property or natural resources and includes acquisition, development, restoration, conservation, preservation and interpretation as interpretation is defined in subdivision (i) of Section 75005 of the Public Resources Code.

(p) “Public agency” means a state agency or department, special district, joint powers authority, city, county, city and county, or other political subdivision of the state.

(q) “Public water systems” are defined in subdivision (h) of section 116275 of the Health and Safety Code and means regional, municipal, and district urban water suppliers, including privately owned water suppliers as defined in Part 2.6, Section 10617 of the Water Code Division 6.

(r) “Restoration” means the improvement of physical structures or facilities and, in the case of natural systems and landscape features, includes but is not limited to projects that improve physical and

ecological processes, including but not limited to erosion control; sediment management; the control and elimination of invasive species; prescribed burning; fuel hazard reduction; fencing out threats to existing or restored natural resources; meadow, wetland, riparian, and stream restoration; and other plant and wildlife habitat improvement to increase the natural system value of the property. Restoration projects shall include the planning, monitoring and reporting necessary to ensure successful implementation of the project objectives.

(s) “Severely disadvantaged community” means a community with a median household income of less than 60 percent (60%) of the statewide median household income.

(t) “Sierra Nevada Watershed Improvement Program” is a coordinated, integrated, collaborative program to restore the health of California's primary watershed by increasing the pace and scale of forest restoration in order to maintain the important benefits that the Sierra Nevada region provides.

(u) “State board” means the State Water Resources Control Board.

(v) “State General Obligation Bond Law” means the State General Obligation Bond Law, Chapter 4 (commencing with Section 16720) of Part 3 of Division 4 of Title 2 of the Government Code.

(w) “Stormwater” and “dry weather runoff” are defined as in Section 10561.5.

(x) “Stormwater Resource Plans” are defined as in Part 2.3 (commencing with Section 10560) of Division 6.

CHAPTER 4. Accountability.

86003. (a) (1) The California Natural Resources Agency shall provide for an independent audit of expenditures pursuant to this division no less than every three years.

(2) On or before January 10, 2020, and every six months thereafter, the Natural Resources Agency shall publish on its website a report that contains all of the following information relating to this division for the previous six months with the information summarized by section of this division:

(A) Funding encumbrances.

(B) Summary of new projects funded.

(C) Summary of projects completed.

(D) Discussion of progress towards meeting the metrics of success established pursuant to Section 86157.

(E) Discussion of common challenges experienced by state agencies and recipients of funding in executing projects.

(F) Discussion of major accomplishments and successes experienced by state agencies and recipients of funding in executing projects.

(3) This subsection shall remain in effect only until January 1, 2028, and as of that date is repealed.

(b) The Department of Finance or the Controller, or the California State Auditor at the direction of the Legislature, may conduct an audit of the expenditures of any state agency receiving funding pursuant to

this act.

(c) The state agency issuing any grant with funding authorized by this division shall require adequate reporting of the expenditures of the funding from the grant.

CHAPTER 5. Improvement of Water Supply and Water Quality.

CHAPTER 5.1. Safe Drinking Water.

86004. The sum of seven hundred fifty million dollars ($750,000,000) is appropriated from the Fund to the State board for expenditures, grants, and loans to improve water quality or help provide clean, safe, and reliable drinking water to all Californians.

86005. The projects eligible for funding pursuant to this chapter shall help improve water quality for a beneficial use. The purposes of this chapter are to:

(a) Reduce contaminants in drinking water supplies regardless of the source of the water or the contamination.

(b) Assess and prioritize the risk of contamination to drinking water supplies.

(c) Address the critical and immediate needs of disadvantaged, rural, or small communities that suffer from contaminated or inadequate drinking water supplies, including, but not limited to, projects that address a public health emergency.

(d) Leverage other private, federal, state, and local drinking water quality and wastewater treatment funds.

(e) Provide disadvantaged communities with public drinking water infrastructure that provides clean, safe, and reliable drinking water supplies that the community can sustain over the long term.

(f) Ensure access to clean, safe, reliable, and affordable drinking water for California's communities.

(g) Meet primary and secondary drinking water standards or remove contaminants identified by the state or federal government to meet primary or secondary drinking water standards.

86006. The contaminants that may be addressed with funding pursuant to this chapter may include, but shall not be limited to, lead, nitrates, perchlorate, MTBE (methyl tertiary butyl ether), arsenic, selenium, hexavalent chromium, mercury, PCE (perchloroethylene), TCE (trichloroethylene), DCE (dichloroethene), DCA (dichloroethane), 1,2,3-TCP (trichloropropane), carbon tetrachloride, 1,4-dioxane, 1,4-dioxacyclohexane, nitrosodimethylamine, bromide, iron, manganese, total dissolved solids, electrical conductivity, and uranium.

86007. (a) (1) Of the funds authorized by Section 86004, five hundred million dollars ($500,000,000) shall be available for grants and loans for public water system infrastructure improvements and related actions to meet safe drinking water standards, ensure affordable drinking water, or both. Priority shall be given to projects that provide treatment for contamination or access to an alternate drinking water source or sources for small community water systems or state small water systems in disadvantaged communities whose drinking water source is impaired by chemical and nitrate contaminants and other health hazards

identified by the State board. Eligible recipients serve disadvantaged communities and are public water systems or public agencies.

(2) Eligible expenses may include initial operation and maintenance costs for systems serving disadvantaged communities. Priority shall be given to projects that provide shared solutions for multiple communities, at least one of which is a disadvantaged community that lacks safe, affordable drinking water and is served by a small community water system, state small water system, or a private well. Construction grants shall be limited to five million dollars ($5,000,000) per project, except that the State board may set a limit of not more than twenty million dollars ($20,000,000) for projects that provide regional benefits or are shared among multiple entities, including consolidation of two or more drinking water systems, at least one of which shall be a small disadvantaged community. Not more than 50 percent (50%) of a grant may be awarded in advance of actual expenditures.

(3) For the purposes of this subdivision, “initial operation and maintenance costs” means those initial, eligible, and reimbursable costs under a construction funding agreement that are incurred up to, and including, but not limited to, initial startup testing of the constructed project in order to deem the project complete. Initial operation and maintenance costs are eligible to receive funding pursuant to this section for a period not to exceed three years.

(b) Of the funds authorized by this section, up to ten million dollars ($10,000,000) shall be available for grants to provide school children with safe drinking water under the Drinking Water for Schools Grant Program pursuant to Section 116276 of the Health and Safety Code.

86008. Of the funds authorized by Section 86004, two hundred fifty million dollars ($250,000,000) shall be available for deposit in the State Water Pollution Control Revolving Fund Small Community Grant Fund created pursuant to Section 13477.6 for grants and loans for wastewater treatment projects. Priority shall be given to projects that serve disadvantaged communities and severely disadvantaged communities, and to projects that address public health hazards. Projects may include, but not be limited to, projects that identify, plan, design, and implement regional mechanisms to consolidate wastewater systems or provide affordable treatment technologies.

86009. Of the funds authorized by Section 86004, up to sixty million dollars ($60,000,000) shall be made available for drinking water infrastructure and/or wastewater improvements on private property, or for interim replacement drinking water supplies.

(a) Funds may be used for the following purposes:

(1) To conduct water quality testing of drinking water wells.

(2) To install and replace laterals, repair or replace private wells or onsite wastewater systems, properly close abandoned wells and septic system infrastructure, and provide infrastructure necessary to connect residences to a public water or wastewater system.

(3) To replace interior drinking water plumbing and fixtures that contain lead.

(4) To provide interim replacement drinking water supplies.

(b) The State board may establish a revolving loan fund to facilitate financing for activities allowable under this section.

(c) Priority shall be given to projects that assist low-income homeowners, including mobile home owners, and vulnerable populations.

86010. (a) For the purposes of awarding funding pursuant to this chapter, a local cost share of not less than 50 percent (50%) of the total costs of the project shall be required. The cost-sharing requirement may be waived or reduced for projects that directly benefit a disadvantaged community or an economically distressed area.

(b) At least 10 percent (10%) of the funds available pursuant to this chapter shall be allocated for projects serving severely disadvantaged communities.

(c) Up to 15 percent (15%) of the funds available pursuant to this chapter may be allocated for technical assistance to disadvantaged communities. The State board shall operate a multidisciplinary technical assistance program for small and disadvantaged communities which may include, but is not limited to, outreach and education, needs assessments, review of alternative approaches to provide communities with safe drinking water or wastewater services, project selection and design, board and operator training, and other technical, managerial, and financial capacity building assistance for utilities serving disadvantaged communities related to providing communities with safe drinking water or wastewater services. The agency may also contract with a nonprofit organization, resource conservation district, or other local agency to provide these services.

CHAPTER 5.2. Water Recycling and Desalination.

86020. The sum of four hundred million dollars ($400,000,000) is appropriated from the Fund to the State board to award grants and loans to eligible entities as defined in subdivision (a) of Section 86166 on a competitive basis for wastewater recycling projects. Grants pursuant to this section may be made for all of the following:

(a) Water recycling projects, including, but not limited to, treatment, storage, conveyance, brine disposal, and distribution facilities for potable and nonpotable recycling projects.

(b) Dedicated distribution infrastructure to serve residential, commercial, agricultural, fish and wildlife habitat, and industrial end-user retrofit projects to allow use of recycled water.

(c) Pilot projects for new potable reuse and contaminant removal technology.

(d) Multi-benefit recycled water projects that improve water quality.

(e) Multi-benefit recycled water projects that protect, conserve and restore wetland and other wildlife habitat.

(f) Technical assistance and grant writing assistance related to specific projects for disadvantaged communities and economically distressed areas.

86021. The sum of four hundred million dollars ($400,000,000) is appropriated from the Fund to the State board to award grants to eligible entities as defined in subdivision (a) of Section 86166 on a competitive basis for desalination of brackish groundwater, and other brackish water desalination projects which do

not directly negatively affect riparian habitat, estuaries, coastal bays, coastal lagoons, or ocean waters of California as defined by the State board. Grants pursuant to this section must comply with the requirements of this section, and may be made for all of the following:

(a) Treatment, storage, conveyance, and distribution facilities. Projects may remove contaminants in addition to salts, but shall be primarily constructed and operated to remove salt.

(b) Distribution infrastructure to serve residential, commercial, agricultural, fish and wildlife habitat, and industrial end-user retrofit projects to allow use of desalted water.

(c) Multi-benefit salt removal projects that improve water quality.

(d) Technical assistance and grant writing assistance related to specific projects for disadvantaged communities and economically distressed areas.

(e) Multi-benefit salt removal projects that provide water supply for wetland and other wildlife habitat.

(f) Technical assistance and grant writing assistance related to specific projects for disadvantaged communities and economically distressed areas.

86022. No grant made pursuant to this chapter shall exceed fifty percent (50%) of the cost of the project, but this requirement may be eliminated or reduced for that portion of projects that primarily serve disadvantaged communities, economically distressed areas, or wildlife habitat.

86023. Projects funded pursuant to this chapter shall be selected on a competitive basis with priority given to the following criteria:

(a) Water supply reliability improvement.

(b) Water quality and ecosystem benefits related to decreased reliance on diversions from the Delta or from local rivers and streams, and benefits related to attainment of beneficial uses and water quality objectives in local receiving waters.

(c) Public health benefits from improved drinking water quality or supply.

(d) Cost-effectiveness, based on the amount of water produced per dollar invested, and other cost-effectiveness criteria adopted by the State board.

(e) Energy efficiency and greenhouse gas emission reductions.

(f) Water supply or water quality improvements benefitting disadvantaged communities.

(g) Protection and restoration of fish and wildlife habitat, as well as provision of a reliable water supply for fish and wildlife.

CHAPTER 5.3. Water Conservation.

86030. The sum of three hundred million dollars ($300,000,000) is appropriated from the Fund to the

department for the following purposes:

(a) Statewide turf removal program.

(1) The program shall provide financial incentives to public and private property owners to convert their irrigated or watered landscaping to drought tolerant plantings, including appropriate low water using plants. The department shall set a maximum amount each applicant can receive, and shall allow greater incentives to low-income homeowners who could not otherwise afford to participate in the landscape water conversion program. No less than seventy-five percent (75%) of the funds allocated to this program shall be spent on programs benefitting residential property owners. The department shall make awards to nonresidential applicants on the basis of cost-effectiveness with respect to water supply. Each grant must reduce water consumption by at least fifty percent (50%) compared to current water use.

(2) The most cost-effective projects and those projects that provide the greatest environmental benefits based on the state investment shall receive highest priority for funding. Environmental benefits shall include, but not be limited to, planting appropriate drought resistant native and other plants, reduction in consumptive water use, and increased availability of water for environmental benefits.

(3) The department shall not reject or reduce eligibility to residents residing in service areas which have previously offered turf removal rebate programs as long as the resident was not a participant in the program.

(4) The department shall cooperate with eligible entities as defined in subdivision (a) of Section 86166 and the California Public Utilities Commission to develop an on-bill repayment mechanism to pay for the consumer's share of the landscape conversion project.

(b) Leak detection.

(1) Competitive grants on a matching basis to public water systems to reduce leaks in their water distribution systems, eliminate leaks in the water systems of their customers if the water system operator determines that customer leak detection and elimination is a cost-effective way to improve the water system operator's water supply and provides a public benefit, and install instrumentation to detect leaks at residential, institutional, and commercial properties. The department shall make awards on the basis of cost-effectiveness with respect to water supply. Water system operators receiving grants pursuant to this subdivision shall give highest priority to leak detection and water waste elimination programs in disadvantaged communities and economically distressed areas.

(2) No grant award shall exceed fifty percent (50%) of the cost of the project. Cost sharing may be reduced or eliminated for a grant award that primarily benefits residential property owners in a disadvantaged community or an economically distressed area.

(c) Toilet replacement. Competitive grants on a matching basis to public water systems or eligible entities as defined in subdivision (a) of Section 86166 to replace toilets using more than three gallons per flush with new toilets that conserve water and flush 1.28 gallons per flush or less. The department shall make awards on the basis of cost-effectiveness with respect to water supply. Entities receiving grants pursuant to this subdivision shall give highest priority to toilet replacement programs in disadvantaged communities and economically distressed areas.

(d) Water meters. Installation of water meters in disadvantaged communities that are not metered.

(e) Energy saving water conservation. Competitive grants on a matching basis to public water systems to undertake water conservation projects that promote saving energy. These projects shall document the greenhouse gas emission reductions coming from water conservation programs. The department shall make awards on the basis of cost-effectiveness with respect to water supply as well as energy savings. Highest priority shall be given to programs in disadvantaged communities and economically distressed areas.

(f) In determining how to allocate the funds appropriated pursuant to this section, the department shall determine which technologies are most cost-effective, produce the greatest environmental benefits, and provide the most benefit to disadvantaged communities and economically distressed areas.

(g) Any entity receiving a grant pursuant to this section may use grant funds to establish a revolving fund from which the entity may make loans to implement water conservation programs. The interest rate shall be established by the entity, and the entity may charge a reasonable administration fee to be paid along with the interest on the loan over the lifetime of the loan. Payments made on loans made pursuant to this program shall be returned to the revolving fund to be used for additional loans to implement water conservation programs. Loans made pursuant to this section may be for up to 15 years, or for the useful life of the water conservation project, whichever is shorter.

86031. The sum of fifteen million dollars ($15,000,000) is appropriated from the Fund to the California Energy Commission for the Water Energy Technology Program to accelerate the deployment of innovative water and energy saving technologies and help continue to make water conservation a California way of life.

86032. (a) The purpose of this section is to help make it possible to improve flows in tributaries to the Delta, and to expedite the transfer of conserved agricultural water while minimizing impacts on water rights holders.

(b) The sum of fifty million dollars ($50,000,000) is appropriated from the Fund to the department for matching grants to local agencies to aid in the construction and implementation of agricultural water conservation projects, and for grants in accordance with Section 79158.

(c) For the purposes of approving a grant under this section, the department shall determine if there will be a net savings of water as a result of each proposed project and if the project is cost-effective and technically sound.

(d) A project under this section shall not receive more than five million dollars ($5,000,000) in grant proceeds from the department.

(e) The department shall give preference to the most cost-effective and technically sound projects.

(f) Priority shall be given to grants that result in water savings which are used to improve the quality of fish and wildlife through increased flows in tributaries to the Delta. Grants improving internal water district efficiency for other uses and transfers are also eligible for funding.

(g) No project may cause adverse impacts to fish or wildlife without mitigating those impacts below a level of significance. The cost of mitigation may be included in grant funds.

CHAPTER 5.4. Flood Management for Improved Water Supply.

86040. (a) The sum of two hundred million dollars ($200,000,000) is appropriated from the Fund to the Central Valley Flood Protection Board for:

(1) Enlargement and environmental enhancement of existing floodways and bypasses within the jurisdiction of the Central Valley Flood Protection Board, including providing recreation opportunities.

(2) Improvement of flood control facilities and environmental enhancement within the jurisdiction of the Central Valley Flood Protection Board.

(b) To be eligible for funding under this section, a project shall provide reduced flood risk, reduced liability, or reduced maintenance responsibility for state agencies or local flood control districts or both.

(c) The Central Valley Flood Protection Board shall give preference to:

(1) Those projects that primarily benefit disadvantaged communities or economically distressed areas.

(2) Multi-benefit projects designed to reduce flood risk and enhance fish and wildlife habitat by allowing rivers and floodplains to function more naturally. These projects create additional public benefits such as protecting farms and ranches, improving water quality, increasing groundwater recharge, and providing public recreation opportunities.

(3) Those projects that include matching funds, including but not limited to matching funds from other state agencies. Matching fund requirements may be reduced or eliminated to the extent the project directly benefits disadvantaged communities or economically distressed areas.

(d) The Central Valley Flood Protection Board may make grants to eligible entities as defined in subdivision (a) of Section 86166 to implement this section.

(e) The Central Valley Flood Protection Board may use up to one million ($1,000,000) of these funds to develop a programmatic permit for authorization of habitat restoration and related multi-benefit floodplain restoration projects whose primary purpose is restoration and that meet the criteria described in paragraphs (a) and (b) of this section.

(f) Of the amount appropriated in paragraph (a), fifty million dollars ($50,000,000) shall be awarded for matching grants to public agencies to construct flood control improvements to existing dams on rivers in the Sacramento Valley that provide flood protection to urbanized areas. If these funds are not awarded for this purpose by January 1, 2032, they may be used for the other purposes of this section.

86041. (a) The sum of one hundred million dollars ($100,000,000) is appropriated from the Fund to the department for grants to local agencies on a fifty percent (50%) matching basis to repair or reoperate reservoirs that provide flood control either as a principal purpose or as an indirect effect of their operation. Grantees must demonstrate that the proposed repair or reoperation will increase the amount of water stored in those reservoirs that could be put to beneficial use. No funds appropriated under this section shall be used to raise the height of any dam. Spillway modification projects that do not raise the

crest height of the dam are eligible for grant funds.

(b) (1) To be eligible for funding under this section, a project must provide substantial increases in recreational opportunities, such as trails along river channels, and significant net improvements to fish and wildlife habitat in and adjacent to the river channel downstream of the reservoir, and to the extent compatible with safe reservoir operation, within the reservoir. At least ten percent (10%) of project costs shall be allocated to these recreational and habitat purposes. The funds to carry out these purposes shall be allocated by the department directly to a state conservancy if there is a conservancy with jurisdiction over the area of the project. If there is no conservancy, the Natural Resources Agency's California River Parkways Program shall contract with an eligible entity as defined in subdivision (a) of Section 86166 to carry out these purposes. The agency operating the reservoir being repaired or reoperated shall approve the recreational and habitat elements of the project and shall not charge any fees for review, plan check, permits, inspections, or any other related costs associated with the project, and shall provide permanent operation and maintenance of the entire project, including the habitat and recreational elements. Projects may include grants to eligible entities as defined in subdivision (a) of Section 86166 to implement this paragraph.

(2) All costs associated with the requirements of this subdivision may be paid for with funds provided to local agencies by this section, and do not have to be matched by the agency.

(c) Grants made pursuant to this section may be for the purpose of seismic retrofit.

(d) No grants made pursuant to this section shall be for reservoir maintenance or sediment removal from the reservoir or upstream of the reservoir, except as necessary to complete projects authorized under paragraphs (a), (b), and (c).

(e) Applicants shall certify that projects paid for by funds provided by this section will be permanently operated and maintained.

(f) First priority shall be given to projects that benefit disadvantaged communities.

(g) Projects to assist in the reoperation of eligible reservoirs shall increase water supply for beneficial uses through the purchase and installation of water measuring equipment, acquisition of information systems, and the use of technologies and data to improve reservoir management.

(h) (1) A local public agency, Indian tribe or nonprofit organization that receives funding under this chapter to create recreational facilities or wildlife habitat may use up to twenty percent (20%) of those funds to establish a trust fund that is exclusively used to help pay for the maintenance and monitoring of those recreational facilities or wildlife habitat.

(2) A local public agency, Indian tribe or nonprofit organization that acquires an interest in land, recreation facilities or wildlife habitat with money from this chapter and transfers the interest in land, recreational facilities or wildlife habitat to another public agency, Indian tribe or nonprofit organization shall also transfer the ownership of the trust fund that was established to maintain that interest in the land, recreational facilities or wildlife habitat.

(3) This subdivision does not apply to state agencies.

(4) If the local public agency, Indian tribe or nonprofit organization does not establish a trust fund

pursuant to this subdivision, the agency, tribe or organization shall certify to the state agency making the grant that it can maintain the land, recreational facilities or wildlife habitat to be acquired or developed from funds otherwise available to the agency, tribe or organization.

(5) If the interest in land, recreational facilities or wildlife habitat is condemned or if the local public agency, Indian tribe or nonprofit organization determines that the interest in land, recreational facilities or wildlife habitat is unable to fulfill the purposes for which money from this chapter was expended, the trust fund and any unexpended interest are appropriated to the agency that provided the money. The funds returned to the agency may be utilized only for projects pursuant to this section.

(i) The department shall give preference to those projects that coordinate reservoir reoperation with the provision of water for groundwater recharge through conjunctive use or other integrated surface/groundwater projects.

86042. The sum of two hundred million dollars ($200,000,000) is appropriated from the Fund to the San Francisco Bay Restoration Authority to provide matching grants for flood management, wetlands restoration, and other projects consistent with Article 2 (commencing with Section 66704.5) of Chapter 5 of Title 7.25 of the Government Code. For purposes of this section, matching funds may include funds provided by local governments, regional governments, the federal government, private parties, or other funds raised by the San Francisco Bay Restoration Authority. No grant shall exceed fifty percent (50%) of the cost of the project.

86043. (a)(1) A local public agency, Indian tribe or nonprofit organization that receives funding under this chapter to acquire an interest in land may use up to twenty percent (20%) of those funds to establish a trust fund that is exclusively used to help pay for the maintenance and monitoring of that interest in land.

(2) A local public agency, Indian tribe or nonprofit organization that acquires an interest in land with money from this chapter and transfers the interest in land to another public agency, Indian tribe or nonprofit organization shall also transfer the ownership of the trust fund that was established to maintain that interest in land.

(3) This subdivision does not apply to state agencies.

(b) If the local public agency, Indian tribe or nonprofit organization does not establish a trust fund pursuant to subdivision (a), the agency, tribe or organization shall certify to the state agency making the grant that it can maintain the land to be acquired from funds otherwise available to the agency, tribe or organization.

(c) If the interest in land is condemned or if the local public agency, Indian tribe or nonprofit organization determines that the interest in land is unable to fulfill the purposes for which money from this chapter was expended, the trust fund and any unexpended interest are appropriated to the agency that provided the money. The funds returned to the agency may be utilized only for projects pursuant to this chapter.

CHAPTER 5.5. Funding for Water Measurement and Information.

86048. The sum of sixty million dollars ($60,000,000) is appropriated from the Fund for water measurement and information systems, as follows:

(a) The sum of twenty million dollars ($20,000,000) is appropriated to the department for development of

methods and installation of water measuring equipment to improve estimates of water balance, water budgets, diversions and water use to support water allocations, drought management, groundwater management, water quality management and water rights.

(b) The sum of ten million dollars ($10,000,000) is appropriated to the State board for development of information systems, technologies, and data that improve the State board's ability to manage water rights. These systems will include, but not be limited to, digitizing and making available the 10 million pages of paper records on water rights within the State board and in other repositories and the creation of a digital repository for water diversion and use data.

(c) The sum of ten million dollars ($10,000,000) is appropriated to the Water Data Administration Fund established pursuant to Section 12420, to be used by the department in consultation with the State board for the purpose of making California water information interoperable, consistent with Part 4.9 of Division 6 of the Water Code.

(d) The sum of twenty million dollars ($20,000,000) is appropriated as follows:

(1) Five million dollars ($5,000,000) is appropriated to the University of California for its multi-campus Water Security and Sustainability Research Initiative to develop core elements of a water resources information system, in cooperation with the department and the State board.

(2) Five million dollars ($5,000,000) is appropriated to the California Water Institute at California State University, Fresno to undertake research leading to improvement and conservation of water supplies and improved water quality in California.

(3) Five million dollars ($5,000,000) is appropriated to the Irrigation Training and Research Center at California Polytechnic State University San Luis Obispo to undertake research leading to improvement and conservation of water supplies and improved water quality in California.

(4) Five million dollars ($5,000,000) is appropriated to the Office of Water Programs at California State University, Sacramento to undertake research leading to improvement and conservation of water supplies and improved water quality in California.

(5) The institutions of higher education receiving funds pursuant to this paragraph shall work together to assure that their efforts do not conflict or overlap, but are complementary to each other.

CHAPTER 5.6. Capture and Use of Urban Runoff and Stormwater.

86050. (a) The sum of four hundred million dollars ($400,000,000) is appropriated from the Fund to the State board for projects to capture and use urban dry weather runoff and stormwater runoff. All grants made pursuant to this section by the State board for construction projects must be to counties or cities, a city and county, or a joint powers authority containing a city, county, or city and county with responsibility for flood control or management. The State board may spend up to fifty million dollars ($50,000,000) for grants to eligible entities as defined in subdivision (a) of Section 86166 to develop Stormwater Resource Plans. Funds available pursuant to this section shall be allocated to projects serving and providing a direct benefit to disadvantaged and severely disadvantaged communities. The State board may use these funds to make grants for technical assistance and outreach to disadvantaged communities.

(b) The sum of thirty million dollars ($30,000,000) is appropriated from the Fund to the California Tahoe Conservancy for projects to capture and use dry weather runoff and stormwater runoff in the Lake Tahoe Basin pursuant to Title 7.42 (commencing with Section 66905) of the Government Code.

(c) The sum of forty million dollars ($40,000,000) is appropriated from the Fund to the Santa Monica Mountains Conservancy for projects to capture and use dry weather runoff and stormwater runoff pursuant to Division 23 (commencing with Section 33000) of the Public Resources Code in the area defined in paragraph (2) of subdivision (d) of Section 86080.

(d) The sum of forty million dollars ($40,000,000) is appropriated from the Fund to the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy for projects to capture and use dry weather runoff and stormwater runoff pursuant to Division 22.8 (commencing with Section 32600) of the Public Resources Code.

(e) The sum of forty million dollars ($40,000,000) is appropriated from the Fund to the State Coastal Conservancy for projects to capture and use dry weather runoff and stormwater runoff pursuant to Division 21 (commencing with Section 31000) of the Public Resources.

(f) Funds spent pursuant to this section shall be used for competitive grants for projects that develop, implement, or improve multi-benefit projects identified and prioritized in Stormwater Resource Plans consistent with Part 2.3 (commencing with Section 10560) of Division 6, as that part may be amended, and shall include as many as possible of the following benefits: capture and treatment of stormwater or dry weather runoff for beneficial uses; removal of pollutants from the captured and treated runoff; creation or restoration of habitat or parkland to capture and treat stormwater or dry weather runoff for beneficial uses by using best management practices that improve environmental quality; removal of pollutants from the captured and treated runoff; creation or restoration of habitat or parkland; storage, infiltration or use of the captured and treated runoff to augment local water supplies; creation or restoration of native habitat, trails, park land or other natural open space; reduction of urban heat islands; and provision of other public recreational opportunities. Projects that include wetlands and native habitat or project elements designed to mimic or restore natural watershed functions shall be given the highest priority.

(g) Of the amount appropriated pursuant to subdivision (a), at least forty million dollars ($40,000,000) shall be available for projects that reduce the flow of trash and other pollutants: (1) into a National Estuarine Research Reserve, onto beaches, or into near-shore coastal waters in San Diego County, or (2) into San Diego Bay. Priority shall be given to projects that reduce the flow of trash or other pollutants into one or more units of the State Parks System.

86051. (a) Each state agency receiving funds pursuant to this chapter shall require at least a fifty percent (50%) cost share by recipients of grant funds, but may eliminate or reduce the matching requirements for that portion of projects primarily benefiting disadvantaged communities or economically distressed areas.

(b) Projects funded by this section must comply with water quality policies or regulations adopted by the State board or the regional water quality control board with jurisdiction over the project.

(c) Project costs may include development of decision support tools, data acquisition, and geographic information system data analysis to identify and evaluate the benefits and costs of potential stormwater capture and reuse projects.

(d) Preference shall be granted to projects that divert stormwater or dry weather runoff from storm drains or channels and put it to beneficial use.

(e) Agencies receiving funds pursuant to this section shall give high priority to projects benefitting disadvantaged communities. Each agency receiving funds pursuant to this chapter shall allocate at least thirty-five percent (35%) of the funds they receive for projects that benefit disadvantaged communities.

(f) In implementing this chapter, each agency receiving funds pursuant to this chapter shall consult with the Natural Resources Agency regarding the integration and prioritization of the habitat, park land, open space, recreational and public use components of stormwater and dry weather runoff capture and reuse projects, and shall seek assistance from the Natural Resources Agency in the review and scoring of proposed projects.

(g) Projects may prevent stormwater and dry weather runoff from entering storm drains or channels.

86052. Entities defined in subdivision (a) of Section 86166 are eligible to receive funds under subdivisions (b), (c), (d) and (e) of Section 86050.

86053. Funds allocated pursuant to this chapter may be granted to an eligible applicant for single or multiple small-scale projects that are consistent with Chapter 6.5 of Division 2 of the Fish and Game Code, regardless of whether that Chapter is still in effect.

Chapter 5.7. Integrated Regional Water Management.

86054. The sum of five million dollars ($5,000,000) is allocated to the department to provide direct funding support to approved Integrated Regional Water Management (IRWM) regional water management groups for the purpose of maintaining ongoing IRWM planning and implementation efforts, thereby sustaining the significant investment made through IRWM for regional collaboration on water management.

CHAPTER 6. Watershed, Land, and Fisheries Improvements.

CHAPTER 6.1. Watershed Improvement for Water Supply and Water Quality Enhancement.

86080. The sum of two billion three hundred fifty-five million dollars ($2,355,000,000) is appropriated from the Fund to protect, restore and improve the health of watershed lands, including forest lands (including oaks, redwoods and sequoias), meadows, wetlands, chaparral, riparian habitat and other watershed lands, including lands owned by the United States, in order to protect and improve water supply and water quality, improve forest health, reduce fire danger consistent with the best available science, mitigate the effects of wildfires on water quality and supply, increase flood protection, remediate aquifers, or to protect or restore riparian or aquatic resources. No grants made pursuant to this section shall be for reservoir maintenance or sediment removal from a reservoir or upstream of a reservoir, except as necessary for field research required pursuant to subdivision (a). Funds shall be allocated as follows:

(a) Two hundred million dollars ($200,000,000) to the Sierra Nevada Conservancy for the protection, restoration and improvement of Sierra Nevada watersheds, pursuant to Division 23.3 (commencing with Section 33300) of the Public Resources Code and including the purposes outlined in Section 33320 of the Public Resources Code. Funds shall also be spent for the implementation and to further the goals and

purposes of the Sierra Nevada Watershed Improvement Program. Projects eligible for funding under the Sierra Nevada Watershed Improvement Program may include research and monitoring to measure the impact of forest restoration work on water supply, climate and other benefits, including long-term air quality, water quality and quantity, greenhouse gas emissions, carbon storage, habitat, recreational uses, and community vitality. Projects funded under the Sierra Nevada watershed Improvement Program shall be based on the best available science regarding forest restoration and must be undertaken to improve water supply and quality, protect and restore ecological values and to promote forest conditions that are more resilient to wildfire, climate change, and other disturbances. The Sierra Nevada Conservancy may make grants to federal agencies if it determines such grants are the most efficient way to implement the intent of this division on federally managed lands.

(b) Sixty million dollars ($60,000,000) to the California Tahoe Conservancy for the protection and restoration of watersheds of the Lake Tahoe Basin, pursuant to Title 7.42 (commencing with Section 66905) of the Government Code. Funds shall be spent for implementation and to further the goals and purposes of the Lake Tahoe Environmental Improvement Program, pursuant to Article 6 of Chapter 1.692 of Division 5 (commencing with Section 5096.351) of the Public Resources Code.

(c) One hundred million dollars ($100,000,000) to the San Francisco Bay Area Conservancy Program of the Coastal Conservancy for the protection and restoration of watersheds of the San Francisco Bay Area, pursuant to Chapter 4.5 of Division 21 of the Public Resources Code (commencing with Section 31160).

(d) One hundred eighty million dollars ($180,000,000) for the protection and restoration of watersheds of Los Angeles, Ventura, and Orange Counties as follows:

(1) Sixty million dollars ($60,000,000) to the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy for the protection and restoration of the watersheds of the San Gabriel and Lower Los Angeles Rivers pursuant to Division 22.8 (commencing with Section 32600) of the Public Resources Code.

(2) Sixty million dollars ($60,000,000) to the Santa Monica Mountains Conservancy, for the protection and restoration of the watersheds of Santa Monica Bay, the Upper Los Angeles River and the Upper Santa Clara River pursuant to Division 23 (commencing with Section 33000) of the Public Resources Code, and the watersheds defined in subdivision (c) of Section 79570.

(3) Thirty million dollars ($30,000,000) to the Santa Ana River Conservancy Program of the Coastal Conservancy for the protection and restoration of watersheds of the Santa Ana River pursuant to Chapter 4.6 of Division 21 of the Public Resources Code (commencing with Section 31170).

(4) Thirty million dollars ($30,000,000) to the Baldwin Hills Conservancy for the protection and restoration of the Baldwin Hills and Ballona Creek watersheds, and for projects to capture dry weather runoff and stormwater runoff pursuant to Division 22.7 (commencing with Section 32550) of the Public Resources Code.

(e) Forty million dollars ($40,000,000) to the San Diego River Conservancy for the protection and restoration of watersheds in San Diego County pursuant to Division of 22.9 (commencing with Section 32630) of the Public Resources Code.

(f) One hundred thirty-five million dollars ($135,000,000) to the State Coastal Conservancy for the protection and restoration of coastal watersheds pursuant to Division 21 (commencing with Section

31000) of the Public Resources Code.

