MITIGATED NEGATIVE DECLARATION

Heidorn Village Subdivision

Prepared for

City of Antioch

August 2015

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INTRODUCTION

The City of Antioch released an Initial Study and proposed Mitigated Negative Declaration on May 29, 2015, which analyzed potential impacts of the proposed Heidorn Village Subdivision Project (the project). The release of the document initiated a public comment period, which ran from May 29, 2015 through June 29, 2015. In publishing the document, the City met the noticing requirements set forth in CEQA Guidelines Section 15072. The City also published a notice in the **East County Times** on **May 29, 2015**. The notice invited interested members of the community to comment on the proposed mitigated negative declaration.

During the public comment period, the City received 4 written comments regarding the environmental review of the project.

This updated document includes the following sections:

Section 1 (page vii) A copy of each written comment received, and individual responses to each substantive issue raised.

Section 2 (page 1) A revised initial study, including edits and corrections made in response to comments received on the draft initial study. In the revised initial study, any added text is shown is presented in ***bold underlined italic*** text. Deleted text is shown in ~~strikeout.~~

COMMENTS RECEIVED IN RESPONSE TO THE INITIAL STUDY/PROPOSED MITIGATED NEGATIVE DECLARATION

Letter 1: California Department of Fish and Wildlife, Bay Delta Region

Letter 2: California Department of Transportation, District 4

Letter 3: Central Valley Regional Water Quality Control Board

Letter 4: State of California Governor's Office of Planning and Research, State Clearinghouse and Planning Unit

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Kyra Engelberg

From: Gentry, Mindy <mgentry@ci.antioch.ca.us>
Sent: Monday, June 01, 2015 4:29 PM
To: John Cook
Cc: Kyra Engelberg
Subject: FW: Heidhorn Village Notice of Completion

First comment letter on Heidorn.

Mindy Gentry
Senior Planner
200 H Street
Antioch, CA 94509
(925) 779-6133 Direct
(925) 779-7035 Department
(925) 779-7034 Fax

From: Stanley, Robert@Wildlife [mailto:Robert.Stanley@wildlife.ca.gov]
Sent: Monday, June 01, 2015 4:28 PM
To: Gentry, Mindy
Subject: Heidhorn Village Notice of Completion

Good Afternoon,

CDFW recently received a notice of completion for Heidhorn Village and had some areas of concern for the Project. The first is the identified drainage channel on site, if this feature has a defined bed, bank and channel then any impact to this area and upland riparian habitat would require a 1600 Lake and Streambed Alteration Agreement. No defined connection to a stream system would be needed, simply bed, bank channel. 1.1

The second issue is the possibility of round-leaved filaree, CDFW strongly suggests focused surveys that occur during the appropriate blooming period for this species, as there are known occurrences of the plant in the immediate vicinity. Please feel free to contact me with any further comments or questions. I would also like to setup a meeting to discuss, preferably with the Project Biologist/consultant. 1.2

Thanks,

Robert Stanley
Environmental Scientist
California Department of Fish and Wildlife
7329 Silverado Trail
Napa, CA 94558

Phone: (707)944-5573
Fax: (707)-944-5563

Response to Comment Letter 1: California Department of Fish and Wildlife

1.1

The commenter states that a Section 1600 permit would be required if the drainage area on the project site has a defined bed, bank, and channel and that the project would result in any impact to these features.

The City's consulting biologist reviewed these comments. The City's biologist noted that it is possible that the drainage ditch could be under CDFW jurisdiction. However, the City's biologist observed that the drainage ditch is not a natural feature, but instead appears to have been excavated from within upland habitat. Moreover, the ditch appears to drain only Heidorn Ranch Road and does not appear to have any hydrologic connection to a natural stream or creek.

In such circumstances, the ditch would likely not fall under CDFW jurisdiction. Similarly, the City's biologist presumes that the ditch would not fall under the jurisdiction of the US Army Corps of Engineers (ACOE) pursuant to Section 404 of the Clean Water Act. Notwithstanding, the Initial Study includes mitigation measures (7a and 7b) acknowledging that only the ACOE can make jurisdictional determinations. Mitigation Measure 7a requires a preliminary jurisdictional delineation by the UACOE. Mitigation Measure 7b requires preconstruction consultation with the CDFW to clarify the potential for CDFW's jurisdiction and to apply for appropriate permits in the event that the CDFW concludes the ditch is under CDFW jurisdiction.

1.2

The commenter states that the project site may contain a special status plant, the round-leaved filaree. The City's biologist reviewed these comments. The City's biologist did not observe any special-status plants on the project site, as noted in the Initial Study. Moreover, the Initial Study notes the highly disturbed state of the project site (which includes periodic disking). Therefore, the City's biologist concluded that no focused surveys for this plant were required and no further mitigation was required related to the prospect of special status plants occurring on the project site.

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
P.O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5528
FAX (510) 286-5559
TTY 711
www.dot.ca.gov

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Help save water!

June 23, 2015

CC0041005
CC-4-R27.81
SCH #2015052069

RECEIVED
JUN 29 2015
CITY OF ANTIOCH
COMMUNITY DEVELOPMENT

Ms. Mindy Gentry
City of Antioch
Community Development Department
200 H Street
Antioch, CA 94531

Dear Ms. Gentry:

Heidorn Village Subdivision–Mitigated Negative Declaration (MND)

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the project referenced above. In our recent phone conversation on 6/12/2015, we appreciate the City of Antioch (City) early coordination to consult with us. The proposed project would construct 117 single-family homes on 20.3 acres with an average density of 5.8 units per acre. The project would also include park and open space areas and internal access road. The project is located in Contra Costa County approximately .75 miles west of State Route (SR) 4.

Sidewalks and crosswalks are provided throughout most of the project vicinity but are absent near the southern portion, where roadways are not built out yet or where they are adjacent to rural lands. Existing sidewalks along Heidorn Ranch Road terminate at the intersection of Heidorn Ranch Road and Lone Tree Plaza Drive; there are no sidewalks adjacent to the proposed project site.

The Antioch General Plan calls for the maintenance of safe and convenient pedestrian and bicycle facilities, rail and bus transit. Pedestrian sidewalks will be constructed long the entire project frontages of Prewett Ranch Drive and Heidorn Ranch Road. Pedestrian sidewalks will also be located internally along both sides of project streets. There will be a pedestrian trail connection to the Mokelumne Trail located in the northwest portion of the project site. A new bus stop will be located on the east side of Heidorn Ranch Road just north of the planned Prewett Ranch Drive and Heidorn Ranch Road intersection.

Caltrans' new mission, vision, and goals signal a modernization of our approach to California's transportation system. We review this local development for impacts to the State Highway transportation System in keeping with our mission, vision, and goals for sustainability, livability, economy, safety and health. We provide these comments consistent with the State's smart mobility goals that support a vibrant economy, and build communities, not sprawl. The following comments are based on the MND.

SR 4 corridor from SR 160 to SR 242 and specifically Lone Tree Way/SR 4 interchange should be included in your traffic analysis. SR 4 is critical to regional and interregional traffic in the San Francisco Bay region. It is vital to commuting, freight, and recreational traffic and is among the most congested regional facilities. 2.1

Traffic Impact Fees

Given the Plan's contribution to area traffic, and the location of the proposed project, traffic impact fees should be identified for project mitigation. Caltrans also encourages the City to participate in a contribution program and plan for the impact of future growth on the regional transportation system and regionally contribute such fees to the East Contra Costa Regional Fee Program administered by TRANSPLAN. Contributions would be used to help fund regional transportation programs that improve the transportation system to lessen future traffic congestion, improve mobility by reducing time delays, and maintain reliability on major roadways throughout the San Francisco Bay Area. Please also consider a Multimodal fee to improve transit, thereby reducing delays on State facilities; this would not only benefit the region but also reduce any queuing on local roadways caused by highway congestion. 2.2

Caltrans encourages you to locate any needed project related housing, jobs and employee related services near major mass transit centers, with connecting streets configured to facilitate walking and biking, as a means of promoting mass transit use and reducing regional vehicle miles traveled and traffic impacts on the State highways. We also encourage you to develop Travel Demand Management (TDM) policies to encourage usage of nearby public transit lines and reduce vehicle trips on the State Highway System. Specifically, the project should increase the use of nearby transit to the Pittsburgh Bart Station or the future Rail Road Bart Station and increase service on Tri Valley Transit for example better headway times on bus lines 380, 383 and 385, and also work with Tri Valley Transit to locate bus stops in your or close to your project. 2.3

The TDM Plan should include appropriate documentation for monitoring TDM measures, including annual reports to demonstrate the ongoing reduction of vehicle trips while continuing to survey the travel patterns of employees and visitors to the facility. http://www.mtc.ca.gov/planning/smart_growth/parking.

Should you have any questions regarding this letter, please call Keith Wayne at 510-286-5737 or keith_wayne@dot.ca.gov.
Sincerely,

Pat C

PATRICIA MAURICE
District Branch Chief
Local Development - Intergovernmental Review

Response to Comment Letter 2: California Department of Transportation

2.1
The commenter states that the traffic analysis for the project should include the SR-4 Corridor from SR 160 to SR 242 as well as the Lone Tree Way/SR 4 Interchange.

Study intersections for the project were developed by the City Engineer and were chosen to represent the intersections and roadways most likely to see effects from project-generated traffic.

The portion of the SR-4 Corridor noted by the commenter is approximately 20 miles in length. The SR 4/Lone Tree Way Interchange is located approximately 1 mile from the project site.

The Initial Study noted that the project would not result in any significant degradation of intersection level of service at the six selected intersections. The study intersections are located closer to the project site than the SR 4/Lone Tree Way Interchange as well as the segment of SR 4 between SR 160 and SR 242. While the City acknowledges that the project may contribute trips to roadways and intersections beyond the project site, given that project traffic would not result in significant effects at the closer study intersections, the likelihood of the project resulting in significant traffic effects at more remote intersections and roadways is negligible. Accordingly, the City did not include the study of other intersections or more distant roadways in its analysis.

2.2
The commenter states that the City should impose traffic impact fees on the project as a mitigation measure. As noted above, the project traffic study found that the project would not result in any significant impacts. In order for the City, in its capacity as a CEQA lead agency to impose mitigation in any form, a nexus to a significant impact must first be established. In the absence of significant traffic impacts, there is no nexus for the imposition of mitigation.

2.3
The commenter states that "any needed project related housing, jobs, and employee related services" be located near major mass transit centers. The commenter also states that the "project should increase the use of nearby transit to the [sic] Pittsburg BART station or the future Rail Road BART station…" Additionally, the commenter states that the City should develop Transportation Demand Management Policies to encourage use of nearby public transit lines and reduce vehicle trips.

At present, no bus routes extend south of Lone Tree Way onto Heidorn Ranch Road and the project site. However, the project site is within one mile of several Tri Delta Transit bus routes that currently travel to the Antioch Park and Ride facility on Hillcrest Avenue.

Some of these routes continue to the Pittsburg/Bay Point BART station. In 2018, eBART service is expected to be extended to stations in Pittsburg (Railroad Avenue) and Antioch (Hillcrest Avenue). In anticipation of the initiation of eBART service, Tri Delta Transit is studying several route modifications as a means of improving feeder service to the future station. The City looks forward to working with Tri Delta Transit and eBART in both the development of the Hillcrest Avenue Station as well as Tri Delta Transit bus routes throughout the City. The City will also take into consideration the commenter's suggestion regarding adoption of Transportation Demand Management policies. As the comment does not identify any issue specific to the analysis or conclusions of the Initial Study, no change to the Initial Study is warranted.

CALIFORNIA
Water Boards

Central Valley Regional Water Quality Control Board

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

RECEIVED
JUN 22 2015
CITY OF ANTIOCH
COMMUNITY DEVELOPMENT

19 June 2015

Mindy Gentry
City of Antioch
Community Development Department
200 H Street
Antioch, CA 94531

CERTIFIED MAIL
7014 2870 0000 7535 3817

COMMENTS TO REQUEST FOR REVIEW FOR THE MITIGATED NEGATIVE DECLARATION, HEIDORN VILLAGE SUBDIVISION PROJECT, SCH# 2015052069, CONTRA COSTA COUNTY

Pursuant to the State Clearinghouse's 28 May 2015 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Mitigated Negative Declaration* for the Heidorn Village Subdivision Project, located in Contra Costa County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). 3.1

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]

The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process. 3.2

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/.

For more information on the Phase II MS4 permit and who it applies to, visit the State Water Resources Control Board at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml

Industrial Storm Water General Permit

Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 97-03-DWQ. 3.3

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml.

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACOE). If a Section 404 permit is required by the USACOE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements. 3.4

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACOE at (916) 557-5250.

[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACOE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications. 3.5

Waste Discharge Requirements

If USACOE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project will require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation. 3.6

For more information on the Water Quality Certification and WDR processes, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/help/business_help/permit2.shtml.

Regulatory Compliance for Commercially Irrigated Agriculture

If the property will be used for commercial irrigated agricultural, the discharger will be required to obtain regulatory coverage under the Irrigated Lands Regulatory Program.
There are two options to comply:

1. **Obtain Coverage Under a Coalition Group.** Join the local Coalition Group that supports land owners with the implementation of the Irrigated Lands Regulatory Program. The Coalition Group conducts water quality monitoring and reporting to the Central Valley Water Board on behalf of its growers. The Coalition Groups charge an annual membership fee, which varies by Coalition Group. To find the Coalition Group in your area, visit the Central Valley Water Board's website at: http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/app_approval/index.shtml; or contact water board staff at (916) 464-4611 or via email at IrrLands@waterboards.ca.gov. 3.7

2. **Obtain Coverage Under the General Waste Discharge Requirements for Individual Growers, General Order R5-2013-0100**. Dischargers not participating in a third-party group (Coalition) are regulated individually. Depending on the specific site conditions, growers may be required to monitor runoff from their property, install monitoring wells, and submit a notice of intent, farm plan, and other action plans regarding their actions to comply with their General Order. Yearly costs would include State administrative fees (for example, annual fees for farm sizes from 10-100 acres are currently $1,084 + $6.70/Acre); the cost to prepare annual monitoring reports; and water quality monitoring costs. To enroll as an Individual Discharger under the Irrigated Lands Regulatory

Program, call the Central Valley Water Board phone line at (916) 464-4611 or e-mail board staff at IrrLands@waterboards.ca.gov.

Low or Limited Threat General NPDES Permit

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Dewatering and Other Low Threat Discharges to Surface Waters* (Low Threat General Order) or the General Order for *Limited Threat Discharges of Treated/Untreated Groundwater from Cleanup Sites, Wastewater from Superchlorination Projects, and Other Limited Threat Wastewaters to Surface Water* (Limited Threat General Order). A complete application must be submitted to the Central Valley Water Board to obtain coverage under these General NPDES permits. 3.8

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0074.pdf

For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0073.pdf

If you have questions regarding these comments, please contact me at (916) 464-4684 or tcleak@waterboards.ca.gov.

Trevor Cleak

Trevor Cleak
Environmental Scientist

cc: State Clearinghouse unit, Governor's Office of Planning and Research, Sacramento

Response to Comment Letter 3: Central Valley Regional Water Quality Control Board (RWQCB)

3.1
The commenter recites permit requirements regarding construction.

Page 55 of the Initial Study describes some of the bioretention features proposed as part of the project. Page 55 also notes that as a condition of project approval, in compliance with guidelines set forth by Contra Costa County and the RWQCB, the project would implement Best Management Practices (BMPs) set forth in the Contra Costa Clean Water Program that would minimize opportunities for construction activities to create polluted runoff water. The Initial Study specifically notes, consistent with the comment that prior to the issuance of any grading or construction permits, a Stormwater Pollution Prevention Plan (SWPPP) would be prepared for City review and approval as per the guidelines set forth by the City and the RWQCB. The SWPPP would incorporate BMPs that minimize the amount of erosion occurring both during and after construction. Further, a Stormwater Control Plan would be submitted to the City for review and approval, which would satisfy all Provision C.3 requirements and meet or exceed all requirements. The Stormwater Control Plan would be implemented to limit the imperviousness of the site by constructing landscape islands and vegetated swales.

3.2
The commenter recites certain conditions related to Phase I and Phase II Municipal Separate Storm Sewer System Permits. The City of Antioch is not a permittee under this program. The comment is therefore not applicable to the project.

3.3
The commenter recites certain conditions applicable to industrial sites. The proposed project is entirely residential. Therefore, the comment is not applicable to the project.

3.4
The commenter states that if the project would involve the discharge of dredged or fill material into navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act would be required from the ACOE. Please see the response to comment 1.1 above.

3.5
The commenter states that if a Section 404 permit is required, the RWQCB would in turn be required to issue a Section 401 Water Quality Certification. Table 1 of the Initial Study notes the potential need for a Section 401 certificate, as does the discussion preceding Mitigation Measures BIO-7a and 7b.

3.6
The commenter states that a Waste Discharge Requirement (WDR) permit may be required if the ACOE determines that the project site contains non-federal (non-jurisdictional) waters. The comment is noted.

3.7
The commenter recites regulations related to commercially irrigated agriculture sites. The proposed project includes residential development only. Therefore, the cited regulations are not applicable to the project.

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

June 29, 2015

RECEIVED
JUL 02 2015
CITY OF ANTIOCH
COMMUNITY DEVELOPMENT

Mindy Gentry
City of Antioch
200 H Street
Antioch, CA 94531

Subject: Heidorn Village Subdivision
SCH#: 2015052069

Dear Mindy Gentry:

The State Clearinghouse submitted the above named Mitigated Negative Declaration to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on June 26, 2015, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

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 contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

Document Details Report
State Clearinghouse Data Base

SCH#	2015052069
Project Title	Heidorn Village Subdivision
Lead Agency	Antioch, City of

Type	MND Mitigated Negative Declaration
Description	The Heidorn Village Project proposes to subdivide 20.3 acres into 117 single-family residential lots, an average density of 5.8 units per acre. The project would also include park and open space areas and internal access roads.

Lead Agency Contact

Name	Mindy Gentry		
Agency	City of Antioch		
Phone	(925) 779-7035	*Fax*	
email			
Address	200 H Street		
City	Antioch	*State* CA	*Zip* 94531

Project Location

County	Contra Costa				
City	Antioch				
Region					
Lat / Long	37° 57' 23.4" N / 121° 45' 11.7" W				
Cross Streets	Heidorn Ranch Road and Lone Tree Way				
Parcel No.	056-130-013, -015, -017, -018				
Township	1N	*Range* 2E	*Section* 4	*Base*	

Proximity to:

Highways	SR 4 Bypass
Airports	No
Railways	Amtrak CA
Waterways	Sand Creek
Schools	Dozier-Libbey Medical
Land Use	Planned Development

Project Issues	Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Coastal Zone; Drainage/Absorption; Economics/Jobs; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Growth Inducing; Landuse; Cumulative Effects

Reviewing Agencies	Resources Agency; Department of Fish and Wildlife, Region 3; Delta Protection Commission; Department of Parks and Recreation; Department of Water Resources; Office of Emergency Services, California; California Highway Patrol; Caltrans, District 4; Air Resources Board; Regional Water Quality Control Bd., Region 5 (Sacramento); Native American Heritage Commission; Public Utilities Commission; Delta Stewardship Council

Date Received 05/28/2015 *Start of Review* 05/28/2015 *End of Review* 06/26/2015

Note: Blanks in data fields result from insufficient information provided by lead agency.

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

clear
6/26/15
E

19 June 2015

RECEIVED
JUN 24 2015
STATE CLEARING HOUSE

Mindy Gentry
City of Antioch
Community Development Department
200 H Street
Antioch, CA 94531

CERTIFIED MAIL
7014 2870 0000 7535 3817

COMMENTS TO REQUEST FOR REVIEW FOR THE MITIGATED NEGATIVE DECLARATION, HEIDORN VILLAGE SUBDIVISION PROJECT, SCH# 2015052069, CONTRA COSTA COUNTY

Pursuant to the State Clearinghouse's 28 May 2015 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Mitigated Negative Declaration* for the Heidorn Village Subdivision Project, located in Contra Costa County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]

The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/.

For more information on the Phase II MS4 permit and who it applies to, visit the State Water Resources Control Board at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml

Industrial Storm Water General Permit

Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 97-03-DWQ.

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml.

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACOE). If a Section 404 permit is required by the USACOE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements.

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACOE at (916) 557-5250.

[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACOE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications.

Waste Discharge Requirements

If USACOE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project will require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation.

For more information on the Water Quality Certification and WDR processes, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/help/business_help/permit2.shtml.

Regulatory Compliance for Commercially Irrigated Agriculture

If the property will be used for commercial irrigated agricultural, the discharger will be required to obtain regulatory coverage under the Irrigated Lands Regulatory Program.
There are two options to comply:

1. **Obtain Coverage Under a Coalition Group.** Join the local Coalition Group that supports land owners with the implementation of the Irrigated Lands Regulatory Program. The Coalition Group conducts water quality monitoring and reporting to the Central Valley Water Board on behalf of its growers. The Coalition Groups charge an annual membership fee, which varies by Coalition Group. To find the Coalition Group in your area, visit the Central Valley Water Board's website at: http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/app_approval/index.shtml; or contact water board staff at (916) 464-4611 or via email at IrrLands@waterboards.ca.gov.