(g) One hundred fifty million dollars ($150,000,000) for the protection and restoration of the watersheds ofthe Sacramento and San Joaquin Rivers as follows:

(1) One hundred million dollars ($100,000,000) to the Sacramento-San Joaquin Delta Conservancy for protection and restoration of the Delta pursuant to Division 22.3 (commencing with Section 32300) of the Public Resources Code. Highest priority shall be given to projects that benefit the restoration of native species and that reduce the negative impacts of excessive salinity intrusion. Highest priority shall also be given to projects that restore habitat important to species listed pursuant to the federal Endangered Species Act (16 U.S.C. Chapter 35) and the California State Endangered Species Act (Fish and Game Code Sections 2050-2100). The funds may also be used for improvement of public recreational facilities in the Delta, and for grants to local agencies and nonprofit organizations to increase community access to parks and recreational opportunities for underserved urban communities in the Delta. The Conservancy may implement programs designed to reduce greenhouse gas emissions from the Delta.

(2) Twenty million dollars ($20,000,000) to the San Joaquin River Conservancy for the implementation of the San Joaquin River Parkway pursuant to Division 22.5 (commencing with Section 32500) of the Public Resources Code.

(3) Thirty million dollars ($30,000,000) to the Lower American River Conservancy Fund created by Section 5845.9 of the Public Resources Code. The Wildlife Conservation Board shall use these funds to implement Chapter 10.5 of Division 5 of the Public Resources Code (commencing with Section 5845).

(h) One hundred and seventy million dollars ($170,000,000) for river parkways, as follows:

(1) Seventy million dollars ($70,000,000) to the California Natural Resources Agency for projects pursuant the California River Parkways Act of 2004, Chapter 3.8 (commencing with Section 5750) of Division 5 of the Public Resources Code. The Secretary of the Natural Resources Agency shall allocate at least sixty-five percent (65%) of these funds for projects that benefit disadvantaged communities. With the remaining funds, the Secretary shall seek to benefit poorer communities that do not qualify as disadvantaged communities.

(2) Ten million dollars ($10,000,000) to the State Coastal Conservancy for grants to nonprofit organizations and local public agencies to implement river parkway projects for habitat restoration, public recreation, and water quality improvement along the Guadalupe River corridor.

(3) Ten million dollars ($10,000,000) to the State Coastal Conservancy for grants to nonprofit organizations and local public agencies to implement river parkway projects for habitat restoration, public recreation, and water quality improvement along the Russian River corridor.

(4) Ten million dollars ($10,000,000) to the State Coastal Conservancy for grants to nonprofit organizations and local public agencies to implement river parkway projects for habitat restoration, public recreation, and water quality improvement along the Santa Clara River corridor.

(5) Ten million dollars ($10,000,000) to the State Coastal Conservancy for grants to nonprofit organizations and local public agencies to implement river parkway projects for habitat restoration, public recreation, and water quality improvement along the Tijuana River corridor.

(6) Ten million dollars ($10,000,000) to the State Coastal Conservancy for grants to nonprofit organizations and local public agencies to implement river parkway projects for habitat restoration, public recreation, and water quality improvement along the Carmel River corridor.

(7) Ten million dollars ($10,000,000) to the State Coastal Conservancy for grants to nonprofit organizations and local public agencies to implement river parkway projects for habitat restoration, public recreation, and water quality improvement along the Napa River corridor.

(8) Fifteen million dollars ($15,000,000) to the State Coastal Conservancy for river parkway projects within the San Diego Bay watershed.

(9) Fifteen million dollars ($15,000,000) to the State Coastal Conservancy for river parkway projects along the Santa Margarita River in San Diego County.

(10) Ten million dollars ($10,000,000) to the California Tahoe Conservancy to implement habitat restoration, public recreation, and water quality improvements along the Upper Truckee River corridor.

(i) One hundred fifty million dollars ($150,000,000) shall be available for projects that restore, protect and preserve the Los Angeles River and its tributaries, as follows:

(1) Seventy-five million dollars ($75,000,000) to the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy pursuant to Division 22.8 (commencing with Section 32600) of the Public Resources Code, and Section 79508 of the Water Code.

(2) Seventy-five million dollars ($75,000,000) to the Santa Monica Mountains Conservancy pursuant to Division 23 (commencing with Section 33000) of the Public Resources Code, and Section 79508 of the Water Code.

(j) Three hundred million dollars ($300,000,000) to the Wildlife Conservation Board for the following:

(1) For the protection and restoration of the watersheds of the Sacramento, Smith, Eel, and Klamath Rivers and other rivers of Marin, Sonoma, Mendocino, Humboldt and Del Norte Counties, and the Carrizo Plain pursuant to Chapter 4 of Division 2 (commencing with Section 1300) of the Fish and Game Code.

(2) For protection and restoration of oak woodlands and rangelands pursuant to Division 10.4 (commencing with Section 10330) of the Public Resources Code and Article 3.5 (commencing with Section 1360) of Chapter 4 of Division 2 of the Fish and Game Code.

(3) For acquisition and restoration of riparian habitat, migratory bird habitat, anadromous fisheries, wetland habitat and other watershed lands pursuant to Chapter 4 of Division 2 (commencing with Section 1300) of the Fish and Game Code.

(4) Grants may include funding to help fulfill state commitments to implement Natural Community Conservation Plans adopted pursuant to Chapter 10 of Division 3 (commencing with Section 2800) of the Fish and Game Code, and to large scale regional Habitat Conservation Plans adopted pursuant to the federal Endangered Species Act (16 U.S.C. Chapter 35).

(5) Of the amount made available pursuant to this subdivision, the sum of ten million dollars ($10,000,000) shall be available to assist farmers in integrating agricultural activities with watershed restoration and wildlife protection. Priority shall be given to projects that include partnerships with resource conservation districts.

(6) Of the amount made available pursuant to this subdivision, the sum of fifty million dollars ($50,000,000) is appropriated to the Oak Woodlands Conservation Fund established by Section 1363 of the Fish and Game Code, and may be expended pursuant to Article 3.5 of Chapter 4 of Division 2 of the Fish and Game Code.

(7) Of the amount made available pursuant to this subdivision, the sum of thirty million dollars ($30,000,000) shall be available for grazing land protection pursuant to the California Rangeland, Grazing Land and Grassland Protection Act, commencing with Section 10330 of Division 10.4 of the Public Resources Code.

(8) Of the amount made available pursuant to this subdivision, not less than sixty million dollars ($60,000,000) shall be available for projects that advance the conservation objectives of natural community conservation plans adopted pursuant to the Natural Community Conservation Planning Act, Chapter 10 (commencing with Section 2800) of Division 3 of the Fish and Game Code. First priority shall be given to plans that include protection of aquatic ecosystems. Funding pursuant to this paragraph shall not be used to offset mitigation obligations otherwise required.

(k) Twenty-five million dollars ($25,000,000) to the Coachella Valley Mountains Conservancy for the protection and restoration of the Coachella Valley watershed pursuant to Division 23.5 (commencing with Section 33500) of the Public Resources Code.

(l) One hundred fifty million dollars ($150,000,000) to the Department of Parks and Recreation for protection and restoration of watershed lands within and affecting units of the State Parks System, with high priority to redwood and other forest land important to protecting river and stream flows and quality. In addition to other purposes authorized pursuant to this section, the Department of Parks and Recreation may allocate funds to improve and increase the efficiency and effectiveness of State Park water supply and wastewater treatment systems.

(m) Sixty million dollars ($60,000,000) to the Department of Conservation for watershed restoration and conservation projects on agricultural lands, rangelands, managed wetlands, and forested lands.

(1) No less than thirteen million dollars ($13,000,000) shall be used for grants pursuant to Section 9084 of the Public Resources Code.

(2) No less than thirty-one million dollars ($31,000,000) shall be used for the purposes of Division 10.2 (commencing with Section 10200) of the Public Resources Code.

(3) Ten million dollars ($10,000,000) shall be used for the Watershed Coordinator Grant Program.

(n) One hundred million dollars ($100,000,000) to the California Ocean Protection Council for projects that: (1) reduce the amount of pollutants that flow to beaches, bays, coastal estuaries, and near-shore ecosystems; and (2) protect coastal and near-shore ocean resources from the impacts of rising sea levels, storm surges, ocean acidification and related hazards, including, but not limited to, increasing the resiliency of near-shore ocean habitats. Projects may include, but are not limited to, projects that protect

or restore beaches, coastal estuaries and watersheds, bays, and near-shore ecosystems including marine protected areas. Of this amount, the Council shall use at least five million dollars ($5,000,000) for the Local Coastal Program sea level rise grant program that supports Local Coastal Program updates to address sea level rise, including sea-level rise modeling, vulnerability assessments, and adaptation planning and policy development.

(o) The sum of two hundred million dollars ($200,000,000) is appropriated from the Fund to the Natural Resources Agency, for water-related projects that implement the Natural Resources Agency's Salton Sea Management Program consistent with provisions of Article 2 (commencing with Section 2940) of Chapter 13 of Division 3 of the Fish and Game Code, and in fulfillment of the obligations of the State of California to comply with the terms of Chapters 611, 612, 613, and 614 of the Statutes of 2003. These statutes were enacted to facilitate the execution and implementation of the Quantification Settlement Agreement, including restoration of the Salton Sea. The Natural Resources Agency may expend these funds on projects that provide multiple benefits of ecosystem restoration, air quality improvement, and economic recovery for severely disadvantaged communities.

(1) Of the amount appropriated pursuant to this paragraph, not less than twenty million dollars ($20,000,000) shall be available for purposes consistent with the New River Water Quality, Public Health, and River Parkway Development Program, as described in Section 71103.6 of the Public Resources Code.

(2) Of the amount allocated pursuant to this section, the sum of one million dollars ($1,000,000) shall be available for a Salton Sea Integrated Watershed Plan providing technical assistance for, outreach to, and engagement with severely disadvantaged communities.

(p) Five million dollars ($5,000,000) to the Delta Stewardship Council for the Delta Science Program as described in Section 85280.

(q) Fifty million dollars ($50,000,000) to the department for Urban Streams Restoration Program competitive grants pursuant to Section 7048. The department shall allocate at least sixty-five (65%) of these funds for projects that benefit disadvantaged communities. With the remaining funds, the department shall seek to benefit poorer communities that do not qualify as disadvantaged communities.

(r) Twenty million dollars ($20,000,000) to the California Department of Forestry and Fire Protection for grants for urban forestry projects that manage, capture or conserve stormwater, recharge local groundwater supplies or improve water supplies or water quality through infiltration, sediment management and erosion control pursuant to the California Urban Forestry Act, Chapter 2 (commencing with Section 4799.06) of Part 2.5 of Division 4 of the Public Resources Code.

(s) Fifteen million dollars ($15,000,000) to the Delta Protection Commission for expenditures, grants, or loans for projects that improve water quality by improving wastewater treatment in Delta legacy communities (as described in section 32301(f) of the Public Resources Code) and at recreational facilities in the Delta. Funds may be expended on wastewater improvement projects serving Delta legacy communities, or Delta legacy community households with failing septic systems which threaten the quality of groundwater or surface water supplies used for urban, agricultural or fisheries purposes. Funds may also be allocated to improve and increase the efficiency and effectiveness of Delta recreational facility wastewater treatment systems. Priority shall be given to projects that address public health hazards. Projects may identify, plan, design, and implement regional mechanisms to consolidate wastewater systems or provide affordable treatment technologies.

(t) Twenty million dollars ($20,000,000) to the Department of Parks and Recreation for projects that provide access to rivers for non-motorized recreation, and for grants to eligible entities as defined in subdivision (a) of Section 86166 for this purpose. First priority shall be given to projects that include matching funds, and to projects that serve disadvantaged communities and economically distressed areas, whether or not they include cost sharing.

(u) (1) Twenty million dollars ($20,000,000) to the Wildlife Conservation Board for the construction of a Pacific Flyway Center in the vicinity of the Suisun Marsh, to be operated by the California Department of Fish and Wildlife. The Department of Fish and Wildlife may contract with a nonprofit organization to operate the Center. The Center shall be used to educate the public about the importance of California's wetlands, agricultural lands (including rice) and riparian areas in benefitting waterfowl, shorebirds, native plants and animals, the value of wetlands in absorbing gases that cause climate change, and similar educational purposes. The operator of the Center shall make special efforts to bring people, and especially students, from disadvantaged communities to the Center for educational purposes. If the Wildlife Conservation Board determines that all or part of these funds is not needed to complete this project, it may allocate the unneeded part of the funds to the purposes of paragraph (j) of this section.

(2) (A) Of the amount appropriated by paragraph (1), the Wildlife Conservation Board may make a grant of up to four million dollars ($4,000,000) to a nonprofit organization whose principal purpose is wildlife conservation to establish a trust fund, the interest from which shall be used exclusively to operate the Pacific Flyway Center and bring people from disadvantaged communities to the Center.

(B) With the approval of the Department of Fish and Wildlife, the nonprofit organization can transfer the operation of the Pacific Flyway Center to another nonprofit organization. If such a transfer takes place, the trust fund shall be transferred to the new nonprofit organization.

(3) If the funds allocated by this section are not all used to construct the Pacific Flyway Center by January 1, 2028, any remaining funds are appropriated to the Wildlife Conservation Board for the purposes of Section 86123.

(v) Eighty million dollars ($80,000,000) to the Coastal Conservancy for the removal of Matilija Dam, and for associated levee and flood control improvements, water supply improvements, and related projects on Matilija Creek and the Ventura River, and for river parkway projects along the Ventura River. The Conservancy may grant all or part of these funds to Ventura County. Highest priority for the river parkway projects shall be those which benefit disadvantaged communities. If the Coastal Conservancy determines that all or part of these funds is not needed to complete this project, it may allocate the unneeded part of the funds to the purposes of paragraph (f) of this section.

(w) The sum of twenty-five million dollars ($25,000,000) to the University of California for the Natural Reserve System for matching grants for land acquisition and for the construction and development of facilities that will be used for research and training to improve the management of aquatic ecosystems, natural lands and the preservation or conservation of California's wildlife resources. Priority shall be given to projects that advance research on the impacts of climate change, reduction of greenhouse gas emissions, and adaptation of natural systems to the impacts of climate change.

(x) (1) The sum of fifty million dollars ($50,000,000) is appropriated from the Fund to the Sierra Nevada Conservancy for the purpose of awarding grants within the jurisdiction of the Conservancy to eligible entities as defined in subdivision (a) of Section 86166 for the purpose of reducing the threat of wildfires which would negatively impact watershed health. Projects may be for the purpose of hazardous fuel

reduction, postfire watershed rehabilitation, forest management practices that promote forest resilience to severe wildfire, climate change, and other disturbances, and development of local plans to reduce the risk of wildfires that could adversely affect watershed health. Preference shall be given to grants which include matching funds, but this preference may be reduced or eliminated for grants which benefit disadvantaged communities or economically distressed areas.

(2) The sum of fifty million dollars ($50,000,000) is appropriated from the Fund to the Department of Forestry and Fire Protection for the purpose of awarding grants in areas outside the jurisdiction of the Sierra Nevada Conservancy to eligible entities as defined in subdivision (a) of Section 86166 for the purpose of reducing the threat of wildfires which would negatively impact watershed health. Projects may be for the purpose of hazardous fuel reduction, postfire watershed rehabilitation and restoration, forest management practices that promote forest resilience to severe wildfire, climate change, and other disturbances, and development of local plans to reduce the risk of wildfires that could adversely affect watershed health. Preference shall be given to grants which include matching funds, but this preference may be reduced or eliminated for grants which benefit disadvantaged communities or economically distressed areas.

86083. Consistent with the other requirements of this chapter, funds spent pursuant to this chapter may be used for grants to eligible entities as defined in subdivision (a) of Section 86166. Funds awarded to eligible entities may be used for projects on land owned by a state or federal agency. With the exception of funds allocated to grant programs, funds may also be used directly by the state agency receiving the funds to implement watershed improvement projects consistent with this chapter. In making grants pursuant to this chapter, agencies shall give high priority to applications that include cost sharing, and to grants that benefit disadvantaged communities and economically distressed areas whether or not they include cost sharing.

86084. (a) For a project to be eligible for funding pursuant to this chapter, the project shall have watershed protection and restoration, water supply or water quality benefits, or ecosystem benefits relating to rivers, streams, forests, meadows, wetlands or other water-related resources.

(b) (1) Funds appropriated pursuant to this chapter may be used for protection and restoration of forests, meadows, wetlands, riparian habitat, coastal resources, and near-shore ocean habitat; to acquire land and easements to protect these resources and avoid development that may reduce watershed health, and to take other measures that protect or improve the quality or quantity of water supplies downstream from projects funded in whole or in part by this chapter. Forest restoration projects, including but not limited to hazardous fuel reduction, post-fire watershed rehabilitation, and forest management and tree planting using appropriate native plants shall be based on the best available science regarding forest restoration and must be undertaken to protect and restore ecological values and to promote forest conditions that are more resilient to wildfire, climate change, and other disturbances.

(2) Fuel hazard reduction activities on United States Forest Service lands in the Sierra Nevada and similar forest types shall be generally consistent with objectives of the Sierra Nevada Watershed Improvement Program and the best available science, including United States Forest Service General Technical Report 220 as it may be updated.

86085. Any entity receiving funds pursuant to this chapter that expends funds on private lands shall secure an agreement or interest in the private lands to assure the purpose of the expenditure is maintained for such time as is commensurate with the best practices for the type of project.

86086. (a)(1) A local public agency, Indian tribe or nonprofit organization that receives funding for a project pursuant to this chapter may use up to twenty percent (20%) of those funds to establish a trust fund that is exclusively used to help pay for the maintenance and monitoring of that project.

(2) A local public agency, Indian tribe or nonprofit organization that acquires an interest in a project with money from this chapter and transfers the interest in the project to another public agency, Indian tribe or nonprofit organization shall also transfer the ownership of the trust fund that was established to maintain that interest in the project.

(3) This subdivision does not apply to state agencies.

(b) If the local public agency, Indian tribe or nonprofit organization does not establish a trust fund pursuant to subdivision (a), the agency, tribe or organization shall certify to the state agency making the grant that it can maintain the project to be undertaken using funds otherwise available to the agency, tribe or organization.

(c) The interest from the trust fund shall be used only to monitor the implementation of a project, and maintain a project and its water supply and water quality benefits implemented pursuant to this chapter.

(d) If an interest in a project is condemned or if the local public agency, Indian tribe or nonprofit organization determines that the interest in the project is unable to fulfill the purposes for which money from this chapter was expended, the trust fund and any unexpended interest are appropriated and shall be returned to the agency that provided the money. The funds returned to the agency may be utilized only for projects pursuant to this chapter.

86087. Funds allocated pursuant to this chapter may be granted to an eligible applicant for single or multiple small-scale projects that are consistent with Chapter 6.5 of Division 2 of the Fish and Game Code, regardless of whether that Chapter is still in effect.

86088. By April 30, 2019, the Natural Resources Agency shall recommend provisions for grant approval guidelines to each state agency that receives an appropriation pursuant to this chapter in order to ensure appropriate consistency of the guidelines. Each agency shall consider the recommendations of the Natural Resources Agency as they adopt their own guidelines.

86089. Agencies receiving funds pursuant to this chapter shall give high priority to projects that benefit the native wildlife, birds and fishes of California.

CHAPTER 6.2. Land and Water Management for Water Supply Improvement.

86090. The sum of one hundred million dollars ($100,000,000) is appropriated from the Fund to the Wildlife Conservation Board for the purpose of awarding competitive grants to eligible entities as defined in subdivision (a) of Section 86166 to improve the quality of public and private rangelands, wildlands, meadows, wetlands, riparian areas and aquatic areas for the purpose of increasing groundwater recharge and water supply from those lands, and for improving water quality consistent with protecting and restoring ecological values.

86091. Funds allocated pursuant to this chapter may be granted to an eligible applicant for single or multiple small-scale projects that are consistent with Chapter 6.5 of Division 2 of the Fish and Game Code,

regardless of whether that Chapter is still in effect.

86094. In making grants pursuant to this chapter, the Wildlife Conservation Board shall give highest priority to projects which:

(a) Are most cost-effective in producing improved water supply or water quality, and which provide the greatest fish and wildlife benefits.

(b) Include matching funds.

(c) Benefit disadvantaged communities and economically distressed areas.

(d) Are for the purpose of invasive plant control and eradication, restoration of riparian habitat, meadows and wetlands, and other projects that improve the flow of water from the lands, and reduce the use of water by invasive plant species.

86096. For a project to be eligible for funding pursuant to this chapter, the project shall have water supply or water quality benefits or both. A project that targets the removal of invasive plants to increase water supply shall only be funded if the applicant guarantees that the land from which plants will be removed will be maintained.

86097. (a)(1) A local public agency, Indian tribe or nonprofit organization that receives funding under this chapter may use up to twenty percent (20%) of those funds to establish a trust fund that is exclusively used to help pay for the maintenance and monitoring of the funded project.

(2) A local public agency, Indian tribe or nonprofit organization that undertakes a project with money from this division and can no longer maintain the project shall transfer the ownership of the trust fund to another public agency, Indian tribe or nonprofit organization that is willing and able to maintain that project.

(3) This subdivision does not apply to state agencies.

(b) If the local public agency, Indian tribe or nonprofit organization does not establish a trust fund pursuant to subdivision (a), the agency, tribe or organization shall certify to the state agency making the grant that it can maintain the project in an appropriate condition.

(c) The interest from the trust fund established from the funds available pursuant to this section shall be used only to maintain a project and its water supply and water quality benefits implemented pursuant to this chapter.

(d) If the interest in a project is condemned or if the local public agency, Indian tribe or nonprofit organization determines that the interest in the project is unable to fulfill the purposes for which money from this chapter was expended, the trust fund and any unexpended interest are appropriated and shall be returned to the Wildlife Conservation Board. The funds returned may be utilized only for projects authorized by this chapter.

86098. In implementing this chapter, the Wildlife Conservation Board may provide incentives to landowners for conservation actions on private lands or use of voluntary habitat credit exchange mechanisms.

86099. At least ten percent (10%) of the funds available pursuant to this section shall be allocated for projects that provide a direct benefit to disadvantaged communities. These benefits may include range improvement, among other benefits. These projects may include technical assistance for, outreach to, and engagement with disadvantaged communities.

CHAPTER 6.3. Conservation Corps.

86105. The sum of forty million dollars ($40,000,000) is appropriated from the Fund to the California Conservation Corps for projects to protect, restore, and improve the health of watershed lands, including forest lands, meadows, wetlands, chaparral, riparian habitat and other watershed lands. Projects may include, but are not limited to, regional and community fuel hazard reduction projects on public lands, invasive species removal, and stream, river, and riparian restoration projects. The California Conservation Corps shall allocate at least fifty percent (50%) of the funds pursuant to this section for grants to certified local conservation corps. Projects shall improve water quality, water supply reliability, or riparian or watershed health. Projects shall be undertaken in coordination with a nonprofit organization or public agency.

CHAPTER 6.4. Central Valley Fisheries Restoration.

86106. (a) The people of California find and declare that the protection, restoration and enhancement of native fish populations (including anadromous salmonids) of the Central Valley is necessary for the ecological and economic health of the State of California.

(b) Fish need both suitable habitat and appropriately timed flows in rivers and their tributaries.

(c) The State Water Resources Control Board shall take note of the funding provided by this chapter and the resulting fish habitat restoration as the Board determines flows necessary to restore Central Valley native fish populations and fisheries.

(d) Many state and federal agencies, including the Department of Water Resources, Department of Fish and Wildlife, Delta Stewardship Council, Delta Conservancy, Wildlife Conservation Board, Central Valley Flood Protection Board, and federal Bureau of Reclamation, United States Fish and Wildlife Service, and National Marine Fisheries Service have prepared policies and plans to restore Central Valley native fish and fisheries habitat, but these policies and plans are not fully funded.

(e) Many state and federal laws require the restoration of Central Valley native fish populations and fisheries habitat, but funding has not been fully available to carry out the requirements of these laws.

(f) The sum of four hundred million dollars ($400,000,000) is appropriated from the Fund to the California Natural Resources Agency for the restoration of Central Valley populations of native fish and fisheries habitat.

(1) (A) The Secretary of the Natural Resources Agency shall appoint a Central Valley Fisheries Advisory Committee made up of representatives from the Central Valley Salmon Habitat Partnership, appropriate local, state and federal fish and water management and other agencies, nonprofit organizations, commercial fishing organizations, universities, local agencies and Indian tribes with relevant scientific expertise including representation from the upper watersheds. The committee shall advise the Secretary on the annual expenditure of funds appropriated pursuant to this Chapter. The

committee may solicit projects, and direct the creation of projects pursuant to this chapter, subject to approval by the Secretary.

(B) The committee shall work closely with representatives from each river basin in the Central Valley, including local government and water agencies, Indian tribes, and nonprofit organizations, to develop projects that are most suitable for the conditions in the basin, and which meet the other requirements of this section.

(C) In proposing projects, the committee shall take into account the entire life cycle of the fish species to be benefitted, and shall consider the interaction of the effects of each project within a river basin with projects in other river basins. The committee shall also consider adverse impacts resulting from poor watershed health, including severe wildfire and extensive tree mortality.

(2) Projects funded pursuant to this section shall increase self-sustaining populations of native fish, or contribute to an existing fish population becoming self-sustaining in the future, with a minimal requirement of expenditures to continue to operate the project. No funds may be expended on fish hatcheries.

(3) The committee shall give high priority to projects that provide multiple benefits, such as improved flood management, improved water quality, improved water supply, enhanced groundwater sustainability, aquifer remediation and reduction of emission of greenhouse gases, while also improving conditions for native fish species and their habitats. The committee shall also give high priority to projects that can be integrated into an existing flow regime and provide multi-species benefits over a range of flow conditions. The committee shall also give high priority to projects that are consistent with recovery plan and resiliency strategies for native California fish species.

(4) Expenditures shall be for capital outlay projects, such as conservation easements, water measurement needed to measure the effects of the project, projects that restore or enhance fisheries habitat such as floodplain expansion, reintroductions of fish into their historical habitat, improved fish passage opportunities, creation or enhancement of spawning and rearing habitat and other projects. Acquisition of land or easements as part of a fisheries enhancement project must be from willing sellers. Project costs shall include the costs of planning, environmental review, mitigation of the impacts of the project, and permitting. High priority shall be given to projects that provide adult and juvenile fish access to or fish passage through agricultural fields or floodplain habitats that will provide enhanced juvenile rearing and food production opportunities.

(5) Of the funds authorized by this section, the Secretary of the Natural Resources Agency may allocate up to ten million dollars ($10,000,000) for one or more grants for capital outlay and related programmatic purposes to institutions of higher education for facilities that can be used to improve scientific and technical coordination, communication and training among those institutions, the department, the Department of Fish and Wildlife, the State board and other state agencies to assure that developments in ecosystem and fisheries science and management are deployed and employed across higher education institutions and state government agencies.

(g) Based on the recommendations of the committee, the Secretary of the Natural Resources Agency may make grants to any state or local agency, Indian tribe, or nonprofit organization to carry out the purpose of this section. The Secretary shall give high priority to projects that include matching funds, projects with a local agency as the lead agency, and projects supporting proposed actions in the Sacramento Valley Salmon Resiliency Strategy (as published by the California Natural Resources Agency in June 2017, and as

it may be amended), the National Marine Fisheries Service California Central Valley Steelhead Recovery Plan and other similar strategies as they are adopted.

(h) Of the amount appropriated pursuant to this section, not less than thirty-five million dollars ($35,000,000) shall be available for projects to restore rivers and streams in support of fisheries and wildlife, including, but not limited to, reconnection of rivers with their floodplains, riparian and side-channel habitat restoration pursuant to the California Riparian Habitat Conservation Program, Chapter 4.1 (commencing with Section 1385) of Division 2 of the Fish and Game Code, and restoration and protection of upper watershed forests and meadow systems that are important for fish and wildlife resources. Subdivision (f) of Section 79738 of the Water Code applies to this subdivision. Priority shall be given to projects supported by multi-stakeholder public or private partnerships, or both, using a science-based approach and measurable objectives to guide identification, design, and implementation of regional actions to benefit salmon and steelhead.

(i) Of the amount appropriated pursuant to this section, five million dollars ($5,000,000) shall be available to assist in the development of the Central Valley Salmon Partnership Habitat Implementation Plan.

(j) The Secretary shall give high priority to the removal of Dennett Dam on the Tuolumne River, if additional funds are still needed to complete removal of the Dam.

(k) A local public agency, Indian tribe or nonprofit organization receiving funding under this chapter may use up to twenty percent (20%) of those funds to establish a trust fund, the proceeds of which shall be used exclusively to pay or help pay for the maintenance and monitoring of the project being funded.

(1) If the local public agency, Indian tribe or nonprofit organization is unable to continue to maintain and monitor the project, it may transfer ownership of the trust fund to another public agency, Indian tribe or nonprofit organization, with the approval of the Secretary of the Natural Resources Agency.

(2) This subdivision does not apply to state agencies.

(3) If the local public agency, Indian tribe or nonprofit organization does not establish a trust fund pursuant to paragraph (1), the agency, tribe or organization shall certify to the Secretary of the Natural Resources Agency that it can maintain the project from funds otherwise available to the agency, tribe or organization.

(4) If all or part of the project cannot be maintained or is condemned, the trust fund and any unexpended interest are appropriated to the California Natural Resources Agency. The funds returned to the Agency may be utilized only for projects pursuant to this chapter.

(l) Of the amount appropriated to the California Natural Resources agency pursuant to this section, seven million dollars ($7,000,000) is appropriated to the Department of Fish and Wildlife for native fish restoration projects on the upper Feather River below Oroville dam for gravel restoration, streambed restoration, and salmon habitat restoration projects.

CHAPTER 7. Groundwater Sustainability and Storage.

86110. (a) The sum of six hundred seventy-five million dollars ($675,000,000) is appropriated from the Fund to the department for projects and programs that support sustainable groundwater management

consistent with Part 2.74 of Division 6 (commencing with Section 10720). The funds shall be used for competitive grants that advance sustainable groundwater management through implementation of groundwater sustainability plans and projects that protect, enhance, or improve groundwater supplies. At least ten percent (10%) of all grants made pursuant to this paragraph shall be made to groundwater sustainability agencies whose groundwater basins underlie disadvantaged communities.

(b) The sum of ten million dollars ($10,000,000) is appropriated from the fund to the State board, for use by the Office of Sustainable Water Solutions to implement a multidisciplinary technical assistance program for small and disadvantaged communities, and support the involvement of disadvantaged communities and the public in groundwater sustainability agencies and in the development and implementation of groundwater sustainability plans.

86111. (a) Of the funds authorized by section 86110, six hundred forty million dollars ($640,000,000) shall be available for grants to groundwater sustainability agencies implementing groundwater sustainability plans pursuant to subdivision (k) of Section 10721 for the following purposes:

(1) Groundwater recharge and storage projects including but not limited to acquisition of land and groundwater pumping allocations from willing sellers, planning of facilities such as feasibility studies and environmental compliance, distribution systems, and monitoring facilities. No grant made pursuant to this section shall exceed twenty million dollars ($20,000,000).

(2) Projects that implement groundwater sustainability plans pursuant to Part 2.74 of Division 6 (commencing with Section 10720). Projects eligible for funding include but are not limited to feasibility studies, environmental compliance, engineering work used to develop groundwater use and sustainable yield for specific projects, well use measurement and innovative decision support tools.

(3) Projects that assess and address saltwater intrusion including future impacts related to climate change.

(4) Matching grants to groundwater sustainability agencies to develop groundwater sustainability plans pursuant to subdivision (k) of Section 10721. No grant shall exceed one million dollars ($1,000,000), and no groundwater sustainability agency shall receive more than one grant.

(b) Of the funds authorized by this section, the sum of five million dollars ($5,000,000) shall be available for research to guide investments made pursuant to this section. Research activities may include, but are not limited to, geophysical surveys, system-level modeling and analysis, development of novel methods and tools that can be applicable to local decision-making, cross-sector economic and policy analysis of novel recharge methods, and development of new approaches to significantly enhance groundwater recharge and fit-for-purpose water treatment and reuse.

(c) Of the funds authorized by this section, the department may allocate up to ten million dollars ($10,000,000) for the development of publicly accessible decision support tools to assist groundwater sustainability agencies in conducting drinking water quality analysis, including the development and assessment of sustainable yield, undesirable results, measurable objectives and other required targets. The decision support tools should also support vulnerability assessments to help determine communities that may be at risk of facing water supply or contamination challenges. The tools should be available for other efforts such as drought vulnerability assessments and shall be linked to the Human Right to Water indicator housed at the State board.

(d) Of the funds authorized by this section, the department may allocate up to five million dollars ($5,000,000) for one or more grants for capital outlay and related programmatic purposes to institutions of higher education for facilities that can be used to improve communication and coordination among these institutions, the department and the State board in order to assure that developments in groundwater science and management are efficiently deployed and employed across higher education institutions and state government agencies.

(e) A local public agency, Indian tribe or nonprofit organization receiving funding under this section may use up to twenty percent (20%) of those funds to establish a trust fund used exclusively to pay or help pay for the maintenance and monitoring of the agency's or organization's interest in land acquired pursuant to this section.

(1) If the local public agency, Indian tribe or nonprofit organization that acquired an interest in land with money from this section decides to transfer that interest to another public agency, Indian tribe or nonprofit organization, the ownership of the trust fund established to maintain that interest in land shall also be transferred.

(2) This subdivision does not apply to state agencies.

(3) If the local public agency, Indian tribe or nonprofit organization does not establish a trust fund pursuant to this subdivision the agency, tribe or organization shall certify to the state agency making the grant that it can maintain the land to be acquired from funds otherwise available to the agency, tribe or organization.

(4) If the interest in land is condemned or if the local public agency, Indian tribe or nonprofit organization determines that the interest in land is unable to fulfill the purposes for which money from this chapter was expended, the trust fund and any unexpended interest are appropriated to the agency that provided the money. The funds returned to the agency may be utilized only for projects pursuant to this chapter.

86112. (a) The department shall give priority for funding pursuant to this chapter to the following in equal priority:

(1) Groundwater basins designated by the department as critically overdrafted basins, groundwater basins which are in danger of becoming critically overdrafted, and groundwater basins where surface and groundwater are interconnected.

(2) Groundwater basins with documented water quality problems, land subsidence, impacts on surface streams or groundwater dependent ecosystems, or other undesirable results as defined by subdivision (x) of Section 10721.

(3) Groundwater basins that protect important state-owned resources, such as state parks and wildlife areas.

(4) Projects that support the use of floodwaters of acceptable water quality to recharge groundwater basins. This innovative multi-benefit concept brings together four important California water management objectives, including flood hazard reduction, sustainable groundwater management, ecosystem restoration, and water supply reliability.

(A) Projects may include adaptive modification of flood and conservation storage operations at reservoirs, modifications to spillway facilities at existing reservoirs, inundation of new or expanded flood bypasses or temporary flood storage land areas, application of floodwaters to agricultural lands during fallow or dormant seasons, or increased use of existing groundwater recharge facilities.

(B) Projects may include using floodwaters for recharge of groundwater projects, with both flood hazard reduction and groundwater sustainability benefits.

(C) Projects that provide benefits in flood hazard reduction and groundwater sustainability. Project feasibility can also be supported by ecosystem restoration and water supply benefits.

(b) Of the amount appropriated in section 86110, the department may use up to ten million dollars ($10,000,000) for the following purposes:

(1) Assess statewide potential for use of floodwaters for recharge and prioritize locations based upon proximity and conveyance connections in the State with flood hazard reduction and groundwater sustainability needs.

(2) Complete a pilot study of a priority location to demonstrate potential water resources management innovations to facilitate flood hazard reduction and groundwater recharge.

(3) Identify and demonstrate use of analytical tools and innovative water management techniques to support development of available floodwaters and recharge of groundwater basins.

(4) Develop economic monetization techniques of groundwater recharge benefits.

(5) Demonstrate application of the department's climate change methodology to both water supply and flood management applications.

(6) Provide technical assistance to groundwater sustainability and local flood management agencies, as well as coordination with state and federal flood agencies.

(c) The department shall consider the following criteria when awarding grants:

(1) The potential of the project to prevent or correct undesirable results due to groundwater use.

(2) The potential of the project to maximize groundwater storage, reliability, recharge or conjunctive use.

(3) The potential of the project to support sustainable groundwater management.

(4) The annualized cost-effectiveness of the project to achieve the goals of the Sustainable Groundwater Management Act, Chapter 2.74 of Division 6 (commencing with Section 10720).

(d) Eligible entities as defined in subdivision (a) of Section 86166, including groundwater sustainability agencies, shall be eligible for grants. Priority for funding shall be given to local agencies implementing the Sustainable Groundwater Management Act.

(e) For purposes of awarding funding under this chapter, a local cost share of not less than fifty percent (50%) of the total cost of the project shall be required. The cost-sharing requirement may be waived or reduced for that portion of a project that directly benefits a disadvantaged community or economically distressed area, or for projects the majority of whose benefits are to restore ecosystems dependent on groundwater.

(f) No grant may be made unless the Department of Fish and Wildlife certifies that harm done to fish or wildlife as a result of the project will be mitigated to ensure any potential impacts are less than significant.

(g) Eligible projects may include such infrastructure improvements such as improved canal and infiltration capacity.

86113. (a) For purposes of this section, "District" means the Borrego Water District.

(b) Of the amount appropriated in Section 86110, thirty-five million dollars ($35,000,000) shall be awarded as a grant to the District for the following programs:

(1) Acquisition of land and acquisition of the right to pump groundwater from willing sellers to reduce groundwater pumping in order to bring groundwater pumping within the boundaries of the Borrego Springs Subbasin of the Borrego Valley Groundwater Basin to a level that is sustainable on a long-term basis pursuant to the Sustainable Groundwater Management Act, Chapter 2.74 of Division 6 (commencing with Section 10720). Lands acquired may be transferred to the Department of Parks and Recreation, a nonprofit organization or another public agency for future management.

(2) Water end-use efficiency, including urban and agricultural water conservation, and water conservation on recreational facilities such as golf courses.

(3) Restoration of lands acquired pursuant to this section.

(4) Stormwater capture for groundwater basin recharge and re-use.

(5) Other District projects implementing the Sustainable Groundwater Management Act.

(c) (1) No cost sharing by the District is required to implement this section. This is justified because the community of Borrego Springs is a severely disadvantaged community, and because excessive groundwater pumping can impact important resources in Anza-Borrego Desert State Park whose 500,000 annual visitors contribute an estimated forty million dollars ($40,000,000) annually to the region, as well as support 600 jobs.

(2) The District may require cost sharing by beneficiaries when making grants pursuant paragraphs (2) and (4) of subdivision (b).

(d) As a condition of this grant, the District must agree to:

(1) Implement measures which assure that lands not presently being irrigated will not come into irrigation, and that presently irrigated lands will not become more intensively irrigated; and

(2) Require new development to pay all costs of water purchases the District incurs, and all costs of water projects the District undertakes in order to accommodate that development.

(e) (1) The District or a nonprofit organization that receives funding pursuant to this chapter to acquire an interest in land may use up to twenty percent (20%) of those funds to establish a trust fund that is exclusively used to help pay for the maintenance, monitoring and restoration of that interest in land.

(2) The District or a nonprofit organization that acquires an interest in land with money from this chapter and transfers the interest in land to another public agency or nonprofit organization shall also transfer the ownership of the trust fund that was established to maintain that interest in land.

(3) This subdivision does not apply to state agencies.

(4) If the District or nonprofit organization does not establish a trust fund pursuant to this subdivision, the agency or organization shall certify to the department that it can maintain the land to be acquired from funds otherwise available to the agency or organization.

(5) If the interest in land is condemned or if the District or nonprofit organization determines that the interest in land is unable to fulfill the purposes for which money from this chapter was expended, the trust fund and any unexpended interest are appropriated to the District. The funds returned to the District may be utilized only for projects pursuant to this chapter.

(f) Any funds not needed by the District to implement the program described in this section may be granted by the District to a nonprofit organization or the California Department of Parks and Recreation to acquire lands adjacent to or in the immediate proximity of Anza-Borrego Desert State Park to prevent development or irrigation of that land which might impact groundwater resources in the Park. These lands may be inside or outside the boundaries of the District, but must be within the boundaries of the Borrego Springs Subbasin of the Borrego Valley Groundwater Basin, which is the source of all potable water for the Borrego Springs community and visitors to the Park. The lands may be used for wildlife habitat.

(g) The District may award grants to nonprofit organizations in order to carry out all or part of the programs authorized by this section.

CHAPTER 8. Water for Wildlife, Pacific Flyway Restoration, and Dynamic Habitat Management.

86120. The sum of three hundred million dollars ($300,000,000) is appropriated from the Fund to the Wildlife Conservation Board (hereinafter in this section “the Board”) to acquire water from willing sellers and to acquire storage and delivery rights to improve conditions for fish and wildlife in streams, rivers, wildlife refuges, wetland habitat areas and estuaries. High priority shall be given to meeting the water delivery goals of the Central Valley Project Improvement Act (Title 34 of Public Law 102-575). The Board may arrange for acquisition, long-term lease agreements, or transfer of water rights if it determines such actions are beneficial to wildlife conservation. The Board may sell, transfer, or store water or storage rights purchased pursuant to this section, if the Board finds that the sale, transfer or storage will not cause harm to fish and wildlife. In years when the Board does not require the water for fish and wildlife purposes, the Board may temporarily sell or lease the water or delivery rights. Notwithstanding Section 13340 of the Government Code, the proceeds of any water sales pursuant to this section by the Board are appropriated directly to the Board without regard to fiscal year. The Board shall use the proceeds of the sale, lease or transfer of water or delivery rights to achieve conservation purposes authorized by this

section. The acquisition of water using funds expended pursuant to this chapter shall only be used for projects that will provide fisheries, wildlife or ecosystem benefits.

86121. The sum of fifty million dollars ($50,000,000) is appropriated from the Fund to the California Department of Fish and Wildlife for the purpose of improving water supply and water quality conditions for fish and wildlife on private lands. The California Department of Fish and Wildlife may provide incentives to landowners for conservation actions on private lands or use of voluntary habitat credit exchange mechanisms. Such incentives shall be designed to be appropriately flexible and responsive to the highly variable amounts of water required by fish and wildlife.

The Department of Fish and Wildlife shall use a portion of the funds provided by this section to develop a programmatic authorization to expedite approval of habitat restoration and water quality improvement projects not covered under Chapter 6.5 of Division 2 of the Fish and Game Code, and for the implementation of that Chapter.

86122. The sum of three hundred million dollars ($300,000,000) is appropriated from the Fund to the Wildlife Conservation Board for coastal and Central Valley salmon and steelhead fisheries restoration projects. The Wildlife Conservation Board shall give priority to projects that contribute to the recovery of salmon and steelhead species listed pursuant to the state or federal endangered species acts, to enhance commercial and recreational salmon fisheries and to achieve the goals of Chapter 8 of Part 1 of Division 6 (commencing with Section 6900) of the Fish and Game Code.

(a) Of the amount appropriated by this section, up to one hundred million dollars ($100,000,000) shall be spent for matching grants to local agencies for capital outlay projects to implement programs to improve fish passage opportunities and to restore anadromous salmonid habitats, particularly juvenile rearing habitat for spring run salmon, on rivers in the Sacramento Valley that have dams blocking the main stem of the river.

(b) Of the amount appropriated by this section, at least one hundred million dollars ($100,000,000) shall be spent to install fish screens on the Sacramento and San Joaquin Rivers and their tributaries and in the Delta to screen anadromous fish from water intakes. High priority shall go to projects identified as high priority in the Sacramento Valley Salmon Resiliency Strategy (as published by the California Natural Resources Agency in June 2017, and as it may be amended).

86123. (a) The sum of two hundred eighty million dollars ($280,000,000) is appropriated from the Fund to the Wildlife Conservation Board for projects to protect migratory birds through habitat acquisition, easements, restoration, or other projects, and to provide water for wildlife refuges and wildlife habitat areas to fulfill the purposes identified in the Central Valley Joint Venture Implementation Plan, as it may be amended, including:

(1) Projects to implement this section which may include conservation actions on private lands.

(2) Protection and restoration of riparian and wetland habitat in the Sacramento River Basin.

(3) Protection and restoration of riparian and wetland habitat in the San Joaquin and Tulare Basins.

(b) Of the amount appropriated by this section, forty million dollars ($40,000,000) shall be deposited in the California Waterfowl Habitat Preservation Account established pursuant to Section 3467 of the Fish

and Game Code, for the purposes of implementing the California Waterfowl Habitat Program pursuant to Article 7 (commencing with Section 3460) of Chapter 2 of Part 1 of Division 4 of the Fish and Game Code, the California Landowner Incentive Program of the Department of Fish and Wildlife, the Permanent Wetland Easement Program of the Wildlife Conservation Board, and the establishment or enhancement of waterfowl nesting and other wildlife habitat cover on fallowed lands including projects authorized pursuant to Section 1018.

(c) Of the amount appropriated by this section, ten million dollars ($10,000,000) shall be deposited in the Shared Habitat Alliance for Recreational Enhancement (SHARE) Account established pursuant to Section 1572 of the Fish and Game Code and administered by the Department of Fish and Wildlife for the purposes of providing hunting and other wildlife-dependent recreational opportunities to the public through voluntary agreements with private landowners.

(d) Of the amount appropriated by this section, at least one hundred and ten million dollars ($110,000,000) shall be expended for acquisition and delivery of water to wildlife refuges, and associated infrastructure projects, to achieve full compliance with the terms of subsection (d) of Section 3406 of the Central Valley Project Improvement Act (Title 34 of Public Law 102-575).

CHAPTER 8.6. Sacramento Region Water Reliability and Habitat Protection.

86124. (a) Ten million dollars ($10,000,000) is appropriated from the Fund to the department for grants to the Regional Water Authority and to the City of Sacramento on behalf of the Sacramento Area Water Forum for projects that are consistent with the coequal objectives of the Water Forum Agreement. Eligible projects include facilities, studies and other actions to improve flow and temperature conditions and habitat in the lower American River, increase water use efficiency and conservation, or improve the integration of surface water and groundwater supplies to provide for dry year water supply reliability.

(b) The Regional Water Authority and the Water Forum shall jointly develop and approve studies, projects, or programs to be funded by the grants. Highest priority shall be given to improving water temperature conditions in the lower American River, and to projects or programs that contribute to both of the Water Forum's coequal objectives of improving water supply and protecting the environment. The Regional Water Authority will be the grantee for water supply and water efficiency projects. The City of Sacramento, on behalf of the Water Forum, will be the grantee for environmental protection, water temperature studies, and habitat restoration projects.

(c) The amount allocated in aggregate to the package of projects shall not exceed fifty percent (50%) of the projects' total cost.

(d) No funds appropriated pursuant to this section may be spent to build new surface storage or raise existing reservoirs.

CHAPTER 9. Bay Area Regional Water Reliability.

86125. Two hundred and fifty million dollars ($250,000,000) is appropriated from the Fund to the department for a grant to the group of eight water agencies collectively known as the Bay Area Regional Reliability Partnership (BARR) for new facilities that extend the benefits of surface water storage for region-wide benefits in any of the following areas: drought supply reliability, drinking water quality, and emergency storage, as generally described in the Final Mitigation Project List contained in the San Francisco Bay Area Regional Reliability Drought Contingency Plan. The Contra Costa Water District may

receive the grant on behalf of the Partnership unless the BARR Partnership has a governance structure in place at the time of the grant award that makes its eligible to receive the funds directly. The participating water agencies in the San Francisco Bay Area Regional Reliability Drought Contingency Plan will determine and designate funds to one or any of the listed projects, however in no case will the amount determined for any single project be more than 50% of the project's total cost. No funds appropriated pursuant to this section may be spent to build new surface storage, or raise existing reservoirs.

CHAPTER 10. Improved Water Conveyance and Water Conservation.

86126. Even though the drought has eased, the effects of the drought are still being felt in many areas throughout the state, including the San Joaquin Valley. Further exacerbating the impact of drought conditions on water users were legal requirements restricting pumping from the Sacramento-San Joaquin Delta. One of the consequences of both the drought and pumping restrictions was a significant increase in groundwater pumping as a means to replace reduced surface supplies. Such increase in groundwater pumping lowers groundwater tables, which in turn causes wells to go dry and land to subside, which has particularly been the case on the east side of the San Joaquin Valley. The Friant-Kern Canal has lost 60% of its capacity to convey water for both consumptive uses and groundwater recharge. Unless conveyance capacity is restored and increased, the subsidence will continue to get worse and those local communities, including disadvantaged communities, who largely rely on groundwater to serve their citizens, will continue to suffer adverse effects. Significant public benefits will result from this state investment, including avoiding increased unemployment, stabilization of groundwater, and securing a more stable food supply for California.

86127. The sum of seven hundred fifty million dollars ($750,000,000) is appropriated from the Fund to the department for a grant to the Friant Water Authority for water conveyance capital improvements, including restored and increased conveyance capacity to and in the Madera and Friant-Kern canals, resulting in greater groundwater recharge, improved conveyance and utilization of floodwaters, and for water conservation. Improvements with funds provided by this paragraph shall be completed consistent with applicable state and federal laws and contracts.

86128. The sum of one hundred million dollars ($100,000,000) is appropriated from the Fund to the Natural Resources Agency for actions that support projects defined in paragraph 11 in the settlement agreement to restore the San Joaquin River referenced in Section 2080.2 of the Fish and Game Code. Before expenditure may occur, formal concurrence on specific projects to be undertaken is required by the settling parties to the agreement.

86129. The diversion of water from Barker Slough to the North Bay Aqueduct adversely impacts listed fish species, and also adversely impacts water quality served to a large urban area. There would be multiple public benefits to relocating the diversion to the North Bay Aqueduct to the Sacramento River.

86130. The sum of five million dollars ($5,000,000) is appropriated from the fund to the department to plan for a diversion of water from the Sacramento River to the North Bay Aqueduct to reduce the adverse impact on listed fish species, and provide a higher quality of drinking water to those served by the Aqueduct.

CHAPTER 11. Oroville Dam Flood Safety.

86131. Oroville Dam provides flood control for the Sacramento Valley. The inclusion of flood control at Oroville Dam was not an obligation of the public water agencies that receive water from Oroville Dam. The flood control function of Oroville Dam was paid for by the federal government.

86132. The sum of two hundred million dollars ($200,000,000) is appropriated from the Fund to the department for repair and reconstruction of the spillways at the Oroville Dam.

86133. The sum of twenty-one million dollars ($21,000,000) is appropriated from the Fund to the department. Fifteen million dollars ($15,000,000) shall be spent for Feather River sediment management and removal between Live Oak and Verona in coordination with the Sutter Butte Flood Control Agency. Six million dollars ($6,000,000) of these funds shall be awarded as a grant to the Sutter Butte Flood Control Agency for floodwater attenuation projects at the Oroville Wildlife Area that provide downstream flood control relief and ecosystem restoration.

86134. The sum of one million dollars ($1,000,000) is appropriated from the Fund to the department for a grant to Butte County for capital outlay projects and equipment for emergency preparedness coordination and communications consistent with the California Office of Emergency Services Standardized Emergency Management System (SEMS).

CHAPTER 12. General Provisions.

86151. (a) In projects involving voluntary habitat restoration, water quality improvement and multi-benefit floodplain restoration each agency administering provisions of this division shall encourage interagency coordination and develop and utilize efficient project approval and permitting mechanisms, including but not limited to the provisions of Chapter 6.5 of Division 2 of the Fish and Game Code (regardless of whether that chapter is still in effect) and programmatic permits for voluntary habitat restoration, so as to avoid project delays and maximize the amount of money spent on project implementation.

(b) Projects designed to primarily protect migratory birds through acquisition, easements, restoration or other projects shall be consistent with the plans and recommendations established by the federal Migratory Bird Joint Venture partnerships that encompass parts of California.

(c) Any agency providing funds pursuant to this division to disadvantaged communities or economically distressed areas may provide funding to assist these communities in applying for that funding, including technical and grant writing assistance. These funds may be provided to nonprofit organizations and local public agencies assisting these communities.

(d) Any agency receiving funds pursuant to this division may contract for the services of resource conservation districts pursuant to Section 9003 of the Public Resources Code.

(e) Agencies may count in-kind contributions up to twenty-five percent (25%) of the total project cost as part of cost sharing. Agencies may count the value of the donated land in a bargain sale as part of cost sharing.

(f) Agencies considering proposals for acquisition of lands shall also consider the ability of the proposed final owner of the land to maintain it in a condition that will protect the values for which it is to be acquired, and to prevent any problems that might occur on neighboring lands if the land is not properly managed.

(g) Trust funds established pursuant to this act shall be managed pursuant to the requirements of the Uniform Prudent Management of Institutional Funds Act, Part 7 (commencing with Section 18501) of Division 9 of the Probate Code.

(h) Projects designed to primarily protect riparian habitat through acquisition, easements, restoration or other projects shall consider the plans and recommendations established by the California Riparian Habitat Conservation Program pursuant to Chapter 4.1 of Division 2 of the Fish and Game Code (commencing with Section 1385).

(i) The administering agency shall provide advance payment of 50% of grant awards for those projects that satisfy both of the following criteria:

(1) The project proponent is a disadvantaged community or eligible entity as defined in subdivision (a) of Section 86166, or the project benefits a disadvantaged community.

(2) The grant award for the project is less than one million dollars ($1,000,000).

(j) Eligible grant costs shall include indirect costs as defined in federal Office of Management and Budget guidelines, as well as reasonable overhead costs.

(k) Agencies receiving funds designated for specific programs or grantees shall expedite the expenditure or transfer of those funds with the least amount of process necessary to comply with existing state laws and regulations, and the requirements of this division. It is the intent of this division that the expenditure or transfer of funds shall be efficient, cost-effective, and expeditious, and generally should occur no later than 90 days from demonstrated eligibility by the recipient for the funds requested.

86152. Agencies shall, to the extent practicable, quantify the amount of water generated for human and environmental use resulting from proposed expenditures they make pursuant to this division. Agencies shall, to the extent practicable, quantify the improvement in the quality of water generated for human and environmental use resulting from proposed expenditures they make pursuant to this division.

86153. To the extent consistent with the other provisions of this division, statewide agencies making grants pursuant to this division shall seek to allocate funds equitably to eligible projects throughout the state, including northern and southern California, coastal and inland regions, and Sierra and Cascade foothill and mountain regions.

86154. Applicants for grants pursuant to this division shall indicate whether the grant proposal is consistent with the local Integrated Regional Water Management Plan, if one exists. However, consistency with the Integrated Regional Water Management Plan shall not be required as a condition of any grant, and grant proposals shall not be given lower priority if they are not consistent with Integrated Regional Water Management Plans.

86155. (a) Notwithstanding any other provision of this division, a local public agency with a population of less than 100,000 and a median household income of less than one hundred percent (100%) of the state average household income shall be required to provide matching funds of no more than thirty-five percent (35%) for a grant for a project entirely within their jurisdiction. State agencies making grants to these local public agencies may provide funding in advance of construction of portions of the project, if the state agency determines that requiring the local public agency to wait for payment until the project is completed would make the project infeasible.

(b) Nothing in this section prohibits a state agency from making a grant to a disadvantaged community or economically distressed area that does not require cost sharing.

86156. Any repayment of loans made pursuant to this division, including interest payments, and interest earnings shall be deposited in the Fund and shall be available solely for the purposes of the chapter or section that authorized the loan.

86157. (a) Each state agency that receives an appropriation of funding made available by this division shall be responsible for establishing metrics of success and reporting the status of projects and all uses of the funding on the state's bond accountability Internet Web site.

(b) Each state agency that receives an appropriation of funding made available by this division shall do the following:

(1) Evaluate the outcomes of projects funded by this division.

(2) Include in the agency's reporting pursuant to Section 86003 the evaluation described in subdivision (a) of this section.

(3) Hold a grantee of funds accountable for completing projects funded by this division on time and within scope.

86158. (a) For projects carried out by state agencies pursuant to this division, up to ten percent (10%) of funds allocated for each program funded by this division may be expended for planning, monitoring and reporting necessary for the successful design, selection, and implementation of the projects and verification of benefits. An eligible entity receiving a grant for a project pursuant to this division may also receive sufficient funds for planning, monitoring and reporting necessary for the successful design, selection, and implementation of the projects. This section shall not otherwise restrict funds ordinarily used by an agency for "preliminary plans," "working drawings," and "construction" for a capital outlay project or grant project.

(b) Permit and plan check fees and reasonable administrative and indirect project fees and costs related to managing construction shall be deemed part of construction costs. Project costs allocated for project planning and design, and direct and indirect administrative costs shall be identified as separate line items in the project budget.

86159. Notwithstanding Section 16727 of the Government Code, funding provided pursuant to Chapters 6 and 8 may be used for grants and loans to nonprofit organizations to repay financing described in Section 22064 of the Financial Code related to projects that are consistent with the purposes of those chapters.

86160. Not more than a total of five percent (5%) of the funds allocated to any state agency under this division may be used to pay for its costs of administering programs and projects specified in this division.

86161. (a) Water quality monitoring data shall be collected and reported to the State board in a manner that is compatible and consistent with surface water monitoring data systems or groundwater monitoring data systems administered by the State board, consistent with Part 4.9 of Division 6. Watershed monitoring data shall be collected and reported to the Department of Conservation in a manner that is compatible and consistent with the statewide watershed program administered by the Department of Conservation.

(b) State agencies making grants or loans pursuant to this division may include specific expenditures for compliance with local, state and federal permitting and other requirements.

(c) Up to one percent (1%) of funds allocated for each program funded by this division may be expended for research into methods to improve water supply, water related habitat, and water quality relevant to that program, in addition to any other amounts provided for in this division.

86162. (a) Prior to disbursing grants or loans pursuant to this division, each state agency that receives an appropriation from the funding made available by this division to administer a grant or loan program under this division shall develop and adopt project solicitation and evaluation guidelines. The guidelines shall include monitoring and reporting requirements and may include a limitation on the dollar amount of each grantor loan to be awarded. The guidelines shall not include a prohibition on the recovery of reasonable overhead or indirect costs by local public agencies, Indian tribes or nonprofit organizations. If the state agency has previously developed and adopted project solicitation and evaluation guidelines that comply with the requirements of this division, it may use those guidelines. Overhead or indirect costs incurred by a local public agency, Indian tribe or nonprofit organization are eligible for reimbursement and shall not weigh negatively in the evaluation of funding proposals pursuant to this division.

(b) Prior to disbursing grants or loans, the state agency shall conduct three regional public meetings to consider public comments prior to finalizing the guidelines. The state agency shall publish the draft solicitation and evaluation guidelines on its website at least 30 days before the public meetings. One meeting shall be conducted at a location in northern California, one meeting shall be conducted at a location in the Central Valley of California, and one meeting shall be conducted at a location in southern California. Agencies without jurisdiction in one or more of these three regions may omit the meetings in the region or regions within which they do not have jurisdiction. Upon adoption, the state agency shall transmit copies of the guidelines to the fiscal committees and the appropriate policy committees of the Legislature.

(c) At least 45 days prior to soliciting projects pursuant to this division, a state agency administering funds pursuant to this division shall post an electronic form of the guidelines for grant applicants on its website. Project solicitation and evaluation guidelines shall only include criteria based on the applicable requirements of this division.

(d) Nothing in this division restricts agencies from enforcing and complying with existing laws.

86163. Each project funded from this division shall comply with the following requirements:

(a) The investment of public funds pursuant to this division will result in public benefits that address the most critical statewide needs and priorities for public funding, as determined by the agency distributing the funds.

(b) In the appropriation and expenditure of funding authorized by this division, priority will be given to projects that leverage private, federal, or local funding or produce the greatest public benefit. All state agencies receiving funds pursuant to this division shall seek to leverage the funds to the greatest extent possible, but agencies shall take into account the limited ability to cost share by small public agencies, and by agencies seeking to benefit disadvantaged communities and economically distressed areas.

(c) A funded project shall advance the purposes of the chapter from which the project received funding.

(d) In making decisions regarding water resources pursuant to this division, state and local agencies will use the best available science to inform those decisions.

(e) To the extent practicable, a project supported by funds made available by this division will include signage informing the public that the project received funds from the Water Supply and Water Quality Act of 2018.

(f) To the extent feasible, projects funded with proceeds from this division shall promote state planning priorities consistent with the provisions of Section 65041.1 of the Government Code and sustainable communities strategies consistent with the provisions of subparagraph (B) of paragraph (2) of subdivision (b) of Section 65080 of the Government Code.

(g) To the extent feasible, watershed objectives for private lands included in this division should be achieved through use of conservation easements and voluntary landowner participation, including, but not limited to, the use of perpetual conservation easements pursuant to Division 10.2 (commencing with Section 10200) and Division 10.4 (commencing with Section 10330) of the Public Resources Code, voluntary habitat credit exchange mechanisms, and conservation actions on private lands.

86164. Funds provided by this division shall not be expended to pay the costs of the design, construction, operation, mitigation, or maintenance of Delta water conveyance facilities. Those costs shall be the responsibility of the water agencies that benefit from the design, construction, operation, mitigation, or maintenance of those facilities.

86165. (a) This division does not diminish, impair, or otherwise affect in any manner whatsoever any area of origin, watershed of origin, county of origin, or any other water rights protections, including, but not limited to, rights to water appropriated prior to December 19, 1914, provided under the law. This division does not limit or affect the application of Article 1.7 (commencing with Section 1215) of Chapter 1 of Part 2 of Division 2, Sections 10505, 10505.5, 11128, 11460, 11461, 11462, and 11463, and Sections 12200 to 12220, inclusive.

(b) For the purposes of this division, an area that utilizes water that has been diverted and conveyed from the Sacramento River hydrologic region, for use outside the Sacramento River hydrologic region or the Delta, shall not be deemed to be immediately adjacent thereto or capable of being conveniently supplied with water therefrom by virtue or on account of the diversion and conveyance of that water through facilities that may be constructed for that purpose after January 1, 2018.

(c) Nothing in this division supersedes, limits, or otherwise modifies the applicability of Chapter 10 (commencing with Section 1700) of Part 2 of Division 2, including petitions related to any new conveyance constructed or operated in accordance with Chapter 2 (commencing with Section 85320) of Part 4 of Division 35.

(d) Unless otherwise expressly provided, nothing in this division supersedes, reduces, or otherwise affects existing legal protections, both procedural and substantive, relating to the State board's regulation of diversion and use of water, including, but not limited to, water right priorities, the protection provided to municipal interests by Sections 106 and 106.5, and changes in water rights. Nothing in this division expands or otherwise alters the State board's existing authority to regulate the diversion and use of water or the courts' existing concurrent jurisdiction over California water rights.

(e) Nothing in this division shall be construed to affect the California Wild and Scenic Rivers Act (Chapter

1.4 (commencing with Section 5093.50) of Division 5 of the Public Resources Code) or the federal Wild and Scenic Rivers Act (16 U.S.C. Section 1271 et seq.) and funds authorized pursuant to this division shall not be available for any project that could have an adverse effect on the values upon which a wild and scenic river or any other river is afforded protections pursuant to the California Wild and Scenic Rivers Act or the federal Wild and Scenic Rivers Act.

(f) Nothing in this division supersedes, limits, or otherwise modifies the Sacramento-San Joaquin Delta Reform Act of 2009 (Division 35 (commencing with Section 85000)) or any other applicable law, including, but not limited to, Division 22.3 (commencing with Section 32300) of the Public Resources Code.

(g) Notwithstanding any other provision of law, any agency or nonprofit organization acquiring land pursuant to this division may make use of the Natural Heritage Preservation Tax Credit Act of 2000 (Division 28 (commencing with Section 37000) of the Public Resources Code). Funds appropriate pursuant to this division that are not designated for competitive grant programs may also be used for the purposes of reimbursing the General Fund pursuant to the Natural Heritage Preservation Tax Credit Act of 2000.

(h) Funds provided pursuant to this division, and any appropriation or transfer of those funds, shall not be deemed to be a transfer of funds for the purposes of Chapter 9 (commencing with Section 2780) of Division 3 of the Fish and Game Code.

86166. (a) Applicants eligible to receive grants, loans and contracts pursuant to this division are public agencies, state universities (including university-managed national laboratories), resource conservation districts, nonprofit organizations, public utilities, mutual water companies, public water systems as defined in subdivision (h) of Section 116275 of the Health and Safety Code, urban water suppliers as defined in Section 10617 of the Water Code, federally recognized Indian tribes, federal agencies owning or managing land in California, and state Indian tribes listed on the Native American Heritage Commission's California Tribal Consultation List. State agencies granting funds pursuant to this division shall give priority to eligible applicants with experience in planning, designing, and developing the types of projects receiving funding from the agencies, or which have access to consulting help in these areas.

(b)(1) To be eligible for funding under this division, a project proposed by a public utility that is regulated by the Public Utilities Commission, or a mutual water company, shall have a clear and definite public purpose and the project shall benefit the customers of the water system and not the investors.

(2) To be eligible for funding under this division, an urban water supplier shall have adopted and submitted an urban water management plan in accordance with the Urban Water Management Planning Act, Part 2.6 (commencing with Section 10610) of Division 6.

(3) To be eligible for funding under this division, an agricultural water supplier shall have adopted and submitted an agricultural water management plan in accordance with the Agricultural Water Management Planning Act, Part 2.8 (commencing with Section 10800) of Division 6.

(4) In accordance with Section 10608.56, an agricultural water supplier or an urban water supplier is ineligible for grant funding under this division unless it complies with the requirements of Part 2.55 (commencing with Section 10608) of Division 6.

(5) Notwithstanding any other provision of this division, agencies receiving funds pursuant to this division may reduce or eliminate cost sharing requirements when making grants of one million dollars ($1,000,000) or less to nonprofit organizations with budgets less than one million dollars ($1,000,000) if

the agency determines that such grants would be the most effective way to achieve the purposes of this division.

86167. Where feasible, projects funded pursuant to this division may use the services of the California Conservation Corps or certified community conservation corps, as defined in Section 14507.5 of the Public Resources Code. Public agencies receiving funding under this division shall give additional priority to projects that involve the services of the California Conservation Corps or a certified community conservation corps, or other nonprofit entities that provide job training and education opportunities for veterans, foster care recipients, farmworkers or local youth in conservation or restoration projects.

86168. Each state agency that receives an appropriation of funding made available by this division shall be responsible for establishing and reporting on the state's bond accountability website each of the following: metrics of success, metrics for benefitting disadvantaged communities and economically distressed areas, progress in meeting those metrics, status of projects funded under this division, and all uses of the funding the state agency receives under this division. The Secretary of the Natural Resources Agency shall annually report to the Legislature expenditures made pursuant to this division, and the benefits derived from those expenditures.

86169. The proceeds of bonds issued and sold pursuant to this division (excluding the proceeds of any refunding bonds issued in accordance with Section 86192) shall be deposited in the Water Supply Reliability and Drought Protection Fund of 2018, which is hereby created in the State Treasury.

86169.1 Notwithstanding Section 13340 of the Government Code, moneys in the Water Supply Reliability and Drought Protection Fund of 2018 are continuously appropriated without regard to fiscal year for the purposes of this division in the manner set forth in this division. Funds authorized by, and made available pursuant to this division shall be available and expended only as provided in this division, and shall not be subject to appropriation or transfer by the Legislature or the Governor for any other purpose.

86170. Chapter 3.5 (commencing with Section 11340) of Part 1 of Division 3 of Title 2 of the Government Code does not apply to the development or implementation of programs or projects authorized or funded under this division.

86171. (a) Funds provided by this division shall not be used to support or pay for the costs of environmental mitigation, except for the costs of environmental mitigation for projects funded pursuant to this division.

(b) Funds provided by this division shall be used for environmental enhancements or other public benefits.

(c) Notwithstanding paragraphs (a) and (b) of this section, the costs of mitigation of the environmental impacts directly related and limited to expenditures under this division may be paid for by funds provided by this division.

(d) Funds available pursuant to this division shall not be expended to pay the costs of the design, construction, operation, mitigation, or maintenance of Delta conveyance facilities.

86172. Every entity implementing this division shall give highest priority to funding projects that combine relatively high cost-effectiveness, durability, and enhanced environmental quality.

86174. Acquisitions pursuant to Chapter 6 of this division shall be from willing sellers only.

86177. The requirement that a project be cost-effective does not require a full benefit/cost analysis.

86178. Agencies implementing this division shall give special consideration to projects that employ new or innovative technology or practices, including decision support tools that support the integration of multiple strategies and jurisdictions, including, but not limited to, water supply, wildfire reduction, habitat improvement, invasive weed control, flood control, land use, and sanitation.

86179. Any contract (including a contract to provide a grant) between a public agency, Indian tribe or nonprofit organization and the Department of Fish and Wildlife or the Wildlife Conservation Board for work funded pursuant to this division, or pursuant to Division 26.7 shall be considered a contract subject to the requirements of Section 1501.5 of the Fish and Game Code, and therefor shall not be considered a public work or a public improvement, and is not subject to Chapter 1 (commencing with Section 1720) of Part 7 of Division 2 of the Labor Code.

86179.1. Priority shall be given to the expenditure of funds on activities that affect the Delta and the species that rely on it that are generally consistent with the report "A Delta Renewed: A Guide to Science-Based Ecological Restoration in the Sacramento-San Joaquin Delta" prepared in 2016 by the San Francisco Estuary Institute-Aquatic Science Center.

86179.2. In the awarding of grants to be made by any agency pursuant to this act or Division 26.7 after the effective date of this act, overhead or indirect costs incurred by a local public agency, Indian tribe or nonprofit organization are eligible for reimbursement and shall not weigh negatively in the evaluation of funding proposals. Eligible grant costs shall include indirect costs as defined in federal Office of Management and Budget guidelines, as well as reasonable overhead costs. For nonprofit organizations, grants shall provide for reimbursement of indirect costs by applying the organization's federally negotiated indirect cost rate, if one exists. If a negotiated rate does not exist, the organization may elect to use the default indirect cost rate of 10 percent (10%) of its modified total direct costs as defined by the Office of Management and Budget.