2. **Obtain Coverage Under the General Waste Discharge Requirements for Individual Growers, General Order R5-2013-0100**. Dischargers not participating in a third-party group (Coalition) are regulated individually. Depending on the specific site conditions, growers may be required to monitor runoff from their property, install monitoring wells, and submit a notice of intent, farm plan, and other action plans regarding their actions to comply with their General Order. Yearly costs would include State administrative fees (for example, annual fees for farm sizes from 10-100 acres are currently $1,084 + $6.70/Acre); the cost to prepare annual monitoring reports; and water quality monitoring costs. To enroll as an Individual Discharger under the Irrigated Lands Regulatory

Program, call the Central Valley Water Board phone line at (916) 464-4611 or e-mail board staff at IrrLands@waterboards.ca.gov.

Low or Limited Threat General NPDES Permit

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Dewatering and Other Low Threat Discharges to Surface Waters* (Low Threat General Order) or the General Order for *Limited Threat Discharges of Treated/Untreated Groundwater from Cleanup Sites, Wastewater from Superchlorination Projects, and Other Limited Threat Wastewaters to Surface Water* (Limited Threat General Order). A complete application must be submitted to the Central Valley Water Board to obtain coverage under these General NPDES permits.

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0074.pdf

For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0073.pdf

If you have questions regarding these comments, please contact me at (916) 464-4684 or tcleak@waterboards.ca.gov.

Trevor Cleak
Environmental Scientist

cc: State Clearinghouse unit, Governor's Office of Planning and Research, Sacramento

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
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Ms. Mindy Gentry
City of Antioch
Community Development Department
200 H Street
Antioch, CA 94531

Dear Ms. Gentry:

Heidorn Village Subdivision–Mitigated Negative Declaration (MND)

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the project referenced above. In our recent phone conversation on 6/12/2015, we appreciate the City of Antioch (City) early coordination to consult with us. The proposed project would construct 117 single-family homes on 20.3 acres with an average density of 5.8 units per acre. The project would also include park and open space areas and internal access road. The project is located in Contra Costa County approximately .75 miles west of State Route (SR) 4.

Sidewalks and crosswalks are provided throughout most of the project vicinity but are absent near the southern portion, where roadways are not built out yet or where they are adjacent to rural lands. Existing sidewalks along Heidorn Ranch Road terminate at the intersection of Heidorn Ranch Road and Lone Tree Plaza Drive; there are no sidewalks adjacent to the proposed project site.

The Antioch General Plan calls for the maintenance of safe and convenient pedestrian and bicycle facilities, rail and bus transit. Pedestrian sidewalks will be constructed long the entire project frontages of Prewett Ranch Drive and Heidorn Ranch Road. Pedestrian sidewalks will also be located internally along both sides of project streets. There will be a pedestrian trail connection to the Mokelumne Trail located in the northwest portion of the project site. A new bus stop will be located on the east side of Heidorn Ranch Road just north of the planned Prewett Ranch Drive and Heidorn Ranch Road intersection.

Caltrans' new mission, vision, and goals signal a modernization of our approach to California's transportation system. We review this local development for impacts to the State Highway transportation System in keeping with our mission, vision, and goals for sustainability, livability, economy, safety and health. We provide these comments consistent with the State's smart mobility goals that support a vibrant economy, and build communities, not sprawl. The following comments are based on the MND.

SR 4 corridor from SR 160 to SR 242 and specifically Lone Tree Way/SR 4 interchange should be included in your traffic analysis. SR 4 is critical to regional and interregional traffic in the San Francisco Bay region. It is vital to commuting, freight, and recreational traffic and is among the most congested regional facilities.

Traffic Impact Fees

Given the Plan's contribution to area traffic, and the location of the proposed project, traffic impact fees should be identified for project mitigation. Caltrans also encourages the City to participate in a contribution program and plan for the impact of future growth on the regional transportation system and regionally contribute such fees to the East Contra Costa Regional Fee Program administered by TRANSPLAN. Contributions would be used to help fund regional transportation programs that improve the transportation system to lessen future traffic congestion, improve mobility by reducing time delays, and maintain reliability on major roadways throughout the San Francisco Bay Area. Please also consider a Multimodal fee to improve transit, thereby reducing delays on State facilities; this would not only benefit the region but also reduce any queuing on local roadways caused by highway congestion.

Caltrans encourages you to locate any needed project related housing, jobs and employee related services near major mass transit centers, with connecting streets configured to facilitate walking and biking, as a means of promoting mass transit use and reducing regional vehicle miles traveled and traffic impacts on the State highways. We also encourage you to develop Travel Demand Management (TDM) policies to encourage usage of nearby public transit lines and reduce vehicle trips on the State Highway System. Specifically, the project should increase the use of nearby transit to the Pittsburgh Bart Station or the future Rail Road Bart Station and increase service on Tri Valley Transit for example better headway times on bus lines 380, 383 and 385, and also work with Tri Valley Transit to locate bus stops in your or close to your project.

The TDM Plan should include appropriate documentation for monitoring TDM measures, including annual reports to demonstrate the ongoing reduction of vehicle trips while continuing to survey the travel patterns of employees and visitors to the facility.
http://www.mtc.ca.gov/planning/smart_growth/parking.

Should you have any questions regarding this letter, please call Keith Wayne at 510-286-5737 or keith_wayne@dot.ca.gov.
Sincerely,

Patti

PATRICIA MAURICE
District Branch Chief
Local Development - Intergovernmental Review

Response to Comment Letter 4: California State Clearinghouse

Pursuant to CEQA requirements, the City distributed the Initial Study and Draft Mitigated Negative Declaration (IS/MND) to the California State Clearinghouse. The State Clearinghouse in turn distributed the IS/MND to state agencies with a potential interest in the project.

The State Clearinghouse's letter includes a compilation of comment letters from the California Department of Fish and Wildlife, the California Department of Transportation, and the Central Valley Regional Water Quality Control Boards – the same letters as presented above in comment letters 1 through 3. Since the State Clearinghouse's letter does not include any additional comments, please see responses to comment letters 1-3 for individual responses to comments.

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SECTION 2 – REVISED INITIAL STUDY

Heidorn Village Subdivision

Project Description

1. ***Project Title***:

Heidorn Village Subdivision

2. ***Lead Agency Name and Address:***

City of Antioch, Community Development Department, Planning Division, 3rd and H Streets, P.O. Box 5007, Antioch, CA 94531

3. ***Contact Person and Phone Number:*** Mindy Gentry, Senior Planner, 925-779-7035, email: mgentry@ci.antioch.ca.us

4. ***Project Location:***
   Figure 1 shows the location of the project site. The 20.3-acre project site is located in the southeastern portion of the City of Antioch (City), along the western side of Heidorn Ranch Road, about 0.4 mile south of Lone Tree Way. Heidorn Ranch Road forms a boundary between the City and the neighboring City of Brentwood. The project site is comprised of four parcels (Assessor Parcel Numbers (APNs) 056-130-013, 056-130-015, 056-130-017, and 056-130-018).

5. ***Project Sponsor's Name and Address:*** Douglas Krah, 1917 Parkmont Drive, Alamo, CA 94507

6. ***General Plan Designation:*** Medium Low Density Residential (6 units/acre)

7. ***Zoning:*** Planned Development (PD) (6 dwelling units/acre)

8. ***Description of Project:***

Project Concept

Figure 2 shows the proposed site plan. The Heidorn Village Project (project) proposes to subdivide 20.3 acres into 117 single-family residential lots, an average density of 5.8 units per acre. The project would also include park and open space areas and internal access roads.

Vehicle access into the project site would be provided at two entry points: Dauphine Street (east project driveway) would provide right-in, right-out only access, while a new Prewett Ranch Drive extension would allow full turning movements from a new Alvar Loop driveway. The ultimate build out of the Prewett Ranch Drive extension is discussed in more detail below.

Per Section 9-5.601 of the Antioch Municipal Code, height, area, and setback regulations for the PD Zoning District are established on a project-by-project basis by the City Council. The applicant proposes lot sizes that would range between 4,000 to 8,806 square feet in area; average lot size would be 4,564 square feet. All lots would have minimum side-yard setbacks of 5 feet, 10- to 15-foot

front-yard setbacks, and rear-yard depths ranging from 15 to 23 feet. Driveways would be a minimum of 20 feet in length.

The applicant has provided conceptual designs for the proposed styles of single-family residences. The applicant proposes four residence types, the tallest of which would have a maximum height of 29 feet, 3 inches (two stories). **Figures 3a** through **3d** depict proposed conceptual architectural styles.

The project would include a 0.7-acre park and two additional open space areas totaling 1.3 acres, for a total of 2 acres of open space. The project would incorporate a gated and landscaped connection to the adjacent Mokelumne Coast-to-Crest Multi Use Trail (Mokelumne Trail). The trail connection would be consistent with the recommendations contained in the Preliminary Development Plan Staff Report to the City Council for Heidorn Village (April 8, 2014 public hearing).

Project Site

Figure 4 shows photographs of existing conditions on the project site. Although the site was previously cultivated as an orchard (as recently as 2006), the site is currently vacant and has been semi-regularly disked over several successive years. There are sparse trees near Heidorn Ranch Road on the property's eastern edge. Site elevations range from about 150 to 160 feet above sea level, with an approximately one percent gradient that rises gradually to the southwest. To the north, the project is bound by the Mokelumne Trail which connects to a segment of a growing regional network of trails spanning the East County area.

Surrounding Land Uses and Settings

The immediate surroundings include residential uses to the north, east, and west; a church/school to the northeast; and open space and agricultural uses to the south.

The Heritage Baptist Church and Heritage Baptist Academy (church/school) also border the northern boundary of the site. The Lone Tree Plaza retail center (Trader Joe's, Kohl's, The Home Depot, and other stores) is located farther to the north in the northwest quadrant of the intersection of Heidorn Ranch Road and Lone Tree Way.

Medium- to low-density residential developments are located immediately west of the project site and to the north beyond the Mokelumne Trail.

Lands immediately to the south of the project site have a General Plan designation of Medium Low Density Residential.

Existing uses to the east include rural residential units and lands in agricultural production. Land east of Heidorn Ranch Road is identified in the Brentwood General Plan as part of Priority Area 1 (PA-1), and is designated Mixed Use Pedestrian Transit (MUPT). The Brentwood General Plan calls for PA-1 to be predominantly developed with a mixture of uses that generate jobs. The MUPT designation identifies areas to be developed predominantly with jobs-generating and commercial uses, but medium to very high density residential development is also allowed. The State Route 4 Bypass is located about 0.3 miles to the east. The Brentwood General Plan Circulation Element includes a future extension of Sand Creek Road to connect with Heidorn Ranch Road about 0.8 miles south of the project site.

Landscaping

Figure 5 depicts a conceptual landscaping plan. The project proposes the planting of approximately 370 trees and associated vegetation (plants and shrubs) along the internal streets as well as in park and open space areas. Trees and other vegetation would vary in form, texture, and color, including the use of water conserving shrubs, grasses, and ground cover. Landscaping would include the installation of a layered massing of water conserving shrubs, grasses, and ground cover plus shade and accent trees. A total of about 40 palm trees would be planted within the park, at the central internal intersection, and at the entrance from Prewett Ranch Drive.

The proposed park would include a children's water play area and two gathering areas with shade sails, seating, and BBQ grills. A mailbox kiosk would also be located in the park, which would include benches and recycling and trash receptacles. Other proposed improvements include street lighting and wood/steel fencing.

Circulation

As shown in **Figure 2**, the project proposes a network of five internal private streets. All internal streets would have two 11-foot traffic lanes. Selected internal streets would have 7-foot parking shoulders on both sides of the street. Sidewalks of about 5 feet in width would be developed on one side of these streets in some locations.

The project would expand the width of Heidorn Ranch Road from two to three lanes (two southbound lanes and one northbound lane).

A total of 351 parking spaces are proposed, inclusive of garage parking, off-street (driveway) parking, and on-street parking. Each of the 117 units would have a garage with parking for two cars (234 spaces total); and an additional 117 on-street parking spaces would be provided.

Prewett Ranch Drive Extension

The project proposes extending Prewett Ranch Drive as a 40-foot-wide roadway (within a 60 to 78 foot right-of-way) from its current terminus at Summerfield Drive easterly to Heidorn Ranch Road in a manner consistent with the Circulation Element of the General Plan.

Required Utilities, Public Service, and Site Improvements

The project site is located immediately adjacent to urbanized developments in the City. Existing water, sewer, and storm drain systems are present at the terminus of Prewett Ranch Drive as well as along Heidorn Ranch Road. The project would connect via extensions to the existing utilities and construct an internal utility network on the project site. Proposed connections include existing natural gas, water, sewer, electricity, and telecommunications lines. Connections to these utilities would require work in public right-of-way areas but would not result in the need for extended lane closures.

If the City approves the project, as a condition of project approval the City would require the establishment of or participation in a land-based financing mechanism to fund police service needs generated by the project in order to meet relevant General Plan service requirements. The financing mechanism would be in the form of a special tax or Community Facilities District (CFD), or other means acceptable to the City and the project applicant. The financing mechanism would be established prior to the issuance of building permits for the first unit of the project. At the City's discretion, the applicant would establish or pay the City's costs to establish the mechanism.

Grading

As the project site is generally flat, relatively minimal grading would be needed to create streets and building pads.

Construction

Development of the project site would be anticipated to occur in multiple phases contingent on funding, market conditions, and other factors. For the purposes of this environmental review, a total of three phases are assumed (see **Figure 6**). Phase I would include improvements to Heidorn Ranch Road and the eastern half of Prewett Ranch Drive (From Heidorn Ranch Road to Alvar Loop), as well as onsite improvements to about 43 lots and construction of about 40 houses. Phase II would include onsite improvements to 36 lots and construction of 36 houses. Phase III would include completing improvements to Prewett Ranch Drive, onsite improvements to any lots not yet prepared and construction of remaining houses. Each phase would consist of multiple stages of releases for the development of the single-family homes.

The overall construction period is estimated at 12 to 18 months, contingent on several aforementioned factors. **Figure 6** shows anticipated construction phasing.

Project Site History

The project site was rezoned to Planned Development and was previously approved for subdivision (vesting tentative map approval) of 83 single-family units in August 1990. Per the City's Subdivision Code, this approval was for a period of two years. The previous applicant requested and received a one-year extension of the approval. However, no Final Map was ever submitted to the City, and the vesting tentative map approval thus expired.

On January 22, 2008, the Antioch City Council approved a residential development allocation for 115 units. The City prepared and circulated for public comment a Draft Initial Study/MND for that proposed development, which was known as "Tierra Villas." However, the developer of that project (different than the current applicant) did not move forward with the project.

Requested Actions

Table 1 lists the various approvals anticipated to be necessary for the proposed project.

Table 1. Project Approvals

Agency/Provider	Permit/Approval
City of Antioch	Adoption of Initial Study/Mitigated Negative Declaration
	Use Permit
	Rezoning as required under PD zone
	Design Review
	Approvals of Tentative and Final Maps
	Grading Permit
	Building Permits
	Encroachment Permit
California Regional Water Quality Control Board	Section 401 Certificate
	National Pollutant Discharge Elimination Permit
	Storm Water Pollution Prevention Plan
United States Army Corps of Engineers	Wetlands Delineation (if needed)
	Section 404 Permit (if required)

Source: Circlepoint, 2015

Environmental Factors Potentially Affected

This initial study includes an evaluation of impacts based on the California Environmental Quality Act (CEQA) Guidelines *Appendix G* Environmental Checklist. Each checklist item is explained in the discussion following the checklist and, if necessary, mitigation measures are provided to reduce impacts to a less-than-significant level. In accordance with CEQA, all answers take into account the whole of the action, including on- and off-site effects, direct and indirect effects, and effects from both construction and operation of any new development.

Each checklist criterion is marked to identify whether there is an environmental impact.

- *No Impact* indicates that there is no impact.
- *Less-than-Significant Impact* means that while there is some impact, the impact does not exceed any identified thresholds.
- *Significant Unless Mitigation Incorporated* indicates that a significant impact has been identified in the course of this analysis and mitigation measures have been provided in this initial study to reduce a potentially significant impact to a less-than-significant level.
- *Significant Impact* indicates that not all impacts have been reduced to less-than-significant and an Environmental Impact Report (EIR) will be required. As noted previously, mitigation measures developed for this project reduce any significant impacts to a less-than-significant level and an EIR will not be required.
- *Cumulative Impact*s are discussed in **Section XVIII, Mandatory Findings**. The project is considered in combination with approved and proposed projects in the vicinity of the project, as well as the projected buildout of the County as allowed under the County's General Plan to determine if the cumulative impact is significant or less than significant. If a significant cumulative impact is identified, the project's contribution to the significant cumulative impact is considered.

The environmental factors checked below would be potentially affected by the project, involving at least one impact that is a significant impact as indicated by the checklist on the following pages. Mitigation measures have been provided for each significant impact, reducing all to a less-than-significant level.

☐ 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 & Circulation
☐ Utilities & Service Systems	☐ Mandatory Findings of Significance

Determination

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 the proposed project COULD have a significant effect on the environment, but mitigations identified in this Initial Study will reduce these impacts to a less than significant level, and 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 significant effect(s) on the environment, but at least one effect 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, if the effect is a "potentially significant impact" or "potentially significant unless mitigated." 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, there WILL NOT be a significant effect in this case because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project. ☐



Alexis Morris
Senior Planner

October 21, 2015
Date

ENVIRONMENTAL IMPACT CHECKLIST

I. Aesthetics

	Significant Impact	Significant Unless 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 which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

a) Have a substantial adverse effect on a scenic vista?

Less-than-Significant Impact. The project site is currently an open, relatively flat, unimproved field, with no on-site buildings or substantial view-interrupting vegetation. Views of Mount Diablo and the Deer Valley ridgelines to the southwest of the project site can be seen from the project site and adjacent areas, including Heidorn Ranch Road and the Mokelumne Trail (See **Figure 4**).

The City's General Plan identifies views of Mount Diablo and local ridgelines as important scenic resources. General Plan Policy 5.4.2c within the General Plan calls for the maintenance of "...view corridors from public spaces to natural ridgelines and landmarks, such as Mount Diablo." However, this same policy expresses a "[recognition] that new development will inevitably result in some loss of existing views" and prohibits "the siting of structures or landscaping that would completely block views from adjacent properties."

The project would be consistent with the surrounding and nearby pattern of development, and would allow for intermittent views of the ridgelines through the spacing of the two-story homes, the angle of the lots, street corridors, and the parks and open spaces. Thus, the project would not have a significant adverse impact to scenic vistas. No mitigation would be required.

b) Substantially damage scenic resources, including but not limited to: trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. According to the California Department of Transportation (Caltrans), there is no state or county designated scenic highway in the City nor in eastern Contra Costa County. Moreover, there are no rock outcroppings or historic buildings in the vicinity of the project site. Therefore, there

would be no impact to scenic resources within any state scenic highway. No mitigation would be required.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Less-than-Significant Impact. While the existing character of the project site would be shifted from undeveloped to a suburban visual environment, the resulting visual character would be consistent with surrounding and nearby residential areas to the north and west. Proposed housing units would feature architectural design styles and building heights similar to those in the surrounding and nearby neighborhoods.[1] The project requires design review approval; this approval would review the consistency of individual site plans with Antioch's Citywide Design Guidelines. Achieving consistency with these guidelines would help ensure a resultant high-quality visual character.

As shown in **Figure 5**, proposed landscaping would incorporate drought tolerant trees and shrubbery that would add texture to the visual character of new development.[2] As such, the project would not significantly degrade the existing visual character or aesthetic quality of the project site and its surroundings. Therefore, visual character and quality impacts would be less than significant. No mitigation would be required.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less-than-Significant Impact. Existing manmade light sources in the project area include lighting associated with nearby residential and commercial areas, and vehicle traffic along Heidorn Ranch Road. Development of the project would potentially introduce new sources of both daytime glare and nighttime lighting to the project area and surrounding areas.

Potential new sources of glare would include the glare produced by sunlight reflecting off exterior walls and windows of the residential units. Anticipated new sources of nighttime lighting would include proposed street and park/landscape area lights as well as exterior and interior lighting of the proposed new houses.

With regard to the potential for daytime glare, the architectural styles proposed for the project would incorporate stucco and other rough, generally non-reflective surfaces in neutral tones, such as cream, terra cotta, and beige. Flat slate roofing ranging from gray to pewter to brown would also help absorb light. No substantial glare effects are anticipated. New sources of nighttime lighting would include pendant-on-pole downcast street lights and pedestrian-scaled lights intended to minimize lateral light spread. Proposed new houses themselves, as well as proposed landscaping along project perimeters would provide a partial buffer for these new sources of nighttime lighting and limit light spread onto other properties. The project does not include any other unusual light source that could potentially interfere with nighttime views. Therefore, project light and glare impacts would be less than significant. No mitigation would be required.

[1] KTGY Architects. 2014. Heidorn Village.
[2] Van Dorn Abed Landscape Architects, Inc. 2014. Heidorn Village Landscape Plan.

II. Agriculture and Forest Resources

	Significant Impact	Significant Unless Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use?	☐	☐	☒	☐
b) Conflict with existing zoning for agricultural use, or with 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?	☐	☐	☒	☐

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use?

and

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?

Less-than-Significant Impact. The project site is currently vacant. A review of historic aerial photos indicates that the site was in walnut orchard use from at least the 1940s until about 2006. The City's General Plan has designated the site for residential use. The site is zoned Planned Development, which is consistent with the General Plan designation. Notably, no land within the City of Antioch is zoned for agricultural use.

According to a review of maps prepared by the California Department of Conservation, the project site does not contain any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. However, the Department of Conservation's 2010 map identifies the site as having farmland of local importance (emphasis added). This is a distinct classification from Prime, Unique or Statewide importance; the CEQA checklist is primarily concerned with these latter classifications.

Lands to the north and west of the project site are in residential use; lands to the south are designated for future residential use. Similarly, the City of Brentwood has designated lands near the project site (across Heidorn Ranch Road) for future residential development. Although some nearby parcels include vestiges of earlier agricultural uses (such as remnants of orchards), these parcels were designated for uses other than agriculture. Therefore, since the project would not result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use, or have the potential to result in other losses of farmland, project impacts to farmland would be less-than-significant.[3] No mitigation would be required.

b) Conflict with zoning for agricultural use, or with a Williamson Act contract?

No Impact. The project site is not zoned for agricultural use, nor is it under a Williamson contract. The City has zoned the property as medium low density residential. The project would not therefore conflict with existing zoning for agricultural use, or with a Williamson Act contract. No mitigation would be required.

c) Conflict with existing zoning for, or cause rezoning or, forest land, timberland, or timberland zoned Timberland Production?

and

d) Result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. The project site contains no forest land and is not zoned as timberland. There are no forested areas in the immediate vicinity. Therefore, the project could not result in any conflicts related to forest land use or forest land/timberland zoning. No mitigation would be required.

[3] California Department of Conservation. 2011. Contra Costa County Important Farmland 2010. Available: ftp://ftp.consrv.ca.gov/pub/dlrp/fmmp/pdf/2010/con10.pdf. Accessed August 11, 2014.

III. Air Quality

	Significant Impact	Significant Unless Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a) Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially 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 non-attainment under 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?	☐	☐	☒	☐

Information in this section was drawn from an Air Quality Report prepared by Illingworth & Rodkin in September, 2014. The report is included as **Appendix A**.

Project Setting

The project site is located in the eastern portion of the San Francisco Bay Area Air Basin. Ambient air quality standards have been established by both federal and state government agencies. The Bay Area meets all ambient air quality standards with the exception of ground-level ozone, respirable particulate matter (PM10), and fine particulate matter (PM2.5).

High ozone levels are caused by the cumulative emissions of two air pollutants: reactive organic gases (ROG) and nitrogen oxides (NOx). These precursor pollutants react under certain meteorological conditions to form high ozone levels, so controlling the emissions of these precursor pollutants is the focus of the Bay Area's attempts to reduce ozone levels. Particulate matter is another problematic air pollutant of the Bay Area (respirable particulate matter or PM10, and fine particulate matter or PM2.5). High particulate matter levels aggravate respiratory and cardiovascular diseases and cause other lung problems.

Toxic air contaminants (TACs) are a broad class of compounds known to cause health problems and include (but are not limited to) so-called "criteria" air pollutants as established by federal and state

regulations. TACs are found in ambient air, especially in urban areas. Diesel exhaust is the predominant TAC in urban air and is estimated to represent about three-quarters of the cancer risk from TACs (based on the Bay Area average). According to the California Air Resources Board (CARB), diesel exhaust is a complex mixture of gases, vapors, and fine particles. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the state's Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB has adopted and implemented a number of regulations for stationary and mobile sources to reduce emissions of diesel particulate matter (DPM). In 2008, CARB approved a new regulation to reduce emissions of DPM and nitrogen oxides from existing on-road heavy-duty diesel fueled vehicles. The regulation requires affected vehicles to meet specific performance requirements between 2014 and 2023, with all affected diesel vehicles required to have 2010 model-year engines or equivalent by 2023.

The BAAQMD is the regional agency tasked with managing regional air quality. At the state level, the CARB (a part of the California Environmental Protection Agency [EPA]) oversees regional air district activities and regulates air quality at the state level. In June 2010, the BAAQMD Board of Directors adopted new CEQA thresholds of significance as part of a larger BAAQMD CEQA Guidelines document. The BAAQMD thresholds were intended to establish the level at which air pollution emissions would cause significant environmental impacts under CEQA. In subsequent litigation, the BAAQMD CEQA Guidelines were determined to be a project under CEQA; BAAQMD was duly ordered to rescind these Guidelines pending completion of environmental review per CEQA. Notwithstanding, the preparers of this document have reviewed the evidence used to formulate the BAAQMD CEQA Guidelines including BAAQMD's May 2010 staff report recommending the adoption of the thresholds and its attachments, and conclude that substantial evidence supports the use of BAAQMD's 2010 thresholds of significance for air quality and greenhouse gas impacts in this IS/MND. BAAQMD's CEQA Guidelines and May 2010 staff report are available for review at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES.aspx.

In September 2010, the BAAQMD adopted a new Clean Air Plan (2010 CAP). The 2010 CAP became effective immediately and includes 55 measures for reducing pollution.

a) Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan or Congestion Management Plan?

Less-than-Significant Impact. The applicable air quality plan is the 2010 CAP.

A project would be judged to conflict with or obstruct implementation of the applicable air quality plan if it would be inconsistent with the regional growth assumptions of population, employment, or Vehicle Miles Traveled (VMT). The emission reduction strategies in the 2010 CAP were developed, in part, on regional population, housing, and employment projections prepared by the Association of Bay Area Governments (ABAG).

The projections for the City were based on the assumptions in the City's General Plan EIR. As the proposed use of the project site would be consistent with the City's General Plan (medium-low density residential with a maximum of 6 dwelling units per acre), the resulting growth would be considered consistent with the projections used to develop the 2010 CAP.

The proposed project would have emissions well below pertinent BAAQMD thresholds (see item b below), and development would be near existing transit with regional connections. The project, at 117 single-family residences, is too small to exceed any of the Plan's significance thresholds and, thus, it would not be required to incorporate project-specific transportation control measures listed in the 2010 CAP.

Therefore, the project would have a less-than-significant impact in regards to the implementation of the 2010 CAP. No mitigation would be required.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Less-than-Significant Impact. The project size is smaller than the BAAQMD screening size for evaluating impacts related to ozone and particulate matter. Therefore, the project would not contribute substantially to existing or projected violations of those standards.

Carbon monoxide emissions from traffic generated by the project would be the pollutant of greatest concern at the local level. Congested intersections with a large volume of traffic have the greatest potential to cause high-localized concentrations of carbon monoxide. Air pollutant monitoring data indicate that carbon monoxide levels have been at healthy levels (i.e., below State and federal standards) in the Bay Area since the early 1990s. As a result, the region has been designated as attainment for the standard. The highest measured level over any 8-hour averaging period during the last 3 years in the Bay Area was less than 3 parts per million (ppm), compared to the ambient air quality standard of 9.0 ppm. Intersections affected by the project would have traffic volumes less than the BAAQMD screening criteria and, thus, the project would not cause a violation of an ambient air quality standard or have a considerable contribution to cumulative violations of these standards. No mitigation would be required.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Less-than-Significant Impact with Mitigation Incorporated. As noted above, the Bay Area is considered a non-attainment area for ground-level ozone and PM2.5 under both the Federal Clean Air Act and the California Clean Air Act. The area is also considered non-attainment for PM10 under the California Clean Air Act, but not the Federal act. As part of an effort to attain and maintain ambient air quality standards for ozone and PM10, the BAAQMD has established thresholds of significance for these air pollutants and their precursors. These thresholds are for ozone precursor pollutants [reactive organic gases (ROG) and nitrogen oxides (NOx)], PM10, and PM2.5 and apply to both construction period and operational period impacts.

Operational: In the 2011 update to its CEQA Air Quality Guidelines, BAAQMD identified the threshold size of residential projects that could result in significant operational period air pollutant emissions as 325 dwelling units. The project, at 117 dwelling units, is substantially below the threshold of 325 units and would therefore be considered to have a less than significant operational period impact.

Construction: BAAQMD's threshold size for potentially significant construction-period emissions is 114 dwelling units. Since the project proposes 117 dwelling units, BAAQMD guidance suggests the need for quantitative evaluation of such construction period emissions.

Project related construction emissions would result from on-site activities such as construction equipment emissions. Other sources of construction period emissions would be generated off-site, such as worker, hauling, and vendor traffic**. Table 2** shows the results of air pollutant modeling performed for the project (see **Appendix A**) relative to BAAQMD established daily thresholds of criteria pollutants (as expressed in pounds per day). As shown in **Table 2**, estimated average daily construction emissions of ROG, NOx, PM10 exhaust, and PM2.5 would be well below the pertinent thresholds. Since daily emissions thresholds would not be exceeded, impacts would be less-than-significant and no mitigation would be required.

Table 2. Construction Period Exhaust Emissions

Scenario	ROG	NOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
Estimated average daily emissions (pounds)[1]	12.4	30.5	1.9	1.8
BAAQMD Thresholds (pounds per day)	*54*	*54*	*82*	*54*
Exceed Threshold?	**No**	**No**	**No**	**No**

Note:[1] Assumes 435 workdays
Source: Illingworth & Rodkin, 2014

In addition to equipment exhaust as analyzed above, other construction-related sources of PM10 and PM2.5 include site preparation and grading activities, which by disturbing or moving soils can result in the generation of fugitive dust. Fugitive dust emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. Fugitive dust emissions would also depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Since the project will disturb and move soils, it has the potential to result in significant fugitive dust impacts. The BAAQMD CEQA Air Quality Guidelines consider fugitive dust impacts to be less than significant if pertinent best management practices (BMPs) are employed. To such an end, Mitigation **Measure AIR-1** would implement these BMPs.

> **Mitigation Measure AIR-1:** Construction BMPs include measures to control dust emissions. The following BMPs shall be implemented during construction:
>
> 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 track-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. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

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. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Significance after Mitigation: Implementation of construction BMPs, as identified in **Mitigation Measure AIR-1**, would reduce fugitive dust (particulate matter) emission impacts to a less-than-significant level.

d) Expose sensitive receptors to substantial pollutant concentrations?

Less-than-Significant with Mitigation Incorporated. Sensitive receptors are locations where an identifiable subset of the general population (children, asthmatics, the elderly, and the chronically ill) that is at greater risk than the general population to the effects of air pollutants are likely to be exposed. These locations include residences, schools, playgrounds, childcare centers, retirement homes, hospitals, and medical clinics. The closest off-site sensitive receptors are residences adjacent to the western project site boundary. Additionally, the Heritage Baptist Church and Heritage Baptist Academy (K through 12th grade school) are located immediately adjacent to the northeastern boundary of the project site.

Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. In addition, there are no nearby sources of TAC emissions, such as roadways or stationary sources, which would adversely affect prospective residents at the project site. However, construction activity would temporarily generate dust and equipment exhaust. Therefore, the focus of this analysis is on potential construction-related effects.

Site preparation and grading would temporarily generate fugitive dust in the form of PM10 and PM2.5. As discussed above, **Mitigation Measure AIR-1** would reduce fugitive dust emissions to a less-than-significant level.

Construction equipment and associated heavy-duty truck traffic would generate diesel exhaust, which is a known TAC. Diesel exhaust poses both a potential health risk and nuisance impact to nearby receptors. A health risk assessment of the project construction activities was conducted to

evaluate potential health effects to sensitive receptors from construction emissions of diesel particulate matter (DPM) which is identified in California as a TAC due to its potential to cause cancer.

The maximum modeled DPM concentrations occurred at a residence on the eastern side of Heidorn Ranch Road, across the street from the project construction site. Increased cancer risks were calculated using the modeled DPM concentrations and BAAQMD recommended risk assessment methods for both a child exposure (3rd trimester through 2 years of age) and adult exposure. The cancer risk calculations were based on applying the BAAQMD recommended age sensitivity factors to the DPM exposures. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer-causing TACs. BAAQMD recommended exposure parameters were used for the cancer risk calculations. Infant and child exposures were assumed to occur at all residences during the entire construction period and a child exposure was assumed to occur for the students at the Heritage Baptist Academy. Results of the health risk assessment indicate that project construction would result in an incremental risk of cancer in children living nearby of 22.6 in one million at the maximally exposed individual receptor. For adults, the related incremental risk would be 1.2 in one million. The maximum school child cancer risk would be 4.7 in one million.

While the increased cancer risks for a residential adult and schoolchild exposures would be lower than the BAAQMD's significance threshold of a cancer risk of 10 in one million or greater, the increase cancer risks for a residential child exposure (22.6 in one million) would be above the threshold and would therefore be considered a potentially significant impact. Mitigation is therefore required (see **AIR-2** below).

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. Non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). California's Office of Environmental Health Hazard Assessment (OEHHA) has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The chronic inhalation REL for DPM is 5 µg/m3. The maximum modeled annual residential DPM concentration was 0.15 µg/m3, which is much lower than the REL. The maximum computed hazard index based on this DPM concentration is 0.03 which is much lower than the BAAQMD significance criterion of a hazard index greater than 1.0. This would be considered a less-than-significant impact. No mitigation would be required.

The maximum modeled annual PM2.5 concentration was 0.20 micrograms per cubic meter (µg/m3) occurring at the same location where the maximum residential cancer risk would occur. This PM2.5 concentration is lower than the BAAQMD significance threshold of 0.3 µg/m3 used to judge the significance of health impacts from PM2.5. This would be considered a less-than-significant impact. No mitigation would be required.

Mitigation Measure AIR-2 would lessen significant health-related effects by imposing requirements on construction equipment to minimize emissions.

Mitigation Measure AIR-2: Minimize construction-related emissions by requiring that all construction equipment meet the following conditions:

1. All diesel-powered off-road equipment larger than 50 horsepower and operating on the site for more than two days continuously shall meet U.S. EPA particulate matter emissions standards for Tier 2[4] engines or equivalent;

2. All portable construction equipment shall meet California Air Resource Board's most recent certification standard for particulate matter emissions; and

3. Minimize the number of hours that equipment will operate, including the use of idling restrictions.

Significance after Mitigation: Implementation of construction BMPs, as identified in **Mitigation Measure AIR-1**, would reduce exhaust emissions by 5 percent and fugitive dust emissions by over 50 percent. Implementation of the equipment selection described in **Mitigation Measure AIR-2**, would further reduce on-site diesel exhaust emissions by over 60 percent. With mitigation the computed maximum increased child cancer risk would be 8.3 in one million and the maximum PM2.5 concentration would be 0.07 µg/m3. The maximum child cancer risk would be reduced to 1.7 in one million, which is below the BAAQMD threshold of 10 in one million. Therefore, impacts would be reduced to less-than-significant levels with adherence to mitigation.

It should be noted that other measures could be used to minimize construction period emissions to reduce the predicted cancer risk below the thresholds. Such measures may be the use of alternative powered equipment (e.g., liquid petroleum gas-powered lifts), alternative fuels (e.g., biofuels), added exhaust devices, or a combination of measures, provided that these measures are demonstrated to amply reduce emissions levels and related health risks and are approved in advance by the City.

e) Create objectionable odors affecting a substantial number of people?

Less-than-Significant Impact. During construction and grading, diesel powered vehicles and equipment used on the site could create localized odors. These odors would be temporary and would dissipate in prevailing westerly winds. Construction period odor impacts would therefore be considered less than significant. No mitigation would be required.

As the project would contain only residential uses, as opposed to industrial uses, the project would not create any new sources of objectionable odors during project operation. The proposed residential uses are not expected to produce any offensive odors that would result in frequent odor complaints. Furthermore, the project is not near any land uses identified by BAAQMD as a potential source of objectionable odors (such as a wastewater treatment plant, landfill, confined animal facility, composting stations, food manufacturing plants, refinery, or chemical plant).[5] Therefore, the project would neither generate significant objectionable odors nor would it result in siting people near an odor source. Impacts would thus be less than significant. No mitigation would be required.

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[4] Federal standards categorize non-road (e.g., construction) diesel engines into four tiers based on engine emissions, with Tier 4 having the most stringent emissions standards.

[5] BAAQMD. 2012. CEQA Air Quality Guidelines. Available: http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx. Accessed February 10, 2015.

IV. Biological Resources

	Significant Impact	Significant Unless 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 candidate, sensitive, or special status species in local or regional plans, policies, regulations, or by the California Department of Fish and Game 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 Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse impact 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 an established 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 a tree preservation policy or ordinance?	☐	☐	☒	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, Regional, or state habitat Conservation plan?	☐	☐	☐	☒

Information in this section was drawn from a September 2014 report prepared by a qualified biologist from Pacific Biology as well as a November 2014 report prepared by a certified arborist from Hort Science. **Appendix B** contains these reports.

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as candidate, sensitive, or special status species in local or regional plans,

policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Less-than-Significant Impact with Mitigation Incorporated. The California Natural Diversity Data Base (CNDDB 2014) was reviewed for the project site and surrounding three-mile area to identify all documented occurrences of special-status species in the project vicinity and to determine their location relative to the project site. Reconnaissance-level surveys were also performed on the project site in September 2014. Pacific Biology also conducted reconnaissance-level surveys on the site on February 9 and 24, 2009; these surveys were conducted for a similar project previously proposed for the site (Tierra Villas); information from those site visits is used to supplement this analysis as relevant.

Background Biological Resources Information

The project site was used as an orchard until late 2005 and since 2006 has been disked on a semi-regular basis. Following the clearance of orchard trees, irrigation was ceased. Since approximately 2006, the project site has and continues to be semi-regularly disked, and was disked just prior to the September 2014 survey. Vegetation on the site at the time of the 2014 survey was largely limited to several stinkwort plants (Dittrichia graveolens), an invasive species, and sparse trees on and near the project property limits. Non-native grass species and ruderal plant species occur along the outer margins of the property including species such as ripgut brome (Bromus diandrus), wild oat (Avena sp.), stork's bill (Erodium botrys), and mustard (Brassica sp.). Such vegetation is sparse and large portions of the site contain bare, exposed soil.

There are 13 trees on the project site, all of which are planted orchard or ornamental species. There are 12 California black walnut trees on the project site; all of these trees appear to have been planted as grafted English walnuts, but when the English walnut top died the black walnut root stock sprouted and formed the current trees (HortScience, 2014). There is also one Mexican fan palm on the project site.

A drainage ditch is located on the eastern portion of the project site and generally follows the southern boundary of the church/school property. The drainage ditch was completely dry at the time of the September 2014 site visit. It is connected to the gutter along Heidorn Ranch Road and it appears that the ditch only contains water during storm events. Vegetation within the drainage ditch includes annual grasses, ruderal species, and some marginal wetland-associated non-native species such as Italian ryegrass (Festuca perennis) and curly dock (Rumex crispus). There are several small walnut trees bordering the drainage channel.

There is a small off-site detention basin to the south of the project site, near Prewett Ranch Road. At the time of the 2014 field survey, the basin was completely dry, but it is expected to hold water for periods following rain events. Vegetation present in the basin included marginal wetland species such curly dock and flat sedge (Cyperus sp.), but species associated with longer ponding durations (e.g., cattails) were absent. The primary water source of the basin appears to be a culvert that conveys stormwater and irrigation runoff from the nearby residential development.

The project site is bordered by residential development to the north and west, some undeveloped land to the east that is crossed by heavily traveled roads, and a large expanse of undeveloped land directly to the south, including agricultural lands. At its closest point, Sand Creek is approximately 0.5 mile to the south of the project site. There are no existing barriers between the creek and the

project site, but the land between the creek and the project site appears to be in agricultural use, was recently disked at the time of the site visit, and vegetation was generally absent.

Special-Status Plant Species

Numerous special-status plant species have been documented in the project area. However, the habitat types associated with these species (e.g., alkali soils, vernal pools, heavy clay soils) do not occur on the project site. Prior to 2006, the project site was an irrigated orchard, and since that time the project site has been disked semi-regularly. Currently, the project site is largely devoid of vegetation, with the only herbaceous vegetation consisting of non-native annual grasses, weedy vegetation and the trees discussed above.

The extent of historic and ongoing disturbance to the project site has eliminated any habitat that could support special-status plant species and no special-status plant species are expected to occur. Therefore, the proposed project would not result in any impacts to special-status plant species.

Special-Status Wildlife Species

Based on the CNDDB review, several special-status wildlife species have been documented in the project vicinity (i.e., within three miles of the project site) including California red-legged frog, California tiger salamander, vernal pool fairy shrimp, vernal pool tadpole shrimp, San Joaquin kit fox, Swainson's hawk, burrowing owl, American badger, white-tailed kite, loggerhead shrike, and tricolored blackbird. Potential onsite occurrence of these species is discussed below and is organized in terms of the project's potential to result in significant impacts to these species.

Species For Which The Project Would Result In Less-than-Significant Impacts

California Tiger Salamander

California tiger salamanders have been documented approximately 1.6 miles to the west and south of the project site. This distance is slightly greater than 1.24 miles, which is the maximum distance the species is known to move between breeding ponds and upland habitat. Shallow ponding was observed on portions of the project site during a period of heavy rain in February of 2009. The observed pools were shallow (less than 12-inches) and short lasting (likely only several weeks during rainy periods). These pools were not deep enough and did not hold water for sufficient duration to support California tiger salamander breeding. Given that there are no suitable seasonal pools on the project site and that the project site is semi-regularly disked, the project site does not contain any suitable breeding or upland habitat for this species. Furthermore, the detention basin adjacent to the south of the project site is also not expected to be used by California tiger salamanders because the surrounding land is semi-regularly disked, and therefore, suitable upland habitat is not present for the California tiger salamanders in the surrounding area. Thus, the project is not expected to result in impacts to the California tiger salamander. No mitigation measures would be required.

Tricolored Blackbird

Suitable nesting habitat for the tricolored blackbird is not present on or bordering the project site, due to the absence of dense stands of cattails or tules in freshwater, emergent wetlands. Thus, the project would have a less-than-significant impact to the tricolored blackbird as construction of the project site would not disturb any nesting habitat which could host this species. No mitigation measures would be required.