86179.3. No grants made pursuant to this division shall result in an unmitigated increase in a community's exposure to flood hazards or in a net reduction in flood conveyance capacity of any publicly owned flood protection facility.

86179.4. In awarding grants for land acquisition, the Wildlife Conservation Board shall give preference to organizations that voluntarily pay property taxes.

CHAPTER 13. Fiscal Provisions.

86180. (a) Bonds in the total amount of eight billion eight hundred seventy-seven million dollars ($8,877,000,000), or so much thereof as is necessary, not including the amount of any refunding bonds issued in accordance with Section 86192 may be issued and sold to provide a fund to be used for carrying out the purposes expressed in this division and to reimburse the General Obligation Bond Expense Revolving Fund pursuant to Section 16724.5 of the Government Code. The bonds, when sold, shall be and constitute a valid and binding obligation of the State of California, and the full faith and credit of the State of California is hereby pledged for the punctual payment of both principal of, and interest on, the bonds as the principal and interest become due and payable.

(b) The Treasurer shall from time to time sell the bonds authorized by the committee pursuant to Section 86182. Bonds shall be sold upon the terms and conditions specified in one or more resolutions to be adopted by the committee pursuant to Section 16731 of the Government Code.

86181. The bonds authorized by this division shall be prepared, executed, issued, sold, paid, and redeemed as provided in the State General Obligation Bond Law, and all of the provisions of that law, as that law may be amended, apply to the bonds and to this division and are hereby incorporated in this division as though set forth in full in this division, except subdivisions (a) and (b) of Section 16727 of the Government Code.

86182. (a) Solely for the purpose of authorizing the issuance and sale pursuant to the State General Obligation Bond Law of the bonds authorized by this division, the Water Supply Reliability and Drought Protection Finance Committee is hereby created. For purposes of this division, the Water Supply Reliability and Drought Protection Finance Committee is the "committee" as that term is used in the State General Obligation Bond Law.

(b) The finance committee consists of the Director of Finance, the Treasurer, and the Controller. Notwithstanding any other provision of law, any member may designate a representative to act as that member in his or her place for all purposes, as though the member were personally present.

(c) The Treasurer shall serve as chairperson of the finance committee.

(d) A majority of the finance committee may act for the finance committee.

86183. The finance committee shall determine whether or not it is necessary or desirable to issue bonds authorized by this division in order to carry out the actions specified in this division and, if so, the amount of bonds to be issued and sold. Successive issues of bonds may be authorized and sold to carry out those actions progressively, and it is not necessary that all of the bonds authorized to be issued be sold at any one time.

86184. For purposes of the State General Obligation Bond Law, "board," as defined in Section 16722 of the Government Code, means the Secretary of the Natural Resources Agency.

86185. There shall be collected each year and in the same manner and at the same time as other state revenue is collected, in addition to the ordinary revenues of the state, a sum in an amount required to pay the principal of, and interest on, the bonds each year. It is the duty of all officers charged by law with any duty in regard to the collection of the revenue to do and perform each and every act that is necessary to collect that additional sum.

86186. Notwithstanding Section 13340 of the Government Code, there is hereby appropriated from the General Fund in the State Treasury, for the purposes of this division, an amount that will equal the total of the following:

(a) The sum annually necessary to pay the principal of, and interest on, bonds issued and sold pursuant to this division, as the principal and interest become due and payable.

(b) The sum that is necessary to carry out the provisions of Section 86189, appropriated without regard to fiscal years.

86187. The board may request the Pooled Money Investment Board to make a loan from the Pooled Money Investment Account in accordance with Section 16312 of the Government Code for the purpose of carrying out this division less any amount withdrawn pursuant to Section 86189. The amount of the request shall not exceed the amount of the unsold bonds that the committee has, by resolution, authorized to be sold (excluding any refunding bond authorized pursuant to Section 86192) for the purpose of carrying out this division. The board shall execute those documents required by the Pooled Money Investment Board to obtain and repay the loan. Any amounts loaned shall be deposited in the Fund to be allocated in accordance with this division.

86188. Notwithstanding any other provision of this division, or of the State General Obligation Bond Law, if the Treasurer sells bonds that include a bond counsel opinion to the effect that the interest on the bonds is excluded from gross income for federal tax purposes under designated conditions or is otherwise entitled to any federal tax advantage, the Treasurer may maintain separate accounts for the bond proceeds invested and for the investment earnings on those proceeds, and may use or direct the use of those proceeds or earnings to pay any rebate, penalty, or other payment required under federal law or take any other action with respect to the investment and use of those bond proceeds, as may be required or desirable under federal law in order to maintain the tax-exempt status of those bonds and to obtain any other advantage under federal law on behalf of the funds of this state.

86189. For the purposes of carrying out this division, the Director of Finance may authorize the withdrawal from the General Fund of an amount or amounts not to exceed the amount of the unsold bonds that have been authorized by the committee to be sold (excluding any refunding bond authorized pursuant to Section 86192) for the purpose of carrying out this division less any amount borrowed pursuant to Section 86187. Any amounts withdrawn shall be deposited in the Fund. Any moneys made available under this section shall be returned to the General Fund, with interest at the rate earned by the moneys in the Pooled Money Investment Account, from proceeds received from the sale of bonds for the purpose of carrying out this division.

86190. All moneys deposited in the Fund that are derived from premium and accrued interest on bonds sold pursuant to this division shall be reserved in the Fund and shall be available for transfer to the General Fund as a credit to expenditures for bond interest, except that amounts derived from premium may be reserved and used to pay the cost of bond issuance prior to any transfer to the General Fund.

86191. Pursuant to the State General Obligation Bond Law, the cost of bond issuance shall be paid out of the bond proceeds, including premiums, if any. To the extent the cost of bond issuance is not paid from premiums received from the sale of bonds, these costs shall be shared proportionately by each program funded through this division by the applicable bond sale.

86192. The bonds issued and sold pursuant to this division may be refunded in accordance with Article 6 (commencing with Section 16780) of Chapter 4 of Part 3 of Division 4 of Title 2 of the Government Code, which is a part of the State General Obligation Bond Law. Approval by the voters of the state for the issuance of the bonds under this division shall include approval of the issuance of any bonds issued to refund any bonds originally issued under this division or any previously issued refunding bonds. Any bond refunded with the proceeds of refunding bonds as authorized by this section may be legally defeased to the extent permitted by law in the manner and to the extent set forth in the resolution, as amended from time to time, authorizing such refunded bonds.

86193. The proceeds from the sale of bonds authorized by this division are not “proceeds of taxes” as that term is used in Article XIII B of the California Constitution, and the disbursement of these proceeds is

not subject to the limitations imposed by that article.

SECTION 2. Section 1 of this act shall take effect immediately upon approval by the voters of the Water Supply and Water Quality Act of 2018, as set forth in that section at the November 6, 2018, statewide general election. In order to fund a water supply reliability and drought protection program at the earliest possible date, it is necessary that this act take effect immediately.

SECTION 3. Conflicting Provisions.

(a) The provisions and intent of the Water Supply and Water Quality Act of 2018 shall be given precedence over any state law, statute, regulation or policy that conflicts with this section, and the policy and intent of this act shall prevail over any such contrary law, statute, regulation or policy.

(b) If this division is approved by the voters, but superseded by any other conflicting ballot division approved by more voters at the same election, and the conflicting ballot division is later held invalid, it is the intent of the voters that this act shall be given the full force of law.

(c) If any rival or conflicting initiative regulating any matter addressed by this act receives the higher affirmative vote, then all non-conflicting parts of this act shall become operative.

SECTION 4. If any provision of this act or the application thereof is held invalid, that invalidity shall not affect other provisions or applications of this act that can be given effect without the invalid provisions or applications, and to this end the provisions of this act are severable.

SECTION 5.

Section 2799.7 is added to the Fish and Game Code to read:

2799.7. Subdivision (f) of Section 2787 does not apply to Section 2795. Notwithstanding other provisions of this article and Section 13340 of the Government Code, as of July 2, 2020 funds transferred pursuant to Section 2795 shall be continuously appropriated to the Wildlife Conservation Board for purposes of Chapter 8 (commencing with Section 86120) of Division 38 of the Water Code.

SECTION 6.

Part 12 is added to Division 6 of the Water Code to read:

Section 11860. (a) Notwithstanding any other provision of law (including Section 13340 of the Government Code and Sections 39710 through 39723 of the Health and Safety Code), the fees paid, the cost of compliance instruments acquired, and the increased cost of power purchased by the Department of Water Resources, hereafter "Department," as a result of the implementation of Division 25.5 of the Health and Safety Code are continuously appropriated to the Department from the Greenhouse Gas Reduction Fund, as defined in Section 16428.8 of the Government Code, and the fees paid, the cost of compliance instruments acquired and the increased cost of power purchased by the Metropolitan Water District of Southern California (Statutes 1969, chapter 209, as amended), hereafter "District," as a result of the implementation of Division 25.5 of the Health and Safety Code are continuously appropriated to the District from the Greenhouse Gas Reduction Fund, as defined in Section 16428.8 of the Government Code.

(b) The funds appropriated to the Department pursuant to this section shall be expended within the State Water Resources Development System, and on consumer water conservation programs within the jurisdiction of the State Water Resources Development System.

(c) The funds appropriated to the District pursuant to this section shall be expended within the water storage, treatment, conveyance, and distribution system of the District and on consumer water conservation programs within the jurisdiction of the District.

(d) Of the consumer water conservation programs authorized by subdivisions (b) and (c), highest priority shall be given to those benefitting disadvantaged communities (as defined subdivision (a) of Section 79505.5, as it may be amended) and economically distressed areas (as defined in subdivision (k) of Section 79702, as it may be amended).

(e) All expenditures pursuant to this section shall meet the requirements of Chapter 4.1 of Part 2 of Division 26 of the Health and Safety Code. The Department and District will provide an annual report to the Air Resources Board on the prior-year's project implementation along with a plan for current year implementation.

(f) No funds provided by this part shall be expended to pay the costs of the design, construction, operation, mitigation, or maintenance of new Delta water conveyance facilities. No funds provided by this section shall be expended to pay the costs of construction of new surface water storage facilities or to expand the capacity of the California Aqueduct or the Colorado River Aqueduct. Those costs shall be the responsibility of the water agencies that benefit from the design, construction, operation, mitigation, or maintenance of those facilities.

(g) All reasonable and feasible measures shall be taken to reduce, avoid, or mitigate significant negative environmental impacts from projects undertaken pursuant to this section.

Section 11861. (a) Notwithstanding any other provision of law (including Section 13340 of the Government Code and Sections 39710 through 39723 of the Health and Safety Code), the fees paid, the cost of compliance instruments acquired, and the increased cost of power purchased by the Contra Costa Water District, hereafter "District," as a result of the implementation of Division 25.5 of the Health and Safety Code are continuously appropriated to the District from the Greenhouse Gas Reduction Fund, as defined in Section 16428.8 of the Government Code, and the fees paid, the cost of compliance instruments acquired and the increased cost of power purchased by the San Luis and Delta Mendota Water Authority hereafter "San Luis Authority," as a result of the implementation of Division 25.5 of the Health and Safety Code are continuously appropriated to the San Luis Authority from the Greenhouse Gas Reduction Fund, as defined in Section 16428.8 of the Government Code.

(b) (1) The funds appropriated to the Contra Costa Water District pursuant to this section shall be expended within the boundaries of the District, and on consumer water conservation programs within the District.

(2) The funds appropriated to the San Luis Authority pursuant to this section shall be expended within the water storage, treatment, conveyance, and distribution system of the San Luis Authority and on water conservation, water quality improvement, water treatment, water supply and similar water programs within the jurisdiction of the Authority.

(c) Of the funds appropriated pursuant to subdivision (b), highest priority shall be given to those projects

benefitting disadvantaged communities (as defined subdivision (a) of Section 79505.5, as it may be amended) and economically distressed areas (as defined in subdivision (k) of Section 79702, as it may be amended).

(d) All expenditures pursuant to this section shall meet the requirements of Chapter 4.1 of Part 2 of Division 26 of the Health and Safety Code. The District and San Luis Authority will provide an annual report to the Air Resources Board on the prior-year's project implementation along with a plan for current year implementation.

(e) All reasonable and feasible measures shall be taken to reduce, avoid, or mitigate significant negative environmental impacts from projects undertaken pursuant to this section.

Comparing the Fall Water Supply and Water Quality Bond Act Being Planned for Fall 2018 Ballot

With the

Park and Water Bond (SB5) on the June 2018 Ballot- Proposition 68

The California Urban Streams Partnership supports the upcoming proposition 68 which will appear on this June's ballot. But we are asking you to also endorse the water bond which will likely appear on the Fall 2018 ballot. The June bond act was prepared by the state legislature and while it keeps the grant programs the watershed and streams community uses the most barely alive, it contains a disappointing level of funding for watersheds and streams and won't come close to sustaining our Bay Area watershed community's needs. The proposition 68 contains over a $ 130 million dollars for the Los Angeles River watershed alone . While we support our counterparts who are restoring the LA River the bond act is grossly out of geographic balance in allocating funds. In contrast, the citizen written Water Bond which many of us are working on actually serves our Bay Area watershed communities well .The Natural Heritage Institute has submitted over 600,000 signatures to the Secretary of State to qualify for the Fall ballot .

For adequate state grants for the Bay Area we seek your endorsement of the Fall 2018 Water Bond : The State Water Supply Infrastructure, Water Conveyance, Ecosystem and Watershed Protection and Restoration, and Drinking Water Protection act of 2018.

Comparing the two bond acts

Spring Water, Parks Bond Act: Proposition 68.	**Fall Water Supply and Quality Bond Act**
Funds available to **anyone statewide or SF Bay Area**:	
California Natural Resources Agency River Parkway Program $20 million	**vs $70 million**
Ca Dept. of Water Resources Urban streams Restoration Program $10 million	**vs. $50 million**
Coastal Conservancy San Francisco Bay Program $60 million	**vs. $100 million**
San Francisco Bay Restoration Authority $20 million	**vs. $200 million**

Department of Conservation Watershed Coordinator Program	$00 .00	**vs. $10 million**
State Water Resource Control Board for statewide stormwater management	$00.00	**vs. $400 million**
Urban Forestry	$15 million	**vs. $20 million**

Short Summary of major programs in Water Supply and Water Quality Bond Act of 2018

Safe drinking water and wastewater treatment for disadvantaged communities. $750 million. Provides safe drinking water and wastewater treatment for disadvantaged communities, especially in the Central Valley.

Wastewater recycling. $400 million. Recycles wastewater mainly for landscaping and industrial uses

Groundwater desalination. $400 million. Converts salty groundwater to usable water supply.

Urban water conservation. $300 million. Leak detection, toilet replacement, landscape conversion.

Agricultural water conservation. $50 million. Improves inefficient irrigation systems, increasing river flows

Central valley flood management, including flood plain restoration. $100 million. Makes farms and communities more flood safe, and makes flood plains for habitat friendly. Additional $50 million for retrofit of a reservoir (probably Bullard's Bar) for better flood management.

San Francisco Bay Wetlands and flood improvements. $200 million. Improves wetlands in San Francisco Bay to provide flood protection and mitigate sea level rise.

Data management. $60 million. Better data collection and management: streamflow, etc.

Stormwater management $600 million for a variety of state agencies. Capture and treatment of stormwater flows improved river and ocean water quality and increasing water supplies

Watershed Improvement $2355 million to a wide variety of state agencies. Pays for better management of watersheds throughout the state to improve water quality and water supply. Includes $150 million for the Los Angeles River, as well as $100 million for the Delta Conservancy, which helps fund the governor's Eco-Restore program. Includes $80 million for the removal of Matilija Dam, a silted-in dam in Ventura County. $200 million for ecological restoration and dust control at the Salton Sea. Watershed restoration after fires in the Sierra Nevada and elsewhere receives $100 million. Funds state conservancies and state parks to better manage watersheds.

Land Management for Water Yield. $100 million. Removal of invasive weeds which use excessive amounts of surface and groundwater such as tamarisk, yellow starthistle, and Arundo. Estimates of water savings are in excess of one million acre feet per year.

Fisheries restoration. $400 million. Restoring fish habitat. Supplements necessary streamflows.

Groundwater. $675 million. Implements the Sustainable Groundwater Management Act., stabilizing groundwater levels in overdraft groundwater basins.

Water and specific habitat improvements for fisheries. $500 million. Purchase of water for fish and waterfowl.

Completion of fish screens in Central Valley. $100 million. Will prevent baby fish from being diverted into irrigation systems.

San Joaquin River fisheries Restoration. $100 million. Restoration of Spring Run Chinook Salmon downstream of Friant dam.

Waterfowl habitat. $280 million. Helps meet waterfowl obligations under the Central Valley Project Improvement Act, and other waterfowl habitat improvement programs.

Bay Area Regional Reliability. $250 million. Improves interconnections between Bay Area water agencies, making it easier to survive droughts.

Improvement to Friant Kern Canal and other Friant water interconnections. $750 million. Restores lost capacity to Friant Kern Canal, pays for groundwater recharge programs, water conservation and possibly new water conveyance in the Friant area.

Oroville Dam Spillway Repair. $200 million. Makes Oroville Dam more flood safe.

The initiative also allows state and federal water contractors to recover the funds they pay in climate change charges due to implementation of AB 32, and use those funds in their own systems for water and energy conservation to reduce greenhouse gas emissions.

Contra Costa County

To: Board of Supervisors

From: Dianne Dinsmore, Human Resources Director

Date: May 1, 2018

Subject: Abolish the Classification of Deputy Director of Animal Services-Exempt

RECOMMENDATION(S):
ADOPT Position Adjustment Resolution No. 22265 to abolish the Deputy Director of Animal Services-Exempt (BJD1) (unrepresented) classification and cancel one vacant position No. 5905 in the Animal Services Department.

FISCAL IMPACT:
No fiscal impact.

BACKGROUND:
The Animal Services Department has been working toward a new organizational structure over the past two years, which has included the establishment of an executive team that supports the Director of Animal Services-Exempt in the overall administration of the Animal Services Department. In the past, this function was carried out solely by the Deputy Director of Animal Services-Exempt; however, due to increased needs for services in the community, there has been growth in both the workforce of the department and the volume/types of work being performed. The management responsibilities previously performed by the Deputy Director have become too great for one position to perform, so the department has moved to establish new classes to provide operational management over each division (field operations, community

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Beth Ward, (925) 608-8400

cc: Arturo Castillo

BACKGROUND: (CONT'D)

outreach, medical programs, and administration) in order to keep the department functioning properly.

The Board of Supervisors approved the new classification of Animal Services Captain-Exempt on November 14, 2017 and one position was added in the Animal Services Department. The incumbent that previously held the position of Deputy Director of Animal Services-Exempt was appointed to the new Captain position on January 5, 2018, eliminating the need for the classification of Deputy Director of Animal Services-Exempt.

CONSEQUENCE OF NEGATIVE ACTION:

The planned transition of an incumbent from the current classification of Deputy Director of Animal Service-Exempt to the Animal Services Captain - Exempt has been completed. If this order is not approved, the department will be required to allocate $189,140 for 2018/19 FY for the vacant Deputy Director of Animal Services-Exempt position.

AGENDA ATTACHMENTS

P300 No. 22265 ASD

MINUTES ATTACHMENTS

Signed P300 22265

POSITION ADJUSTMENT REQUEST

NO. 22265
DATE 3/22/2018

Department Animal Services

Department No./
Budget Unit No. 0366 Org No. 3333 Agency No. 36

Action Requested: ADOPT Position Adjustment Resolution No. 22265 to abolish the Deputy Director of Animal Services-Exempt (BJD1) (unrepresented) classification and cancel one vacant position (#5905) in the Animal Services Department.

Proposed Effective Date: 4/1/2018

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☒ No ☐

Total One-Time Costs (non-salary) associated with request: $0.00

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost	$0.00	Net County Cost	$0.00
Total this FY	$0.00	N.C.C. this FY	$0.00

SOURCE OF FUNDING TO OFFSET ADJUSTMENT No fiscal impact

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Arturo Castillo
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

Susan Smith — 4/25/2018
Deputy County Administrator — Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE 4/3/2018

ADOPT Position Adjustment Resolution No. 22265 to abolish the Deputy Director of Animal Services-Exempt (BJD1) (unrepresented) classification and cancel one vacant position No. 5905 in the Animal Services Department.

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☒ Day following Board Action.
☐ _____(Date)

Lauren Ludwig — 4/3/18
(for) Director of Human Resources — Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE _____

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☐ Other: _____

(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☐ DISAPPROVED ☐

David J. Twa, Clerk of the Board of Supervisors and County Administrator

DATE _____ BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

P300 (M347) Rev 3/15/01

REQUEST FOR PROJECT POSITIONS

Department _____ Date 4/25/2018 No. xxxxxx

1. Project Positions Requested:

2. Explain Specific Duties of Position(s)

3. Name / Purpose of Project and Funding Source (do not use acronyms i.e. SB40 Project or SDSS Funds)

4. Duration of the Project: Start Date _____ End Date _____
   Is funding for a specified period of time (i.e. 2 years) or on a year-to-year basis? Please explain.

5. Project Annual Cost

   a. Salary & Benefits Costs: _____

   b. Support Costs: _____
   (services, supplies, equipment, etc.)

   c. Less revenue or expenditure: _____

   d. Net cost to General or other fund: _____

6. Briefly explain the consequences of not filling the project position(s) in terms of:
   a. potential future costs
   b. legal implications
   c. financial implications
   d. political implications
   e. organizational implications

7. Briefly describe the alternative approaches to delivering the services which you have considered. Indicate why these alternatives were not chosen.

8. Departments requesting new project positions must submit an updated cost benefit analysis of each project position at the halfway point of the project duration. This report is to be submitted to the Human Resources Department, which will forward the report to the Board of Supervisors. Indicate the date that your cost / benefit analysis will be submitted

9. How will the project position(s) be filled?
   - ☐ a. Competitive examination(s)
   - ☐ b. Existing employment list(s) Which one(s)? _____
   - ☐ c. Direct appointment of:
     - ☐ 1. Merit System employee who will be placed on leave from current job
     - ☐ 2. Non-County employee

   Provide a justification if filling position(s) by C1 or C2

USE ADDITIONAL PAPER IF NECESSARY

C.15

POSITION ADJUSTMENT REQUEST

NO. 22265
DATE 3/22/2018

Department Animal Services

Department No./
Budget Unit No. 0366 Org No. 3333 Agency No. 36

Action Requested: ADOPT Position Adjustment Resolution No. 22265 to abolish the Deputy Director of Animal Services-Exempt (BJD1) (unrepresented) classification and cancel one vacant position (#5905) in the Animal Services Department.

Proposed Effective Date: 4/1/2018

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☒ No ☐

Total One-Time Costs (non-salary) associated with request: $0.00

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost	$0.00	Net County Cost	$0.00
Total this FY	$0.00	N.C.C. this FY	$0.00

SOURCE OF FUNDING TO OFFSET ADJUSTMENT No fiscal impact

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Arturo Castillo
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

Susan Smith — 4/25/2018
Deputy County Administrator — Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE 4/3/2018
ADOPT Position Adjustment Resolution No. 22265 to abolish the Deputy Director of Animal Services-Exempt (BJD1) (unrepresented) classification and cancel one vacant position No. 5905 in the Animal Services Department.

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.
Effective: ☒ Day following Board Action.
☐ _____(Date)

Lauren Ludwig — 4/3/18
(for) Director of Human Resources — Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE _____
☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☐ Other: _____

(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☒ ~~DISAPPROVED~~ ☐

David J. Twa, Clerk of the Board of Supervisors and County Administrator

DATE May 1, 2018

BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

P300 (M347) Rev 3/15/01

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services

Date: May 1, 2018

Subject: Add one Senior Health Education Specialist position and cancel one Health Education Specialist position in the Health Services Department

RECOMMENDATION(S):

ADOPT Position Adjustment Resolution No. 22275 to add one (1) Senior Health Education Specialist (VMWE) position at salary plan and grade level TC5-1543 ($5,494 - $6,678) and cancel one (1) vacant Health Education Specialist position #16084 (VMWD) at salary plan and grade level TC5-1207 ($3,939 - $4,788) in the Health Services Department. (Represented)

FISCAL IMPACT:

Upon approval, this request has an annual cost of approximately $33,339 with pension costs of $8,051 already included. This cost is funded with 50% Family Maternal and Child Health Program funds and 50% Proposition 56 funds supporting the Children's Oral Health Program.

BACKGROUND:

The Health Services Department is requesting to add the Senior Health Education Specialist position and cancel the vacant Health Education Specialist position (#16084) as part of the restructuring to better serve the current needs of the Public Health Division. The new position is allocated to the Children's Oral Health Program within the Family, Maternal and Child

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Jo-Anne Linares (925) 957-5240

cc:

BACKGROUND: (CONT'D)

Health Program. The program provides preventive dental services to children in low-income areas of the County working with schools, preschools, and community partners to increase access to oral health services.

The primary duties of the new position includes planning, conducting and evaluating the health education and health prevention aspects with a great degree of independence, in addition to lead responsibilities to direct and coordinate children oral health training activities. The Health Education Specialist position will be cancelled as it no longer meets the operational needs of the division and to partially offset the cost of the new position.

CONSEQUENCE OF NEGATIVE ACTION:

If this action is not approved, the Children's Oral Health Program within Family Maternal and Child Health Program will not have the appropriate level of staffing with lead responsibilities and independence to implement educational and health promotional activities.

AGENDA ATTACHMENTS

P300 No. 22275 HSD

MINUTES ATTACHMENTS

Signed P300 22275

POSITION ADJUSTMENT REQUEST

NO. 22275
DATE 4/17/2018

Department Health Services

Department No./
Budget Unit No. 0450 Org No. 5826 Agency No. A18

Action Requested: Add one Senior Health Education Specialist (VMWE) position at salary plan and grade level TC5-1543 ($5,494 - $6,678) and cancel one Health Education Specialist (VMWD) position #16084 at salary plan and grade level TC5-1207 ($3,939 - $4,788) in the Health Services Department. (Represented)

Proposed Effective Date: _____

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☒ No ☐

Total One-Time Costs (non-salary) associated with request: $0.00

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost $33,339.00 Net County Cost ____

Total this FY $5,556.00 N.C.C. this FY _____

SOURCE OF FUNDING TO OFFSET ADJUSTMENT 50% Family Maternal & Child Health fund, 50% Prop 56 funds

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Jo-Anne Linares
_____
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

Susan Smith 4/23/2018
_____ _____
Deputy County Administrator Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE _____
Exempt from Human Resources review under delegated authority.

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☐ Day following Board Action.
☐ _____(Date)

_____ _____
(for) Director of Human Resources Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE _____

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☒ Other: Approve as recommended by the Department.

_____
(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☐ DISAPPROVED ☐

David J. Twa, Clerk of the Board of Supervisors and County Administrator

DATE _____ BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

REQUEST FOR PROJECT POSITIONS

Department _____ Date 4/23/2018 No. xxxxxx

1. Project Positions Requested:

2. Explain Specific Duties of Position(s)

3. Name / Purpose of Project and Funding Source (do not use acronyms i.e. SB40 Project or SDSS Funds)

4. Duration of the Project: Start Date _____ End Date _____
   Is funding for a specified period of time (i.e. 2 years) or on a year-to-year basis? Please explain.

5. Project Annual Cost

   a. Salary & Benefits Costs: _____

   b. Support Costs: _____
   (services, supplies, equipment, etc.)

   c. Less revenue or expenditure: _____

   d. Net cost to General or other fund: _____

6. Briefly explain the consequences of not filling the project position(s) in terms of:
   a. potential future costs
   b. legal implications
   c. financial implications
   d. political implications
   e. organizational implications

7. Briefly describe the alternative approaches to delivering the services which you have considered. Indicate why these alternatives were not chosen.

8. Departments requesting new project positions must submit an updated cost benefit analysis of each project position at the halfway point of the project duration. This report is to be submitted to the Human Resources Department, which will forward the report to the Board of Supervisors. Indicate the date that your cost / benefit analysis will be submitted

9. How will the project position(s) be filled?
   - ☐ a. Competitive examination(s)
   - ☐ b. Existing employment list(s) Which one(s)? _____
   - ☐ c. Direct appointment of:
     - ☐ 1. Merit System employee who will be placed on leave from current job
     - ☐ 2. Non-County employee

   Provide a justification if filling position(s) by C1 or C2

USE ADDITIONAL PAPER IF NECESSARY

POSITION ADJUSTMENT REQUEST

C.16

NO. 22275
DATE 4/17/2018

Department Health Services

Department No./
Budget Unit No. 0450 Org No. 5826 Agency No. A18

Action Requested: Add one Senior Health Education Specialist (VMWE) position at salary plan and grade level TC5-1543 ($5,494 - $6,678) and cancel one Health Education Specialist (VMWD) position #16084 at salary plan and grade level TC5-1207 ($3,939 - $4,788) in the Health Services Department. (Represented)

Proposed Effective Date: _____

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☒ No ☐

Total One-Time Costs (non-salary) associated with request: $0.00

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost $33,339.00 Net County Cost ____

Total this FY $5,556.00 N.C.C. this FY ____

SOURCE OF FUNDING TO OFFSET ADJUSTMENT 50% Family Maternal & Child Health fund, 50% Prop 56 funds

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Jo-Anne Linares
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

Susan Smith — 4/23/2018
Deputy County Administrator — Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS
Exempt from Human Resources review under delegated authority.

DATE _____

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☒ Day following Board Action.
☐ _____(Date)

(for) Director of Human Resources — Date

COUNTY ADMINISTRATOR RECOMMENDATION:

DATE _____

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☒ Other: Approve as recommended by the Department.

(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☒ ~~DISAPPROVED~~ ☐

DATE May 1 2018

David J. Twa, Clerk of the Board of Supervisors
and County Administrator

BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

P300 (M347) Rev 3/15/01

Contra Costa County

To: Board of Supervisors

From: Sharon L. Anderson, County Counsel

Date: May 1, 2018

Subject: Add one Deputy County Counsel Advanced - Exempt and Cancel one Deputy County Counsel Advanced

RECOMMENDATION(S):
ADOPT Position Adjustment Resolution No. 22276 to add one (1) full-time Deputy County Counsel-Advanced- Exempt (2ET3) (unrepresented) position at salary level B8B 2297 ($12,354 - $14,685) and cancel one (1) full-time Deputy County Counsel-Advanced (2ETK) (unrepresented) vacant position No 14021 at salary level B8B 2297 ($12, 354 - $13,977; $14,685 maximum with performance pay) in the Office of the County Counsel.

FISCAL IMPACT:
None.

BACKGROUND:
The County Counsel's office no longer hires into the Deputy County Counsel classification, which has been replaced by the Deputy County Counsel-Exempt classification. The purpose of this action is to enable the Office of the County Counsel to hire an attorney who has the specialized training and/or expertise in specified areas of civil law, so that the Office can efficiently and effectively satisfy the County's legal needs.

CONSEQUENCE OF NEGATIVE ACTION:
The County Counsel will be unable to hire a new attorney into the appropriate classification.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Wanda McAdoo, (925) 335-1811

cc: Wanda McAdoo, Dianne Dinsmore, Human Resources Director

AGENDA ATTACHMENTS

AIR 33401 P300 22276 Add and Cancel

MINUTES ATTACHMENTS

Signed P300 22276

POSITION ADJUSTMENT REQUEST

NO. 22276
DATE 5/1/2018

Department Office of the County Counsel — Department No./ Budget Unit No. 0030 Org No. 1735 Agency No. 17

Action Requested: ADOPT Position Adjustment Resolution No. 22276 to ADD one (1) full-time Deputy County Counsel - Advanced Exempt (2ET3) (unrepresented) position at salary level B8B 2297 ($12,354.27-$14,685.34) and CANCEL one (1) full-time Deputy County Counsel Advanced (2ETK) (unrepresented) vacant position No. 14021 at salary level B8B 2297 ($12, 354-$13,977; $14,685 max with performance pay) in the Office of the County Counsel.

Proposed Effective Date: 5/2/2018

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☐ No ☒

Total One-Time Costs (non-salary) associated with request: $0.00

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost $0.00 — Net County Cost $0.00

Total this FY $0.00 — N.C.C. this FY $0.00

SOURCE OF FUNDING TO OFFSET ADJUSTMENT No fiscal impact - cost neutral

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Sharon L. Anderson
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

L.Strobel — 4/23/2018
Deputy County Administrator — Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS — DATE 4/14/2018

Add one (1) full-time Deputy County Counsel-Advanced- Exempt (2ET3) (unrepresented) position at salary level B8B 2297 ($12,354 - $14,685) and cancel one (1) full-time Deputy County Counsel-Advanced (2ETK) (unrepresented) vacant position No 14021 at salary level B8B 2297 ($12, 354 - $13,977; $14,685 max with performance pay)

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☒ Day following Board Action.
☐ _____(Date)

Lauren Ludwig — 4/24/2018
(for) Director of Human Resources — Date

COUNTY ADMINISTRATOR RECOMMENDATION: — DATE _____

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☐ Other: _____

(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☐ DISAPPROVED ☐

David J. Twa, Clerk of the Board of Supervisors and County Administrator

DATE _____ BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

REQUEST FOR PROJECT POSITIONS

Department _ Date 4/25/2018 No.

1. Project Positions Requested:

2. Explain Specific Duties of Position(s)

3. Name / Purpose of Project and Funding Source (do not use acronyms i.e. SB40 Project or SDSS Funds)

4. Duration of the Project: Start Date _____ End Date _____
   Is funding for a specified period of time (i.e. 2 years) or on a year-to-year basis? Please explain.

5. Project Annual Cost

   a. Salary & Benefits Costs: _____

   b. Support Costs: _____
   (services, supplies, equipment, etc.)

   c. Less revenue or expenditure: _____

   d. Net cost to General or other fund: _____

6. Briefly explain the consequences of not filling the project position(s) in terms of:
   a. potential future costs
   b. legal implications
   c. financial implications
   d. political implications
   e. organizational implications

7. Briefly describe the alternative approaches to delivering the services which you have considered. Indicate why these alternatives were not chosen.

8. Departments requesting new project positions must submit an updated cost benefit analysis of each project position at the halfway point of the project duration. This report is to be submitted to the Human Resources Department, which will forward the report to the Board of Supervisors. Indicate the date that your cost / benefit analysis will be submitted

9. How will the project position(s) be filled?
   - ☐ a. Competitive examination(s)
   - ☐ b. Existing employment list(s) Which one(s)? _____
   - ☐ c. Direct appointment of:
     - ☐ 1. Merit System employee who will be placed on leave from current job
     - ☐ 2. Non-County employee

   Provide a justification if filling position(s) by C1 or C2

USE ADDITIONAL PAPER IF NECESSARY

POSITION ADJUSTMENT REQUEST

C.17

NO. 22276
DATE 5/1/2018

Department Office of the County Counsel

Department No./
Budget Unit No. 0030 Org No. 1735 Agency No. 17

Action Requested: ADOPT Position Adjustment Resolution No. 22276 to ADD one (1) full-time Deputy County Counsel - Advanced Exempt (2ET3) (unrepresented) position at salary level B8B 2297 ($12,354.27-$14,685.34) and CANCEL one (1) full-time Deputy County Counsel Advanced (2ETK) (unrepresented) vacant position No. 14021 at salary level B8B 2297 ($12, 354-$13,977; $14,685 max with performance pay) in the Office of the County Counsel.