Species For Which The Project Would Result In Less Than Significant Impacts with Mitigation Incorporated

California Red-Legged Frog

California red-legged frogs have been documented approximately 1.7 miles southwest of the project site. The project site, however, does not provide suitable breeding habitat, as the project site lacks long-lasting aquatic features and is semi-regularly disked. Shallow ponding was observed on portions of the project site during a period of heavy rain in February of 2009. However, the observed pools were shallow (less than 12 inches in depth) and short lasting (likely only several weeks during rainy periods). Therefore, the ponding area was not deep enough and did not hold water for sufficient duration to support California red-legged frog breeding. It is not known if ponding would still occur on the site should heavy rain occur, as the site has continued to be disked since 2009 and no evidence of ponding (i.e., cracked soils, wetland vegetation) was observed during the September 2014 site visit.

The project site also does not contain any woodland areas or springs that would provide typical refuge habitat for the species during dry periods. While ground squirrel burrows can be present between disking cycles, it is very unlikely that red-legged frogs would use any such burrows for refuge for the following reasons: (1) the project site is semi-regularly disked; (2) the project site is more than 0.5 mile from the closest suitable breeding habitat (i.e., Sand Creek); (3) portions of Sand Creek are perennial (thus the species would need to move relatively long distances to marginal refuge habitat); and (4) the project site is not located between aquatic habitats and is not part of an expected dispersal pathway.

However, given that California red-legged frog habitat is present at Sand Creek, and Sand Creek is located 0.5 mile to the south of the project site and no barriers to movement are currently present, it is possible that dispersing frogs could infrequently occur on the project site. This would be most likely to occur during periods of rain when red-legged frogs are known to disperse across upland habitats. Also, the detention basin adjacent to the south of the project site could potentially attract frogs from Sand Creek. While it is possible that California red-legged frogs could disperse onto the project site temporarily, the potential for occurrence on the project site is low. However, the potential (albeit unlikely) that California red-legged frogs could be present during project construction activities represents a potentially significant impact. Mitigation is therefore required.

> **Mitigation Measure BIO-1**: Prior to the commencement of construction activities, temporary exclusionary fencing shall be installed along the southern property boundary of the project site, between the project and the adjacent detention basin and Sand Creek. The fencing shall be installed in a manner to prevent California red-legged frogs from dispersing from the detention basin or Sand Creek into the construction zone. Fencing shall be maintained throughout the duration of construction activities, and shall be approved by a qualified biologist (subject to the approval of the City of Antioch) to confirm the adequacy of the fencing to prevent frogs from entering the construction zone prior to the commencement of construction activities.
>
> Immediately preceding the installation of the exclusionary fencing, the qualified biologist shall survey the construction zone to ensure that no frogs are present in the construction zone. Should a California red-legged frog be observed during the survey, all construction

activities shall be immediately halted and the United States Fish and Wildlife Service (USFWS) shall be immediately contacted. Any California red-legged frogs present may only be removed by a permitted biologist (authorized by the USFWS). Construction activities may only proceed once it is determined by the qualified biologist that California red-legged frogs are not present in the construction zone.

The fencing may be removed between construction phases if there would be a prolonged period when construction would not occur. However, consistent with the requirements described above, the fencing shall be reinstalled and a clearance survey would be required prior to the re-commencement of construction activities. Should the fencing remain in place between construction phases or during prolonged periods when construction would not occur, then the fencing shall be inspected by a qualified biologist and any necessary repairs made by the project applicant prior to the re-commencement of construction activities.

Significance after Mitigation: Implementation of exclusionary fencing and preconstruction clearance surveys, as required by **Mitigation Measure BIO-1** would reduce potentially significant impacts to California red-legged frog to a less-than-significant level.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

Based on the CNDDB, the closest documented occurrence of vernal pool fairy shrimp is approximately 2.5 miles southwest of the project site. Vernal pool fairy shrimp have the shortest average maturation period (18 days) and the shortest average number of days to reproduce (39 days) of the California endemic fairy shrimp. Vernal pool tadpole shrimp take an average of 38 days to mature and typically reproduces in about 54 days (Helm 1998). Given the above, conservatively, a minimum ponding duration of 3-5 weeks would be required to provide potential vernal pool fairy shrimp habitat and a longer ponding duration would be required to support vernal pool tadpole shrimp.

As previously discussed, shallow ponding was observed on portions of the project site during a period of heavy rain in February of 2009. The ponding was present during the site visit conducted on February 9 and was still present at the time of the February 24 site visit. The total ponding duration was not monitored, but it appeared that standing water would persist for at least three weeks or longer. The period when the ponding was observed was characterized by multiple days of heavy rain and the pools may not persist for prolonged periods in the absence of near continual rain or in average rainfall years. Vegetation within the pools was sparse and did not differ from the surrounding area, which indicates that the pools only recently filled, had not held water for a long enough period to develop wetland-associated vegetation, and that the presence of standing water may closely coincide with storm events. It is not known if ponding would still occur on the site should heavy rain occur, as the site has continued to be disked since 2009 and no evidence of ponding (i.e., cracked soils, wetland vegetation) was observed during the September 2014 site visit. If water still ponds on the site during heavy rain events, the quality of the habitat for vernal pool fairy and tadpole shrimp may be compromised by the pools (observed in 2009) being within a field that is semi-regularly disked and that was previously an orchard. Given the above, the potential for vernal pool fairy shrimp and/or tadpole shrimp to occur is low. However, there is some potential the

species would occur and any loss of vernal pool fairy and tadpole shrimp and their associated habitat would be a significant impact. Mitigation is therefore required.

Mitigation Measure BIO-2a: Assuming the project is approved, a qualified biologist shall monitor the project site during the winter and spring preceding construction activities to determine if suitable habitat for vernal pool fairy and tadpole shrimp (i.e., pools that persist for at least three weeks before drying) occurs on the project site. The biologist shall submit his/her findings to the City for review. If no suitable habitat is found, no further actions would be required. If potentially suitable pools are observed, or if the applicant chooses to assume the presence of these species, then Mitigation Measure BIO-2b shall be implemented.

Mitigation Measure BIO-2b: If it is found or assumed that suitable habitat is present, prior to the commencement of construction on the project site, a qualified biologist shall conduct protocol surveys for vernal pool fairy shrimp and tadpole shrimp. These surveys may be conducted concurrently with **Mitigation Measure BIO-2a**. The surveys shall be conducted according to the accepted USFWS survey protocol, which includes either two years of wet season surveys (with eight individual surveys per wet season), or one wet season survey followed by a dry season survey. If no vernal pool fairy shrimp or tadpole shrimp are observed during the surveys, then no further action would be required.

Mitigation Measure BIO-2c: If the survey in **Mitigation Measure BIO-2b** above concludes that fairy shrimp and or tadpole shrimp are present on the project site, prior to the issuance of grading permits, the loss of vernal pool fairy and tadpole shrimp habitat shall be compensated for through the purchase of credits at a 3:1 ratio at an USFWS-approved mitigation bank. The amount of project-related habitat loss may be determined as follows:

- Any areas of suitable habitat (i.e., ponding for at least three weeks) on the site will be mapped during the winter months and may be assumed to be occupied habitat; or

- The area of habitat found to be occupied during the implementation of **Mitigation Measure BIO-2b** (see above) shall be compensated for.

The availability of credits at an USFWS-approved mitigation bank shall be demonstrated prior to the issuance of a grading permit, or other equivalent compensation must be approved by the USFWS.

Significance after Mitigation: Implementation of site monitoring, protocol surveys, and/or compensation for the loss of habitat, as identified in **Mitigation Measures BIO-2a, 2b**, and **2c**, would reduce potentially significant impacts to vernal pool fairy and tadpole shrimp to a less-than-significant level.

Swainson's Hawk

Swainson's hawks are known to nest in the vicinity of the project site, with the closest documented nesting occurrence located approximately 0.8 miles south of the project site along Sand Creek. While the project site provides marginal nesting habitat due to the absence of adequately sized trees, the species could nest within 500 feet of the project site in the large eucalyptus trees along Heidorn Ranch Road to the east.

Additionally, given the importance of nearby suitable foraging habitat for the species, the CDFW has developed recommendations to protect suitable Swainson's hawk foraging habitat within a 10-mile radius of any active nest. Based on the CNDDB, the closest documented nesting occurrence (CNDDB Occurrence #1681) is located approximately 0.8 mile south of the project site along Sand Creek. Two adults were observed nesting at this location in 2007. It is not known if recent surveys have been conducted of the nest and if the nest is still active. Another nest has been documented approximately 3.5 miles north of the project site (CNDDB Occurrence #1804). According to the CNDDB, this nest was active in 2011 and 2012, but was not active in 2013. The CDFW considers a nest used during one or more of the last five years to be active. Therefore, at a minimum, the nest located 3.5 miles north of the project site would be considered active by the CDFW (unless the nest location/tree is no longer present). Although the project would not result in the direct loss of an active Swainson's hawk nest due to the absence of expected nesting habitat on the project site, development of the project site would result in the loss of 20.3 acres of potential foraging habitat. Further, if any active nest is located within 500 feet of the project site, such as in the off-site eucalyptus trees along Heidorn Ranch Road, project construction noise levels could result in the abandonment of the nest. Thus, the development of the project site would have a potentially significant impact upon Swainson's hawk. Mitigation is therefore required.

> **Mitigation Measure BIO-3a:** If construction would commence during the nesting/breeding season of native bird species potentially nesting on or near the site (typically February through August in the project region), a pre-construction survey of the project vicinity for nesting birds shall be conducted. This survey shall be conducted by a qualified biologist (experienced with the nesting behavior of bird species of the region) within 14 days of the commencement of construction activities. The intent of the survey shall be to determine if active nests of special status bird species or other species protected by the Migratory Bird Treaty Act and/or the California Fish and Game Code are present within the construction zone or within 500 feet of the construction zone.
>
> The survey area shall include all trees and shrubs, as well as fallow fields (which could be utilized by burrowing owls) in the construction zone and a surrounding 500 feet area (where access is possible). The surveys shall be timed such that the last survey is concluded no more than two weeks prior to initiation of construction or tree removal. If the initiation of ground disturbance activities is delayed following a survey, then an additional pre-construction survey shall be conducted such that no more than two weeks will have elapsed between the final survey and the commencement of ground disturbance activities.
>
> If the survey finds that active nests are located in construction areas or are within 500 feet of construction and would be subject to prolonged construction-related noise, a no-disturbance buffer zone shall be created around active nests during the breeding season or until a qualified biologist determines that all young have fledged. The size of the buffer

zones and types of construction activities restricted within them will be determined by taking into account factors such as the following:

- Noise and human disturbance levels at the construction site at the time of the survey and the noise and disturbance expected during the construction activity;
- Distance and amount of vegetation or other screening between the construction site and the nest; and
- Sensitivity of individual nesting species and behaviors of the nesting birds.

Limits of construction to avoid an active nest shall be established in the field with flagging, fencing, or another appropriate barrier, and construction personnel shall be instructed on the sensitivity of nest areas. A qualified biologist shall serve as a construction monitor during those periods when construction activities would occur near active nest areas of Swainson's hawk to ensure that no impacts on these nests occur.

Mitigation Measure BIO-3b: A qualified biologist will contact the CDFW to confirm whether the Swainson's hawk nest located 3.5 miles north of the project site is still considered "active" and to determine if there is additional survey data regarding the current status of the nest 0.8 mile south of the project site along Sand Creek. The biologist shall provide the City with a summary of his/her findings. If it is determined that the project site is within 10 miles of an active Swainson's hawk nest, the applicant will mitigate for the loss of suitable Swainson's hawk foraging habitat by implementing one of the below measures:

- **Active nest identified within 1 mile of the project site:** One acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. At least 10% of the land requirements shall be met by fee title acquisition or a conservation easement allowing the active management of the habitat, with the remaining 90% of the protected land protected by a conservation easement (subject to CDFW approval);
  or
  One-half acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. All of the land requirements shall be met by fee title acquisition or a conservation easement (subject to CDFW approval).
- **Nest identified within 5 miles (but greater than 1 mile) of the project site:** 0.75 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. All of the land requirements may be met by fee title acquisition or a conservation easement (subject to CDFW approval).
- **Nest identified within 10 miles (but greater than 5 miles) of the project site:** 0.5 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. All of the land requirements may be met by fee title acquisition or a conservation easement (subject to CDFW approval).

Significance after Mitigation: Implementation of the preconstruction surveys and, if necessary, compensation for the loss of suitable foraging habitat, as identified in **Mitigation Measures BIO-3a** and **3b**, would reduce potentially significant impacts to Swainson's hawk to a less-than-significant level.

San Joaquin Kit Fox

Based on the CNDDB, the closest documented occurrence of San Joaquin kit fox is located approximately 5 miles to the west of the project site. It is considered unlikely that San Joaquin kit fox would occur on the project site for the following reasons: (1) the project site is regularly disked, which limits the abundance of prey and potential den sites; (2) the species has not been documented in the project area in approximately 15 years; (3) the project site is not part of an expected movement corridor for the species as it is bordered on three sides by development; and (4) dogs that live in the adjacent residential developments and that are walked on the bike path occur on the project site and chase wildlife (such as jackrabbits and ground squirrels). However, the project site is located near a potential kit fox dispersal corridor (i.e., Sand Creek area) and the potential of an individual kit fox to temporarily occur on the project site between disking cycles cannot be entirely ruled out. In the unlikely event that a kit fox is present at the time of construction, construction activities could result in the loss or harm of a kit fox. Given the status of the species, the loss or harm of a kit fox would be a potentially significant impact. Mitigation is therefore required.

> **Mitigation Measure BIO-4:** No less than 14 days and no more than 30 days prior to the beginning of ground-disturbance activities, a qualified biologist shall conduct a preconstruction survey for San Joaquin kit fox (SJKF). The survey shall include searching for signs of SJKF presence, identifying any potential habitat features, and evaluating habitat use by SJKF. The status of any identified potential den sites shall be determined. The USFWS shall be immediately contacted if an individual SJKF or sign of the species is observed during the survey. Under no circumstances shall an individual SJKF be relocated or an active den destroyed without authorization from the USFWS. Construction shall only proceed once the qualified biologist has determined that SJKF is not present, or in the event that SJKF or signs of species presence is observed during the preconstruction survey, until the USFWS has issued take authorization (in the form of a Biological Opinion).

Significance after Mitigation: Implementation of preconstruction clearance surveys, as required by **Mitigation Measure BIO-4** would reduce potentially significant impacts to San Joaquin kit fox to a less-than-significant level.

American Badger

According to the CNDDB, the closest documented occurrence of the American badger is approximately 0.6 miles south of the project site, near Sand Creek. The regular disking of the project site would prevent the species from colonizing or successfully denning on the project site. However, given known occurrences in the project area, the potential of an individual badger to temporarily occur on the project site between disking cycles cannot be entirely ruled out. In the unlikely event that a badger is present at the time of construction, construction activities could result in the loss or harm of a badger. The loss or harm of a badger would be a potentially significant impact. Mitigation is therefore required.

> **Mitigation Measure BIO-5:** Within 30 days of the commencement of construction, the project site shall be surveyed for potential badger den sites by a qualified biologist. If an occupied den is found, then any badgers present shall be removed from the den either by trapping or the use of exclusionary devices. If trapped, the badgers shall be moved to other suitable habitat. Once any badgers were trapped or excluded, the dens would be excavated by hand and refilled to prevent reoccupation. Exclusion would continue until the badgers had been successfully excluded from the site, as determined by a qualified biologist.

Significance after Mitigation: Implementation of preconstruction clearance surveys, as required by **Mitigation Measure BIO-5** would reduce potentially significant impacts to American badger to a less-than-significant level.

Burrowing Owl

Burrowing owls nest and shelter in ground squirrel and other suitable small mammal burrows or artificial structures. The species prefers areas of short grass or bare ground and few trees to reduce the potential for predators to hide near the nest or foraging grounds. According to the CNDDB, numerous occurrences of burrowing owl have been documented within 1 mile of the project site. California ground squirrels may be present on the project site to varying degree based on the frequency of disking. At the time of the September 2014 site visit, the burrows of this small mammal were observed on portions of the project site. Therefore, when ground squirrel burrows are present, the project site provides potential habitat for burrowing owl.

Given the presence of suitable habitat and nearby known occurrences, burrowing owl nesting surveys were conducted on the project site in June 2009 to determine if burrowing owls nest on the project site.[6] No owls or sign of owls (i.e., molted feathers, cast pellets, prey remains, eggshell fragments, or excrement) were observed during the surveys. As no signs of burrowing owls were documented, it was concluded that while suitable burrowing owl habitat could be present between disking cycles, it is likely that the disking prevents borrowing owls from successfully colonizing or nesting on the project site. Additionally, several dogs (from the adjacent residential development) were frequently observed on the project site. It is possible that these dogs could further deter owls from colonizing the site.

Based on the findings of the 2009 surveys and because the site continues to be semi-regularly disked, burrowing owls are not expected to permanently reside or successfully nest on the project site. However, there is potential that owls could temporarily occur on the project site between disking cycles. Should burrowing owls be present during construction activities, development of the project site could have a significant impact on burrowing owls. Mitigation is therefore required.

> **Mitigation Measure BIO-6:** A qualified biologist shall conduct clearance surveys for burrowing owls on the project site. The survey shall be conducted no more than 14 days prior to commencement of construction activities.
> If burrowing owls are observed using burrows during the non-breeding season (typically September through January), or after young have fledged following the conclusion of the breeding season, owls shall be excluded from all active burrows through the use of exclusion devices placed in occupied burrows in accordance with CDFW protocols (CDFW 1995). Specifically, exclusion devices, utilizing one-way doors, shall be installed in the entrance of all active burrows. The devices shall be left in the burrows for at least 48 hours to ensure that all owls have been excluded from the burrows. Each of the burrows shall then be excavated by hand and refilled to prevent reoccupation. Exclusion shall continue until the owls have been successfully excluded from the site, as determined by a qualified biologist.

[6] The nesting burrowing owl surveys were performed according to the requirements of the Burrowing Owl Survey Protocol and Mitigation Guidelines recommended by The California Burrowing Owl Consortium (April 1993) and adopted by the California Department of Fish and Wildlife (CDFW).

In the event that nesting owls are observed, disturbance to the nests, as determined by a qualified biologist, will be avoided until all young have fledged. The implementation of **Mitigation Measure BIO-3a**, above, would further ensure that any owls potentially occurring on the project site during the nesting seasons would not be harmed.

Significance after Mitigation: Implementation of the preconstruction and clearance burrowing owl surveys, as identified in **Mitigation Measure BIO-3a** and **Mitigation Measure BIO-6**, would reduce potentially significant impacts to burrowing owl to a less-than-significant level.

White-Tailed Kite and Loggerhead Shrike

White-tailed kite typically nest in trees, often in isolated stands, surrounded by open foraging habitat. The project site provides low quality but potential nesting habitat due to the small size of trees. Therefore, there is some potential that tree removal could result in the loss of an active nest. Should an active nest be present within 500 feet of the project site (e.g., within the large eucalyptus trees on Heidorn Ranch Road), construction-related activities and noise levels could result in the abandonment of the nest, representing a significant impact. Therefore, the loss of an active nest is a potentially significant impact and mitigation would be required. **Mitigation Measure BIO-3a** (above) would reduce impacts to the white-tailed kite to a less-than-significant level.

The project site also provides potential nesting habitat, for the loggerhead shrike, with potential nesting habitat being limited to several small shrubby trees. Should the species nest on the project site, construction activities could result in the direct loss or abandonment of an active loggerhead shrike nest, representing a significant impact for which mitigation would be required. **Mitigation Measure BIO-3a** (above) would reduce impacts to the loggerhead shrike to a less-than-significant level.

The project site provides suitable foraging habitat for loggerhead shrike and white-tailed kite. The project-related loss of 20.3 acres of suitable foraging habitat is not expected to have a substantial adverse effect on local populations of these species given that these species are not uncommon in the project region and due to the extent of suitable foraging habitat south of the project site. Impacts to foraging habitat for these species would thus be less-than-significant. No mitigation would be required.

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 Game or U.S. Fish and Wildlife Service?

No Impact. The project site does not contain any riparian habitat or sensitive plant communities. The project site is semi-regularly disked and vegetation is limited to non-native, annual grasses and ruderal plant species. Therefore, the project would have no impact in regards to riparian habitat or sensitive plant communities. No mitigation would be required.

c) Have a substantial adverse impact 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?

Less-than-Significant with Mitigation Incorporated. A drainage ditch is located on the eastern portion of the project site, near the southern boundary of the adjacent church on Heidorn Ranch Road. The drainage ditch is an earthen channel approximately 1 to 2 feet wide and 2 feet deep. The source of water for the drainage ditch appears to be roadside runoff. The drainage ditch is not a

natural feature and appears to have been excavated from upland habitat. Additionally, several pools of standing water were observed on the project site during and following periods of heavy rain in February 2009.

Vegetation within the areas of ponded water was sparse and did not differ from the surrounding disked fields, which may indicate that the pools do not hold water for long enough periods to develop wetland-associated vegetation and that the presence of standing water may closely coincides with seasonal storm events. It is not known if ponding would still occur on the site should heavy rain occur, as the site has continued to be disked since 2009 and no evidence of ponding (i.e., cracked soils, wetland vegetation) was observed during the September 2014 site visit. The drainage ditch and the observed areas of ponding do not have an apparent hydrologic connection to Waters of the U.S.

It should be noted that the area where ponding occurred in 2009 does not provide habitat values that substantially differ from the surrounding disked field because wetland vegetation was not present in the ponded areas in 2009, that no evidence of a wetland (e.g., wetland vegetation, cracked soils) were observed at that location during the 2014 site visit, that this area has continued to be semi-regularly disked since 2006; prior to 2006 the project site was an orchard. Therefore, from a habitat perspective, the development of the area where ponding occurred would not result in a substantial adverse effect to wetland habitat. Similarly, as the drainage ditch appears to have been excavated in an upland area, because vegetation within the ditch does not substantially differ from adjacent weedy habitats, and because the drainage ditch only conveys surface runoff from Heidorn Ranch Road (and is not part of a natural stream system), the loss of this feature would not be considered substantial from a habitat perspective.

While the drainage ditch and ponded areas do not have an obvious hydrologic connection to any Waters of the U.S., and lack wetland-associated vegetation, ACOE is the authority to determine if a wetland or drainage is under their jurisdiction pursuant to Section 404 of the federal Clean Water Act. Furthermore, atypical conditions occur on the project site given the regular disking, and ACOE takes atypical conditions into consideration in making a jurisdictional determination. Thus, there is some potential that the ponded areas observed in 2009 and the drainage ditch may be considered to be jurisdictional by ACOE. In addition, the area of ponded water and the drainage ditch could be under the jurisdiction of the CDFW (Section 1600 of the Fish and Game Code) and the Regional Water Quality Control Board (RWQCB) (Section 401 of the federal Clean Water Act).. Therefore, mitigation would be required.

> **Mitigation Measure BIO-7a**: Prior to the commencement of construction activities, a preliminary jurisdictional delineation shall be conducted and the results shall be submitted to the ACOE for verification. If ACOE determines that jurisdictional wetlands or other waters are not present, no future actions with the ACOE would be required. If the ACOE and/or RWQCB determine that wetlands and/or other waters under their jurisdiction are present, the applicant will apply for the required permits/certifications prior to any fill of the features and comply with all conditions and mitigation requirements of any such permits. At a minimum, the applicant shall ensure that no net loss of jurisdictional wetlands occurs; this may be achieved through purchasing credits at an approved wetland mitigation bank or through the creation and implementation of a wetland creation plan.

Mitigation Measure BIO-7b: Prior to the commencement of construction activities, the applicant shall coordinate with the CDFW regarding their potential jurisdiction over the onsite drainage ditch. If CDFW takes jurisdiction over the drainage ditch, then the applicant will apply for and obtain a Lake and Streambed Alteration Agreement prior to disturbance to the drainage ditch.

Significance after Mitigation: Mitigation Measure BIO-7 requires a preliminary jurisdictional delineation to confirm the status of the drainage ditch and observed pools and the acquisition of any required permits from the ACOE, RWQCB, and/or CDFW. Compliance with those permit conditions would reduce related impacts to a less-than-significant level.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with an established resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less-than-Significant Impact. The project site is located at the outer edge of an urbanized and developed area, immediately bordered to the north and west by residential development. The location of the project site precludes wildlife movement through the project site to the north and west. While some undeveloped land occurs to the east of the project site, this land is crossed by heavily traveled roads, including the SR 4 Bypass, and contains some areas of relatively dense urban and commercial development. As a result, wildlife movement opportunities to the east are heavily constrained and the project site does not therefore provide habitat connectivity to open spaces to the east.

To the south of the project site exists an expanse of currently undeveloped land with no substantial barriers to wildlife movement between it and the project site. While this open space occurs to the south of the project site, the project site is not part of a wildlife movement corridor due to its location at the outer edge of an urban area. Thus, the project would have a less-than-significant impact in regards to wildlife movement corridors. No mitigation would be required.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Less-than-Significant Impact. The project site does not contain any biological resources that are protected by ordinance at the City levels, with the exception of potentially protected trees. The trees occurring on and bordering the project site are described in the Arborist Report (see **Appendix B**). There are 13 trees on the project site, all of which are planted orchard or ornamental species. There are 12 California black walnuts on the project site; all of these trees appear to have been planted as grafted English walnuts, but when the English walnut top died the black walnut root stock sprouted and formed the current trees. There is also one Mexican fan palm on the project site. The City's Tree Ordinance does not specify what species and size of trees are protected.[7] To provide a conservative estimate, all trees on the project site are assumed to be protected under the City's Tree Ordinance. Under the Tree Ordinance, the project applicant would be required to obtain a permit

[7] City of Antioch. 2013. *Antioch Municipal Code, Title 9, Chapter 5, Article 12: Tree Preservation and Regulation.*

through the development approval process for the removal of the trees on the project site. Obtaining a permit for tree removal would be consistent with local regulations. Thus, impacts related to local policies and ordinances protecting biological resources would be less than significant. No mitigation would be required.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, Regional, or state habitat Conservation plan?

No Impact. The project site is not within any adopted Habitat Conservation Plan (HCP) area. The closest adopted HCP is the East Contra Costa County Habitat Conservation Plan (ECCCHCP), but the City has not adopted the ECCCHCP and is not subject to its requirements. Therefore, the proposed project would not conflict with the provisions of an adopted HCP. No mitigation would be required.

V. Cultural Resources

	Significant Impact	Significant Unless 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 Section 15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archeological resource, pursuant to Section 15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource, site, or unique geologic features?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Responses to questions a) and b) were drawn in part from a September 2014 cultural records search of the California Historic Resources Information System's (CHRIS) Northwest Information Center at Sonoma State University. CHRIS tracks records of both archaeological and historic architectural resources.

a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

No Impact. The project site does not contain any buildings. As noted in the Phase I Environmental Site Assessment (ESA) prepared for the project (see **Appendix D**), the only remaining structure on the property is an underground vault. As indicated in a review of historic aerial maps included in the Phase I ESA, the vault structure appears to have been constructed between 1968 and 1979. In 1968 and subsequent years, aerial photography shows the location of the vault structure to be in orchard use. Therefore, the vault structure could not be more than 50 years old and thus could not be an eligible historic resource. Moreover, the CHRIS search did not identify any known historic resources on or in the immediate vicinity of the project site. Therefore, the project could not adversely affect any such historical resources. No mitigation would be required.

b) Cause a substantial adverse change in the significance of an archaeological resource, pursuant to Section 15064.5?

Less-than-Significant with Mitigation Incorporated. According to the CHRIS record search results, the project site and surrounding areas do not contain any recorded Native American or historic-period archaeological resources.

However, in the general vicinity of the project site, Native American cultural resources have been found on the banks and mid-slope terraces above seasonal and perennial watercourses. The project site is located within the Lone Tree Valley in a Holocene alluvial fan deposit, approximately ½-mile north of Sand Creek and a seasonal drainage. Given the similarity of these environmental factors, there is a moderate potential that unrecorded Native American cultural resources could exist below the ground surface of the project site, even though the site was previously in orchard use and routinely disked. Project related grading and soil disturbance could damage or destroy these resources thus resulting in a potentially significant environmental impact. Therefore, mitigation is proposed as noted below.

Mitigation Measure CUL-1: In the event that unrecorded archaeological resources are encountered during project grading, site preparation, or construction, the City shall require that construction and/or grading activities within 100 feet of any find is temporarily halted until a qualified archaeologist meeting federal criteria under 36 CFR 61 can assess the significance of the find and provide proper management recommendations. Prehistoric cultural material includes, but is not limited to; shell ridden deposits, hearth remains, stone and/or shell artifacts, and/or burials. Historic material, including but not limited to whole or fragmentary ceramic, glass or metal objects, wood, nails, brick, or other materials may occur within the project site in deposits such as old privies, dumps, or even as part of the fill. Deposits of prehistoric or historic archaeological materials are optimally avoided by project activities. However, if the deposits cannot be avoided, the City shall require that a qualified archaeologist evaluate the resources for their potential historic significance. If the deposits are determined to be historically significant by the qualified archaeologist, the resources are optimally avoided, but if avoidance is not feasible, impacts shall be mitigated in accordance with the recommendations of the qualified archaeologist, in coordination with the City and CEQA Guidelines Section 15126.4 (b)(3)(C), which requires implementation of a data recovery plan. Upon completion of the qualified archaeologist's assessment, he/she shall prepare a report documenting the methods and results, and provide recommendations for the treatment of the discovered archaeological materials. The report shall be submitted to the City and the Northwest Information Center. Once the report is reviewed and approved by the City and any appropriate resource recovery and/or mitigation measures are completed, project construction activity within the area of the find may resume.

Mitigation Measure CUL-2: Prior to the issuance of grading permits, the City shall require that the project applicant and contractor provide documentation that all construction crews that will work on the project site have undergone a training session to inform them of the potential for previously undiscovered archaeological resources, federal or state-eligible cultural resources, and human remains within the project site, of the laws protecting these resources and penalties associated with destruction or removal expect by qualified archaeologist, and of the procedures to follow should they discover cultural resources during project-related work.

Significance after Mitigation: The implementation of **Mitigation Measures CUL-1** and **CUL-2** would reduce the project's potential impacts to archaeological resources to a less-than-significant level.

c) Directly or indirectly destroy a unique paleontological resource, site, or unique geologic features?

Less-than-Significant with Mitigation Incorporated. Paleontological resources include, but are not limited to, fossils and material remains. According to the City's General Plan and the General Plan EIR, numerous paleontological resources have been recorded within the City limits, particularly near the San Joaquin River and the Mount Diablo foothills. The project site is situated in the Great Valley Geologic Province of California, and is underlain by Holocene and upper Pleistocene alluvium deposits of Marsh Creek. The Marsh Creek Formation consists of alluvial-fan and alluvial-terrace deposits.

The project site is not located near the San Joaquin River or Mount Diablo foothills, and paleontological resources are very unlikely to occur in the Holocene era deposits such as those underlying the project site. However, there remains the minute potential to encounter and damage paleontological resources on the project site during grading/site grading. This is a potentially significant impact; mitigation is therefore required.

> **Mitigation Measure CUL-3:** In the event that buried paleontological resources are encountered during project grading, site preparation, and/or construction, construction and/or grading activities within 100 feet of the find shall be temporarily halted until a qualified paleontologist can assess the significance of the find and provide proper management recommendations.

Significance after Mitigation: The implementation of **Mitigation Measure CUL-3** would reduce potential project impacts to paleontological resources to a less-than-significant level.

d) Disturb any human remains, including those interred outside of formal cemeteries?

Less-than-Significant with Mitigation Incorporated. According to the CHRIS records search, the project site contains no recorded Native American or historic-period archaeological resources nor any other known or likely source of burials of human remains. Notwithstanding, Native American human remains have been found in locations throughout the greater San Francisco Bay and San Joaquin River areas. Since the project requires grading and ground disturbance, the project has the potential to encounter buried, unrecorded human remains. This is a potentially significant impact and mitigation is therefore required.

> **Mitigation Measure CUL-4:** If human remains are encountered during grading within the project site, the City shall require that work within 25 feet of the discovery shall be stopped and the project contractor shall immediately notify the Contra Costa County Coroner. At the same time, a qualified archaeologist meeting federal criteria under 36 CFR 61 shall be contacted by the project applicants and project contractor to assess the situation and consult with the appropriate agencies. If the human remains are of Native American origin, the Coroner shall notify the NAHC within 24 hours of this identification. The NAHC will identify a Most Likely Descendant (MLD) to inspect the site and provide recommendations for the proper treatment of the remains and any associated grave goods.
>
> Upon completion of the assessment, the qualified archaeologist shall prepare a report documenting the background to the finds, 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, the City, and the Northwest Information Center. Once the report is reviewed and approved by the City, and any appropriate treatment completed, project construction activity within the area of the find may resume.

Significance after Mitigation: The implementation of **Mitigation Measure CUL-4** as well as **Mitigation Measure CUL-2**, described above, would reduce potential impacts to any human remains discovered on the project site to a less-than-significant level.

VI. Geology and Soils

	Significant Impact	Significant Unless 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:				
i) 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?	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☒	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslide?	☐	☐	☒	☐
b) Would the project 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 18-1b 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 wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

Information in this section was drawn from a geotechnical engineering study conducted by the PRA Group, Inc. in January 2007. The study is included as **Appendix C**.

a. Expose people or structures to potential substantial adverse effects including the risk of loss, injury or death involving:

i) 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?

Less-than-Significant Impact. Although the San Francisco Bay region is generally considered to be seismically active and thus subject to the effects of earthquakes, there is no evidence of active or recent faulting on the project site. No active faults or Earthquake Fault Zones (Alquist-Priolo Special Studies Zones) are located on the project site or within the City.[8] As there are no known active faults on the project site or in the immediate vicinity, project-site risks of fault rupture are considered to be less than significant. No mitigation would be required.

a. ii) Strong seismic ground shaking?

Less-than-Significant with Mitigation Incorporated. Despite the lack of known faults in its immediate area, the project site will likely experience seismic ground shaking similar to other areas in the seismically active San Francisco Bay Area region. Five major active faults are located within 45 miles of the project site. Earthquakes along these faults could result in moderate to strong ground shaking at the project site. The intensity of earthquake ground motions would depend on the characteristics of the generating fault, distance to the fault and rupture zone, earthquake magnitude, earthquake duration, and site-specific geologic conditions. This is a potentially significant impact and mitigation would be required.

> **Mitigation Measure GEO-1:** Prior to the issuance of building permits, the City shall ascertain that all buildings and structures on the project site will be constructed in conformance with the provisions of the most recent version of the California Uniform Building Code (UBC) adopted by the City. The Geotechnical Study prepared by The PRA Group, Inc., January 31, 2007, incorporated herein by reference, includes seismic shaking criteria for consideration by the project structural engineer in the design of the building foundation. The final choice of design parameters remains the purview of the project structural engineer, subject to the review and approval of the City Engineer.

Significance after Mitigation: Adherence to **Mitigation Measure GEO-1** would reduce the risks associated with strong seismic ground shaking to a less-than-significant level.

a. iii) Seismic-related ground failure, including liquefaction?

Less-than-Significant Impact. Liquefaction is a phenomenon in which saturated soils lose their strength and stiffness as a result of seismic-related ground shaking.[9] When liquefaction occurs and the strength of the soil decreases, the soil loses the ability to support building foundations. Based on exploratory drilling and soil sampling conducted on the project site in 2007, the soils on the project site consist of a mixture of soils, including silty clay of medium to high plasticity (upper 1-3 feet), fine sandy clay (between 3-10 feet below ground surface), and silty clay to sandy silt (at maximum drilled

[8] City of Antioch. 2003b. *City of Antioch General Plan Update EIR*.

[9] Saturated soils are soils in which the space between individual soil particles is completely filled with water.

depths of 11.5 feet below ground surface). These soils show an increased resistance to the effects of liquefaction. Additionally, no free groundwater was encountered in the soil samples, with the deepest exploratory drilling extending 31.5 feet below ground surface. Based upon the classification of the subsurface materials at the project site and the absence of groundwater, the liquefaction potential of the project site is considered low. Impacts related to seismic related ground failure would therefore be less-than-significant.

iv) Landslides?

Less-than-Significant Impact. The majority of the project site consists of flat or gently sloping topography. According to the City's General Plan EIR, the project site is located within an area that is considered "Very Stable," with areas of 0 to 5 percent slope without underlying landslide deposits.[10] Therefore, the potential for landslides to occur at the project site is remote; impacts related to landslides would therefore be less than significant. No mitigation would be required.

b) Would the project result in substantial soil erosion or the loss of topsoil?

Less-than-Significant with Mitigation Incorporated. Construction would involve minor grading activities to prepare building pads and contour the site for appropriate drainage. As the project site is generally flat with slopes of 0 to 5 percent and would retain a similar profile following construction, the project would not have significant potential to result in soil erosion or topsoil loss. As described in **Section IX (Hydrology and Water Quality)**, conditions of the regional stormwater control permit require preparation of and adherence to stormwater control plans. Adherence to plans prepared consistent with the regional permit would further reduce the potential for the project to result in soil erosion during construction. Once construction is complete, the site would be landscaped or otherwise developed, precluding the potential for soil erosion. Therefore, the project would not result in substantial soil erosion impacts. No mitigation would be required.

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?

***Less-than-Significant Impact*.** As noted above, the project site is located within an area that is considered "Very Stable," and has been determined to have low potential for landside, liquefaction, or other ground failure. Impacts related to unstable soil or geologic unit would therefore be less than significant. No mitigation would be required.

d) Be located on expansive soil, as defined in table 18-1b of the Uniform Building Code (1994), creating substantial risks to life or property?

Less-than-Significant with Mitigation Incorporated. Expansive soils generally consist of clay materials that are capable of absorbing water. With water absorption, the associated change in soil volume (expansion) has the potential to result in structural damage to buildings or other structures, including cracks in building foundations. According to the geotechnical engineering study, soil materials in the top 4 feet of the project site generally consist of moderate to expansive silty clay to sandy materials that have the potential to impact the foundation and pavement design for the

[10] City of Antioch. 200). *City of Antioch General Plan Update EIR* (Figure 4.5.5)

project. The presence of expansive soils presents a potentially significant environmental impact and mitigation is thus required.

> **Mitigation Measure GEO-2:** Prior to foundation placement and the issuance of a building permit, the City shall ascertain that the applicant/contractor has performed moisture conditioning of all pads. Upon completion of grading operations, the applicant/contractor shall submit to the City an inventory of the final pad grade soil condition conducted by a qualified geotechnical engineer. The inventory shall identify potential expansive and corrosive conditions and make geotechnical design recommendations for the proposed foundation systems. The findings of this inventory shall be incorporated into project plan revisions to the satisfaction of the Building Division. The City shall not issue a building permit for the project until the above measures are completed to the satisfaction of the Chief Building Inspector.

Significance after Mitigation: Geotechnical design recommendations, based on the inventory of soil conditions, will reduce potential impacts from expansive soils to a less-than-significant level.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No Impact. The project would be connected to the City's sanitary sewer system. No septic tanks or other on site wastewater disposal systems are included as part of the project. The project would not result in any impacts related to septic tanks. No mitigation would be required.

VII. Greenhouse Gas Emissions

	Significant Impact	Significant Unless 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?	☐	☐	☐	☒

Information in this section was drawn from an Air Quality and Greenhouse Gas Emissions Report prepared by Illingworth & Rodkin in September 2014. The report is included as **Appendix A**.

Project Setting

Greenhouse gases (GHGs) trap heat in the atmosphere and thus affect the earth's temperature. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate. The most common GHGs are carbon dioxide (CO2) and water vapor, but there are also several others, most importantly methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). These are released into the earth's atmosphere through a variety of natural processes as well as human activities. Sources of GHGs are generally as follows:

- CO2 and N2O are byproducts of fossil fuel combustion.
- N2O is associated with agricultural operations such as fertilization of crops.
- CH4 is commonly created by off-gassing from agricultural practices (e.g., keeping livestock) and landfill operations.
- Chlorofluorocarbons (CFCs) were widely used as refrigerants, propellants, and cleaning solvents but their production has been stopped by international treaty.
- HFCs are now used as a substitute for CFCs in refrigeration and cooling.
- PFCs and sulfur hexafluoride emissions are commonly created by industries such as aluminum production and semi-conductor manufacturing.

Each GHG has its own effect upon the earth's energy balance. This is expressed in terms of a global warming potential (GWP), with CO2 being assigned a value of 1 and sulfur hexafluoride being several

orders of magnitude stronger with a GWP of 23,900. In GHG emission analyses, the weight of each gas is multiplied by its GWP and is measured in units of CO2 *equivalents* (CO2e).

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less-than-Significant Impact. BAAQMD's CEQA Guidelines includes significance thresholds for operational period GHG emissions. In subsequent litigation, adoption of the BAAQMD CEQA Guidelines was determined to be a project under CEQA; BAAQMD was duly ordered to rescind its approval pending environmental review under CEQA. As noted in **Section III, Air Quality**, substantial evidence supports the use of BAAQMD's 2010 thresholds of significance as thresholds of significance for greenhouse gas impacts. These thresholds include a "bright-line" emissions level of 1,100 metric tons (MT) per year for land-use type projects such as Heidorn Village. Land use projects with emissions above the 1,100 metric ton per year threshold would then be subject to a GHG efficiency threshold of 4.6 metric tons per year per service population (further described below).

Operational emissions were modeled based on land use type and size, trip generation, energy consumption, and other factors. Project service population is the sum of future residents and full-time employees. Since this is a residential-only project, the service population would be the number of future residents, which was estimated at 374 people, based on a projected average of 3.20 residents per household.[11] In 2018, annual emissions resulting from operation of the proposed project are predicted to be 1,554 MT of CO2e. Because this is greater than the "bright-line" emissions level of 1,100 MT per year, the project is subject to the 4.6 metric tons per year per service population threshold as well. **Table 3** shows predicted project GHG emissions.

In terms of construction related GHG emissions, BAAQMD has not identified any significance threshold but recommends that lead agencies quantify and disclose projected construction period emissions and require adherence to several identified best management practices found to reduce GHG emissions during construction

[11] United States Census Bureau. 2014. State & County QuickFacts: Antioch (city), California. Available online: http://quickfacts.census.gov/qfd/states/06/0602252.html. Accessed: October 14, 2014.