Proposed Effective Date: 5/2/2018

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☐ No ☒

Total One-Time Costs (non-salary) associated with request: $0.00

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost $0.00 Net County Cost $0.00

Total this FY $0.00 N.C.C. this FY $0.00

SOURCE OF FUNDING TO OFFSET ADJUSTMENT No fiscal impact - cost neutral

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Sharon L. Anderson

(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

L.Strobel — 4/23/2018

Deputy County Administrator — Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE 4/14/2018

Add one (1) full-time Deputy County Counsel-Advanced- Exempt (2ET3) (unrepresented) position at salary level B8B 2297 ($12,354 - $14,685) and cancel one (1) full-time Deputy County Counsel-Advanced (2ETK) (unrepresented) vacant position No 14021 at salary level B8B 2297 ($12, 354 - $13,977; $14,685 max with performance pay)

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☒ Day following Board Action.
☐ _____(Date)

Lauren Ludwig — 4/24/2018

(for) Director of Human Resources — Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE _____

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☐ Other: _____

(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☒ ~~DISAPPROVED~~

David J. Twa, Clerk of the Board of Supervisors and County Administrator

DATE May 1 2018

BY Gina Molina

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

P300 (M347) Rev 3/15/01

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: May 1, 2018

Subject: AUTHORIZE a lease with Cove Investments, LLC for office space at 1160 Brickyard Cove Road, Suite 111, Richmond for the Health Services CORE Program.

RECOMMENDATION(S):

APPROVE Public Works Director, or designee, to execute a lease with Cove Investments, LLC, for a term of five years for approximately 1,340 square feet of office space for the Health Services Department - Mental Health CORE Program located at 1160 Brickyard Cove Road, Suite 111, Richmond, at an initial annual rent of $37,788 for the first year with annual increases thereafter, with two two-year renewal terms, under the terms and conditions set forth in the lease.

AUTHORIZE the Public Works Director, or designee, to execute the lease on behalf of Contra Costa County, and any renewal options under the terms and conditions set forth in the lease beyond its initial five-year term.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Stacey Sinclair, (925) 313-2130

cc:

FISCAL IMPACT:

100% Mental Health Services Act funds. The lease will obligate the County to pay rent of approximately $196,000 over the five year term of the lease.

BACKGROUND:

The Contra Costa Mental Health, West County Child and Adolescent Services developed a new intensive outpatient program (CORE Program) designed specifically for teens ages 13-18 that have substance abuse and related psychological and behavioral problems. Services will be provided by a multi-disciplinary team, and will include individual, group, and family therapy, and linkage to community services. This space will house 8 staff members (not all full-time) and serve 80 unduplicated clients per year.

CONSEQUENCE OF NEGATIVE ACTION:

Failure to approve the lease will result in potential loss of funding for the CORE program if they cannot secure suitable space.

ATTACHMENTS

Draft Lease Agreement

LEASE

CONTRA COSTA HEALTH SERVICES
1160 Brickyard Cove Road, Suite 111
Richmond, California

This lease is dated _____2018, and is between Cove Investments, LLC, a California limited liability company ("**Lessor**") and the County of Contra Costa, a political subdivision of the State of California ("**County**").

Recitals

A. Lessor is the owner of that certain premises located at 1160 Brickyard Cove Road (the "**Building**").

B. Lessor desires to lease to County and County desires to lease from Lessor a portion of the Building consisting of approximately 1,340 square feet of floor space known as Suite 111, as more particularly described in Exhibit A – Floor Plan (the "**Premises**") and five non-exclusive parking spaces.

The parties therefore agree as follows:

Agreement

1. Lease of Premises. In consideration of the rents and subject to the terms herein set forth, Lessor hereby leases to County and County hereby leases from Lessor, the Premises.

2. Term**.** The "**Term**" of this lease is comprised of an Initial Term and, at County's election, Renewal Terms, each as defined below.

   a. Initial Term. The "**Initial Term**" is five years, commencing on May 1, 2018 (the "**Commencement Date**") and ending April 30, 2023.

   b. Renewal Terms. County has two options to renew this lease for a term of two years for each option (each, a "**Renewal Term**") upon all the terms and conditions set forth herein.

      i. County will provide Lessor with written notice of its election to renew the Lease thirty days prior to the end of the Term. However, if County fails to provide such notice, its right to renew the Lease will not expire until fifteen working days after County's receipt of Lessor's written demand that County exercise or forfeit the option to renew.

ii. Upon the commencement of a Renewal Term, all references to the Term of this lease will be deemed to mean the Term as extended pursuant to this Section.

3. Rent. County shall pay rent ("**Rent**") to Lessor monthly in advance beginning on the Commencement Date. Rent is payable on the tenth day of each month during the Initial Term and, if applicable, the Renewal Terms, in the amounts set forth below:

a. Initial Term

Months	Monthly Rent
1-12	$3,149
13-24	$3,216
25-36	$3,283
37-48	$3,350
49-60	$3,417

b. First Renewal Term

Months	Monthly Rent
61-72	$3,484
73-84	$3,551

c. Second Renewal Term

Months	Monthly Rent
85-96	$3,618
97-108	$3,685

Rent for any fractional month will be prorated and computed on a daily basis with each day's rent equal to one-thirtieth (1/30) of the monthly Rent.

4. Tenant Improvements.

a. Improvements by Lessor. Lessor, at its sole cost and expense, shall cause the following improvements to be made to the Premises prior to the Commencement Date:

i. The installation of upper and lower cabinetry with electrical outlets for a refrigerator and microwave.

ii. The installation of a sink in the location designated by the County. The Tenant is responsible for all costs associated with the repair and maintenance

of the sink and its plumbing if problems arise that are caused by inappropriate use of the sink or inappropriate objects going down the drain. The sink must comply with local and state accessibility requirements and must conform to the final plans approved by the County.

b. Improvements by County. The County, at its sole cost and expense, shall cause the data and telecommunication cabling and signage to be installed in the Premises.

5. Use. County may use the Premises for the purpose of conducting various functions of County and any other purpose permitted by law.

6. No Disorderly Conduct. The County will not permit clients or guests who are visiting the Premises to engage in loud or disruptive behavior that disturbs the quiet enjoyment of other tenants of the Building.

7. Obligation to Pay Utilities and Janitorial. Lessor shall pay for all water, sewer, gas, electricity, janitorial cleaning, and refuse collection services provided to the Premises.

8. Maintenance and Repairs.

a. Roof and Exterior of Premises. Lessor shall keep the roof and exterior of the Premises in good order, condition, and repair, and shall maintain the structural integrity of the Building, including the exterior doors and their fixtures, closers and hinges, glass and glazing, used in the Premises. Lessor is responsible for all locks and key systems used in the Premises.

b. Interior of Premises. County shall keep and maintain the interior of the Premises in good order, condition and repair, but Lessor shall repair damage to the interior caused by its failure to maintain the exterior in good repair, including damage to the interior caused by roof leaks and/or interior and exterior wall leaks.

c. Janitorial. Lessor shall provide janitorial services, consisting of emptying trash daily, other than weekends and holidays, and vacuuming the carpets in the Premises once a week, in and about the premises and window washing services in a manner consistent with other comparable buildings in the vicinity of the Building.

d. Utilities. Lessor shall repair and maintain the electrical, lighting, water and plumbing systems in good order, condition and repair.

e. HVAC. Lessor shall maintain and repair the heating, ventilating, and air-conditioning (HVAC) systems.

f. Parking; Exterior Lighting. Lessor shall maintain the parking lot and exterior lighting system in good order, condition and repair.

g. Services by Lessor. If County determines that the Premises are in need of maintenance, construction, remodeling or similar service that is beyond Lessor's responsibilities under this lease, at County's request, Lessor shall perform such service at County's expense. In performing the service, Lessor shall consult with County and use either licensed insured contractors or employees of Lessor. Lessor shall obtain County's prior written approval of the scope, terms, and cost of any contracts. County may, by giving Lessor thirty (30) days prior written notice, change the level of service, terminate any or all service, or require that a service be performed by a different contractor.

9. Quiet Enjoyment. Provided County is in compliance with the material terms of this lease, Lessor shall warrant and defend County in the quiet enjoyment and possession of the Premises during the Term.

10. Assignment and Sublease. County has the right to assign this lease or sublease the Premises or any part thereof at any time during the Term to other county entities only

11. Alterations; Fixtures and Signs**.**

a. County Fixtures. Subject to Section 11.b., below, County may (i) make any lawful and proper minor alterations to the Premises and (ii) attach fixtures and signs ("**County Fixtures**") in or upon the Premises. Any County Fixtures will remain the property of County and may be removed from the Premises by County at any time during the Term. County is responsible for the cost of all alterations and County Fixtures.

b. Installation and Removal of Signs. All signs and graphics of every kind visible in or from public view or corridors, the common areas or the exterior of the Premises (whether located inside or outside the Premises) are subject to Landlord's prior written approval, in Landlord's sole and absolute discretion, and are subject to any applicable governmental laws, ordinances, and regulations. County shall remove all of its signs and graphics upon the termination of this lease. The installation and removal of signs and graphics will be done at County's sole cost and expense and in such manner as to avoid injury or defacement of the Premises or the Building and County shall repair, at County's sole cost and expense, any injury or defacement, including without limitation, discoloration caused by such installation or removal. Any signs installed by County are to be maintained by County in a neat, clean and professional manner, at County's sole cost and expense.

12. Prior Possession. Commencing _____, County has the right to install fixtures, telephones and other items required to prepare the Premises for County's occupancy and to store furniture, supplies and equipment, provided such work and storage and can be effected without unduly interfering with Lessor's completion of any tenant improvements.

13. Insurance.

a. Liability Insurance. Throughout the Term, County shall maintain in full force and effect, at its sole expense, a general self-insurance program covering bodily injury (including death), personal injury, and property damage, including loss of use. County shall provide Lessor with a letter of self-insurance affirming the existence of the aforementioned self-insurance program.

b. Self-Insurance Exclusion. County's self-insurance does not provide coverage for (i) areas to be maintained by Lessor under this lease, or (ii) negligence, willful misconduct, or other intentional act, error or omission of Lessor, its officers, agents, or employees.

14. Surrender of Premises. On the last day of the Term, or sooner termination of this lease, County shall peaceably and quietly leave and surrender to Lessor the Premises, along with appurtenances and fixtures at the Premises (except County Fixtures), all in good condition, ordinary wear and tear, damage by casualty, condemnation, acts of God and Lessor's failure to make repairs required of Lessor excepted. County is not responsible for painting or for repairing or replacing any floor coverings in the Premises upon the expiration or earlier termination of this lease.

15. Waste, Nuisance. County may not commit, or suffer to be committed, any waste upon the Premises, or any nuisance or other act or thing that may disturb the quiet enjoyment of any other occupant of the Building.

16. Inspection. Lessor, or its proper representative or contractor, may enter the Premises by prior appointment between the hours of 9:00 a.m. and 4:30 p.m., Monday through Friday, holidays excepted, to determine that (i) the Premises is being reasonably cared for, (ii) no waste is being made and that all actions affecting the Premises are done in the manner best calculated to preserve the Premises, and (iii) County is in compliance with the terms and conditions of this lease.

17. Perilous Conditions. If the County's Director of Public Works becomes aware of a perilous condition on the Premises that, in his or her opinion, substantially and significantly threatens the health and safety of County employees and/or invitees (a "**Perilous Condition**"), the Director of Public Works, or his or her designee, will immediately notify Lessor of the Perilous Condition and Lessor shall use best efforts to immediately eliminate the Perilous Condition.

Lessor shall immediately address any condition reasonably constituting an emergency, whether Lessor learns of the condition through County or otherwise.

If Lessor fails to address a Perilous Condition within twenty-four (24) hours after County's notice or to immediately address an emergency situation, County may attempt to resolve the Perilous Condition or emergency situation. Lessor shall reimburse County for any costs incurred by County in addressing the Perilous Condition or emergency situation promptly upon receipt of County's invoice.

18. Destruction. If damage occurs that causes a partial destruction of the Premises during the Term from any cause and repairs can be made within sixty days from the date of the damage under the applicable laws and regulations of governmental authorities, Lessor shall repair the damage promptly. Such partial destruction will not void this lease, except that County will be entitled to a proportionate reduction in Rent while such repairs are being made. The proportionate reduction in Rent will be calculated by multiplying Rent by a fraction, the numerator of which is the number of square feet that are unusable by County and the denominator of which is the total number of square feet in the Premises.

If repairs cannot be made in sixty days, County will have the option to terminate the lease or request that Lessor make the repairs within a reasonable time, in which case, Lessor will make the repairs and Rent will be proportionately reduced as provided in the previous paragraph.

This lease will terminate in the event of a total destruction of the Building or the Premises.

19. Hazardous Material. Lessor warrants to County that Lessor does not have any knowledge of the presence of Hazardous Material (as defined below) or contamination of the Building or Premises in violation of environmental laws. Lessor shall defend, save, protect and hold County harmless from any loss arising out of the presence of any Hazardous Material on the Premises that was not brought to the Premises by or at the request of County, its agents, contractors, invitees or employees. Lessor acknowledges and agrees that County has no obligation to clean up or remediate, or contribute to the cost of clean up or remediation, of any Hazardous Material unless such Hazardous Material is released, discharged or spilled on or about the Premises by County or any of its agents, employees, contractors, invitees or other representatives. The obligations of this Section shall survive the expiration or earlier termination of this lease.

"Hazardous Material" means any substance, material or waste, including lead based paint, asbestos and petroleum (including crude oil or any fraction thereof), that is or becomes designated as a hazardous substance, hazardous waste, hazardous material, toxic substance, or toxic material under any federal, state or local law, regulation, or ordinance.

20. Indemnification.

a. County. County shall defend, indemnify and hold Lessor harmless from County's share of any and all claims, costs and liability for any damage, injury or death of or to any person or the property of any person, including attorneys' fees, caused by the willful misconduct or the negligent acts, errors, or omissions of County, its officers, agents or employees in using the Premises pursuant to this lease, or the County's performance under this lease, except to the extent caused or contributed to by (i) the structural, mechanical, or other failure of buildings owned or maintained by Lessor, and/or (ii) the negligent acts, errors, or omissions of Lessor, its officers, agents, or employees.

b. Lessor. Lessor shall defend, indemnify and hold County harmless from Lessor's share of any and all claims, costs and liability for any damage, injury or death of or to any person or the property of any person, including attorneys' fees, caused by the willful misconduct or the negligent acts, errors or omissions of Lessor, its officers, agents, employees, with respect to the Premises, or Lessor's performance under this lease, or the Lessor's performance, delivery or supervision of services at the Premises, or by the structural, mechanical or other failure of buildings owned or maintained by Lessor, except to the extent caused or contributed to by the negligent acts, errors, or omissions of County, its officers, agents, or employees.

21. Default.

The occurrence of any of the following events is a default under this lease:

a. County.

i. County's failure to pay Rent within ten business days after receipt of a written notice of failure (a "**Notice**") from Lessor to County; provided, however, that County will have additional time if its failure to pay Rent is due to circumstances beyond its reasonable control, including, without limitation, failure of the County's Board of Supervisors to adopt a budget. In no event may such additional time exceed seventy-five days from receipt of a Notice.

ii. County's failure to comply with any other material term or provision of this lease if such failure is not remedied within thirty days after receipt of a Notice from Lessor to County specifying the nature of the breach in reasonably sufficient detail; provided, however, if such default cannot reasonably be remedied within such thirty day period, then a default will not be deemed to occur until the occurrence of County's failure to comply within the period of time that may be reasonably required to remedy the default, up to an aggregate of ninety days, provided County commences curing such default within thirty days and thereafter diligently proceeds to cure such default.

b. Lessor. Lessor's failure to perform any obligation under this lease if such failure is not remedied within thirty days after receipt of a Notice from County to Lessor specifying the nature of the breach in reasonably sufficient detail; provided, however, if such breach cannot reasonably be remedied within such thirty day period, then a default will not be deemed to occur until the occurrence of Lessor's failure to perform within the period of time that may be reasonably required to remedy the breach, up to an aggregate of ninety days, provided Lessor commences curing such breach within thirty days and thereafter diligently proceeds to cure such breach.

22. Remedies.

a. Lessor. Upon the occurrence of a default by County, Lessor may, after giving County written notice of the default, and in accordance with due process of law, reenter and repossess the Premises and remove all persons and property from the Premises.

b. County. Upon the occurrence of a default by Lessor, County may (i) terminate this lease by giving written notice to Lessor and quit the Premises without further cost or obligation to County or (ii) proceed to repair or correct the failure and, at County's option, either deduct the cost thereof from Rent due to Lessor, or invoice Lessor for the cost of repair, which invoice Lessor shall pay promptly upon receipt.

23. Notices. Any notice required or permitted under this lease shall be in writing and sent by overnight delivery service or registered or certified mail, postage prepaid and directed as follows:

To Lessor:	Cove Investment's LLC Lessor's Address
To County:	Contra Costa County Public Works Department Attn: Real Estate Manager 255 Glacier Drive Martinez, CA 94553

Either party may at any time designate in writing a substitute address for that set forth above and thereafter notices are to be directed to such substituted address. If sent in accordance with this Section, all notices will be deemed effective (i) the next business day, if sent by overnight courier, or (ii) three days after being deposited in the United States Postal system.

24. Successors and Assigns. This lease binds and inures to the benefit of the heirs, successors, and assigns of the parties hereto.

25. Holding Over. Any holding over after the Term of this lease is a tenancy from month to month and is subject to the terms of this lease.

26. Time is of the Essence. In fulfilling all terms and conditions of this lease, time is of the essence.

27. Governing Law. The laws of the State of California govern all matters arising out of this lease.

28. Severability. In the event that any provision herein contained is held to be invalid or unenforceable in any respect, the validity and enforceability of the remaining provisions of this lease will not in any way be affected or impaired.

29. Real Estate Commission. In negotiating this lease, Lessor is represented by TRI Commercial and the County represents itself. Lessor shall pay a real estate commission to TRI Commercial pursuant to a separate written agreement. Lessor recognizes and acknowledges that the County is entitled to a real estate commission when it represents itself. The County warrants to Lessor that County's contact with Lessor in connection with this Lease has been directly with TRI Commercial.

Lessor shall pay to County a real estate commission in the amount of Nine Thousand Eight Hundred Forty-Nine Dollars ($9,849) (the "**County Commission**"). Lessor shall pay one-half of the County Commission upon the execution of this lease and the remainder on the Commencement Date.

[Remainder of Page Intentionally Left Blank]

30. Entire Agreement; Construction; Modification. Neither party has relied on any promise or representation not contained in this lease. All previous conversations, negotiations, and understandings are of no further force or effect. This lease is not to be construed as if it had been prepared by one of the parties, but rather as if both parties have prepared it. This lease may be modified only by a writing signed by both parties.

The parties are executing this lease on the date set forth in the introductory paragraph.

COUNTY OF CONTRA COSTA, a political subdivision of the State of California

By: _____
Brian Balbas
Director of Public Works

RECOMMENDED FOR APPROVAL:

By: _____
Karen Laws
Principal Real Property Agent

By: _____
Stacey Sinclair
Senior Real Property Agent

APPROVED AS TO FORM
SHARON L. ANDERSON, COUNTY COUNSEL

By: _____
Kathleen M. Andrus
Deputy County Counsel

COVE INVESTMENTS, LLC

By: _____
Name and Title

By: _____
Name and Title

H:\Real Estate Services\1160 Brickyard Ste 111 V6.doc

EXHIBIT A

[Floor Plan]

Contra Costa County

To: Board of Supervisors

From: Matt Slattengren

Date: May 1, 2018

Subject: 17-0549-022SF European Grapevine Moth Program

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Agricultural Commissioner, or designee, to execute an agreement with the California Department of Food and Agriculture in an amount not to exceed $23,443 to place and service traps for the detection of the European Grapevine Moth from January 1, 2018 through December 31, 2018.

FISCAL IMPACT:
The agreement reimburses the department for all associated costs incurred for the implementation of the European Grapevine Moth Program in an amount not to exceed $23,443. There is no County match of funds requirement. This revenue was anticipated in the FY 18/19 departmental budget.

BACKGROUND:
The County Department of Agriculture will provide all trapping materials, training of trappers, and deploy appropriate traps and service them at regular intervals according to the Insect Trapping Guide provided by the California Department of Food and Agriculture (CDFA). If European Grapevine Moth (EGVM) is detected it will be delimited and controlled/eradicated. Costs will be reimbursed by CDFA in an amount not to exceed $23,443. EGVM and it's vectors are a clear and present danger to Contra Costa County's agricultural commodity of grapes.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: 646-5250

cc:

CONSEQUENCE OF NEGATIVE ACTION:

Failure to approve this agreement will result in lost revenue for the department and a possible threat to the agricultural grape industry in Contra Costa County.

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: May 1, 2018

Subject: 2018-19 Early Head Start Childcare Partnerships Grant Supplemental Funds

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Employment and Human Services Department Director, or designee, to apply for and accept funding in an amount not to exceed $3,540,487 from the Department of Health and Human Services Administration for Children and Families for Early Head Start supplemental funding for the term of September 1, 2018 through August 31, 2019.

FISCAL IMPACT:
If awarded, the County would receive supplemental revenues in an amount not to exceed $3,540,487. The County, as Grantee, would be required to generate a 20% non-federal in-kind match in an amount not to exceed $885,122 (see calculation below). The match will be met through collaboration with State Child Development programs and the volunteer hours accrued by Head Start parents and community partners.

CFDA # 93.708

Match Calculation

Federal $3,540,487 = 80%
Match (In-Kind) $885,122 = 20%
Total $4,425,609 = 100%
In-Kind match is 20% of total funding

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: CSB (925) 681-6389

cc: Nasim Eghlima, Christina Reich, Haydee Ilan

BACKGROUND:

The Administration for Children and Families (ACF) routinely provides expanded funding opportunities throughout the program year. The Office of Head Start recognizes that grantees will identify needs for additional funding during the initial implementation phase that were not apparent at the time of the initial award. The Employment and Human Services Department has identified the need for additional funds to address health and nutrition, disabilities and mental health, safety, and professional development for Early Head Start staff.

The Board approved submission of a grant application to ACF for Early Head Start Childcare Partnership grant funds on August 16, 2016 (C.37). As a result, the County was awarded funding in an amount not to exceed $6,250,000. The Board approved the submission of a supplemental grant application for a final 6 month budget period of March 1, 2018 through August 31, 2018 through the Early Head Start Childcare Partnership Program #2 on December 5, 2017 (C.51). This board order is to approve the submission of an application for continued funding under this program. The application submittal was approved by the Head Start Policy Council on April 18, 2018 and will be submitted to ACF on June 1, 2018.

CONSEQUENCE OF NEGATIVE ACTION:

If not approved, supplemental funding to operate the Early Head Start program will not be received.

CHILDREN'S IMPACT STATEMENT:

The Community Services Bureau of the Employment and Human Services Department's Head Start program supports three of Contra Costa County's community outcomes: (1) Children Ready for and Succeeding in School; (3) Families that are Economically Self-sufficient; and (4) Families that are Safe, Stable, and Nurturing. These outcomes are achieved by offering comprehensive services, including high quality early childhood education, nutrition, and health services to low-income children throughout Contra Costa County.

ATTACHMENTS

Budget Narrative

Grant letter

EXECUTIVE SUMMARY
INCOMING FUNDS NARRATIVE STATEMENT

1. PROJECT/PROGRAM TITLE. Early Head Start-Child Care Partnership #2 Funding Application for Budget Period September 1, 2018 through August 31, 2019.

2. FUNDING AGENCY. Department of Health and Human Services, Administration for Children and Families (ACF), Office of Head Start (OHS).

3. SUBMITTAL STATUS. This is a submission of application for Early Head Start Child Care Partnership #2 grant funding for FY 2018- 2019.

4. PROPOSED TERM. Funding must be requested annually. The standard one year budget period is from September 1, 2018 through August 31, 2019. The budget summary is below.

5. CURRENT FUNDING. Funding for Early Head Start Child Care Partnership #2 is provided by federal dollars. Contra Costa County, as Grantee, is required to generate a 20% non-federal match of the total project budget, which may be in cash or in-kind contributions, fairly valued.

6. FUTURE FUNDING. An application for continuation grant funding must be submitted each year.

7. BUDGET SUMMARY

Budget Categories:	**FY 2018-2019 EHS Child Care Partnership #2 Operation**
Personnel	$ 551,105
Fringe Benefits	$ 354,609
T & TA	$ 86,354
Travel	$ - 0 -
Supplies	$ 56,000
Contractual	$ 791,000
Other	$ 1,569,705
Sub-Total of Direct Charges	**$3,408,773**
Indirect Costs	$ 131,714
Total Federal Amount Being Requested	**$3,540,487**
Non-Federal Share	***$ 885,122***
Total Federal and Non-Federal	***$4,425,609***

8. STAFFING REQUIREMENTS. As Grantee, Contra Costa County operates the Head Start Program, which is administered and staffed by the Employment & Human Services Department, Community Services Bureau.

9. PROGRAM NEED. The Community Services Bureau serves the needs of low-income children (3-5 years of age under Head Start, and prenatal - 3 yrs under Early Head Start) and their families, by providing quality childcare, child development, and other services such as medical, mental health and dental needs.

10. RELATIONSHIP TO OTHER PROGRAMS. The Community Services Bureau's Head Start program combines Federal Head Start and State Child Development funding into one cohesive program. The Bureau also has strong collaborations with other departments within the County and partners with community based organizations, local private businesses, schools, non-profits, and volunteer organizations.

11. PROJECT GOALS. (Same goals and objectives for both Head Start and Early Head Start)

Goal 1: Goal 1: Through the use of multiple technologies, CSB will develop systems to enhance staff and client communication while coordinating program-wide approaches to effective data management and ensuring high quality service delivery.
Goal 2: Due to an 84% increase in Early Head Start slots (from 311 to 573) in two years, CSB will enhance its Early Head Start programming through a multi-faceted approach.
Goal 3: CSB will implement a "Grow Our Own" approach to hiring, developing, and retaining a robust staff across all service areas that are responsive to the clients and intrinsically motivated to be the best they can be through a variety of supports and services.
Goal 4: CSB will implement data-driven Parent, Family and Community Engagement (PFCE) services that embrace the PFCE framework and result in measurable impacts that achieve the mission of the organization.

12. STATED OBJECTIVES.

- By June 30, 2018, CSB will have interactive self-service kiosk stations at large centers and the administrative building.
- By June 30, 2018, CSB will have an interactive web-portal and mobile application to improve communication between client and staff.
- By June 30, 2018, CSB will implement an Interactive Voice Response (IVR) and Short Message System (SMS) that allows a computer to interact with clients through the use of voice and/or text and to input via keypad on their land line or mobile device.
- By June 30, 2018, CSB will have computer stations set up for parents at 4 designated centers. By July 2017, CSB will enhance its violence prevention and safety program for children, families, and staff.
- By June, 2018, CSB will implement its Early Head Start Program for Infant Toddler Caregiving (PITC) Training Matrix 2017-18 for all Early Head Start teachers.
- By December 31, 2018, CSB will implement a comprehensive material and equipment purchasing plan to optimize the quality of the Early Head Start environment.

- By December 31, 2018, CSB will provide families with education on safe sleep practices to reduce the risk of Sudden Infant Death Syndrome and other sleep-related causes of infant death.
- By December 31, 2018, CSB will ensure curriculum implementation fidelity through its enhanced education monitoring tool.
- By December 30, 2018, CSB will enhance its Bright Futures Early Periodic Screening Diagnosis and Treatment (EPSDT) Implementation through adaptations to systems, services and community partnerships.
- By December 31, 2018, CSB will collaborate with SEIU Local 1021, the YMCA of the Bay Area and the Los Angeles Trade-Tech College in the California Apprenticeship Initiative to engage participants in the early care and education field.
- December 31, 2018, CSB will partner with California Head Start Association and local educational institutions to provide training and education to meet the credentialing/certification requirements for "Family Services staff" in the Head Start Performance Standards."
- By December 31, 2018, CSB, in collaboration with First 5 and the Alliance to End Abuse, will implement a Trauma 2.0 Curriculum for Early Educators in a train-the-trainer model that includes extensive coaching and support by a consultant.
- By December 31, 2018 will re-design its Family Partnership Agreement to include measureable family outcomes that demonstrate the effectiveness of program services and supports.
- By December 31, 2018 CSB implement the Make Parenting a Pleasure curriculum at all of its centers.
- By June 2017, CSB parents will enhance their parenting skills to be more positive with their children and will have developed self-reliant abilities.
- By June 30, 2018, CSB, in collaboration with REadingADvantage will implement two family literacy programs: Parent Power! for parents of preschoolers and Itsy Bitsy (Read Me a Story) for parents of infants and toddlers.

13. ACTIVITY SUMMARY. Program continues to provide high-quality services.

14. EVALUATION METHOD(S). Measurable, results-based child and family outcomes have been implemented, such as the required State of California's Desired Results Developmental Profile, for programs providing services through collaboration with the State of California Department of Education.

15. CHANGES COMPARED TO PRIOR YEAR (if any). Goals and Objectives cover FY 2018 – FY 2022. Policy Council has been involved in the development, review and evaluation process of the goals and objectives.

16. POTENTIAL CONTROVERSIAL ISSUES. None. Public perception of the Head Start and Early Head Start programs remain positive. The Policy Council will approve submission of this grant at their April 18, 2018 meeting.

ADMINISTRATION FOR
CHILDREN & FAMILIES

Office of Head Start | Region IX | 90 Seventh Street, Room 450, San Francisco, CA 94103 |
www.eclkc.ohs.acf.hhs.gov

Karen Mitchoff
Board Chair
Contra Costa County Community Services
1470 Civic Court, Suite 200
Concord, CA 94520

MAR 30 2018

Re: Grant No. 09HP000111

Dear Ms. Mitchoff:

A grant application must be completed for the upcoming budget period. Please consult the grant application instructions to determine the type of application required. The application for the Head Start grant is due 06/01/2018.

The following table reflects the projected funding and enrollment levels for the 09/01/2018 – 08/31/2019 budget period.

Funding Type	Funding Level	Funded Federal Enrollment
Early Head Start Program Operations	$3,454,133	190
Early Head Start Training and Technical Assistance	$86,354	
TOTAL	**$3,540,487**	**190**

Application Submission Requirements

The application must be prepared and submitted in accordance with the *Head Start Grant Application Instructions with Guidance, Version 3 (Application Instructions)*. It must be submitted on behalf of the Authorizing Official registered in the HSES.

Incomplete applications will not be processed.

The *Application Instructions* are available on the home page of HSES. Please review the instructions carefully prior to preparing the application. Submission guidance can be found in the "Instructions" section of the HSES.

Please contact Maureen Burns-Vermette, Head Start Program Specialist, at (415) 437-8452 or maureen.burns@acf.hhs.gov or Frank Olguin, Grants Management Specialist, at (415) 437-8415 or frank.olguin@acf.hhs.gov with questions regarding the *Application Instructions*.

For assistance submitting the application in HSES, contact help@hsesinfo.org or 1-866-771-4737.

Funding is contingent upon the availability of federal funds and satisfactory performance under the terms and conditions of the Head Start grant in the current budget period.

Thank you for your cooperation and timely submission of the grant application.

Sincerely,

Jan Len
Regional Program Manager
Office of Head Start

cc:
Kathy Gallagher, Executive Director
Camilla Rand, Head Start Director

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: May 1, 2018

Subject: City of Brentwood Grant Funding

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to apply for and accept a grant in an amount not to exceed $12,000 from the City of Brentwood to provide economic development advising, training, and outreach services to Brentwood businesses for the period July 1, 2018 through June 30, 2019.

FISCAL IMPACT:
County to receive an amount not to exceed $12,000 from the City of Brentwood Economic Development Grant that is funded from its business license revenues. The grant requires a 1-to-1 cash or in-kind match up to the full grant amount awarded, not to exceed $12,000. The SBDC's federal Small Business Administration funds qualify as match.

BACKGROUND:
The City of Brentwood Economic Development Grant has the explicit purpose of business promotion and institutional advertisement for the City of Brentwood. As part of that effort, City of Brentwood offers grants for local marketing, events, and business development projects.

The Workforce Development Board, Small Business Development Center (SBDC) proposes to actively support economic development in the City of Brentwood by supporting staff on business outreach walks,

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Elaine Burres, 608-4960

cc:

BACKGROUND: (CONT'D)

attending events and delivering group training for business models, and individualized advising with the overreaching goals of business/job retention, new business startups, increased revenues, debt/equity investments and job creation.

CONSEQUENCE OF NEGATIVE ACTION:

Without funding, economic development services in the Brentwood business community would be curtailed.

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: May 1, 2018

Subject: 2018-19 Food Services Agreement with Mt. Diablo Unified School District / Crossroads High School

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract and accept reimbursement in an amount not to exceed $15,000 from Mount Diablo Unified School District, for the provision of food services at the Crossroads High School childcare program for the period July 1, 2018 through June 30, 2019.

FISCAL IMPACT:
There are no net County costs associated with this agreement. Mount Diablo Unified School District has agreed to reimburse the County up to the limits of the California Child and Adult Food Program, for all food service expenses related to this contract. The program may provide up to 5,040 meals at $3.00/meal.

BACKGROUND:
In order to further support the childcare service partnership with Crossroads High School and to ensure the success of food and nutrition goals within these programs, the Department provides the daily meals at selected childcare sites. The meals are provided to program eligible children co-enrolled in the California Child and Adult Food Program and the Contractor's education programs.

CONSEQUENCE OF NEGATIVE ACTION:
If not approved, the County will be unable to provide food services to its childcare partner.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: CSB (925) 681-6334

cc: Nelly Ige, Sam Mendoza, Velma Braggs

CHILDREN'S IMPACT STATEMENT:

The Employment & Human Services Department Community Services Bureau supports three of Contra Costa County's community outcomes - Outcome 1: Children Ready for and Succeeding in School" Outcome 3: Families that are Economically Self-sufficient, and Outcome 4: Families that are Safe, Stable, and Nurturing. These outcomes are achieved by offering comprehensive services, including high quality early childhood education, nutrition, and health services to low-income children throughout Contra Costa County.

ATTACHMENTS

Food service agreement

STANDARD AGREEMENT
FOR FOOD SERVICE / VENDING

This Agreement is entered into on this first day of **July 2018** by and between **Mt. Diablo Unified School District, Crossroads High School,** hereinafter referred to as the Agency and **Contra Costa County** through and by its **Employment & Human Services Department, Community Services Bureau** hereinafter referred to as the Vendor.

THE VENDOR AGREES TO:

1. Prepare and supply the meals, inclusive of milk, to **Mt. Diablo Unified School District, Crossroads High School at 2701 Willow Pass Road, Concord, CA 94519 by 11:00 a.m. each day of Vendor operation, Monday through Friday** in accordance with the number of meals requested and at the cost(s) per meal listed below. **FY 2018-19** rates noted below.