Table 3. Estimated GHG Emissions –

Operational Period Source Category	**Estimated Emissions (Metric Tons in 2018)**
Mobile Sources	978
Energy Consumption	463
Solid Waste Generation	64
Water Usage	26
Area Sources	23
Estimated Annual Operational Emissions	1,554
Projected Service Population	374 people
Project Per Capita Emissions	**4.16 MT CO_2e/year/capita**
BAAQMD Per Capita Threshold	**4.6 MT CO_2e/year/capita**
Significant?	No

Source: Illingworth & Rodkin, 2014

As calculated in **Appendix A**, construction related GHG emissions are estimated to range between 273 to 274 metric tons of CO2e per year over the anticipated 12 to 18 month- construction period. These are the emissions from on-site operation of construction equipment, vendor truck trips, and worker trips. Best management practices (BMPs) include but are not limited to using at least 10 percent local building materials, and recycling or reusing at least 50 percent of construction waste or demolition materials. While construction-related GHG emissions are not significant, these BMPs reduce the number and distance of construction-related trips to and from the project site. Although not required, such improvement measures would reduce construction-related GHG emissions.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

No Impact. Estimated GHG emissions of the project are below BAAQMD significance thresholds and would not conflict with any other regulations related to GHG emissions. However, the project would remain subject to any new requirements under rule making developed at the state or local levels regarding greenhouse gas emissions.

VIII. Hazards and Hazardous Materials

	Significant Impact	Significant Unless 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 complied 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?	☐	☐	☒	☐

	Significant Impact	Significant Unless Mitigation Incorporated	Less-than-Significant Impact	No Impact
h) Expose people or structures to the risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

Information in this section was drawn from a Phase I Environmental Site Assessment (ESA) conducted by Aqua Science Engineers, Inc. in July 2014. The study is included as Appendix D. In addition, the City referenced a Phase I ESA prepared for the project site dating from 2003. Both Phase I ESAs reached similar conclusions regarding the potential presence of hazardous materials on site. The 2003 Phase I ESA is on file with the City.

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less-than-Significant Impact. The proposed residential development would not involve the routine use, transport, or disposal of significant quantities of hazardous materials. Incidental uses of potentially hazardous materials associated with residential use, such as pesticides and fertilizers, are highly controlled by federal and state regulations. Transport and use of hazardous materials during construction could involve paint, building material finishing products, automotive oil, fertilizers, pesticides, cleaning agents, and lubricants. Such materials typically do not generate significant hazardous air emissions or involve the use of acutely hazardous materials in their composition to pose a significant threat to human health or environment, and are also highly controlled by federal and state regulations. Therefore, the project would not create a significant hazard to the public or the environment associated with hazardous materials. No mitigation would be required.

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?

Less-than-Significant with Mitigation Incorporated. A review of historical resources and aerial photographs indicate that the project site was in orchard use (walnut trees) dating back at least to 1939. The property remained in exclusively agricultural use until the early 1980s. By 1981, two residential dwellings (a conventional house and a trailer) were added to the northern portion of the property while orchard uses continued to the south. In association with the residential uses, the site once also hosted a septic system, a water well, and an underground storage vault. The residential uses were demolished under permit in 2004; around the same time, both the septic system and water well were closed/removed under permit. The storage vault remains on site today.

Historic aerial photos from 2005 indicate that the site remained in orchard use following the demolition/removal of the residential properties. The orchard appears to have been removed sometime in early 2006.

Small stockpiles of what appear to be concrete rubble exist in both the southeast and northernmost areas of the property. The previous use of the vault cannot be conclusively determined, but a review

of aerial photography included in the Phase I ESA indicates that the vault was constructed sometime after 1968.

The California Department of Conservation advised the City in 2010 that the project site was within the administrative boundaries of the Brentwood natural gas field. However, the City's research indicates that this gas field was not discovered until 1962.[12] Historic aerial photography of the project site included in the Phase I ESA shows no oil or gas well equipment on the project site. Moreover, the Phase I ESA included a search of the state's database of oil and gas wells (DOGGR); the search did not identify any such wells on the project site. Field reconnaissance of the project site in association with the preparation of the 2014 (and 2003) Phase I ESA did not yield any evidence of oil or gas wells on the site. Beyond the site being within the administrative boundary of the Brentwood natural gas field, there is no evidence before the City that the project site ever included an oil or gas well. Notwithstanding, in the highly unlikely event that an unrecorded abandoned oil or gas well were to be found on the project site, its plugging/closure would be governed by state law (Public Resources Code 3208.1) which includes a requirement to contact the California Department of Conservation.

The previous known agricultural and residential activities on the project site may have entailed the use and/or disposal of hazardous materials, residues of which may persist in site soils and groundwater. Site preparation and grading activities, therefore, have the potential to result in a significant effect on the environment - that is to say, exposure of site workers or people in the vicinity to hazardous materials. To address this effect, mitigation is proposed.

> **Mitigation Measure HAZ-1:** Prior to the issuance of any grading permit, the project applicant shall enlist a qualified professional to prepare a Phase II ESA under pertinent industry standards and state/local guidelines. The Phase II ESA shall, at minimum, consist of the collection and analysis of soil samples to determine the presence/concentration of hazardous materials. The findings of this investigation shall be documented in a written report and submitted to the City. If the results of the Phase II ESA confirm the presence of hazards or hazardous materials, site remediation shall be required with oversight by applicable state and local regulatory agencies, depending on the nature and extent of contamination. The impact of specific remedies implemented on air quality and resulting health effects, nuisance conditions, risk of upset in the event of an accident, and transportation of contaminated material associated with the remediation shall be addressed prior to implementation of the site remedy.

Significance after Mitigation: Preparation of and adherence to the recommendations of a Phase II ESA as set forth in **Mitigation Measure HAZ-1** would reduce to a less-than-significant level impacts associated with the project's potential to expose people to hazardous materials.

[12] Abstract of Natural Gases of North America, Volume 1; Brentwood Oil and Gas Field, Contra Costa County California (1968). Accessed February 5, 2015 at http://archives.datapages.com/data/specpubs/fieldst1/data/a007/a007/0001/0100/0104.htm

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Less-than-Significant Impact. The Heritage Baptist Academy is located approximately 50 feet to the east/northeast of the project site, fronting Heidorn Ranch Road. No other school is located within a quarter mile of the project site. However, as noted above, the proposed residential use of the project site would not result in significant hazardous emissions or the handling of acutely hazardous materials/substances/waste.

Incidental uses of potentially hazardous materials associated with construction activities and proposed residential uses, such as fuels, fertilizers, and pesticides, are already highly controlled by federal and state regulations such that project effects would be less than significant. No mitigation would be required.

d) Be located on a site which is included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5 and as a result, would it create a significant hazard to the public or the environment?

No Impact. According to the Phase I ESA, the project site was not identified as a hazardous materials site on any of the local regulatory agency database lists, including the so called "Cortese list" compiled pursuant to Government Code Section 65962.5. No mitigation would be required.

e) and f) Proximity to Airport/Private Airstrip?

Less-than-Significant Impact. The closest public use airport to the project site is Byron Airport, located about 15 miles to the southeast. The closest private airstrip to the project site is the Funny Farm Airport, located 6 miles to the east beyond the City of Brentwood. The project site's distance from airports and private airstrips ensures that the project would not be adversely affected by airport operations. No mitigation would be required.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less-than-Significant Impact. The Contra Costa County Fire Prevention District (CCCFPD) considers its service levels adequate for existing developments and response areas; the project would not alter or interfere with the provision of emergency services or existing emergency evacuation plans to these existing developments and response areas.[13] In all, the project would have a less-than-significant impact to emergency services plans. No mitigation would be required.

h) Expose people or structures to the risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Less-than-Significant Impact. According to the 2009 Contra Costa County Fire Hazard Severity Zones in Local Responsibility Area (LRA) map, the project site is located in non-Very High Fire Hazard Severity Zone (non-VHFHSZ).[14] However, the project site is surrounded by highly developed land to

[13] Ted Leach, Fire Inspector, CCFPD. Personal Communication, October 22, 2014.
[14] California Department of Forest and Fire Protection, Fire and Resource Assessment Program. 2014. Contra Costa County Fire Hazard Severity Zones in LRA. Available: http://frap.cdf.ca.gov/webdata/maps/contra_costa/fhszl06_1_map.7.pdf. Accessed August 4, 2014.

the north and west, and vacant lands to the south. Sparse residential development is located to the east. Therefore, there are no adjacent wildlands and no plans to intermix houses and wildland and the associated risk of wildland fire would be reduced to a less-than–significant level. No mitigation would be required.

IX. Hydrology and Water Quality

	Significant Impact	Significant Unless 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 level 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 patterns 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 runoff 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 run-off?	☐	☐	☒	☐
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?	☐	☐	☒	☒

	Significant Impact	Significant Unless Mitigation Incorporated	Less-than-Significant Impact	No Impact
h) Place within a 100-year flood hazard area structures which 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?	☐	☐	☒	☐

Information in this section was drawn from a draft Stormwater Control Plan prepared in July 2014. This plan is included as Appendix E.

Development projects within Contra Costa County are required to comply with terms of a regional permit—specifically, provision C.3 of the Regional Water Quality Control Board's National Pollutant Discharge Elimination System (NPDES) permit. For land development projects, provision C.3 requires that the quantity of post-project runoff be less than pre-project runoff and that source control measures to improve the quality of runoff be implemented. Provision C.3 also requires preparation of and adherence to a Stormwater Control Plan that demonstrates how compliance with these requirements would be achieved.

a), c), d), e), and f) Impacts Related to Warm Quality/Stormwater Runoff/Site Drainage?

Less-than-Significant Impact. Currently, when stormwater falls on the existing, undeveloped project site, the water is either absorbed into the earth, flows to the northeast (where site elevation is the lowest), or evaporates. The project site is underlain by silty clay near-surface soils that have a moderately slow permeability (infiltration of water measured in inches of water per hour).

The proposed construction of 117 houses, plus landscaping and paved surfaces would increase the extent of impervious surface on the site. To address water quality impacts and ensure compliance with C.3 requirements, the project proposes to collect and convey stormwater in a combination of overland flows and grassy swales and direct it to two bioretention areas:

1) in the northern part of the project site running along the East Bay Municipal Utilities District (EBMUD) easement to the north and Heritage Baptist Church to the east and

2) in the southeast corner of the project site bordering Heidorn Ranch Road.

The biorention facilities would be sized to retain peak stormwater flows, allowing pollutants to settle. Following the cleansing process, the runoff would be collected by perforated pipe networks and discharged into the City storm drain system.

Such bioretention facilities would be operated and maintained by the Homeowners Association.

As a condition of project approval, in compliance with guidelines set forth by Contra Costa County and the RWQCB, the project would implement Best Management Practices (BMPs) set forth in the

Contra Costa Clean Water Program that would minimize opportunities for construction activities to create polluted runoff water. Prior to the issuance of any grading or construction permits, a Stormwater Pollution Prevention Plan (SWPPP) would be prepared for City review and approval as per the guidelines set forth by the City and the RWQCB. The SWPPP would incorporate BMPs that minimize the amount of erosion occurring both during and after construction. A Stormwater Control Plan would be submitted to the City for review and approval, which would satisfy all Provision C.3 requirements and meet or exceed all requirements. The Stormwater Control Plan would be implemented to limit the imperviousness of the site by constructing landscape islands and vegetated swales.

Assuming adherence to these existing regulations, impacts to water quality would be less than significant. No mitigation would be required.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge?

Less-than-Significant Impact. Groundwater basins in the project area are not utilized as public water sources. The project does not include any plan to draw groundwater. The project would increase the amount of impervious coverage on the project site from essentially 0 percent to 58 percent, resulting in a slowing of groundwater recharge relative to existing conditions. However, landscaped areas and drainage swales on the project site would help achieve a degree of site porosity, allowing for the continuation of some groundwater recharge. Mainly, however, the project would not substantially deplete groundwater as there is no plan to create any water wells on the project site; the proposed dwelling units would receive municipal water. Therefore, the project would not significantly deplete groundwater. No mitigation would be required.

g), h), and i) Place housing or structures within a flood hazard zone or otherwise redirect floodwaters?

Less-than-Significant Impact. According to maps prepared by the Federal Emergency Management Agency (FEMA), the project site does not contain any areas designated as a 100-year flood hazard zone.[15] As such, no housing or other structures associated with the project would be constructed within any 100-year flood hazard area. The closest 100-year flood hazard area to the project site is within the immediate concrete channel of the Contra Costa Canal, approximately 0.5 miles north of the project site.

The Contra Loma Dam is the closest dam to the project site, located approximately 3.5 miles west. The City-wide inundation map for the failure of Contra Loma Dam and Dike No. 2 indicates that the project site is more than 3 miles east of the areas that would be impacted by this dam failure.[16] Furthermore, the project site is more than 4 miles south and upgradient of levees along the Sacramento/San Joaquin River, minimizing the likelihood of any adverse effects associated with levee rupture.

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[15]Federal Emergency Management Agency. 1987. *Federal Insurance Rate Map No.0600250335B, Contra Costa County*

[16] City of Antioch. 2003. *City of Antioch General Plan* (Figure 4.7.3).

In sum, the project would not place any housing or structures within any identified flood hazard zone nor would it have the potential to redirect floodwaters. Impacts related to flooding would thus be less than significant. No mitigation would be required.

j) Inundation by seiche, tsunami, or mudflow?

Less-than-Significant Impact. The project site is located about 50 miles from the Pacific Ocean. Tsunamis typically affect coastlines and areas up to ¼ mile inland. Due to the project's distance from the coast, potential impacts related to a tsunami would be minimal. Additionally, the project site is not susceptible to impacts resulting from seiche because of its distance from any enclosed body of water. The nearest body of to the project site is the Antioch Municipal Reservoir, which is located approximately 3 miles northwest of the project site. The Contra Loma Reservoir is also located just over 3 miles to the northwest of the project site. As no steep slopes are located in close proximity to the project site, the possibility of inundation by landslides or mudflows would be remote. Impacts would be less-than-significant; no mitigation would be required.

X. Land Use and Planning

	Significant Impact	Significant Unless 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 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?	☐	☐	☐	☒

a) Physically divide an established community?

No Impact. The project site is located between existing residential neighborhoods to the north and west and largely undeveloped lands (designated for housing) to the south and east. The project would result in a southerly and easterly extension of existing residential areas. As such, the project would not have the potential to physically divide any established communities. No mitigation would be required.

b) Conflict with relevant land use plan, policy, or regulation?

Less-than-Significant Impact. The General Plan designates the project site for medium low-density residential uses, at a maximum of 6 dwelling units per acre. As the project would result in the construction of single-family homes at a density of approximately 5.8 units per acre, the project would be consistent with the General Plan designation for the project site. The project site is currently zoned as Planned Development (PD), which explicitly contemplates residential uses.[17] However, the City's customary approach is to rezone a PD as part of the application process such that the resultant rezoning conforms exactly with the attributes of the given project. Accordingly, the City will consider a rezoning for the project site as part of the review and approval process. If the City can make findings to support the rezoning, the project would not conflict with zoning.

[17]City of Antioch. 2008. *Antioch Municipal Code, City Code Section 9-5.2304*.

The City's General Plan also defines performance standards for community services, including police protection, for which the performance standard is 1.2 to 1.5 police officers per 1,000 individuals.[18] The increase in population of approximately 374 individuals generated by the project (**see Section XIII, Population and Housing**) would create additional demand for less than one police officer. In order to avoid conflict with the General Plan and as a condition of project approval, the City would require the applicant to establish or participate in a land-based financing mechanism to fund police service needs generated by the project in order to meet relevant General Plan service requirements. The financing mechanism would be in the form of a special tax or Community Facilities District (CFD) or other means acceptable to the City. The City would require that the financing mechanism be established prior to the issuance of a building permit for the first unit of the project. At the City's discretion, the applicant would establish or pay the City's costs to establish the mechanism. With the foregoing as a condition of project approval, the project would not conflict with the General Plan.

As with any other development within the City, the project would be required to conform to the general design standards and guidelines of the City Code as well as the Citywide Design Guidelines regarding residential uses. Thus, the project would not conflict with any existing land use plans or policies. No mitigation would be required.

c) Conflict with any applicable habitat conservation plan?

No Impact. There is no operative habitat conservation plan within the City of Antioch. The closest habitat conservation plan is the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (ECCCHCP). The City is not within the ECCCHCP area and not subject to the requirements of the HCP.

Therefore, the project would not conflict with the provisions of an adopted habitat conservation plan or natural community conservation plan. No mitigation would be required.

[18] City of Antioch. 2003a. *City of Antioch General Plan, Section 3.5.3.1, Performance Objective*

XI. Mineral Resources

	Significant Impact	Significant Unless 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 of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☒	☐

a) and b) Result in the loss of availability of a known mineral resource and/or the availability of a locally important mineral resource recovery site?

Less-than-Significant Impact. According to the Contra Costa County General Plan, the project site is not classified or designated within any mineral resource zone. Furthermore, the City's General Plan EIR states that none of the areas identified for new development within the City are known to contain mineral resources that would be of value to the region and residents of the state.

As noted previously in the discussion of Hazards/Hazardous Materials (**Section VIII**), the project site is located within the administrative boundaries of the Brentwood natural gas field. However, there is no history of any petroleum exploration on the project site. Moreover, the boundaries of the Brentwood natural gas field extend well beyond the project site. Construction of the project would therefore not preclude other exploration of and extraction from the gas field. Finally, many other sources of gas and oil are widely available throughout the state and in other locations in and out of the United States. The project would therefore not result in any significant loss of the availability of such resources. No mitigation would be required.

XII. Noise

	Significant Impact	Significant Unless Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a) Result in 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 the other agencies?	☐	☐	☒	☐
b) Result in exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?	☐	☐	☒	☐
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d) Result in 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 located within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Information in this section is based on a noise assessment prepared by Illingworth & Rodkin, Inc. in October 2014, included as **Appendix F** and summarized below.

Background

The project site is currently vacant, and therefore there are no on-site uses that generate audible noise. Potential noise-sensitive receptors in the project area include people in neighborhoods to the north and west of the project site, recreational users of the Mokelumne Trail to the north, attendees and students of the church/school to the northeast, and residents of two large-lot rural residential homes to the east of the project site across Heidorn Ranch Road, located in the City of Brentwood.

Approved roadway improvements in the vicinity of the project site have the potential to alter the existing noise environment. The City of Brentwood's General Plan shows the extension of Sand Creek Road across the State Route 4 Bypass, ultimately connecting to Heidorn Ranch Road.

Land along the eastern side of Heidorn Ranch Road is designated in the Brentwood General Plan as part of Priority Area 1 (PA-1). The Brentwood General Plan calls for a mixed use development in this area, consisting of office/professional, commercial, and medium- to high-density residential uses. To this end, the Noise Element of the Brentwood General Plan assumes that portions of Heidorn Ranch Road between the future Sand Creek Road intersection and Lone Tree Way would experience noise levels at or above 60 dBA CNEL.[19]

To date, Sand Creek Road has not been extended and PA-1, including the area across Heidorn Ranch Road from the project site, has not been fully built out as per the Brentwood General Plan. PA-1 regulations do not assume the inclusion of rural residential development, so the existing rural residential properties are expected to be redeveloped with higher intensity uses consistent with PA 1.

Project Impacts

Project construction and ongoing operations (primarily vehicular traffic) have the potential to generate noise.

The City of Antioch General Plan sets forth noise objectives and policies to protect citizens from the harmful and annoying effects of excessive noise. The General Plan's Noise Element is intended to achieve and maintain noise levels appropriate to planned land uses. For single-family residential areas, the noise level outlined in this objective is 60 dBA CNEL for outdoor areas.

The General Plan also outlines noise policies, including continuing enforcement of California Noise Insulation Standards. The California Building Code (CBC) no longer includes noise insulation standards for residences. For compliance with the intent of this policy, the 2010 CBC noise insulation standards are used. The 2010 CBC established an interior noise level standard of 45 dBA CNEL/Ldn in any habitable room for new hotels, motels, dormitories, and apartment houses. This standard is generally also applied for single family dwellings.

The City of Antioch does not define a "significant noise increase." However, there are adjacent noise-sensitive uses located east of the project site across Heidorn Ranch Road, within the City of Brentwood. Therefore, for the purposes of evaluating this project most conservatively, this analysis applies the City of Brentwood's policy.

Once constructed, the primary noise source resulting from the project would be vehicular traffic along Heidorn Ranch Road. A noise increase would be considered significant if traffic or commercial operating noise generated by the project would substantially increase noise levels at sensitive

[19] CNEL refers to the "Community Noise Equivalent Level." CNEL represents the average noise level over a 24 hour period. CNEL is computed by measuring sound in a given location for at least 24 hours. The average noise level, as measured in decibels (dBA), is the CNEL measurement. The CNEL standard provides for "penalties" in that noises that occur during late evening and early morning hours, when people tend to be most sensitive to noise disturbance, are given a heavier weighting than if they occurred during daytime hours.

receptors in the vicinity. The City of Brentwood's General Plan defines substantial increase relative to existing traffic noise levels, as shown in **Table 4**.

Table 4. Significant Noise Increase Criteria

Existing Traffic Noise Levels[1]	Significant Increase in Roadway Noise Levels
less than 60 dB CNEL	+5 dB Ldn
60 and 65 dB CNEL	+3 dB Ldn
greater than 65 dB CNEL	+ 1.5 dB Ldn

Notes: 1 At the outdoor activity areas of noise-sensitive uses

Ldn = Average noise levels during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 p.m. and 7:00 a.m.

Source: Illingworth & Rodkin, 2014

In order to quantify existing noise levels, noise monitoring surveys were conducted for the project site from March 31, 2009 to April 3, 2009 (in association with an earlier, similar development previously proposed for the project site) and on September 26, 2014. The purpose of the 2014 survey was to update the 2009 noise survey and to confirm that no major changes in land uses had occurred near the site that could affect the results of the 2009 noise study. The 2009 noise monitoring survey included one long-term (24-hour) noise measurement site (LT-1) and two attended short-term noise measurement sites (ST-1 and ST-2). For the 2014 noise measurement survey, new short-term measurements were made at locations LT-1 and ST-2. All measurement locations, represented in Figure 7, were selected based on the location of existing sensitive receptors.

Table 5 provides a summary of existing noise measurements. These levels are generally consistent with a suburban environment.

Table 5. Existing Noise Levels

Measurement Location		Measured Noise Levels (dBA) L_{max}	Measured Noise Levels (dBA) L_{eq}	Estimated Noise Level, dBA CNEL	Primary Noise Source
LT-1 – 40 feet from center of Heidorn Ranch Road (9/26/2014)		55	47	57	Heidorn Ranch Road
ST-1 – 155 feet from nearest residential land use (3/31/2009)		58	47	49	Heidorn Ranch Road
ST-2 – End of Prewett Ranch Drive	4/3/2009	59	46	471	Prewett Ranch Drive
	9/26/2014	52	44		

Notes: 1 Calculated by averaging measured noise levels from both dates.
Lmax = The maximum noise level during the measurement period; Leq = Average noise level during the measurement period
Source: Illingworth & Rodkin, 2014

To provide perspective on the measured noise levels in Table 5, some examples of other typical noise levels include a library (30 dBA), heavy traffic (60 dBA), a garbage disposal (80 dBA), and a rock concert (110 dBA).

Significance Criteria

The project would have a significant noise impact if its construction and/or operation would cause:

- Exterior noise levels exceeding 60 dBA CNEL in backyards of proposed residences or interior noise levels exceeding 45 dBA CNEL inside residences.
- A substantial permanent noise level increase at existing sensitive receptors (e.g., residences). A "substantial increase" is defined above in Table 4.
- Construction noise levels that exceed 60 dBA Leq and raise the ambient level by at least 5 dBA Leq) for a period of more than one year at adjacent residential land uses.

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 the other agencies?

Less-than-Significant Impact. Noise levels at the project site are anticipated to increase not only because of the project but also as a result of cumulative growth forecast under the current General Plan.

The noise analysis projected noise levels in the year 2030. These levels include noise associated with the project as well as other noise associated with traffic/cumulative area growth. They were also used to assess the compatibility of the proposed residential project with respect to the noise environment expected at the site. The analysis found that traffic noise levels would be about 53 dBA CNEL at the setback of proposed project homes along Heidorn Ranch Road and about 55 dBA CNEL at the setback of homes along Prewett Ranch Road. These noise levels would meet the exterior noise and land use compatibility standard presented in the City of Antioch's General Plan. Noise levels along most of the roads in and around the project area were calculated to increase 1 dBA CNEL or less as a result of project generated traffic on Lone Tree Way, Prewett Ranch Drive, Hillcrest Avenue, Canada Valley Road, and the portions of Heidorn Ranch Road north of Lone Tree Way and south of

the project's northern entrance. This increase is less than the 3 and 5 dBA increase that would constitute a significant increase according to the City of Brentwood General Plan (**Table 4**). Project-related traffic noise increases of 2 to 3 dBA were estimated for the portion of Heidorn Ranch Road between Lone Tree Way and north of the northern project entrance. Because the existing noise levels in this area are less than 60 dB CNEL, the 2 to 3 dBA does not constitute a significance noise increase (**Table 4**).

In buildings of typical residential construction, interior noise levels are approximately 15 dBA lower than exterior noise levels with the windows partially open and 20 to 25 dBA lower than exterior noise levels with the windows closed. As a result, interior noise levels on the project site would be expected to meet the 45 dBA CNEL interior standard with standard construction and windows in the open or shut position.

At the open space area proposed adjacent to Heidorn Ranch Road, future year (2030) traffic noise levels are anticipated to exceed 60 dBA CNEL within about 60 feet of the center of the roadway. Approximately two-thirds of this open space area is located beyond 60 feet from the center of Heidorn Ranch Road. This area would primarily serve as a landscaping and visual buffer area between proposed new dwelling units and Heidorn Ranch Road, rather than a recreational area. In addition, all project dwelling units would have private yards and access to the proposed interior recreational area, all of which would have noise levels below the 60 dBA CNEL criteria. In all, the project would not result in the long-term exposure of people to excessive noise. Impacts would be less-than-significant. No mitigation would be required.

b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?

Less-than-Significant Impact. The project includes no components that would generate ground-borne noise or vibration, except as associated with temporary construction activities. Potential effects related to construction are discussed below in subheading d).

Project construction would generate perceptible vibration when heavy equipment or impact tools (e.g. jackhammers, hoe rams, etc.) are used in areas adjacent to developed properties. Construction activities would include grading, site preparation work, foundation work, and new building framing and finishing. The proposed project would not require pile driving, which can cause excessive vibration.

There are several different ways to measure ground vibration. One method is called Peak Particle Velocity (PPV), which is a measurement of maximum ground particle movement in inches per second (in/sec). A PPV of 0.04 in/sec is perceptible, while 0.1 is strongly perceptible, and 0.5 is severe, with vibrations considered unpleasant. Groundborne vibration levels exceeding 0.3 in/sec, PPV would be considered a significant vibration impact.

Project construction activities, such as drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.) may generate substantial vibration in the immediate vicinity of the work area. Jackhammers typically generate vibration levels of 0.035 in/sec, PPV, and drilling typically generates vibration levels of 0.09 in/sec, PPV at a distance of 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used.

The closest neighboring residential structures are about 25 feet west and more than 100 feet north of the project site. At residences to the west, vibration levels would be expected to be 0.2 in/sec, PPV or less when vibration generating operations are located adjacent to these residences. For the residences to the north, vibration levels would be expected to be 0.05 in/sec, PPV, or less. Vibration generated by construction activities near the common property line to the west could at times be perceptible at adjacent residences, but would only occur for short periods of time. However, these levels would be below the significance threshold of 0.3 in/sec, PPV.

Therefore, the project would have a less-than-significant impact with regard to groundborne vibration. No mitigation would be required.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Less-than-Significant Impact. The development of the project will cause an increase in vehicular traffic on the surrounding/nearby street network. Increased vehicular traffic on the streets is the only source of operational noise that would substantially affect the noise environment in the vicinity of the project. A substantial noise increase, as defined in **Table 4** above, depends on the increase relative to existing noise levels. The noise exposure levels were evaluated at three existing and three future intersections in the vicinity of the project to determine whether or not the increased vehicular traffic would cause a substantial increase in the noise environment.

Noise levels along the roads in and around the project site were calculated to increase above existing levels by no more than 1 dBA CNEL or less as a result of project generated traffic (Existing Plus Project Condition) at five of the six locations:

- Lone Tree Way
- Prewett Ranch Drive
- Hillcrest Avenue
- Canada Valley Road
- Heidorn Ranch Road, north of Lone Tree Way and south of the project's northern project entrance

These increases would not typically be noticeable and are below the 3 and 5 dBA CNEL permanent noise increase thresholds.

Project-related traffic noise increases of 2 to 3 dBA CNEL were estimated for the portion of Heidorn Ranch Road between Lone Tree Way and north of the northern project entrance (where project-related noise levels would be expected to be the highest). The combination of existing plus project noise levels here would exceed 60 dBA CNEL at a distance of about 80 feet from the center of Heidorn Ranch Road, assuming vehicles travel the posted speed limit of 45 mph. There are no noise sensitive uses located east of Heidorn Ranch Road along this segment. Single and multi-family residences are 90 and 120 feet west of the center of the road, respectively. Heritage Baptist Academy is located about 175 feet west of Heidorn Ranch Road, with one basketball court located about 90 feet from the center of the road. Noise levels at these noise- sensitive locations would continue to be below the 60 dBA CNEL threshold with existing and project noise levels. As a result,

increases in vehicular traffic would not cause a significant noise impact to existing residents or businesses in the area. This would be a less-than-significant impact and no mitigation would be required.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Less-than-Significant with Mitigation Incorporated Temporary noise impacts resulting from construction depend on the type of equipment, the timing and duration of its use, and the distance between construction noise sources and noise sensitive receptors. Construction activities can generate considerable amounts of noise, especially when heavy equipment is used. Construction noise is most noticeable and thus of concern when activities occur during noise-sensitive times of the day (early morning, evening, or nighttime hours), near noise sensitive land uses, or when construction extends over long periods of time.

The project is likely to be built in phases. After construction of model homes, each phase would involve the construction of about 36 to 40 homes. The highest noise levels would be generated during site preparation, grading, and trenching. Framing and finishing a dwelling unit generally results in lower noise levels. Noise levels typically drop further once exterior construction is complete and only interior finishing remains.

The typical range of maximum noise levels would be 80 to 90 dBA Lmax at a distance of 50 feet. Hourly average noise levels generated by construction are about 81 dBA to 88 dBA Leq measured at a distance of 50 feet from the center of a busy construction site. Hourly average construction noise levels associated with the erection of the residential units, such as hammer- and drilling-related noise, range from approximately 63 to 71 dBA at a distance of 50 feet.

The nearest existing residential receivers to the west would be exposed to hourly average noise levels ranging from 79 to 86 dBA Leq during the busiest construction periods along the western perimeter of the site. At residences to the north, located about 100 feet from the project boundary, construction noise levels would be about 69 to 78 Leq during the busiest construction periods located adjacent to the northern boundary of the site. Construction generated noise levels drop off at a rate of about 6 dBA per doubling of distance between the source and receptor. Shielding by barriers or buildings would provide 5 to 10 decibels further reduction at receptors. As construction moves away from noise-sensitive receptors, or indoors, noise levels generated by heavy construction would be lower.

Although the entire construction period would exceed 12 months, not all construction activities would be anticipated to generate high levels of noise. Additionally, construction would move around the site as different phases of the project are built. However, the project has the potential to result in substantial increases in noise at adjacent properties. Therefore, mitigation is required.

> **Mitigation Measure NOI-1:** The following construction best management controls, as identified in the Antioch General Plan and Municipal Code and the Brentwood General Plan, shall be implemented at the construction site:
>
> - Per the most conservative restrictions between Section 5-17.04 of the City's Municipal Code and Action N 1e of City of Brentwood's General Plan, construction activities, including haul truck deliveries, shall be limited to the hours of:

- 8:00 AM to 5:00 PM on weekdays within 300 feet of occupied dwelling units, and the Heritage Baptist Church and Academy,
- 7:00 AM to 6:00 PM on weekdays for construction located more than 300 feet from occupied dwelling units and the Heritage Baptist Church/Academy,
- 9:00 AM to 5:00 PM on Saturdays, and
- No construction shall occur on Sundays or public holidays.

- Prohibit unnecessary idling of internal combustion engines. Equip all equipment driven by internal combustion engines with mufflers which are in good mechanical condition, appropriate for the equipment, and no less effective that those originally installed by the manufacturer.

- Utilize "quiet" air compressors and other stationary noise sources where technology exists.

- Locate stationary noise-generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors and place equipment so that emitted noise is directed away from nearby sensitive receptors.

- Construct temporary noise barriers, where feasible, to screen stationary noise-generating equipment when located within 200 feet of adjoining sensitive land uses. Temporary noise barrier fences would provide a 5 dBA noise reduction if the noise barrier interrupts the line-of-sight between the noise source and receiver and if the barrier is constructed in a manner that eliminates any cracks or gaps.

- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.

- Construct units at the perimeter of the site and immediately adjacent to existing residences as early as possible so that the completed buildings will provide acoustical shielding for existing residences to the north and west. Constructing units along the western and northern perimeters of the site would provide approximately 10 dB of noise reduction during the remainder of project construction activities.

- Designate a "disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and instituting reasonable measures as warranted to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

- Coordinate with the City to notice to the residents immediately adjacent to the project site and the Heritage Baptist Academy regarding the project construction schedule. The notice shall include the contact information for the disturbance coordinator.

Mitigation Measure NOI-2: Prior to the issuance of a grading permit, the applicant shall submit a construction-related noise mitigation plan to the Community Development Director for review and approval. The plan should depict the location of construction equipment, storage, and maintenance areas, and document incorporation of the best management controls identified in **Mitigation Measure NOI-1** above.

Significance after Mitigation: While construction of the residential units would take place over a period greater than one year, the noise levels associated with unit construction would be localized to a single portion of the project site pursuant to the unit phasing, would result in substantially lower noise levels than would project site preparation activities, and would be subject to the same construction time limits and mitigation plan requirements as identified in **Mitigation Measures NOI-1 and NOI-2**. Thus, implementation of these mitigation measures would reduce temporary construction-related noise impacts to a less-than-significant level.

e) and f) Located within an airport land use plan/vicinity of a private airstrip?

No Impact. The project would not be located within an airport land use plan, within two miles of an airport, nor within the vicinity of any private airstrip. Byron Airport is the nearest public airport to the project site, approximately 15 miles southeast of the project site. The nearest private airstrip, Funny Farm Airport, is located 6 miles east of the project site. Due to the project's distance from and the flight path orientation of these airports, there would be no impact. No mitigation would be required.

XIII. Population and Housing

	Significant Impact	Significant Unless 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?	☐	☐	☐	☒

a) Induce substantial population growth?

Less-than-Significant Impact. The City's General Plan has designated the project site for residential development at a maximum of 6 dwelling units per acre. The project proposes a density of under 6 dwelling units per acre. The project would therefore increase population in the City, but in an amount consistent with the General Plan and in turn consistent with regional population forecasts. The project site is immediately adjacent to existing transportation and utility infrastructure and thus would not require the extension of such infrastructure beyond the project site (which could indirectly induce growth). Therefore, the project would not have the potential to directly or indirectly induce substantial population growth. No mitigation would be required.

b) and c) Displace housing or people?

No Impact. The project site is currently an unimproved field, with no buildings or above-ground structures. No housing units or businesses would be affected by the project, and no relocation would occur. Therefore, the project would not result in the displacement of any homes or people. No mitigation would be required.

XIV. Public Services

	Significant Impact	Significant Unless 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:				
i) Fire protection?	☐	☒	☐	☐
ii) Police protection?	☐	☐	☒	☐
iii) Schools?	☐	☐	☒	☐
iv) Parks?	☐	☐	☒	☐
v) Other public facilities?	☐	☐	☒	☐

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:

i) Fire protection impacts?

Less-than-Significant with Mitigation Incorporated. Fire protection services to the project site would be provided by the Contra Costa County Fire Protection District (CCCFPD).

Station 88, located at 4288 Folsom Drive (2.7 miles north of the project site), would be the primary responding CCCFPD station.[20] Station 82, located at 196 Bluerock Drive (3.7 miles from the project site), would be the secondary responding CCCFPD station.

Both the City and the CCCFPD have established their own response time goals for fire protection services. Performance Standard 3.5.2.2 of the Antioch General Plan requires that prior to the approval of discretionary development projects, the CCCFPD provide written verification that the project would not interfere with CCCFPD's ability to maintain a five-minute response time for 80 percent of all City emergency calls. CCCFPD's own response time goal for the District as a whole is five minutes for the 90 percent of emergency calls.

CCCFPD has stated that it could not with its present facilities meet its own or the City's response time goals because of the location of the project site relative to such existing facilities. Existing residential and institutional development adjacent to the project site faces a similar response time challenge as those that are anticipated for the project site once developed. To remedy existing conditions and better serve future development (including, but not limited to the project), both CCCFPD and the City have preliminarily identified a site at the future intersection of Deer Valley and Sand Creek Roads for the construction of a new fire station.

Construction of the Heidorn Village project would therefore contribute incrementally to a currently existing need for an additional fire facility in this area of Antioch. Therefore, the project itself would not trigger such a need for additional facilities. The City and CCCFPD have agreed upon fire facility impact fees to be imposed upon new development in the City that will ultimately help fund construction of new fire facilities, including the proposed facility at Deer Valley and Sand Creek Roads. Because the project would incrementally contribute to previously established/determined need for a new fire facility, the project would result in a potentially significant environmental impact. Mitigation is therefore required.

> **Mitigation Measure PUB-1:** At the time of building permit issuance, the City shall impose and collect a fire facility impact fee according to the fee schedule established by the City and in place at the time of tentative map approval.

Significance after Mitigation: Less than significant. As fire facility impact fees were assessed at a district-wide level to determine the impact of new development relative to firefighting infrastructure, payment of these fees represents appropriate project mitigation. Construction of the new fire station would take place once adequate fees have been collected; construction would be subject to environmental review under CEQA. Such review would require the identification of any significant environmental effects associated with the fire station as well as any measures that would avoid, minimize, or compensate for such effects.

ii) Police protection impacts?

Less-than-Significant Impact. Police services in the area are provided by the Antioch Police Department (APD). The APD is headquartered in the City's downtown, approximately 7 miles from the project site.[21]

[20] Ted Leach, Fire Inspector, CCFPD. Personal Communication, October 22, 2014.

The City's General Plan identifies a response time goal of between seven and eight minutes for all Priority 1 calls for emergency services within the City.[22] The APD reports that the average response time for a Priority 1 call is ten minutes and 51 seconds, indicating that the APD is currently operating below the General Plan standard.

Due to the economic downturn in the last several years, staffing was reduced from a high of 126 sworn officers to the current level of approximately 90, making the APD the lowest per capita staffed police department in Contra Costa County. Additionally, APD previously had 18 community service officers assisting with community policing and prisoner custody details, where there are now three. Average response times to a Priority 1 call went from a low of 7 minutes 5 seconds in 2008, to the current 10 minutes 51 seconds due to this decrease in staffing. APD is currently in the process of rebuilding their ranks. The need for increased staffing and improved response time exists with or without the proposed project.

The increase in population of approximately 374 individuals generated by the project (see **Section XIII, Population and Housing**) would create additional demand for less than one police officer, based on the General Plan staffing goal of 1.2 to 1.5 police officers per 1,000 individuals.[23] According to the APD, the project would require the creation of one additional officer position because the department does not fund fractions of positions. This additional staffing would not entail the need for new or expanded physical facilities; the staffing increase could be accommodated within existing police facilities. As a condition of project approval, the City would require the applicant to establish or participate in a land-based financing mechanism to fund police service needs generated by the project in order to meet relevant General Plan requirements. The financing mechanism will be in the form of a special tax or Community Facilities District (CFD) or other means acceptable to the City and the applicant. The City will require that the financing mechanism be established prior to the issuance of a building permit for the first unit of the project. At the City's discretion, the applicant would establish or pay the City's costs to establish the mechanism. Since the project would not result in the need to physically expand police facilities, however, project impacts under CEQA would be less than significant. No mitigation would be required.

iii) School impacts?

Less-than-Significant Impact. The project site is within the Brentwood Union School District (BUSD) and the Liberty Union High School District (LUHSD). The BUSD serves elementary and middle school students (kindergarten through 8th grade), while the LUHSD serves high school students 9th through 12th grades. **Table 6** identifies the closest BUSD and LUHSD schools to the project site. Students from the project site would likely attend the closest schools; however, these school districts have the ability to redirect school children to specific schools (potentially further away) in order to maximize the effectiveness of existing resources and facilities.

[21] Tammany Brooks, Captain - Field Services Division, Antioch Police Department. Personal Communication, September 25, 2014.
[22] City of Antioch. 2003a. *City of Antioch General Plan, Section 3.5.3.1, Performance Objective*
[23] City of Antioch. 2003a. *City of Antioch General Plan, Section 3.5.3.1, Performance Objective*

Table 6. Nearby BUSD and LUHSD Schools

School Name	School Address	Distance from Project Site (Approximate)
Pioneer Elementary School	2010 Shady Willow Lane	1 mile
Loma Vista Elementary School	2110 San Jose Avenue	1.5 miles
Freedom High School	1050 Neroly Road	2 miles
Ron Nunn Elementary School	1755 Central Boulevard	2.2 miles
Heritage High School	101 American Avenue	2.4 miles
Bristow Middle School	855 Minnesota Avenue	2.5 miles
Adams Middle School	401 American Avenue	2.6 miles

Source: Google Earth, 2014

The Leroy F. Greene School Facilities Act of 1998, or Senate Bill 50 (SB 50), restricts the ability of local agencies to deny project approvals on the basis that public school facilities (classrooms, auditoriums, etc.) are inadequate. School impact fees are collected at the time when building permits are issued.

Pursuant to SB 50, the BUSD and the LUHSD collect school impact fees on each new square foot of residential construction within their respective districts.[24] Due to the fact that the project would be located within the BUSD and LUHSD, the project would be subject to the districts' school impact fees. Under SB 50's provisions, payment of school fees is considered full and complete mitigation of any school impacts for the purposes of CEQA. Thus, the project's impact to schools, assuming payment of fees pursuant to SB 50, would be less than significant. No further mitigation would be required.

iv) and v) Parks and other public facilities impacts?

Less-than-Significant Impact. The project includes a new 0.7 acre park site and approximately 1.3 acres of open space. The environmental effects associated with the creation of these areas are considered in this document. Section 9-4.1004 of the City of Antioch's Subdivision Ordinance sets forth a parkland dedication requirement of 5 acres per 1,000 people. For this project, application of Section 9-4.1004 would result in a parkland dedication requirement of approximately 1.75 acres. The project proposes 0.7 acres of active parkland, which is below the requirement computed through application of Section 9-4.1004. However, Section 9-4.1002 of the Subdivision Ordinance states that as a condition of a tentative subdivision map approval, the City may require land dedication, an in-lieu fee, or a combination thereof. Accordingly, the City will include as a condition of tentative subdivision map approval parkland dedication plus an in-lieu fee that together would achieve consistency with the City's parkland dedication requirements. The City will use collected fees to construct new park facilities, but at this time, no specific new facility is proposed. Construction of any such facility would be subject to separate environmental review.