For Toddler children ages 18-36 months:

Breakfast	$ n/a Each	Lunch	$ 3.00 Each
Supplement/Snack (PM)	$ n/a Each	Supper	$ n/a Each

2. Provide the Agency the menu for each month at least **five (5)** days prior to the beginning of the month to which the menu applies.
3. Assure that each meal provided to the Agency under this contract meets the minimum nutritional requirements as defined by the California Child and Adult Care Food Program.
4. Maintain on a daily basis an accurate count of the number of meals by meal type, prepared for the Agency. Meal count documentation must include the number of meals requested by the Agency.
5. Allow the Agency to increase or decrease the number of meal orders, as needed when the request is made within **one (1) business day** of the schedule delivery time.
6. Present to the Agency an invoice accompanied by reports **no later than the 20th day of each month** that itemizes the previous month's delivery. The Vendor agrees to forfeit payment for meals that are not ready within one (1) hour of the agreed upon delivery time, are spoiled or unwholesome at the time of delivery,

Agency County

are short of components, or do not otherwise meet the meal requirements contained in this agreement.

7. Provide the Agency with a copy of current health certifications for the food service facility in which it prepares meals. The Vendor shall ensure that all health and sanitation requirement of the California Retail Food Facilities Law, and chapter 4 of the California Health and Safety Code, are met all times.
8. Not subcontract for the total meal, with or without milk, or for the assembly of the meal.
9. As required by the State Drug-Free workplace Act of 1990 (Government Code §8350 et.seq.) and the Federal Drug-Free Workplace Act of 1988, and implementing regulations, Vendor certifies that it will continue to provide a drug-free workplace.

THE AGENCY AGREES TO:

1. Notify Vendor of necessary increases or decreases in number of meal orders within **eight (8) hours** of the scheduled delivery time. Errors in meal order counts made by the Agency shall be the responsibility of the Agency, and Agency shall pay Vender for all meals ordered even if Agency erroneously ordered an excess number of meals.
2. Ensure that an Agency representative is available at each delivery site, at the specified time on each specified delivery day to receive, inspect and sign for the requested number of meals. This individual will verify the temperature, quality, and quantity of each meal service delivery. The Agency assures the Vendor that this individual will be trained in health and sanitation practices.
3. Provide personnel to serve meals, clean the serving and eating areas, and assemble transport carts and auxiliary items for pick-up/delivery by the Vendor no later than **twenty-four (24) hours** following the delivery of such carts.
4. Notify the Vendor within **ten (10) days** of receipt of the next month's proposed menu of any changes, additions, or deletions that will be required in the menu request.
5. As required by the State Drug-Free workplace Act of 1990 (Government Code §8350 et. seq.) and the Federal Drug-Free Workplace Act of 1988, and implementing regulations, Agency certifies that it will continue to provide a drug-free workplace.
6. Pay the Vendor by the **thirtieth (30th) day of each month** the full amount presented in the monthly itemized invoice. The Agency agrees to notify the Vendor within **forty-eight (48) hours** of receipt of any discrepancy in the invoice.

7. Agency shall defend, indemnify, save and hold harmless Vendor and it's officers and employees from any and all claims, costs and liability for any damages, sickness, death or injury to person(s) or property, including without limitation all consequential damages, from any cause whatsoever arising directly or indirectly from or connected with the operations or services of Agency or its agents, servants, employees or subcontractors hereunder, save and except claims or litigation arising through the sole negligence or sole willful misconduct of Vendor or its officers or employees. Agency will reimburse Vendor for any expenditures, including reasonable attorney fees, Vendor may make by reason of the matters that are the subject of this indemnification, and if requested by Vendor, will defend any claims or litigation to which this indemnification provision applies at the sole cost and expense of Agency.

TERMS OF THE AGREEMENT:

The effective date of this Contract is **July 1, 2018**. It terminates on **June 30, 2019**. This contract may be terminated by either party, in its sole discretion, upon thirty-day advance written notice thereof to the other, and may be cancelled immediately by written mutual consent.

IN WITNESS WHEREOF, THE PARTIES HERETO HAVE EXECUTED THIS AGREEMENT AS OF THE DATES INDICATED BELOW:

CONTRA COSTA COUNTY **COUNTY ADMINISTRATOR'S OFFICE** By: _____ Designee	**COUNTY COUNSEL** **Approved as to Form:** By: _____ Deputy
CONTRA COSTA COUNTY **EMPLOYEMNT & HUMAN SERVICES DEPARTMENT** By: _____ Director/Designee Department Director Title _____ Telephone _____ Date	**MT. DIABLO UNIFIED SCHOOL DISTRICT, CROSSROADS HIGH SCHOOL** By: _____ Official Signature _____ Title _____ Telephone _____ Date

Contra Costa County Board of Supervisors Approval via Board Order (attached)

Contra Costa County

To: Board of Supervisors

From: David O. Livingston, Sheriff-Coroner

Date: May 1, 2018

Subject: Gemalto Cogent Incorporated - Livescan

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Sheriff-Coroner, or designee, to execute a Maintenance and Support Agreement with Gemalto Cogent, Inc., in an amount not to exceed, $454,772 for the purchase of Livescan specific hardware, implementation services, and support of the software, for a five-year period beginning January 1, 2018 through December 31, 2022.

FISCAL IMPACT:
No County Cost. $454,772.00 from CAL ID Funds.

BACKGROUND:
The California Identification System (Cal-ID) is the automated system maintained by the California Department of Justice (DOJ) for retaining fingerprint files and identifying latent fingerprints. Cal-ID monies are collected from the fees from each vehicle registered, two dollars for non-commercial vehicles and four dollars from commercial vehicles, and are used to fund programs that enhance the capacity of the state and local law enforcement to provide automated mobile, fixed Livescan fingerprint capture stations and Automated Fingerprint Identification Systems (AFIS) that allow identification of individuals involved in motor vehicle crimes. The California Department of Justice has established the Remote Access Network (RAN), which is a uniform statewide network

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Sandra Brown
925-335-1553

cc:

BACKGROUND: (CONT'D)

of equipment and procedures allowing local law enforcement agencies direct access to the Cal-ID System. The Contra Costa County local RAN board determines the placement of RAN equipment within the County, and coordinates the acceptance, delivery, and installation of RAN equipment. Acting as the local RAN board, mobile fingerprint identification hardware has been distributed to local law enforcement agencies within the County pursuant to the criteria specified in the Penal Code. Under the proposed contract, maintenance and support for the Livescan will be purchased to provide support and hardware replacement so that local law enforcement agencies can continue to capture arrest data and booking related fingerprints. The Livescans are a high-use device and parts wear out frequently. If maintenance and support is not obtained, replacement of the hardware and updates to the software will no longer be supported. The Gemalto Cogent Livescans provide the mechanism for the capture of fingerprints, photos and charge information as state and federally mandated for arrest reporting to the California Department of Justice and the Federal Bureau of Investigations. The maintenance and support agreement will provide 24/7 support and hardware replacement to keep the Livescans in working order.

CONSEQUENCE OF NEGATIVE ACTION:

If the Office of the Sheriff is not allowed to contract with Gemalto Cogent for the Livescan Maintenance and Support for the Livescan fingerprint capture stations, agencies in the county will experience extended downtime preventing officers from capturing the requisite fingerprint and arrest/booking data required by the state and federal mandates. This may lead to the release of wanted subjects from booking facilities because they have not been identified. Some subjects may be wanted for a more serious offense under another name. In addition, the lack of ability to identify an arrested subject may detain an individual that is not the person sought in a warrant or an investigation.

CHILDREN'S IMPACT STATEMENT:

No impact.

Contra Costa County

To: Board of Supervisors

From: Matt Slattengren

Date: May 1, 2018

Subject: APHIS-WS Integrated Wildlife Management Program 18-73-06-0251-RA

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Agricultural Commissioner, or designee, to execute Agreement #18-73-06-0251-RA with the United States Department of Agriculture (USDA) Wildlife Services in an amount not to exceed $40,649 to provide wildlife damage management for the period July 1, 2018 through June 30, 2019.

FISCAL IMPACT:
This agreement is funded with Unclaimed Gas Tax revenue (60%) and County General Fund (40%). It has been anticipated and budgeted for FY 2018/19.

BACKGROUND:
Animal and Plant Health Inspection Services - Wildlife Services (APHIS-WS) is a federal agency with a broad mission that includes carrying out wildlife damage management activities. In recent years, the United States Department of Agriculture- Animal and Plant Health Inspection Services (USDA-APHIS) has maintained an effective Integrated Wildlife Damage Management Program (IWDM) to resolve conflicts with wildlife throughout the County. APHIS-WS overall goal is to maintain a biologically sound IWDM program to assist property owners, businesses, private citizens, and governmental agencies in resolving wildlife damage problems and conduct control activities in accordance with applicable Federal, State

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: 646-5250

cc:

BACKGROUND: (CONT'D)

and local laws and regulations. Assistance may be in the form of providing (1) technical assistance through demonstration and instruction of wildlife damage prevention and/or control techniques; (2) predator identification and removal when livestock, crop or natural resource damage is verified; (3) nuisance wildlife technical assistance including removal, if necessary, when property damage is identified; (4) removal of wildlife displaying aggressive behavior or causing actual injury to County residents.

CONSEQUENCE OF NEGATIVE ACTION:

A negative action will restrict the Department in providing wildlife damage management and taking corrective actions on existing wildlife damage problems for the residents of the County.

Contra Costa County

To: Board of Supervisors

From: David O. Livingston, Sheriff-Coroner

Date: May 1, 2018

Subject: Shotcaller Global Inc. - GunOps

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Sheriff-Coroner, or designee, to execute a software and licensing agreement, including modified indemnification language, with Shotcaller Global, Inc., in an annual amount of $25,500 for the "GunOps" crime tracking system software tracking system for the period April 17, 2018 and renewed annually unless canceled by either party.

FISCAL IMPACT:
$25,500 Grant Funded. No county funds.

BACKGROUND:
The Contra Costa County Office of the Sheriff's Crime Lab has been on the forefront of assisting Law Enforcement investigators with real time results and actionable intelligence. GunOps provides real-time linkages between three databases already in the Sheriff's Office domain through state-of-the art GPS technology. GunOps offers a superior product that will enable the Sheriff's Office to better detect and deter future gun-related crimes. The board will need to approve the agreement due to change in indemnification language.

CONSEQUENCE OF NEGATIVE ACTION:
Negative action will result in the inability of the Sheriff's Office to better detect and deter future gun-related crimes.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Sandra Brown
925-335-1553

cc:

CHILDREN'S IMPACT STATEMENT:

None.

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: May 1, 2018

Subject: Contract with Language Line Services, Inc. for Interpretation and Translation Services

RECOMMENDATION(S):

APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract with Language Line Services, Inc., in an amount not to exceed $1,250,000 for interpretation and translation services for the period July 1, 2018 through June 30, 2019.

FISCAL IMPACT:

This contract will increase department expenditures by $1,250,000 to be funded with 10% County, 48% State, 42% Federal revenue.

BACKGROUND:

Language Line Services, Inc. provides telephone interpretation, on-site interpretation, and document translation services to the Employment and Human Services Department and to the clients served by the Employment and Human Services Department. Services are provided to the County adult population, children, families, and employment and training program related clients throughout the County. State and Federal regulations require the County to provide public information materials to potential, present and past recipients regarding client services in any non-English language that is prevalent within the County.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Gina Chenoweth
8-4961

cc:

CONSEQUENCE OF NEGATIVE ACTION:

Employment and Human Services would be unable to meet requirements for the administration of State and Federal programs.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Contract #27-842-3 with Contra Costa Hearing Aid Center, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County, Contract #27-842-3 with Contra Costa Hearing Aid Center, Inc., a corporation, in an amount not to exceed $250,000, to provide audiology and hearing aid services to Contra Costa Health Plan (CCHP) members for the period May 1, 2018 through April 30, 2020.

FISCAL IMPACT:
This contract is funded 100% by CCHP Enterprise Fund II. (No rate increase)

BACKGROUND:
On April 27, 2015, the Board of Supervisors approved Contract #27-842-2 with Contra Costa Hearing Aid Center, Inc. for the provision of audiology and hearing aid services to CCHP members, for the period from May 1, 2015 through April 30, 2018.

Approval of Contract #27-842-3 will allow the contractor to continue to provide audiology and hearing aid services for CCHP members through April 30, 2020.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Patricia Tanquary, 925-313-6004

cc: A Floyd, M Wilhelm

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, certain specialty health care services for its members under the terms of their Individual and Group Health Plan membership contracts with the County will not be provided.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Contract #27-599-14 with Paladin Managed Care Services, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County, Contract #27-599-14 with Paladin Managed Care Services, Inc., a corporation, in an amount not to exceed $300,000, to provide claims processing and negotiation services to Contra Costa Health Plan (CCHP) members for the period June 1, 2018 through May 31, 2020.

FISCAL IMPACT:
This is a contingency fee contract. Contractor receives a percentage of the savings received from their actions. (No rate increase)

BACKGROUND:
On May 24, 2016, the Board of Supervisors approved Contract #27-599-13 with Paladin Managed Care Services, Inc. for the period from June 1, 2016 through May 31, 2018 for claims processing and negotiation services for CCHP including: acting as billing agent to negotiate discounted rates, reviewing the documentation of medical claims, and electronically transmitting claims from out-of-network medical providers. Approval of Contract #27-599-14 will allow the contractor to continue to provide services through May 31, 2020.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Patricia Tanquary, (925) 313-6004

cc: A Floyd , M Wilhelm

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, Contra Costa Health Plan will not have access to the contractor's negotiation, claims processing and price factoring services.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Contract #77-022-1 with California Center for Behavioral Health

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County, Contract #77-022-1 with California Center for Behavioral Health, a corporation, in an amount not to exceed $150,000, to provide outpatient psychiatry services to Contra Costa Health Plan (CCHP) members for the period June 1, 2018 through May 31, 2020.

FISCAL IMPACT:
This contract is funded 100% by CCHP Enterprise Fund II. (No rate increase)

BACKGROUND:
In April 2016, the County Administrator approved and the Purchasing Manager executed Contract #77-022 with California Center for Behavioral Health, for the period from June 1, 2016 through May 31, 2018, for the provision of outpatient psychiatry services for CCHP members.

Approval of Contract #77-022-1 will allow the contractor to continue to provide outpatient psychiatry services for CCHP members through May 31, 2020.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Patricia Tanquary, (925) 313-6004

cc: A Floyd, M Wilhelm

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, certain specialty health care services for its members under the terms of their Individual and Group Health Plan membership contracts with the County will not be provided.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Contract #74-233-3 with Estelita Marquez-Floyd, M.D.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County, Contract #74-233-3 with Estelita Marquez-Floyd, M.D., an individual, in an amount not to exceed $266,240, to provide outpatient psychiatric services at the East County Mental Health Clinic, for the period from July 1, 2018 through June 30, 2019.

FISCAL IMPACT:
This contract is funded by 50% Federal Medi-Cal and 50% Mental Health Realignment funds. (No rate increase)

BACKGROUND:
On June 20, 2017, the Board of Supervisors approved Contract #74-233-2 with Estelita Marquez-Floyd, M.D., for the provision of outpatient psychiatric services including diagnosing, counseling, evaluating, and providing medical and therapeutic treatment to children and adolescents at the East County Mental Health Clinic, for the period from July 1, 2017 through June 30, 2018.

Approval of Contract #74-233-3 will allow the contractor to continue providing outpatient psychiatric services at the East County Mental Health Clinic through June 30, 2019.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Matthew White, M.D., 925-957-5201

cc: D Morgan, M WILHELM

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, County's clients will not have access to the contractor's psychiatric services.

CHILDREN'S IMPACT STATEMENT:

This program supports the following Board of Supervisors' community outcomes: "Children Ready For and Succeeding in School"; "Families that are Safe, Stable, and Nurturing"; and "Communities that are Safe and Provide a High Quality of Life for Children and Families". Expected program outcomes include an increase in positive social and emotional development as measured by the Child and Adolescent Functional Assessment Scale (CAFAS).

Contra Costa County

To: Board of Supervisors

From: Sharon Offord Hymes, Risk Manager

Date: May 1, 2018

Subject: Contract Amendment for BSI EHS Services and Solutions

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Director of Risk Management to execute a contract amendment with BSI EHS Services and Solutions to increase the payment limit by $508,600 to a new total payment limit of $1,727,400 for additional Occupational Safety Health Administration (OSHA) compliance support during the term of July 1, 2017 through June 30, 2018.

FISCAL IMPACT:
Additional cost of $508,600 will be paid through the Workers' Compensation Internal Service Fund.

BACKGROUND:
BSI EHS Services and Solutions assists in dealing with Occupational Safety Health Administration (OSHA) compliance inspections and responses on behalf of all County departments. Since the inception of this contract, additional services have been needed for Public Works asbestos sampling, Contra Costa Fire asbestos sampling, ADA pubic access compliance and the desktop alert emergency notification system.

CONSEQUENCE OF NEGATIVE ACTION:
The County will not be able to ensure OSHA and CalOSHA compliance.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Sharon Hymes-Offord, 925 335-1450

cc: Brian Balbas, Public Works Director

Contra Costa County

To: Board of Supervisors

From: David O. Livingston, Sheriff-Coroner

Date: May 1, 2018

Subject: Men and Women of Purpose

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Sheriff-Coroner, or designee, to execute a contract with Men and Women of Purpose in an amount not to exceed $191,650 for the provision of mentoring and placement services to assist adult inmates transitioning back into the community for the period July 1, 2018 through June 30, 2019.

FISCAL IMPACT:
$191,650; 100% 2018/19 AB109.

BACKGROUND:
The purpose of this Contract is to implement the Jail to Community Program as part of the County's AB109 public safety realignment plan. In order to implement the Jail to Community Program, the Men and Women of Purpose(MWP) and the Office of the Sheriff-Coroner will commit to an ongoing collaboration to strengthen and develop a multi-disciplinary approach to serve adult offenders inside the County's West County Detention Facility, Martinez, Detention Facility, and Marsh Creek Detention Facility. Those incarcerated and in the custody of the County's Sheriff-Coroner would need to meet certain criteria to be among the AB 109 re-entry population. Some of the services MWP provides are initial assessments, recommending treatment plans, developing support

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
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Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Sandra Brown, 925-335-1553

cc:

BACKGROUND: (CONT'D)

groups, and assisting participants with the recovery of their California Driver's License, Social Security Card and Green Cards for the re-entry population. MWP will provide participants online access and print outs of the County's 211 information services and participant services to each of its Outpatient and Day Treatment programs after the participant is released.

CONSEQUENCE OF NEGATIVE ACTION:

A negative action would result in the incarcerated not having an improved chance to not re-offend and return to the detention facility resulting in an increased fiscal impact and continued overcrowding.

CHILDREN'S IMPACT STATEMENT:

No impact.

Contra Costa County

To: Board of Supervisors

From: David O. Livingston, Sheriff-Coroner

Date: May 1, 2018

Subject: CHAPLAIN SERVICES FOR ADULT DETENTION FACILITIES

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Sheriff-Coroner, or designee, to execute a contract with Bay Area Chaplains, Inc., in an amount not to exceed $156,100 for chaplaincy services for the period July 1, 2018 through June 30, 2019.

FISCAL IMPACT:
$156,100; Budgeted, 100% Inmate Welfare Fund.

BACKGROUND:
The Bay Area Chaplains, Inc., provide clergy to meet the diverse spiritual needs of inmates and their families housed in the Office of the Sheriff's adult detention facilities in Contra Costa County. Clergy of all denominations provide counseling, religious materials and literature, bible studies, worship services, and respond to crisis and emergencies involving inmates or staff.

CONSEQUENCE OF NEGATIVE ACTION:
Chaplaincy services within the three adult detention facilities will discontinue after July 1, 2018.

CHILDREN'S IMPACT STATEMENT:
No impact.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Sandra Brown, 925-335-1553

cc:

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Contract #23-591-2 with Archer Business Solutions, LLC

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County, Contract #23-591-2 with Archer Business Solutions, LLC, a limited liability company, in an amount not to exceed $145,000, to provide technical support and consulting services for the Health Services Department's Information Systems Unit for the period from July 1, 2018 through June 30, 2019.

FISCAL IMPACT:
This contract is funded 100% by Hospital Enterprise Fund I. (Rate increase)

BACKGROUND:
On June 13, 2017, the Board of Supervisors approved Contract #23-591-1 with Archer Business Solutions, LLC, for the provision of technical support, consulting, training and project management for the Department's Information Systems Unit, in regards to the implementation of PeopleSoft data analytics and reporting system for the period from July 1, 2017 through June 30, 2018.

Approval of Contract #23-591-2 will allow the contractor to continue to provide technical support and consulting through June 30, 2019.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

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Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Bud DeCesare, 925-957-5429

cc: L Walker, M Wilhelm

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, County will not have access to the contractor's expert technical assistance, support, and optimization skills for its Information Systems Unit.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Novation Contract #74–358–9 with Contra Costa Crisis Center

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County, Novation Contract #74–358–9 with Contra Costa Crisis Center, a non-profit corporation, in an amount not to exceed $310,685, to provide prevention and early intervention services pursuant to the Mental Health Services Act (MHSA) for the period from July 1, 2018 through June 30, 2019, which includes a six-month automatic extension through December 31, 2019, in an amount not to exceed $155,342.

FISCAL IMPACT:
This contract is funded 100% by Mental Health Services Act. (3% Cost of Living Adjustment)

BACKGROUND:
This contract meets the social needs of County's population by providing a nationally-certified 24-hour suicide prevention hotline that lowers the risk of suicide at a time when people are most vulnerable, enhances safety and connectedness for suicidal individuals, and builds a bridge to community resources for at-risk persons.

On June 6, 2017, the Board of Supervisors approved Novation Contract #74-358-8 with Contra Costa Crisis Center for the provision of MHSA prevention and early intervention services for the period from July 1, 2017 through June 30, 2018, which included a six-month automatic extension through December 31, 2018.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
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Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Mathew White M.D., 925-957-5201

cc: L Walker , M Wilhelm

BACKGROUND: (CONT'D)

Approval of Novation Contract #74–358–9 replaces the automatic extension under the prior contract and allows the contractor to continue providing services through June 30, 2019.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the contractor will not be able to provide suicide prevention hotline services to non-English speaking callers.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Contract #76-549-3 with Yana Wirengard, M.D.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #76-549-3 with Yana Wirengard, M.D., an individual, in an amount not to exceed $467,000, to provide general surgery services at Contra Costa Regional Medical Center (CCRMC) and Contra Costa Health Centers for the period July 1, 2018 through June 30, 2019.

FISCAL IMPACT:
This contract is funded 100% by Hospital Enterprise Fund I. (Rate increase)

BACKGROUND:
On June 20, 2017, the Board of Supervisors approved Contract #76-549-2 with Yana Wirengard, M.D., to provide general surgery services at CCRMC and Contra Costa Health Centers, including clinic coverage, surgical procedures, on-call and administrative support services, through June 30, 2018.

Approval of Contract #76-549-3 will allow the contractor to continue to provide general surgery services at CCRMC and Contra Costa Health Centers through June 30, 2019.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Samir Shah, 925-370-5525

cc: K Cyr, M Wilhelm

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, patients requiring general surgery services at CCRMC and Health Centers will not have access to the contractor's services.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Amendment Agreement #24–933–36 with Crestwood Behavioral Health, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County, Contract Amendment Agreement #24–933–36 with Crestwood Behavioral Health, Inc., a corporation, effective May 1, 2018, to amend Contract #24–933–35 to increase the payment limit by $1,006,976, from $7,383,000 to a new payment limit of $8,389,976 with no change in the term of July 1, 2017 through June 30, 2018.

FISCAL IMPACT:
This contract is funded by 92% Mental Health Realignment and 8% Mental Health Services Act funds. (No rate increase)

BACKGROUND:
This contract meets the social needs of County's population in that it provides subacute skilled nursing care services for County's Severe and Persistent Mental Illness (SPMI) and neurobehavioral clients.

On July 11, 2017, the Board of Supervisors approved Contract #24-933-35 with Crestwood Behavioral Health, Inc., for the period from July 1, 2017 through June 30, 2018 for the provision of subacute skilled nursing care for SPMI and neurobehavioral clients.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
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Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Mathew White M.D., 925-957-5201

cc: L Walker , M Wilhelm

BACKGROUND: (CONT'D)

Approval of Contract #24-933-36 will allow the contractor to provide additional services through June 30, 2018.

CONSEQUENCE OF NEGATIVE ACTION:

The Behavioral Health Services Division/Mental Health places clients at contractor's facilities which is licensed for various levels of care. If the contract is not approved, a significant number of mentally ill young adults and adults may be displaced to the community without the mental health services they require.

Contra Costa County

To: Board of Supervisors

From: David O. Livingston, Sheriff-Coroner

Date: May 1, 2018

Subject: Gemalto Cogent Inc.

RECOMMENDATION(S):
RESCIND Board Action of February 13, 2018 (C.52) and APPROVE and AUTHORIZE the Sheriff-Coroner, or designee, to execute a Services Agreement with Gemalto Cogent, Inc., in an amount not to exceed, $120,000 for the services and maintenance enhancement of a dedicated on-site support engineer for a term of July 1, 2018 through June 30, 2019 with no change in payment limit.

FISCAL IMPACT:
No County Cost. $120,000.00 from CAL ID Funds.

BACKGROUND:
The California Identification System (Cal-ID) is the automated system maintained by the California Department of Justice (DOJ) for retaining fingerprint files and identifying latent fingerprints. Cal-ID monies are collected from the fees from each vehicle registered, two dollars for non-commercial vehicles and four dollars from commercial vehicles, and are used to fund programs that enhance the capacity of the state and local law enforcement to provide automated mobile, fixed Livescan fingerprint capture stations and Cogent Automated Biometric Identification System (CABIS), formerly known as Cogent Automated Fingerprint Identification System (CAFIS), that allow

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Sandra Brown
925-335-1553

cc:

BACKGROUND: (CONT'D)

identification of individuals involved in motor vehicle crimes. The California Department of Justice has established the Remote Access Network (RAN), which is a uniform statewide network of equipment and procedures allowing local law enforcement agencies direct access to the Cal-ID System.

The Contra Costa County local RAN board determines the placement of RAN equipment within the County, and coordinates the acceptance, delivery, and installation of RAN equipment. Acting as the local RAN board, mobile fingerprint identification hardware has been distributed to local law enforcement agencies within the County pursuant to the criteria specified in the Penal Code. Under the proposed contract, a dedicated support engineer will provide to Contra Costa County Sheriff's Office and its client agencies high availability of support for the Cogent Automated Fingerprint Identification System (CAFIS), the mugshot server, Latent Gateway, WebID, 31 Livescans, and the 350 Mobile ID devices throughout the county. A dedicated support engineer will provide continuity to the support needs, develop more personalized technical support relationships with users, perform proactive maintenance to reduce technical problems and downtimes minimizing disruption to the daily business for the law enforcement officer.

CONSEQUENCE OF NEGATIVE ACTION:

If the Office of the Sheriff is not allowed to contract with Gemalto Cogent for the dedicated support engineer, Contra Costa County Sheriff's Office and its client agencies will experience support engineers that are not familiar with the configurations and components of our systems which slows the support response. In addition, Contra Costa County and its agencies vie for support time with the Gemalto Cogent support engineers with many other counties and police departments throughout Northern California. Delayed support response can translate into the inability to identify unknown subjects on the street with Mobile ID or the inability to capture fingerprints at booking facilities with a Livescan for mandated reporting to the California Department of Justice and the Federal Bureau of Investigations. The delay to fix failures of the aforementioned systems could lead to the release of subjects on the street or from booking facilities because they have not been identified and may be wanted for a more serious offense under another name. In addition, the lack of ability to identify an arrested subject may detain an individual that is not the person sought in a warrant or an investigation.

CHILDREN'S IMPACT STATEMENT:

N/A

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: May 1, 2018

Subject: Amend Contract with CoCoKids for Promoting Safe and Stable Families Program Services

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract amendment with CocoKids, Inc., effective May 1, 2018, to increase the payment limit by $40,000 to a new payment limit of $120,000 and to extend the term ending date from June 30, 2018 to December 31, 2018 to provide ongoing Promoting Safe and Stable Families Program Services.

FISCAL IMPACT:
This contract will increase expenditures by $40,000 and is funded 30% by County and 70% by State Family Preservation revenues.

BACKGROUND:
This Contractor was selected through the competitive bid process, Request For Proposals (RFP) 1135 by Employment and Human Services, Children and Family Services Bureau (CFS). RFP 1135 requested community-based and/or faith-based organizations to provide Promoting Safe and Stable Families (PSSF) services in Contra Costa County. The purpose of PSSF services is to prevent the unnecessary separation of children from their families, improve the quality of care and services to children and their families, and to ensure permanency for children by reuniting them with their parents, by adoption, or by another permanent living arrangement.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Gina Chenoweth
8-4961

cc:

BACKGROUND: (CONT'D)

This amendment and extension will ensure Contractor continues to provide the following services while a Request For Proposal can be processed by the County; support services to parents and families in the Family Together Program to improve parenting skills, provide case management, parent education, parent and child enrichment activities and information about and referrals to other relevant community resources and services.

CONSEQUENCE OF NEGATIVE ACTION:

Parents and families in the Family Together Program will not receive services to improve parenting skills, parent education, and parent and child enrichment activities and information.

CHILDREN'S IMPACT STATEMENT:

This contract supports all five community outcomes: 1) Children Ready for and Succeeding in School; 2) Children and Youth Healthy and Preparing for Productive Adulthood; 3) Families that are Economically Self-Sufficient; 4) Families that are Safe, Stable and Nurturing; and 5) Communities that are Safe and Provide a High Quality of Life for Children and Families, by providing resources and referrals to support self-sufficiency.

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: May 1, 2018

Subject: Amend Contract with Aspiranet for Outreach, Advocacy, and Support to Adoptive Families

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract amendment with Aspiranet, effective May 1, 2018, to increase the payment limit by $36,964 to a new payment limit of $155,311 and to extend the ending term date from June 30, 2018 to December 31, 2018, to provide ongoing outreach, advocacy, and support to adoptive families.

FISCAL IMPACT:
This contract amendment will increase expenditures by $36,964 and will be funded 100% by Federal Promoting Safe and Stable Families Program revenue.

BACKGROUND:
Aspiranet is one of several agencies selected as a result of a competitive bidding process for Promoting Safe and Stable Families (PSSF) funding. The primary goals of the PSSF Program are to prevent the unnecessary separation of children from their families, improve the quality of care and services to children and their families, and ensure permanency for children by reuniting them with their parents, by adoption, or by another permanent arrangement. PSSF funding is used to support services to strengthen parental relationships and may be used to remove barriers that impede the process of adoption when children cannot

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Gina Chenoweth
8-4961

cc:

BACKGROUND: (CONT'D)

be safely reunited with their families and to address the unique issues adoptive families and children may face.

This extension ensures Aspiranet provides the following ongoing services while a Request For Proposal (RFP) can be processed; REACH Contra Costa (Reaching Out to Assist Post-Adoption Families by Providing: Resources, Education, Advocacy, Crisis Counseling, and Hope – REACH) services through Contra Costa County; community outreach; advocacy; and parent and family support.

CONSEQUENCE OF NEGATIVE ACTION:

Comprehensive, no-cost, adoption outreach and advocacy, information and referral, crisis intervention, case management, and socialization services will be unavailable to Contra Costa County's adoptive families.

CHILDREN'S IMPACT STATEMENT:

The services provided under this contract support all five of Contra Costa County's community outcomes: (1) Children Ready for and Succeeding in School; (2) Children and Youth Healthy and Preparing for Productive Adulthood; (3) Families that are Economically Self-Sufficient; (4) Families that are Safe, Stable and Nurturing; and (5) Communities that are Safe and Provide a High Quality of Life for Children and Families by providing services to maintain the adoptive family unit.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Cancellation Agreement#74-479-4 and Contract #74-479-5 with David Robert Ruecker, M.D.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County as follows: (1) Cancellation Agreement #74-479-4 with D R Ruecker, M.D., Inc., a corporation, effective on the close of business on April 30, 2018; and (2) Contract #74-479-5 with David Robert Ruecker, M.D., an individual, in an amount not to exceed $300,800, to provide outpatient psychiatric care for seriously emotionally disturbed (SED) children and adolescents in Central Contra Costa County for the period from May 1, 2018 through April 30, 2019.

FISCAL IMPACT:
This contract is funded 50% Federal Medi-Cal and 50% Mental Health Realignment. (No rate increase)

BACKGROUND:
On September 26, 2017, the Board of Supervisors approved Contract #74-479-3, with D. R. Ruecker M.D., Inc., for the provision of outpatient psychiatric care services, including diagnosing, counseling, evaluating and providing medical and therapeutic treatment to, SED children and adolescents in Central Contra Costa County, for the period from January 1, 2018 through December 31, 2018.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
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Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Matthew White M.D., 925-370-5891

cc: E Suisala, M Wilhelm

BACKGROUND: (CONT'D)

The contractor has changed his legal status from a corporation to an individual. Therefore, in accordance with General Conditions Paragraph 5 (Termination), of the Contract, the Department and D. R. Ruecker, M.D., Inc., have agreed to a mutual cancellation of Contract #74-479-3, effective at the close of business on April 30, 2018. Cancellation Agreement #74-479-4 will accomplish this termination.

Approval of Contract #74-479-5 will allow David Robert Ruecker, M.D. to continue providing outpatient psychiatric care, under his legal status as an individual, through April 30, 2019.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, County's clients will not have access to contractor's outpatient psychiatric care.

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: May 1, 2018

Subject: Amend Contract with Paul Gibson for Clinical Supervision Services

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract amendment with Paul Gibson, LCSW, to increase the payment limit by $52,500 to a new payment limit of $145,300 to provide Clinical Supervision Services to Children and Family Services Bureau staff seeking licensure, effective July 1, 2018 with no change to the original contract term of July 1, 2017 through June 30, 2019.

FISCAL IMPACT:
The contract amendment will increase department expenditures by $52,500. The funds allocated for this contract are 100% State 2011 Realignment and are included in the FY 2018/19 department budget.

BACKGROUND:
In order to meet the standards of the Board of Behavioral Science Examiners (Board) to be licensed as a Licensed Clinical Social Worker (LCSW) or Marriage and Family Therapist (MFT), staff with advanced degrees must register as interns with the Board. Interns are required to accumulate a specified number of individual supervision hours through their clinical practice.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: V. Kaplan, (925) 608-4963

cc:

BACKGROUND: (CONT'D)

In addition to group clinical supervision, Contractor will provide supervision and training that will include, but not be limited to, case-specific consultation, guidance, and support to Employment and Human Services Department Children and Family Services staff with the focus on providing supervisees with hours towards their licensures. A certificate of completion for fifteen (15) hour clinical supervisor courses and copies of current Board of Behavioral Sciences license will be provided to supervisees who meet the required accumulated hours.

The original contract had a payment limit of $92,800 with a term of July 1, 2017 through June 30, 2019.

CONSEQUENCE OF NEGATIVE ACTION:

If not approved, valuable training and information will not be provided to Employment and Human Services Department staff. It could also impact staff's ability to properly assess and provide services to youth and families.

CHILDREN'S IMPACT STATEMENT:

This contract supports three of the community outcomes established in the Children's Report Card: 1) Children and Youth Healthy and Preparing for Productive Adulthood; 2) Families that are Safe, Stable and Nurturing; and 3) Communities that are Safe and Provide a High Quality of Life for Children and Families, by providing child welfare staff with the tools needed to deliver services to youth and families.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Contract #24-681-2(35) with God's Grace Caring Home, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County, Contract #24-681-2(35) with God's Grace Caring Home, Inc., a corporation, in an amount not to exceed $358,800 to provide augmented board and care services for the period from July 1, 2018 through June 30, 2019.

FISCAL IMPACT:
This contract is funded 100% by Mental Health Realignment funds. (No rate increase)

BACKGROUND:
This contract meets the social needs of the County's population by providing augmentation of room and board, and twenty-four hour emergency residential care and supervision, to eligible mentally disordered clients, who are specifically referred by the Mental Health Program staff and who are served by County Mental Health Services.

On June 20, 2017, the Board of Supervisors approved Contract #24-681-2(33) [as amended by Amendment Agreement #24-681-2(34)] with God's Grace Caring Home, Inc. for the provision of augmented board and care services for County-referred mentally disordered clients for the period from July 1, 2017 through June 30, 2018.

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Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Matthew White M.D., 925-957-5201

cc: L Walker , M Wilhelm

BACKGROUND: (CONT'D)

Approval of Contract #24-681-2(35) will allow the contractor to continue providing augmented board and care services through June 30, 2019.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, augmented board and care services will not be provided to County-referred mentally disordered clients by this Contractor.

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: May 1, 2018

Subject: Interagency Agreement with Contra Costa Community College District - Diablo Valley College Campus for Resource Family Pre-Approval Training

RECOMMENDATION(S):

APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute an interagency agreement with Contra Costa Community College District – Diablo Valley College in an amount not to exceed $30,000 to provide Resource Family Pre-Approval training for the period July 1, 2018 through June 30, 2019.

FISCAL IMPACT:

The funds allocated for this agreement are $22,500 (75%) Federal and $7,500 (25%) State, and are included in the FY 2018/19 department budget.

BACKGROUND:

Resource Family Approval (RFA) was enacted by legislation in 2007 and expanded through Senate Bill 1013 (Chapter 35, Statutes of 2012). The statute requires the California Department of Social Services, in consultation with county child welfare agencies, including Juvenile Probation, foster parent associations and other interested community parties, to implement a unified, family friendly and child-centered resource family approval process.

☑ APPROVE ☐ OTHER

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Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: V. Kaplan, (925) 608-4963

cc:

BACKGROUND: (CONT'D)

The RFA program has a single approval standard that replaces the existing multiple processes for licensing foster family homes, approving relatives and non-relative extended family members as foster care providers, and approving families for legal guardianship or adoption. In compliance with state mandates, Contra Costa Community College District - Diablo Valley College will provide caregivers of foster children six 12-hour training sessions, locate and hire independent training consultants, and provide appropriate instructional materials to each training participant.

CONSEQUENCE OF NEGATIVE ACTION:

State law requires that all currently licensed foster family homes, approved relative caregivers, or non-relative extended family members must convert to the Resource Family Approval program no later than December 31, 2019. If the caregiver does not obtain resource family approval by December 31, 2019, all licenses and prior approvals shall forfeit on that date.

CHILDREN'S IMPACT STATEMENT:

This agreement supports all five of the community outcomes established in the Children's Report Card: 1) Children Ready for and Succeeding in School; 2) Children and Youth Healthy and Preparing for Productive Adulthood; 3) Families that are Economically Self Sufficient; 4) Families that are Safe, Stable and Nurturing; and 5) Communities that are Safe and Provide a High Quality of Life for Children and Families, by preparing families to better meet the needs of vulnerable children in the foster care system and allows seamless transition to permanency.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Amendment #74-271-19(12) with Ena Rios, LCSW (dba Ena Rios Corporation)

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County, Contract Amendment Agreement #74-475-19(12) with Ena Rios, LCSW (dba Ena Rios Corporation), a corporation, effective May 1, 2018, to amend Contract #74-271-19(11), to increase the payment limit by $130,000, from $100,000 to a new payment limit of $230,000, with no change in the term of July 1, 2016 through June 30, 2018.

FISCAL IMPACT:
This contract is funded by 50% Federal Medi-Cal and 50% State Mental Health Realignment. (No rate increase)

BACKGROUND:
In October 2016, the County Administrator approved and the Purchasing Services Manager executed Contract #74-271-19(11), with Ena Rios, LCSW (dba Ena Rios Corporation) for the provision of Medi-Cal specialty mental health services for the period from July 1, 2016 through June 30, 2018.

At the time of negotiations, the payment limit was based on target levels of utilization. However, the utilization during the term of the contract was higher than originally anticipated. Approval of Contract

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

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Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Matthew White, M.D., 925-370-5891

cc: Robert Curotto, Marcy Wilhelm

BACKGROUND: (CONT'D)

Amendment Agreement #74-271-19(12) will allow the contractor to provide additional mental health services through June 30, 2018.

CONSEQUENCE OF NEGATIVE ACTION:

If this amendment is not approved, services provided to Contra Costa Mental Health Plan Medi-Cal beneficiaries could be negatively impacted, including access to services, choice of providers, cultural competency, language capacity, geographical locations of service providers, and waiting lists.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Amendment #74-341-70(6) with Bay Area Doctors, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract Amendment Agreement #74-341-70(6) with Bay Area Doctors, Inc., a corporation, effective May 1, 2018, to amend Contract #74-341-70(5), to increase the payment limit by $100,000, from $700,000 to a new payment limit of $800,000, with no change in the term of July 1, 2016 through June 30, 2018.

FISCAL IMPACT:
This contract is funded by 50% Federal Medi-Cal and 50% State Mental Health Realignment. (No rate increase)

BACKGROUND:
On September 13, 2016, the Board of Supervisors approved Contract #74-341-70(5) with Bay Area Doctors, Inc. for the provision of Medi-Cal specialty mental health services for the period from July 1, 2016 through June 30, 2018.

At the time of negotiations, the payment limit was based on target levels of utilization. However,

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☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

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Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Matthew White, M.D., 925-370-5891

cc: Robert Curotto, Marcy Wilhelm

BACKGROUND: (CONT'D)

the utilization during the term of the contract was higher than originally anticipated. Approval of Contract Amendment Agreement #74-341-70(6) will allow the contractor to provide additional mental health services through June 30, 2018.

CONSEQUENCE OF NEGATIVE ACTION:

If this amendment is not approved, services provided to Contra Costa Mental Health Plan Medi-Cal beneficiaries could be negatively impacted, including access to services, choice of providers, cultural competency, language capacity, geographical locations of service providers, and waiting lists.

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: May 1, 2018

Subject: Contract with Family Support Services for Comprehensive Respite Services for Foster Parents

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract with Family Support Services, in an amount not to exceed $360,317 to provide comprehensive respite services to foster parents and relative caregivers for the period of July 1, 2018 through June 30, 2019.

FISCAL IMPACT:
The funds allocated for this contract are 79% State 2011 Realignment ($283,569) and 21% County ($76,748), and are included in the FY 2018/19 department budget.

BACKGROUND:
This contract allows Family Support Services to provide comprehensive high quality in-home, out-of-home and site based respite services to support the relative caregivers and foster parents in their full-time role as caregivers. Family Support Services supports foster caregivers throughout Contra Costa County, most of which foster drug-exposed and medically fragile children. Respite services are available 24-hours a day, seven days a week.

The program is designed to: improve the safety, permanence and well-being of the children receiving services; allow the primary caregiver(s) time for necessary self-care and to keep medical and other

☑ APPROVE ☐ OTHER

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Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

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Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: V. Kaplan, (925) 608-4963

cc:

BACKGROUND: (CONT'D)

personal appointments; reduce stress, improve family stability; and ensure families are able to access a range of resources that support permanence, stability and self-sufficiency.

CONSEQUENCE OF NEGATIVE ACTION:

If not approved, foster caregivers will not have the opportunity to receive respite services for the children in their care, including those who are drug-exposed and medically fragile.

CHILDREN'S IMPACT STATEMENT:

Respite services support four of Contra Costa County's community outcomes: (1) Children Ready for and Succeeding in School; (2) Children and Youth Healthy and Preparing for Productive Adulthood; (4) Families that are Safe, Stable and Nurturing; and (5) Communities that are Safe and Provide a High Quality of Life for Children and Families. Respite services may be used during times of crisis when a caregiver needs to be away from home or when parents or relative caregivers must pursue other activities that temporarily take them away from children whose special needs require ongoing care.

Contra Costa County

To: Board of Supervisors

From: Sharon Offord Hymes, Risk Manager

Date: May 1, 2018

Subject: Contract Amendment/Extension with Ah Hing dba Risk Management Outsourcing LLC

RECOMMENDATION(S):

APPROVE and AUTHORIZE the Director of Risk Management to execute a contract amendment with Ah Hing (dba Risk Management Outsourcing, LLC), increase the payment limit by $59,494 to a new payment limit of $178,482 and extend the term from June 30, 2018 to December 31, 2018 to continue providing risk management services on behalf of Contra Costa County.

FISCAL IMPACT:

Costs for risk management related services are charged out to operating departments through the Self-Insurance Internal Service Funds.

BACKGROUND:

Risk Management Outsourcing, LLP, has been providing expert services needed to: 1) develop self-insured workers' compensation and liability premium charges for Departments based on payroll and losses; 2) obtain and organize data for actuarial reviews of the County's self-insurance program; 3) develop insurance requirements, indemnification and other provisions to protect the County in contracts with Departments; 4) work with Departments and public contracting parties to develop reasonable alternatives to standard

☑ APPROVE ☐ OTHER

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Clerks Notes:

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Sharon Hymes-Offord, (925) 335-1450

cc: Robert Campbell, County Auditor-Controller

BACKGROUND: (CONT'D)

form contract insurance requirements; 6) obtain and organize underwriting information required by the County's excess property, general liability, medical malpractice, bonding, aircraft, and workers' compensation insurance carrier; 7) prepare forms for filing of risk management information required by state and federal regulatory agencies. These services need to continue until a position to handle these functions can be filled.

CONSEQUENCE OF NEGATIVE ACTION:

The County will not be able to ensure compliance with risk management and safety information required by state and federal regulatory agencies.

Contra Costa County

To: Board of Supervisors

From: Russell Watts, Treasurer-Tax Collector

Date: May 1, 2018

Subject: Contract with Steckbauer Weinhart, LLP, for Legal Services

RECOMMENDATION(S):
APPROVE and AUTHORIZE the County Administrator, or his designee to execute a contract between the County and Steckbauer Weinhart, LLP, in an amount not to exceed $150,000, for legal services in the area of tax-related bankruptcy matters for the period from May 1, 2018 through April 30, 2021.

FISCAL IMPACT:
100% General Fund

BACKGROUND:
Bankruptcy claims have become more complex and beyond the expertise of the Treasurer-Tax Collector and, at times, County Counsel's staff. The need for external legal services and legal representation in tax related bankruptcy matters is necessary to preserve the County's interest in taxes owed by debtors.

CONSEQUENCE OF NEGATIVE ACTION:
If this contract is not approved, the County's ability to collect unpaid taxes from a taxpayer's bankruptcy estate may be diminished, resulting in less tax revenue to the County.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Brice Bins, (925) 957-2848

cc: Robert Campbell, County Auditor-Controller

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Payments for Services #72-100-3 with Concord Yellow Cab, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Auditor-Controller, to pay $16,465.69 to Concord Yellow Cab, Inc. for non-emergency transportation services to County clients and patients with HIV disease for services rendered to Contra Costa County residents for services provided between November 1, 2017 through February 28, 2018.

FISCAL IMPACT:
This contract is funded by 100% State funds.

BACKGROUND:
In July 2017, County Administrator approved and Purchasing Services manager executed Contract #72-100 (as amended by Contract Amendment Agreement #72-100-1) with Concord Yellow Cab, Inc., to provide non-emergency transportation services for County residents with HIV disease. On July 26, 2017, Public Health Clinic Services requested a reallocation of $16,465.69 for medical appointments, mental health appointments, wellness and prenatal checkup, for non-emergency transportation services to County clients and patients with HIV disease additional transportation services were requested by County and provided by the contractor in good faith.
The

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

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David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Dan Peddycord, 925-313-6712

cc: D Morgan, M Wilhelm

BACKGROUND: (CONT'D)

contractor is entitled to payment for the reasonable value of its services under the equitable relief theory of quantum meruit. That theory provides that where a contractor has been asked to provide services without a valid contract, and the contractor does so to the benefit of the County, the contractor is entitled to recover the reasonable value of those services. The contractor has provided services at the request of the County after the original contract payment limit had been reached. The department cannot pay contractor for services rendered that exceed the contract limits. As such, the department recommends that the Board authorize the Auditor-Controller to issue a one-time payment not to exceed $16,465.69 to Concord Yellow Cab, Inc. for services provided between November 1, 2017 through February 28, 2018.

CONSEQUENCE OF NEGATIVE ACTION:

If this Board Order is not approved, the contractor will not be paid for services requested by County staff and provided by the contractor.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Correct February 13, 2018 Board Order item # C.51 with Beckman Coulter, Inc.

RECOMMENDATION(S):
APPROVE clarification of Board action of February 13, 2018 (Item C.51), which authorized the Purchasing Agent to execute a purchase order with Beckman Coulter, Inc. in the amount of $253,395 for the purchase of the CellaVision DM9600 for the clinical laboratory at Contra Costa Regional Medical Center and Health Centers, to reflect the correct payment limit of $264,009.

FISCAL IMPACT:
Funded 100% by Hospital Enterprise Fund I.

BACKGROUND:
On February 13, 2018, the Board of Supervisors approved the Purchase Order with Beckman Coulter, Inc. in the amount of $253,395 for the purchase of the CellaVision DM9600 in order to process blood smears and body fluids. The purpose of this board order is to correct an administrative error in the total payment limit which should have read in an amount of $264,009 instead of $253,395.

CONSEQUENCE OF NEGATIVE ACTION:
If the correction to the purchase order is not approved, CCRMC will not be able to purchase the CellaVision DM9600 to process blood smears and body fluids for the laboratory.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Jaspreet Benepal, 925-370-5101

cc: Tasha Scott, Marcy Wilhelm, Margaret Uitti

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Contract #24-628-18 with Nancy E. Ebbert, M.D.

RECOMMENDATION(S):
APPROVE AND AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County, Contract #24-628-18 with Nancy E. Ebbert, M.D., an individual, in an amount not to exceed $332,800, to provide outpatient psychiatric services to adolescent and transitional age adult patients, for the period from July 1, 2018 through June 30, 2019.

FISCAL IMPACT:
This contract is funded 24% Mental Health Services Act, 38% State Mental Health Realignment, and 38% Federal Medi-Cal. (No rate increase)

BACKGROUND:
On April 25, 2017, the Board of Supervisors approved Contract #24-628-17 with Nancy E. Ebbert, M.D, for the provision of outpatient psychiatric services including diagnosing, counseling, evaluating, and providing medical and therapeutic training to clinical staff, for the intensive early psychosis intervention (First Hope) Program, located in Concord, for the period from July 1, 2017 through June 30, 2018.

Approval of Contract #24-628-18 will allow contractor to continue providing outpatient psychiatric services through June 30, 2019.

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☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Matthew White, M.D., 925-957 5201

cc: D Morgan, M Wilhelm

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the County's clients will not have access to the contractor's outpatient psychiatric services.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: May 1, 2018

Subject: Contract #76-617 with Antoine Samman, M.D.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County, Contract #76-617 with Antoine Samman, M.D., an individual, in an amount not to exceed $240,000, to provide neurology services at Contra Costa Regional Medical Center (CCRMC) and Health Centers for the period May 1, 2018 through April 30, 2019.

FISCAL IMPACT:
This contract is funded 100% by Hospital Enterprise Fund I.

BACKGROUND:
Under Contract #76-617, the contractor will provide neurology services at CCRMC and Health Centers including clinic coverage, consultation, on-call coverage, training, and medical procedures, for the period May 1, 2018 through April 30, 2019.

CONSEQUENCE OF NEGATIVE ACTION:
If this contract is not approved, patients requiring neurology services at CCRMC and Health Centers will not have access to the contractor's services.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Samir Shah, M.D., 925-370-5525

cc: K Cyr, M Wilhelm

Contra Costa County

To: Board of Supervisors

From: John Kopchik, Director, Conservation & Development Department

Date: May 1, 2018

Subject: General Plan Amendment Request for Contra Costa Centre Multi-Family Project

RECOMMENDATION(S):

1. AUTHORIZE initiation of a General Plan Amendment (GPA) process to consider changing the General Plan land use designation from "Multiple-Family Residential-Very High Density" (MV) to "Multiple-Family Residential-Very High Special Density" (MS) for a group of five parcels totaling 2.48 acres located at the intersection of Del Hombre Lane and Roble Road in the Contra Costa Centre area, Assessor's Parcel Numbers 148-170-001, -022, -037, -041, and -042.

2. ACKNOWLEDGE that granting this authorization does not imply any sort of endorsement for the application to amend the General Plan, but only that the matter is appropriate for consideration.

FISCAL IMPACT:

None. If authorization is granted, the project applicant will pay application fees to cover the cost of processing the GPA.

BACKGROUND:

The Department of Conservation and Development is in receipt of a letter from Mr. Scott Youdall of The Hanover Company (applicant) requesting a GPA for an assemblage of five parcels located at the intersection of Del Hombre Lane and Roble Road in the Contra Costa Centre area (see Attachment A). The

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: (925) 674-7791

cc:

BACKGROUND: (CONT'D)

subject parcels are designated MV on the General Plan Land Use Element Map and zoned Planned Unit District (P-1) and Single-Family Residential District (R-15). The letter requests that the General Plan land use designation for the parcels be changed from MV to MS to allow development of a multiple-family residential project including up to 297 apartments. If the Board authorizes initiation of the GPA process, the applicant will then file Rezoning and Final Development Plan applications to allow review of the project's design and layout, as well as its potential environmental impacts.

The subject site is essentially square, flat, and occupied by two single-family residences. The site abuts multiple-family residences on its north, east, and south sides. Pleasant Hill/Contra Costa Centre BART Station and the Iron Horse Trail are immediately west. Attachments B and C are, respectively, a map showing the existing and proposed General Plan land use designations and an aerial photo of the site and its surroundings.

The proposed GPA warrants further consideration. The subject site is located directly across from the Pleasant Hill/Contra Costa Centre BART Station and is ideal for high-density, transit-oriented multiple-family housing. Perhaps more importantly, the proposal provides a unique opportunity to consolidate the five small parcels comprising the site into one project, allowing for much more efficient use of the land than could occur if each parcel was developed separately. For these reasons, staff recommends authorization to proceed with the GPA process. Staff emphasizes, however, that authorization to proceed with the GPA process does not imply the Board's support or endorsement for the application to amend the General Plan, but only that this matter is appropriate for further consideration.

Staff notes that if authorized by the Board, the application for a GPA will be administratively closed after one year if the associated Rezoning and Final Development Plan applications have not been submitted.

CONSEQUENCE OF NEGATIVE ACTION:

If the Board does not authorize initiation of the GPA process, then an application to amend the General Plan cannot be filed and the subject site will retain its MV land use designation. The proposed multi-family residential project could not move forward at the density proposed.

ATTACHMENTS

Attachment A - Letter from The Hanover Company Requesting General Plan Amendment Feasibility Study

Attachment B - General Plan Land Use Map

Attachment C - Aerial Photo

ATTACHMENT A

THE HANOVER COMPANY

CONTRA COSTA COUNTY

MEMORANDUM

Date: March 19, 2018

2018 MAR 19 P 5:07

DEPARTMENT OF CONSERVATION AND DEVELOPMENT

To: John Kopchik, Director, Contra Costa County Department of Conservation and Development

From: Scott Youdall, Development Partner, The Hanover Company

Re: 112 Roble Road, 3010, 3018, 3050 & 3070 Del Hombre Lane, Walnut Creek, CA

Subject: General Plan Amendment Feasibility Request

The Hanover Company (Hanover) is under contract on a 5-parcel assemblage consisting of three vacant lots and two single family homes located on the southeast corner of Del Hombre Lane and Roble Road, adjacent to the Pleasant Hill/Contra Costa Centre BART Transit Village.

The 2.48-acre site is currently zoned Single-Family Residential (R-15) and has a General Plan Land Use designation of Multiple-Family Residential, Very High (MV), which supports 30 to 44.9 dwelling units per acre. The existing zoning of R-15 is inconsistent with the existing MV land use designation. The General Plan lists the MV land use designation as consistent with the Multiple Family Residential (M-29) and Planned Unit District (P-1) zoning districts. We are requesting the Board of Supervisor's approval to proceed with an application for a General Plan Amendment (GPA) from MV to Multiple-Family Residential, Very High-Special (MS), which permits 45 to 99.9 dwelling units per acre. This would also require the site to be rezoned from R-15 to P-1 so that the zoning is consistent with the proposed land use designation. An environmental evaluation of the proposal is also required by CEQA.

The proposed project may have up to 297 apartments, including 25 affordable units at the Low or Moderate income level, located within steps of the Pleasant Hill BART Station. The requested GPA would allow for up to 248 units (99.9 du/ac), but to maximize affordable housing in this transit-oriented development location, the project will seek to utilize SB 1818, the California State Density Bonus, to increase the density by up to 20% (or 297 units total.). The proposed development would be a six-story podium apartment community with 5 stories of Type IIIA residential over two levels of Type I parking. One level of the garage would be below grade and the above grade portion would be appropriately screened.

For the reasons listed below, we ask the Contra Costa County Department of Conservation and Development and the Board of Supervisors to authorize us to proceed with an application to study the requested GPA and Rezoning:

1. The proposed development locates high-density residential near existing high-density residential uses that will be in harmony with the character of the surrounding neighborhood and community. The parcels directly to the north and east of the site have a land use designation of MV and are improved with the 466-unit, 3-4 story Avalon Walnut Ridge apartment community located on approximately 7.95 acres (59 du/ac). The two-story Honey Trail and Del Hombre condominiums are located directly south of the site across Honey Trail and have a land use designation of Multiple-Family Residential, Medium (MM) density. The 18-acre Contra Costa Centre Transit Village, in the Pleasant Hill/

Contra Costa Centre BART Station area, is located directly west of the site. This area consists of a mix of high-density housing, offices, hotel and neighborhood-serving retail uses. The 4-6 story, 422-unit Avalon Walnut Creek apartment community, is located just southwest of this site next to the Pleasant Hill BART Station on an approximately 4.7-acre site (90 du/ac). A third project by AvalonBay is under construction and will provide approximately 200 apartment units on 1.61 acres (124 du/ac) within a 6 story building.

2. The high-density residential development will provide housing next to transit and services that will establish a residential environment of continued desirability and stability.
3. The project will help the County meet the Regional Housing Needs Allocation (RHNA)
4. The project will deliver much needed units to the County during this housing crisis.
5. The P-1 zoning district and MS land use are the appropriate designations for the proposed project and are consistent with the principles of transit-oriented development, and the goals and policies of the County General Plan, including:

   Chapter 3. Land Use Element Goals:

   - *3-E. To recognize and support existing land use densities in most communities, while encouraging higher densities in appropriate areas, such as near major transportation hubs and job centers.*
   - *3-K. To develop a balance between job availability and housing availability with consideration given to wage levels, commute distance, and housing affordability....*

   Chapter 3. Land Use Element Policies:

   - *3-8. Infilling of already developed areas shall be encouraged. Proposals that would prematurely extend development into areas lacking requisite services, facilities, and infrastructure shall be opposed. In accommodating new development, preference shall generally be given to vacant or underused sites within urbanized areas, which have necessary utilities installed with available remaining capacity, before undeveloped suburban lands are utilized.*
   - *3-16. Community appearance shall be upgraded by encouraging redevelopment, where appropriate, to replace inappropriate uses.*
   - *3-21... Multiple-family housing shall generally be located in proximity to facilities such as arterial roads, transit corridors, and shopping areas.*
   - *3-22. Housing opportunities for all income levels shall be created. Fair affordable housing opportunities should exist for all economic segments of the county.*

Exhibits:

1. Location Map
2. Zoning Map
3. General Plan Land Use Map

Exhibit 1 – Location Map

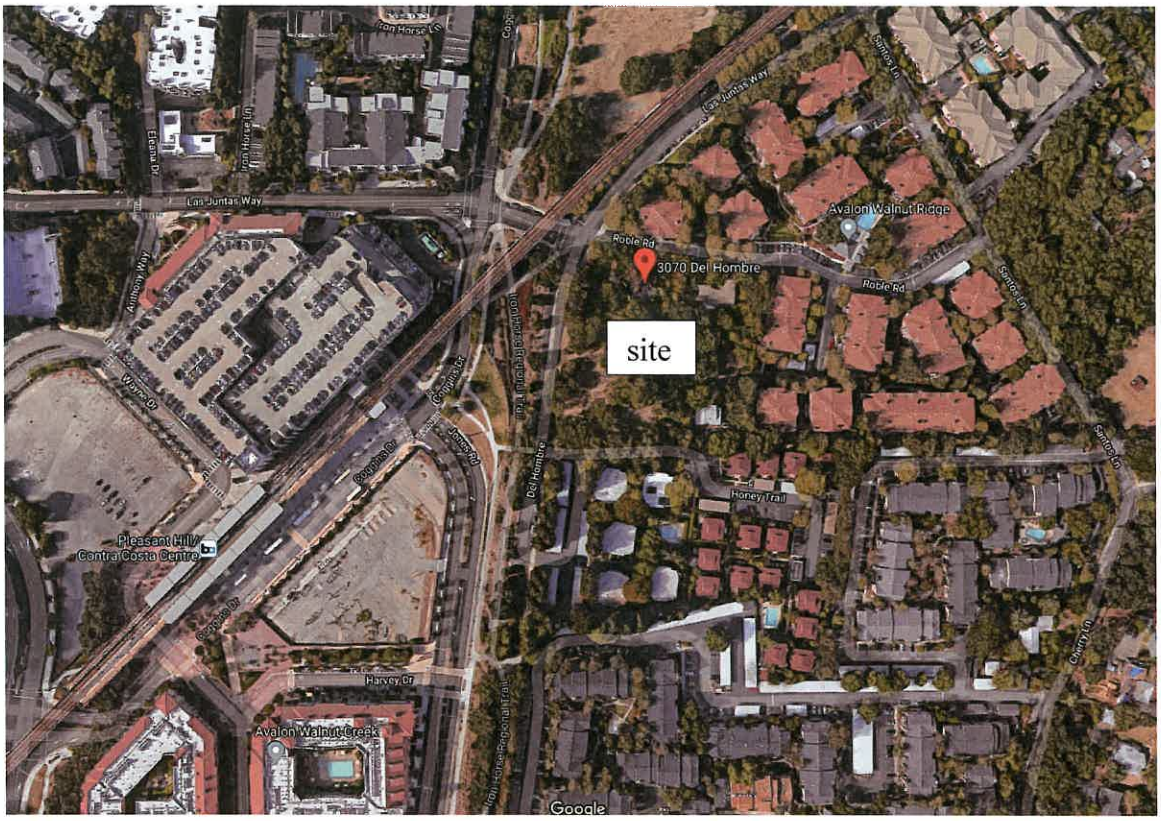
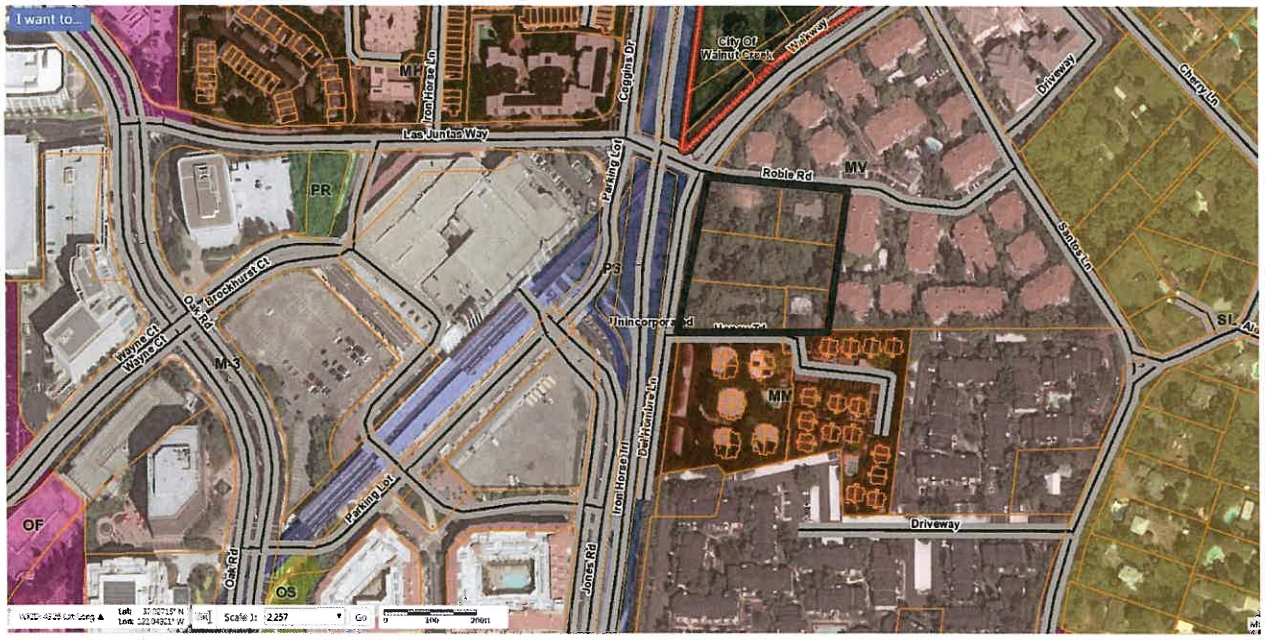


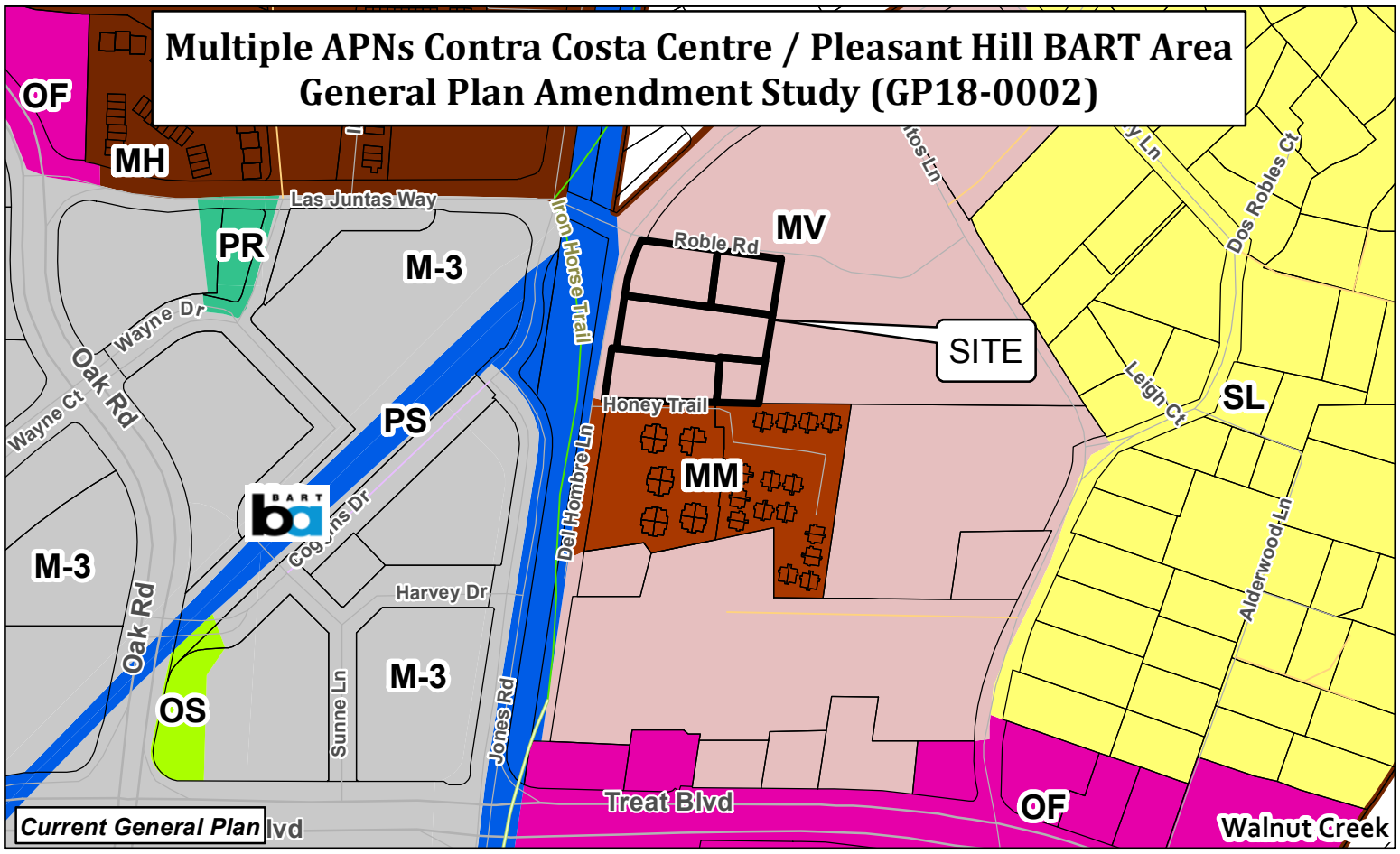
Exhibit 2 – Zoning Map

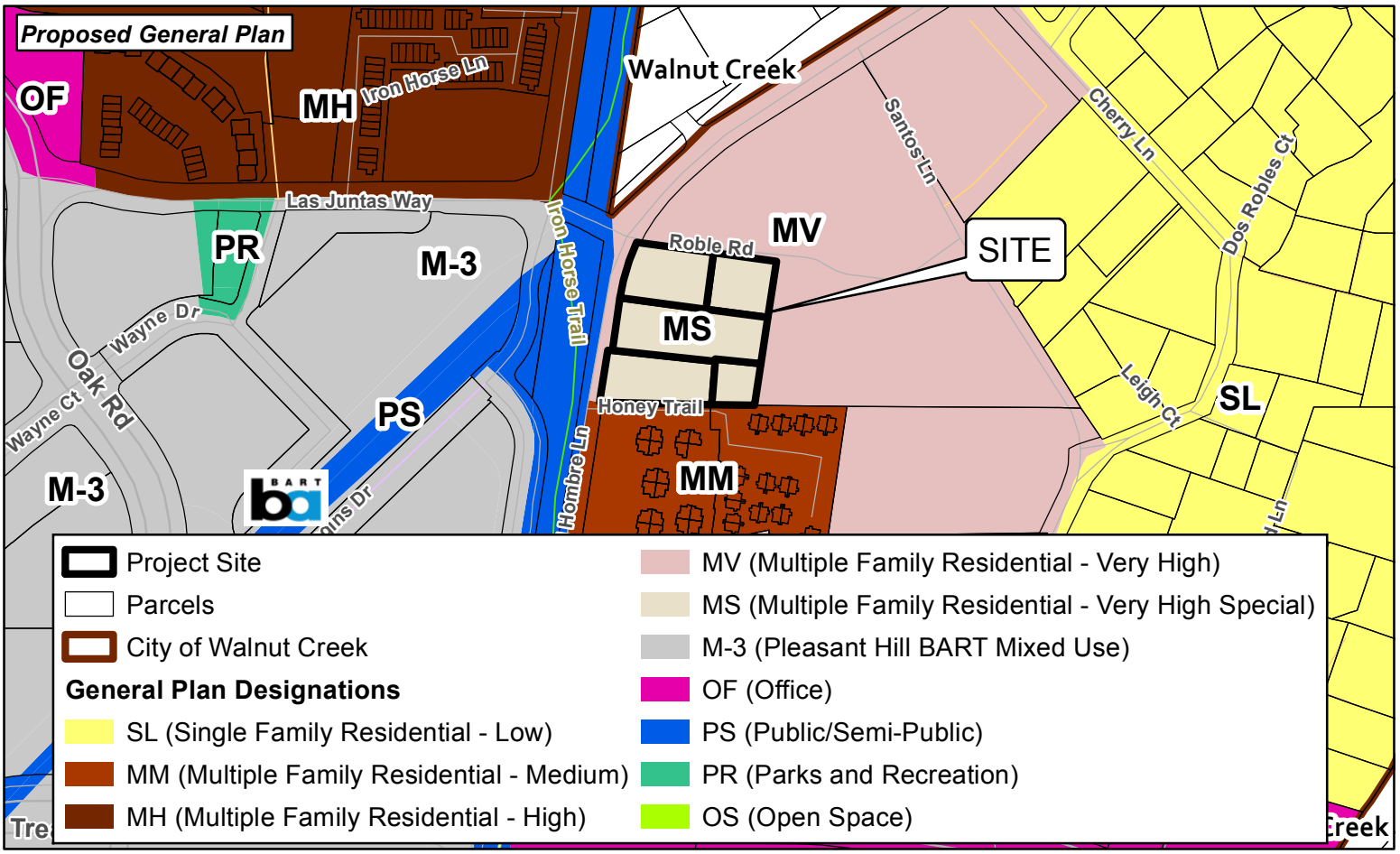
Exhibit 3 –General Plan Land Use Ma



ATTACHMENT B

Multiple APNs Contra Costa Centre / Pleasant Hill BART Area General Plan Amendment Study (GP18-0002)





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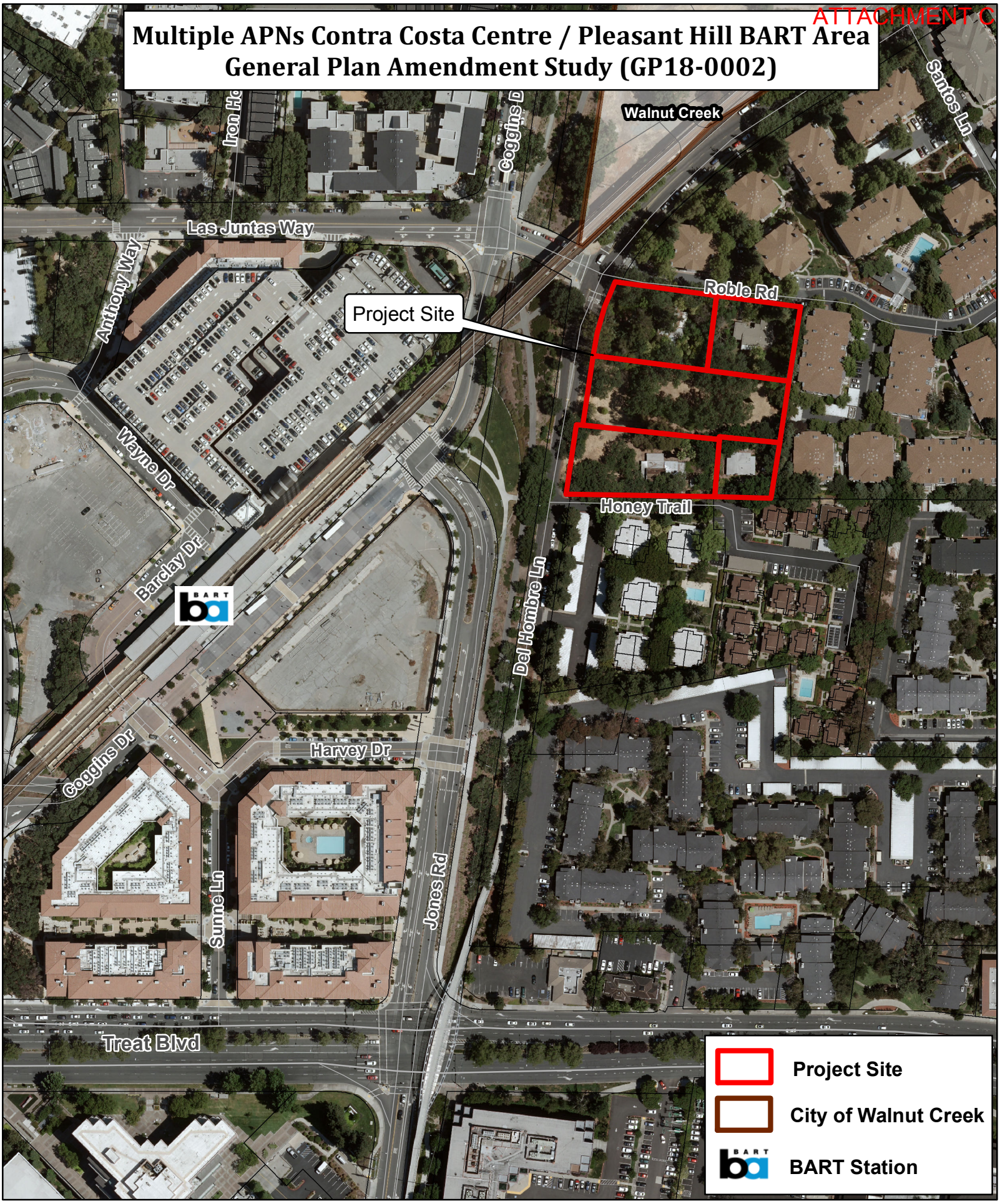
Map Created 4/10/2018
by Contra Costa County Department of Conservation and Development, GIS Group
30 Muir Road, Martinez, CA 94553
37:59:41.791N 122:07:03.756W

This map was created by the Contra Costa County Department of Conservation and Development with data from the Contra Costa County GIS Program. Some base data, primarily City Limits, is derived from the CA State Board of Equalization's tax rate areas. While obligated to use this data the County assumes no responsibility for its accuracy. This map contains copyrighted information and may not be altered. It may be reproduced in its current state if the source is cited. Users of this map agree to read and accept the County of Contra Costa disclaimer of liability for geographic information.

ATTACHMENT C

Multiple APNs Contra Costa Centre / Pleasant Hill BART Area General Plan Amendment Study (GP18-0002)



Feet

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Map Created 3/14/2018
by Contra Costa County Department of
Conservation and Development, GIS Group
30 Muir Road, Martinez, CA 94553
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This map was created by the Contra Costa County Department of Conservation and Development with data from the Contra Costa County GIS Program. Some base data, primarily City Limits, is derived from the CA State Board of Equalization's tax rate areas. While obligated to use this data the County assumes no responsibility for its accuracy. This map contains copyrighted information and may not be altered. It may be reproduced in its current state if the source is cited. Users of this map agree to read and accept the County of Contra Costa disclaimer of liability for geographic information.

Contra Costa County

To: Board of Supervisors

From: David O. Livingston, Office of the Sheriff

Date: May 1, 2018

Subject: Accept the Fiscal Year 2016-2017 Inmate Welfare Fund Expenditure Report

RECOMMENDATION(S):
ACCEPT the report prepared by the Office of the Sheriff in accordance with Penal Code Section 4025(e) representing an accounting of all Inmate Welfare Fund receipts and disbursements for Fiscal Year 2016/2017.

FISCAL IMPACT:
None. This is an informational report.

BACKGROUND:
Penal Code Section 4025(e) states that money and property deposited in the Inmate Welfare Fund shall be expended by the Office of the Sheriff-Coroner primarily for the benefit, education, and welfare of the inmates confined within the jail. Any funds that are not needed for the welfare of inmates may be expended for the maintenance of county jail facilities. Maintenance of county jail facilities may include, but is not limited to, the salary and benefits of personnel used in the programs to benefit the inmates, including but not limited to education, drug and alcohol treatment, welfare, library, accounting, and other programs deemed appropriate by the Sheriff. An itemized report of these expenditures shall be submitted annually to the Board of Supervisors.

This

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: Stacey M. Boyd, Deputy

Contact: Liz Arbuckle, 925-335-1529

cc: Liz Arbuckle, Heike Anderson, Tim Ewell

BACKGROUND: (CONT'D)

fund received the majority of its revenues from inmate telephone commissions and commissary sales. The Director of Inmate Services, working with the public members of the Inmate Welfare Committee, manages the delivery of professional services, establishes an annual budget and oversees expenditures for the Sheriff.

The Inmate Welfare Fund continues to provide valuable professional, educational, and recreational services to persons in custody at the Martinez Detention Facility, West County Detention Facility, and the Marsh Creek Detention Facility.

CONSEQUENCE OF NEGATIVE ACTION:

The County will be out of compliance with Penal Code section 4025(e).

CHILDREN'S IMPACT STATEMENT:

No impact.

ATTACHMENTS

FY 2016-17 Inmate Welfare Fund Expenditures

Inmate Welfare Fund
Statement of Receipts, Disbursements, and Fund Balance
Fiscal Year Ended June 30, 2017

Receipts:

GTL Telephone Commissions	$791,501	
Canteen Commissions	880,208	
WCDF Inmate Industries	58,054	
MCDF Frame Shop	4,404	
Investment Interest	7,231	
Miscellaneous	43,047	
Total Receipts		$1,784,445

Disbursements:

Entertainment		
Purchase of TV's/VCR's/DVD's/Accessories		
Public Performance License & Movie Rental	$ 6,429	
Inmate Work Crew Refreshments/Treats	15,253	
Sub-Total		$ 21,682
Recreation		
Table/Board Games/Sports Equipment	$ 3,281	
Satellite TV Service	24,720	
Sub-Total		$ 28,001
Education and Welfare		
Bay Area Chaplains Contractual Services	$152,750	
Office of Education Contractual Services	394,262	
Library Program	204,756	
Inmate Legal Services	39,635	
MCDF Landscape Program	40,698	
WCDF Inmate Industries	134,227	
BART and Bus Tickets	60,800	
WCDF Frame Shop Program	31,845	
Sub-Total		$1,058,973

Personal Care/Hygiene		
Hair Clippers, Curling Irons, Hair Dryers, Electric Razors, etc.	$ 6,117	
Sub-Total		$ 6,117
Other		
Staff Salaries/Benefits	$289,479	
Staff Travel Expenses	974	
Communication	1,400	
Office Supplies	25	
Office Equipment	0	
Specialized Services & Supplies	36,000	
Sub-Total		$ 327,878
Total Disbursements		$1,442,651
Receipts less Disbursements		$ 341,794
Cash & Investments		$1,599,791
Total		$1,941,585

Closing Date 12-18-2017

Contra Costa County

To: Board of Supervisors

From: Melinda Cervantes, County Librarian

Date: May 1, 2018

Subject: Planned Refurbishment of the Kensington County Library

RECOMMENDATION(S):
APPROVE and AUTHORIZE the County Librarian to close the Kensington Library from June 4, 2018 through and including June 12, 2018 in order to repaint the interior, upgrade the employee work area and replace furniture in the public area.

FISCAL IMPACT:
The Library Fund will be contributing $25,000 and Kensington Library Friends will be contributing $11,000 to this planned refresh for repainting and the upgraded employee work area.

BACKGROUND:
This is a planned refresh of the Kensington Library. The Library will be paying for the painting, installation of ergonomic furniture in the employee work space and the reconfiguring of that space. The Friends of the Kensington Library will be paying for some furniture in the public area. The library will close on June 4th and reopen on June 14th (Wednesday the 13th is a regularly scheduled closed day). The book drop will not be open during the closure. Holds will not be available for pick up during the closure. Users needing library services during the closure can visit the nearby El Cerrito Library or any other Contra Costa County Library.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

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Federal D. Glover, District V Supervisor

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Walt Beveridge (925) 608-7730

cc:

CONSEQUENCE OF NEGATIVE ACTION:

The Kensington Library will not be closed to the public, which means the planned refresh will not occur.

Contra Costa County

To: Board of Supervisors

From: David Twa, County Administrator

Date: May 1, 2018

Subject: Civil Grand Jury Report No. 1802, "Los Medanos Community Healthcare District"

RECOMMENDATION(S):
RECEIVE Civil Grand Jury Report No. 1802, entitled "Los Medanos Community Healthcare District" (attached), and FORWARD to the County Administrator for response.

FISCAL IMPACT:
No fiscal impact.

BACKGROUND:
On April 19, 2018 the 2017/18 Civil Grand Jury filed the above referenced attached report. Per standard procedures, this action alerts the Board of Supervisors that the report has been received and directs appropriate staff to review the report, provide the Board of Supervisors with an appropriate response, and forward that response to the Superior Court no later than July 18, 2018 (90 days).

CONSEQUENCE OF NEGATIVE ACTION:
No immediate consequence.

CHILDREN'S IMPACT STATEMENT:
No impact.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **05/01/2018** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

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ATTESTED: May 1, 2018

David J. Twa, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Timothy Ewell, (925) 335-1036

cc:

ATTACHMENTS

Grand Jury Report No. 1802 "Los Medanos Community Healthcare District"

Contact: Mario Gutierrez
Foreperson
925-389-1556

Contra Costa County Grand Jury Report 1802

Los Medanos Community Healthcare District

TO: Contra Costa County Board of Supervisors, Los Medanos Community Healthcare District, Local Agency Formation Commission

SUMMARY

The Los Medanos Community Healthcare District (LMCHD) is a community-based healthcare district that serves Pittsburg, Bay Point, and portions of Clayton, Clyde, and Antioch. The combined population served is approximately 96,760.[1]

The Contra Costa County Civil Grand Jury (Grand Jury) conducted an investigation of LMCHD's efficiencies providing healthcare services, and evaluated how the special healthcare needs of its population are being met, especially in terms of preventative healthcare.

The Grand Jury found that LMCHD does not provide any hospital, physician, or emergency medical services. Instead, LMCHD funds grants to third-party agencies that provide healthcare programs and activities related to health, wellness, and disease prevention. The Grand Jury also found LMCHD grant program administrative expenses are high compared to the amount spent on grants. For example, in FY2016-2017, LMCHD spent 40% of its revenue on grants and 36% administering those grants, with the remaining 24% going to reserves. LMCHD's FY2017-2018 budget allocates 42% for grant programs, and 51% for grant program administration. Earlier years' administrative expenditures were similarly distributed. Typically, comparable local governmental administrative entities devote 10-20% to administrative expenses. Previous Grand Jury reports reached similar conclusions.

Based on these findings, the Grand Jury recommends that the Local Agency Formation Commission (LAFCO) consider dissolving LMCHD. The Grand Jury also recommends that the grants for healthcare programs currently funded by LMCHD be maintained by a

successor. These healthcare programs are important to the community. Any savings from the dissolution could be applied to improvement and expansion of healthcare programs.

METHODOLOGY

In the course of its investigation, the Grand Jury:

- Researched the history, programs, and current financial status of the LMCHD
- Interviewed public officials, County employees, and members of the LMCHD Board and the County Board of Supervisors
- Attended an LMCHD Board Meeting and reviewed meeting minutes
- Attended 2017 Local Agency Formation Commission (LAFCO) Healthcare Services Municipal Service Review (MSR) meetings
- Reviewed County records, budget reports, LMCHD's Strategic Plan, and LAFCO's Municipal Service Review documents

BACKGROUND

Previous Grand Jury reports examined LMCHD's administrative expenses. The current Grand Jury investigated LMCHD fiscal performance and healthcare needs of the district in terms of preventative healthcare.

Preventative Healthcare

Healthcare continues to be a significant national and local concern. Research from the Centers for Disease Control and Prevention (CDC) shows that "70 percent of chronic illnesses are preventable, and health costs savings associated with keeping people healthy and out of hospitals substantial." The delivery of healthcare has shifted from hospital-based services to preventative healthcare, which consists of measures taken for disease prevention rather than disease treatment.[2]

Preventative healthcare is important given the increase in chronic diseases and resulting deaths. One key method for preventing disease is regular check-ups for adults and children. Physicians may consider using these visits to conduct disease screenings, provide tips for healthy and balanced lifestyles, and administer immunizations and boosters. Some common disease screenings include checking for hypertension (high blood pressure), hyperglycemia (high blood sugar, a risk factor for diabetes), hypercholesterolemia (high blood cholesterol), colorectal cancer, and depression. Additionally, screenings specifically for women include mammography (for breast cancer) and Pap smear tests (for cervical cancer).

A presentation to the Board of Supervisors on January 31, 2017, by the County Administrator, identified reduction of hospital dependency as a budget challenge. According to the CDC, a preventative healthcare program reduces hospital dependency by producing a healthier population.

Los Medanos Community Healthcare District

LMCHD was formed in 1948 to operate a hospital within its boundaries. In rural communities, such districts were created to provide for hospitals that otherwise would not exist. LMCHD operated the Los Medanos Community Hospital until 1994 when the hospital closed due to bankruptcy. Since then, LMCHD has not provided any hospital, physician, or emergency medical services. Instead of providing direct services, LMCHD funds third-party agencies that provide health-related programs.
LMCHD derives most of its revenue from property taxes. They lease its decommissioned hospital building to the County, which operates it as the Pittsburg Health Center. The Health Center is the largest clinic in the Contra Costa County Health System, with over 100,000 patient visits per year.

LMCHD is governed by a Board of Directors. The directors are elected at-large by the residents of the District and serve four-year terms.

The FY2017-2018 budget shows a general fund revenue of $1.0 million. Of that amount, $0.5 million is allocated to administrative overhead, $0.4 million to community health programs, and $0.1 million to reserves.

Local Agency Formation Commissions (LAFCOs)

Local Agency Formation Commissions (LAFCOs) are regional agencies that oversee the creation, expansion, governance, and dissolution of local government bodies. State law requires LAFCOs to prepare a Municipal Service Review (MSR) for each District every five years. These reviews provide information to guide districts in performance improvement and boundary changes and can serve as a catalyst for LAFCO to initiate consolidations or dissolutions.

DISCUSSION

Cancer, heart disease, stroke, and diabetes are the leading causes of preventable morbidity (disease) and premature mortality (death) in Contra Costa County. They are major drivers of health inequities in our communities. Contra Costa Health Services defines health inequities as "unnecessary, avoidable, unfair and unjust differences in health status due to unequal distribution of social, physical, economic and political resources that put some groups at a disadvantage for good health outcomes and limits their ability to lead healthy lives."[3] Major risk factors for chronic diseases include

obesity, poor nutrition, lack of physical activity, tobacco use, and drug and alcohol consumption.[4]

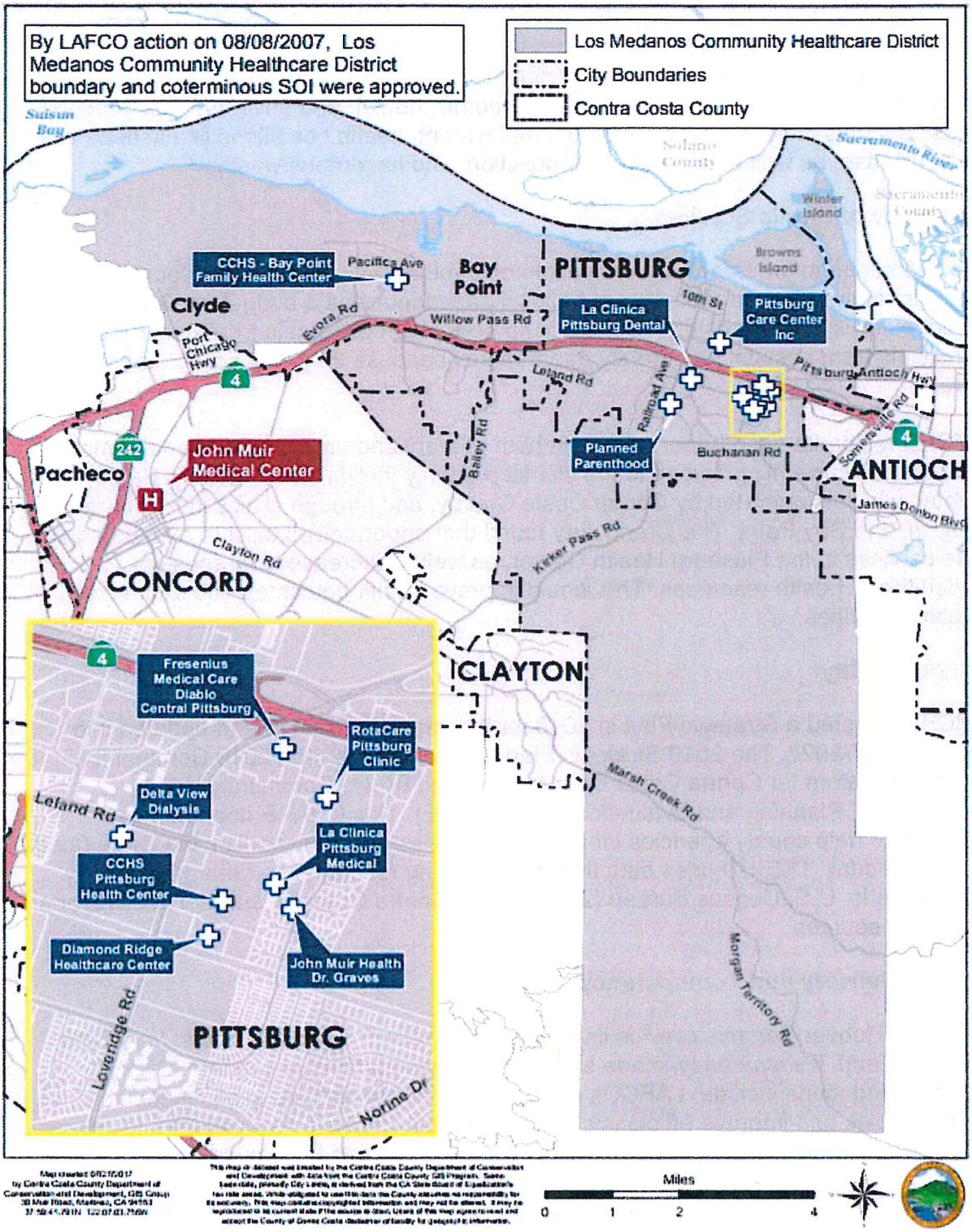
Growth and population projections

Chronic diseases are linked to income, education, and ethnicity and are thus more prevalent in areas of poverty, low educational attainment, and communities of color. The population within the current LMCHD boundaries is especially affected by these socioeconomic conditions and is growing faster than the county at large.[5] Because of the rapid growth of these populations, preventative healthcare programs are important to improve health in the community and to contain costs.

The Association of Bay Area Governments (ABAG) projects continued growth in LMCHD, estimated at 36% from 2015 through 2040. This compares to 23% growth overall in the County. Population growth and demographic changes will drive future health care needs.[6]

The map below indicates the location of medical facilities within and near LMCHD. While there are no acute care hospitals within the district, several major acute care facilities do exist in adjacent communities. Other medical facilities operate within and around the district to address preventative healthcare needs.

LMCHD Sphere of Influence (SOI)



Characteristics of disadvantaged communities within LMCHD

The unincorporated communities of Clyde and Bay Point, and much of the City of Pittsburg qualify as disadvantaged communities. The California Public Utilities Commission defines "disadvantaged communities" as the areas throughout California which most suffer from a combination of economic, health, and environmental burdens. These burdens include poverty, high unemployment, health conditions like asthma and heart disease, as well as air and water pollution, and hazardous wastes.[7]

Adequacy of Public Services

A presentation to the Board of Supervisors on January 31, 2017, by the County Administrator, identified reduction of hospital dependency as a budget challenge. Some senior officials indicated that a significant number of people obtain treatment for chronic conditions from hospital emergency departments because they lack access to primary care.

LMCHD residents need better access to both primary and urgent care. General medical services are currently provided in the district primarily through the Pittsburg Health Center, which is operated by Contra Costa County, and through clinics in Pittsburg, Antioch, and Bay Point. The Grand Jury found that opportunities exist to expand urgent care services in the Pittsburg Health Center, as well as increase awareness of underutilized health resources. This would improve health outcomes and decrease health disparities.

Accountability

LMCHD adopted a Strategic Plan in 2010 for the years 2011-2016 and updated it to include 2017-2022. The 2010 Strategic Plan relied heavily on the 2010 Community Health Indicators for Contra Costa County, prepared by the Community Health Assessment, Planning and Evaluation Unit (CHAPE). This CHAPE document is intended to help county agencies identify and address health disparities in Contra Costa County. Today, LMCHD uses data from the following resources to determine priority health needs: U.S. Census Bureau (2016), CDC, Contra Costa Health Services reports, and other sources.

Service Delivery and Transparency

The Little Hoover Commission,[8] in its August 2017 report *Special Districts: Improving Oversight and Transparency*, made several recommendations relevant to LMCHD. Recommendations include: LAFCOs consider district dissolutions to eliminate redundancies and improve efficiency; steps that healthcare districts can take to improve operational transparency—such as requiring every district to have a website with basic information; and to standardize current reporting requirements on revenues, expenditures and reserves.[9]

Although the grant programs funded through LMCHD may be of significant benefit to the community, the LMCHD website lacks data demonstrating such a benefit. It does not provide metrics addressing the public health needs of the community. In addition, it provides no data indicating targeted populations nor any measurement of outcomes.

The Grand Jury found no evidence that LMCHD collaborated with the County, non-profit hospitals, or other local entities to avoid duplication of services. Several organizations received grants from both the County and LMCHD. This duplication of services occurred because the County grant administrator, Keller Canyon Mitigation Fund, supports some of the same programs funded through LMCHD. If the County were to assume administration of LMCHD grant programs, there would be no duplication of administrative expenses because the County grant process is already in place.

LMCHD did not utilize health needs assessments to determine the community's health needs before funding programs. Health needs assessment is a "systematic method of identifying unmet health and healthcare needs of a population and making changes to meet these unmet needs."[10]

For comparison, in 2016 the Kaiser Foundation Hospital-Antioch conducted a Community Health Needs Assessment (CHNA) of its service area, which includes the LMCHD geography. Based on the CHNA, Kaiser determined that the top healthcare priorities in the area were: 1) Economic Security, and 2) Obesity, Diabetes, Healthy Eating, and Active Living.[11] Kaiser's CHNA cited the names of grantees, the grant amounts they received, the nature of their project, and their progress to date. Kaiser had implemented the grants, tracked the grantees' progress, and documented their results. The outcomes of the programs were clearly displayed on Kaiser's website. Kaiser's CHNA is an example of what other healthcare providers use to manage grant distribution based on community health needs.

The grant program is important as the non-profit entities delivering the services can best focus on particular needs of affected communities, where the services are most needed. This safety net ensures that grant program funds are allocated and used effectively for the most disadvantaged communities.

Finances

LMCHD receives nearly all its annual revenue from property taxes. It uses this revenue to pay for program and wellness grants, as well as administrative expenses. It also funds an ongoing reserve/surplus. The tables below provide a breakdown of these revenue/expense items for fiscal years 2013 through 2018.

Table 1

LMCHD Governmental Fund Revenue and Expenditure year ended June
($ in Thousands)

	2013	2014	2015	2016	2017	2018
Revenue	683	786	865	960	1,106	992
Grants/Program Outreach	(345)	(380)	(303)	(329)	(438)	(412)
Administration	(438)	(358)	(423)	(362)	(396)	(510)
Surplus/Deficit	(100)	48	139	269	272	70

Source: 2018 Adopted Budget, 2017 unaudited financial statements, 2013-2016 audited financial statements

Table 2

LMCHD Governmental Fund Revenue and Expenditure year ended June
Expense as a % of Revenue

	2013	2014	2015	2016	2017	2018
Grants/Program Outreach	51%	48%	35%	34%	40%	42%
Administration	64%	46%	49%	38%	36%	51%

Source: 2018 Adopted Budget, 2017 unaudited financial statements, 2013-2016 audited financial statements

LMCHD's FY2017-2018 Budget allocated $411,875 (or 42%) of the total General Fund to be spent on community health programs. The LMCHD's largest expenditure category is general administration at $509,698 (or 51%) of total revenues.

According to the 2017 fiscal year unaudited financial statements, the District spent 36% of its revenue on administrative expenses and 40% on grants and programs. The remaining revenue was held as cash. As of June 30, 2017, the District had a cash balance of $1.8 million. Of the $1.8 million cash on hand, $0.9 million was held in a bank account that earned no interest, and $0.9 million at LAIF (Local Agency Investment Fund) in an interest-earning account. (See Table 3)

Table 3

LMCHD Governmental Fund Cash Balance as of year ended June ($ in Thousands)

	2013	2014	2015	2016	2017
Cash on hand	296	349	422	697	889
Investment in LAIF	849	828	880	886	943
Total	1,145	1,176	1,302	1,584	1,832

Source: 2017 Unaudited financial statements, 2013-2016 audited financial statements

Operational Efficiency

LMCHD's administrative expenses range from 36% to 64% of General Fund revenues from FY2013-2018, depending on whether grant administration and program development are included in overhead. Other comparable Federal Grant programs run at 10% administrative costs. Contra Costa County budget runs at 15% administrative costs, and Concord/Pleasant Hill Healthcare District runs at 20%.[12] Because LMCHD is a free-standing entity, it incurs higher overhead costs than Concord/Pleasant Hill Healthcare District, a subsidiary district of the City of Concord.

During FY2015-2016, LMCHD funded twelve Community Health Programs in the amount of $268,569, or approximately 25% of LMCHD revenue (see table 4). LMCHD's largest expenditure category was for administrative expense at $362,307 or 38% of total revenues.

Table 4

Summary of LMCHD FY2015-2016 Grants

Student Eyeglasses Program	$ 7,750
Youth Intern Program	$ 4,682
African American Community Baby Shower	$10,000
District Programs and Activities Committee	$ 851
CPR/FAST	$ 8,980
Pittsburg Swim Academy	$20,900
Supervisor Glover's Youth Summit	$10,000
St. Vincent de Paul RotaCare	$30,000
Health and Wellness Fall Allocation	$85,988
Health and Wellness Summer Allocation	$75,359
Board Community Benefit Fund	$10,300
Community Garden	$ 3,759
TOTAL FUNDING	**$268,569**

Source: LMCHD Annual Financial Report, June 30, 2016

Conclusions

To shift the current healthcare landscape in the community and offer more preventative healthcare services, dissolution of the LMCHD is recommended. Any cost savings can be directed toward enhancing current healthcare preventive services provided by the grantees, and exploring new programs and possible creation of an urgent care facility.

The community agrees and the Grand Jury's research validates the need for improvement of health services and urgent care in the area. The County health system may be in the best position to offer those services at a lower cost.

FINDINGS

F1. LMCHD website lacked data addressing the public health needs of the community or measurable outcomes of the grant programs targeting the population served.

F2. LMCHD used obsolete data rather than the current health needs assessments to prioritize grants.

F3. The Grand Jury found no evidence LMCHD collaborated with the County, non-profit hospitals, or other local districts to avoid duplication of services.

F4. LMCHD's level of administrative costs is high compared to other government agencies that fund grants.

F5. As the County already has a grant administration program in place, and has some of the same grantees as the District, there is potential for administrative cost savings through elimination of redundancies.

F6. LMCHD did not maximize cash assets as large balances were left in non-interest bearing account.

RECOMMENDATIONS

R1. LAFCO should consider dissolving the LMCHD by December 2018 and assigning all the assets, rights, and responsibilities to the County as the successor to LMCHD.

R2 The Board of Supervisors should consider maintaining grant funding levels for healthcare programs upon dissolution of LMCHD.

R3. The Board of Supervisors should consider using any savings from LMCHD dissolution to improve and expand healthcare programs once appointed as the successor to LMCHD.

REQUIRED RESPONSES

	Findings	Recommendations
Contra Costa County Board of Supervisors	F5	R2, and R3
Los Medanos Community Healthcare District	F1, F2, F3, F4, and F6	
Local Agency Formation Commission	F1, F2, F3, F4, and F5,	R1

These responses must be provided in the format and by the date set forth in the cover letter that accompanies this report. An electronic copy of these responses in the form of a Word document should be sent by e-mail to ctadmin@contracosta.courts.ca.gov and a hard (paper) copy should be sent to:

Civil Grand Jury – Foreperson
725 Court Street
P.O. Box 431
Martinez, CA 94553-0091

Appendix

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[1] Berkson Associates, *Healthcare Services Municipal Service Review & Sphere of Influence Updates: Public Review Draft* (Martinez, CA: Contra Costa LAFCO, December 2, 2017): 39, http://www.contracostalafco.org/municipal_service_reviews/healthcare-services/Public%20Review%20Draft%2012-5-17.pdf.

[2] Little Hoover Commission, *Special Districts: Improving Oversight and Transparency*. Report #239 (August, 2017): 46, http://www.lhc.ca.gov/sites/lhc.ca.gov/files/Reports/239/Report239.pdf.

[3] Contra Costa Health Services, *Community Health Indicators for Contra Costa County* (Martinez, CA: Contra Costa Health Services, December, 2010), accessed April 2, 2018, http://cchealth.org/health-data/hospital-council/2010/pdf/2010_community_health_indicators_report_complete.pdf.

[4] Contra Costa Health Services, *Health Indicators and Environmental Factors Related to Obesity for Antioch, Bay Point, and Pittsburg* (Martinez, CA: Contra Costa Health Services, May, 2013): I, accessed April 2, 2018, http://cchealth.org/prevention/pdf/Health-Indicators-and-Environmental-Factors-Related-to-Obesity-2013.pdf.

[5] Contra Costa Health Services, *Health Indicators and Environmental Factors*, III.

[6] Berkson Associates, *Healthcare Services Municipal Service Review*, 40.

[7] "Disadvantaged Communities", California Public Utilities Commission, accessed April 2, 2018, http://www.cpuc.ca.gov/discom/.

[8] Little Hoover Commission, *Special Districts.*

[9] Berkson Associates, *Healthcare Services Municipal Service Review*, 4.

[10] Berkson Associates, *Healthcare Services Municipal Service Review*, 10, 14.

[11] Berkson Associates, *Healthcare Services Municipal Service Review*, 40.

[12] Berkson Associates, *Healthcare Services Municipal Service Review*, 55.