[24] Lisa Williams, Accountant, LUHSD; and Barbara Tittle, Facilities Technician, BUSD. Personal Communication, September 16, 2014.

Taking the above into account, plus the nearby availability of several other local and regional parks, the project's population increase would not result in the need for any other new parks or public facilities. Impacts would therefore be less-than-significant. No mitigation would be required.

Potential impacts to recreational facilities are discussed in **Section XV (Recreation)** below.

XV. Recreation

	Significant Impact	Significant Unless Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a) 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) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

a) Increase use of existing recreational facilities?

and

b) Include/require construction of new recreational facilities?

Less-than-Significant Impact. The project would increase area population by about 374 people. This could create increase use of existing park facilities in the area. However, the project includes a park to help offset this increase in demand. Moreover, the project site is in proximity to two large regional parks (Contra Loma and Black Diamond Mines) as well as the Mokelumne Trail.

The Mokelumne Trail is located within an EBMUD easement, but is maintained by the East Bay Regional Parks District (EBRPD). A substantial portion of the EBRPD funding sources comes from property taxes collected by the County and special revenue funds, including the Brentwood/Antioch/East County Lighting and Landscaping District (LLD). In 1991, the EBRPD formed the LLD to collect money in east Contra Costa County for funding of ongoing maintenance of EBRPD facilities. This LLD follows the boundaries of the Liberty Union High School District and includes the project site. As such the project would be subject to the payment of LLD fees on the order of $19.70 per single family dwelling.[25]

Payment of LLD fees would contribute toward the maintenance of existing facilities and thus help offset any increase in use that might result from the project's incremental increase in area population.

Moreover, as noted above in the discussion of Public Services, the project is subject to the City's Subdivision Ordinance which includes parkland dedication requirements. The project proposes to

[25] Rafael Breines, Senior Parks Planner, EBRPD, Personal Communication, September 24, 2014.

include 0.7 acres of parkland, which is less than what the Subdivision Ordinance requires. Accordingly, the City will include as a condition of tentative subdivision map approval the payment of in-lieu parkland dedication fees in an amount which when considered along with the 0.7 acres of parkland proposed, would achieve compliance with the Subdivision Ordinance. Taking all of the foregoing into account, impacts would thus be less-than-significant. No mitigation would be required.

XVI. Transportation and Traffic

	Significant Impact	Significant Unless 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?	☐	☐	☒	☐

Information for this section is based on data provided in the Heidorn Village Project Traffic Impact Study prepared by Kimley-Horn and Associates, dated September 2014. Appendix G contains this report in its entirety.

Project Setting

Regional Access

Regional access to the project site is provided by the State Route 4 Bypass and State Route 4 itself (SR 4). The SR 4 Bypass project (Segments 1, 2, and 3) extends from existing SR 4 east of Hillcrest Avenue interchanges in the City to Marsh Creek Road in the City of Brentwood. SR 4 provides access east to Stockton (and beyond) and west to the cities of Antioch, Oakley, Pittsburg, Concord, and Martinez.

In the project vicinity, the SR 4 Bypass extends in a north-south direction. A full southbound on-and off-ramp intersection is provided at Lone Tree Way. On the east side of the SR 4 Bypass, a northbound on-ramp is provided at the intersection of Lone Tree Way and Jeffery Way. However, no eastbound left-turn lanes are provided from Lone Tree Way onto the SR4 Bypass northbound on-ramp. As such, motorists wishing to access the SR 4 Bypass in a northbound direction travelling eastbound on Lone Tree Way must travel ¼ mile to Jeffery Way to access the northbound ramp.

Local Access

The following roadways provide local access to the project site.

- **Hillcrest Avenue** extends in a north-south direction between Lone Tree Way and Prewett Ranch Drive, just west of the project site. In this segment, Hillcrest Avenue is a four-lane arterial street with raised, landscaped medians, left-turn storage lanes, Class II[26] bike lanes, and pedestrian sidewalks. As a limited access roadway, no vehicle parking is allowed in this segment. Hillcrest Avenue provides access to residential and recreational areas south of Lone Tree Way. North of Lone Tree Way, the roadway extends in the same configuration and provides access to both commercial and residential areas.

- **Prewett Ranch Drive** begins west of Dallas Ranch Road and extends through Hillcrest Avenue to the western boundary of the project site where it terminates. Between Hillcrest Avenue and Cedar Point Way, there is a raised landscaped median. Street parking is prohibited in the portions of Prewett Ranch Drive that include the median. From Cedar Point Way to Summerfield Road, Prewett Ranch Drive is a 40 foot wide, two-lane residential collector street with on-street parking. If extended from its present terminus to Heidorn Ranch Road as is proposed as part of the project, Prewett Ranch Drive would provide direct access to the project site.
- **Heidorn Ranch Road** extends in a north-south direction between Lone Tree Way and Old Sand Creek Road. Between Lone Tree Way and Lone Tree Plaza Drive, Heidorn Ranch Road is a four-lane arterial street with raised, landscaped medians, left-turn storage lanes, Class II bike lanes, and pedestrian sidewalks and/or pedestrian paths. In this area, the roadway provides access to residential and retail-commercial uses. South

[26] Bicycle facilities can be described as one of three different trail classification: Class I is a bike path which provides a completely separate right-of way for the exclusive use of bicyclists and pedestrians; Class II is a bike lane which provides clearly marked signage and pavement striping for one-way bicycle travel on a roadway; and Class III is a bike route which provides shared use with pedestrians or motor vehicle traffic and is clearly marked by signs.

of Lone Tree Plaza Drive, Heidorn Ranch Road narrows to two travel lanes and provides access to institutional (church/school), residential, and agricultural uses. North of Lone Tree Way, Fairside Way forms the southbound approach leg of the Lone Tree Way/Heidorn Ranch Road intersection, and provides access to homes in this area. Heidorn Ranch Road provides direct access to the project site.

- **Lone Tree Way** is a four- to six-lane major arterial street that extends in an east-west direction north of the project site. At Heidorn Ranch Road, Lone Tree Way has three eastbound travel lanes and three westbound travel lanes. The roadway narrows to four travel lanes ¾ mile east of the SR 4 Bypass. Similar to other arterial streets, Lone Tree Way has raised landscaped medians, left-tum storage lanes, a Class I bike path (north side), and pedestrian sidewalks/paths. Lone Tree Way provides access between the City and Brentwood and acts as an alternative route to SR 4.

- **Lone Tree Plaza Drive** starts approximately ¼ mile south of Lone Tree Way, and extends east from Heidorn Ranch Road. The street provides access to commercial-retail areas northeast of the project site. As a four-lane roadway, Lone Tree Plaza Drive has limited access and limited turn lanes at retail access driveways. Pedestrian sidewalks are discontinuous on its north side, and there are no pedestrian facilities on its south side.

- **Kohl's Drive** is a two-lane driveway that intersects with Heidorn Ranch Road northeast of the project site. Kohl's Drive starts about 660 feet south of Lone Tree Way and extends east from Heidorn Ranch Road to commercial-retail areas.

- **Canada Valley Road** is a north-south, two-lane collector street that provides access primarily to residential areas north of Lone Tree Way. In the vicinity of the project site, this roadway has Class II bike lanes and pedestrian paths/sidewalks. South of Lone Tree Way, Canada Valley Road provides access to the Lone Tree Plaza shopping center before terminating. The roadway widens in this area to allow for increased traffic flow and multiple turn lanes, and also includes a speed hump to slow southbound vehicles entering the commercial center.

- **Jeffery Way** is a north-south arterial street located east of the SR4 Bypass that provides access to commercial and institutional uses. As a limited access roadway with four travel lanes and raised landscaped medians, Jeffery Way extends south from Lone Tree Way to provide full northbound on-off access (via hook ramps) to the SR4 Bypass.

- **Vista Grande Drive** extends between Hillcrest Avenue and Lone Tree Way and is a wide, two-lane residential collector street with limited access and no street parking. Providing access to residential neighborhoods located west of the project site, Vista Grande Drive has pedestrian sidewalks and Class II bike lanes.
- **Summerfield Drive** is a north-south, two-lane residential street that is located immediately west of the project site. Extending between Prewett Ranch Drive and Vista Grande Drive, Summerfield Drive provides access to residential areas and has on-street parking and sidewalks.

Existing Transit Facilities

Tri-Delta Transit provides bus service in Antioch. Routes 380, 383, 385, and 395 operate within the study area. Currently there are no bus routes that pass directly adjacent to the proposed project site. However, routes 380, 383, and 385 run along Lone Tree Way, north of the proposed project site. Tri-Delta Transit connects passengers to the Antioch Park and Ride (Hillcrest), Kaiser Medical Center, Pittsburg/Bay Point BART Station, Tri Delta Transit Station, various local schools, Brentwood Park and Ride, the Streets of Brentwood, the Lone Tree Plaza shopping center, and other local and regional locations.

- **TDT Route 380** operates between the Pittsburg/Bay Point BART Station to the Tri Delta Transit station. This route runs along Lone Tree Way, Canada Valley Road, Laurel Road, and Hillcrest Avenue within the study area. This route operates on weekdays from 3:04 AM to 11:33 PM on a frequency of 10-minute to 120-minute headways.

- **TDT Route 383** operates between the Antioch Park and Ride (Hillcrest) to Freedom High School. This route runs along Deer Valley Road and Lone Tree Way within the study area. This route operates on weekdays from 7:12 AM to 5:23 PM on a frequency of 60-minute to 125-minute headways.

- **TDT Route 385** operates between the Antioch Park and Ride (Hillcrest) to the Brentwood Park and Ride. This route runs along Hillcrest Avenue, Lone Tree Way, Sand Creek Road, and the SR 4 Bypass within the study area. This route operates on weekdays from 6:39 AM to 7:17 PM on a frequency of 25-minute to 145-minute headways.

- **TRT Route 395** operates between the Antioch Park and Ride (Hillcrest) to the Streets of Brentwood. This route runs along the SR 4 Bypass and Sand Creek Road within the study area. This route operates on weekends from 9:40 AM to 8:03 PM on a frequency of 60-minute headways.

Bicycle and Pedestrian Facilities

There are multiple existing and proposed bikeway facilities in Antioch. Class I bike paths located within the project vicinity include the Mokelumne Trail and the Canada Valley Trail. The Mokelumne Trail runs parallel to Lone Tree Way on the north side, starting west of the study area and terminates at Hillcrest Avenue. The Canada Valley Trail runs parallel to Country Hills Drive on the south side, starting at Hillcrest Avenue and terminates near SR 4.

Class II bike lanes are located within the project vicinity on Canada Valley Road from Vista Grande Drive to Lone Tree Way, on Hillcrest Avenue from E. 18th Street to Prewett Ranch Drive, on Prewett Ranch Drive, and on Heidorn Road from Lone Tree Way to south of Lone Tree Plaza Drive.

Sidewalks and crosswalks are provided throughout most of the project vicinity but are absent near the southern portion, where roadways are not built out yet or where they are adjacent to rural lands. Existing sidewalks along Heidorn Ranch Road terminate at the intersection of Heidorn Ranch Road and Lone Tree Plaza Drive; there are no sidewalks adjacent to the proposed project site.

Operating Conditions and Criteria

In addition to the criteria set forth in Appendix G of the CEQA Guidelines, the following criteria were used to determine if the project would have a significant impact relative to traffic:

- **Level of Service (LOS):** Analysis of project effects at intersections is based on the concept of Level of Service (LOS). The LOS of an intersection is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. Levels of Service for this study were determined using methods defined in the Highway Capacity Manual, 2010 (HCM) and appropriate traffic analysis software. Table 7 describes operation conditions each LOS category for signalized and unsignalized intersections. The HCM includes procedures for analyzing side-street stop-controlled, all-way stop-controlled, and signalized intersections.

    - Side-street stop-controlled intersections: LOS is based on average delay for each side-street approach.

    - All-way stop-controlled and signalized intersection: LOS is based on average delay for the intersection as a whole.

The City of Antioch has an LOS requirement of "High D" or better (except for routes of regional significance, described below).

Table 7. Intersection Level of Service Definitions

Level of Service	Description	Signalized (Average delay in seconds per vehicle)	Unsignalized (Average delay in seconds per vehicle)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream	10	10
B	Stable traffic. Traffic flows smoothly with few delays.	10 – 20	10 – 15
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	20 – 35	15 – 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	35 – 55	25 – 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	55 – 80	35 – 50
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	80	50

Sources: Transportation Research Board, Highway Capacity Manual 2000, National Research Council, 2000 and Transportation Research Board, Highway Capacity Manual 2010, National Research Council, 2010

- **Routes of Regional Significance:** Routes of Regional Significance are roadways that connect two or more subareas of Contra Costa County, cross county boundaries, carry significant through traffic, and/or provide access to a regional highway or transit facility. Contra Costa Transportation Authority (CCTA) may designate a Regional Route that

meets one or more of these criteria. Routes of regional significance are governed by the CCTA Technical Procedures, which has a level of service requirement of LOS D or better. These requirements would apply to all study intersections on routes of regional significance. Lone Tree Way is the only route of regional significance within the project study area.

- **95th Percentile Queue:** The effects of vehicle queuing (waiting in line) were also analyzed and the 95th percentile queue is reported for all study intersections. The 95th percentile queue length means that 95 percent of the time during the peak period, traffic volumes and related queuing will be at or less that queue length. Average queuing is generally less. Queuing is considered a potentially significant impact because long queues can create potentially hazardous conditions by blocking or disrupting through traffic. These potentially hazardous queues are generally associated with left-turn movements, as right turns occur at the same time as through traffic movement and therefore are unlikely to hinder movement in through lanes. Therefore, a queuing impact would be considered to occur when project traffic causes a left turn queue to extend beyond the left turn lane by 25 feet or more into adjacent traffic lanes that move separately from the left turn lane. If the queue already exceeds that length under pre-project conditions, a project impact would occur when project traffic lengthens the queue by 25 feet or more.

Project impacts are determined by comparing conditions with the proposed project to those without the proposed project. Significant impacts would be created if traffic from the proposed project caused the LOS at an intersection to fall below a specific threshold. Mitigation may be required when traffic from the project causes the intersection to operate below acceptable levels of traffic operation.

Existing and Near-term Conditions at Study Intersections

The proposed project will generate new vehicular trips that will increase traffic volumes on the nearby street network. To assess changes in traffic conditions associated with the project, the following intersections, illustrated in **Figure 8**, were selected for evaluation:

1. Heidorn Ranch Road/Lone Tree Way
2. Canada Valley Road/Lone Tree Way
3. Hillcrest Avenue/Prewett Ranch Drive
4. South Project Driveway/Prewett Ranch Drive (future)
5. Heidorn Ranch Road/Prewett Ranch Drive (future)
6. Heidorn Ranch Road/East Project Driveway (future)

As shown **in Table 8**, all of the study intersections function within acceptable standards under existing, near-term, and long-term scenarios. Existing conditions are based on current traffic counts in 2014 and existing roadway geometry and traffic control. Near-term (2019) conditions are based

on traffic volumes and traffic added by pending and approved (but not yet completed) developments anticipated to occur at the time the project is constructed, and also include programmed roadway projects which are scheduled to be in place at the same time the project is anticipated to be completed in 2019. Long-term (2030) conditions are based on future year traffic forecasts from the CCTA 2040 travel demand forecast model, and include road projects anticipated to be in place under the long-term condition.

Table 8. Existing (2014), Near-Term (2019), and Long-Term (2030) Level of Service Summary

	Intersection	Control	AM Peak[2]						PM Peak[2]					
			Existing		Near-Term		Long-Term		Existing		Near-Term		Long-Term	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	Lone Tree Way and Heidorn Ranch Road	Signal	A	3.0	A	2.5	A	2.3	A	3.6	A	3.4	A	3.7
2	Lone Tree Way and Canada Valley Road	Signal	B	13.6	A	9.4	A	9.6	B	14.4	B	12.7	B	12.6
3	Prewett Ranch Drive and Hillcrest Avenue	Signal (AWSC)[1]	A	9.8	B	15.2	B	17.5	A	9.8	B	16.9	B	17.1
4	Prewett Ranch Drive and South Project Driveway Worst Approach	SSSC	Future Intersections											
5	Prewett Ranch Drive and Heidorn Ranch Road	Signal					A	6.8					A	9.4
6	East Project Driveway and Heidorn Ranch Road Worst Approach	SSSC												

Notes: AWSC = all-way stop-controlled; SSSC = side-street stop-controlled
1 Prewett Ranch Drive and Hillcrest Avenue is a signalized intersection; however, it operates as an AWSC with flashing red lights
2 AM peak period = 7:00 AM to 9:00 AM; PM peak period = 4:00 PM to 6:00 PM for typical weekday
Source: Kimley Horn, 2014

Project Impacts

a) and b) Conflict with an applicable plan/congestion management program establishing measures for the performance of the circulation system?

Less-than-Significant Impact. Traffic forecasts for the project were based on trip generation rates found in the Institute of Transportation Engineers (ITE) trip research manual for detached single-family homes.[27] Vehicle trip generation for the project was disaggregated by daily vehicle trips and "peak hour" vehicle trips. Daily trips are the total vehicle trips generated by the project over a 24-hour period. Peak hour trips are generated during the busiest hours of the morning (7:00-9:00 AM) and afternoon (4:00-6:00 PM) commute periods. Daily and peak hour project trip generation is shown in **Table 9**. The project is expected to generate approximately 1,114 daily trips, including 88 AM peak hour trips and 117 PM peak hour trips.

Table 9. Heidorn Village Residential Trip Generation

Time period	Land Use	Trip Rate			Trips		
		In	Out	Total	In	Out	Total
Daily	Single-Family Detached Housing (117 DU)	4.76	4.76	9.52	557	557	1,114
AM Peak	Single-Family Detached Housing (117 DU)	0.1875	0.5625	0.75	22	66	88
PM Peak	Single-Family Detached Housing (117 DU)	0.63	0.37	1.00	74	43	117

Source: Kimley-Horn, 2014

Project trip distribution is based on the updated CCTA travel demand model as well as existing traffic patterns and field observations. Due to the future roadways being completed only in the long-term scenario, the trip distribution is different in the near-term than the long-term. When compared to the near-term, the long-term trip distribution is higher in the southern portions of the City along Sand Creek Road, Hillcrest Avenue, and the SR 4 Bypass. In both scenarios, about 35 percent of the project's traffic would occur to and from the SR 4 Bypass and the remaining 65 percent on adjacent roadways in the City.

[27] Institute of Transportation Engineers. 2012. *Trip Generation, 9th Edition.*

Project Roadway Improvement

As part of the proposed project, an operable section of Prewett Ranch Drive would be extended east to Heidorn Ranch Road. The full section of this road would be completed when the property to the south moves forward to development. The project also proposes to add a sidewalk along the frontages of the project. Bicycle lanes may be added along Prewett Ranch Drive in the area without front-on housing. The project also proposes to add an access intersection on the Prewett Ranch Drive extension, which is planned to be unsignalized. An access intersection on Heidorn Ranch Road is also planned, which will also be unsignalized. It is important to note that the project driveway intersections are only analyzed under the plus Proposed Project conditions, as they do not currently exist and would only exist with construction of the project.

Project Intersection Operations

Project traffic was added to the existing, near-term, and long-term volumes at the study intersections and the volumes. Traffic operations were evaluated under the Existing (2014) Plus Project, Near-term (2019) Plus Project, and Long-term (2030) Plus Project Traffic Conditions. Results of the analyses are presented in **Tables 10, 11, and 12**. As shown in these tables, all the study intersections function within acceptable standards under these scenarios.

Planned Roadway Projects in Vicinity of Site

The City plans to implement roadway improvements in the study area. In the near-term (2019), the following improvements are expected to be implemented:

- Dual left turn lanes would be added to the east- and southbound approaches to Intersection #2 (Lone Tree Way and Canada Valley Road) and a through-right lane would be added to the southbound approach;
- The traffic signal at Intersection #3 (Prewett Ranch Drive and Hillcrest Avenue) would go from all red flashing to fully operational

In addition to these City improvements, the project would construct an operable section of Prewett Ranch Drive extending to Heidorn Ranch Road.

In the long-term (2030), Sand Creek Road is planned to be extended from the Dozier Libbey Medical High School to the SR 4 Bypass, and Hillcrest Avenue will be extended to Balfour Road.3

Approved & Pending Development Projects in Vicinity of Site

Development projects in the vicinity of the project site that are in various stages of planning, approval, or development were identified and included in the Near-term (2019) conditions. Available trip generation and trip distribution were used to assign vehicle trips to the study area. **Figure 9** shows the pending and approved projects considered in this study for the Near-term scenario.

Near-term Plus Project and Long-term Plus Project represent the cumulative effect of this project and other planned projects. As shown in **Tables 10, 11, and 12**, all study intersections function within acceptable standards under cumulative conditions.

Table 10. Existing (2014) Plus Project Level of Service Summary

	Intersection	Control	Existing				Existing + Project					
			AM Peak		PM Peak		AM Peak			PM Peak		
			LOS	Delay	LOS	Delay	LOS	Delay	Var	LOS	Delay	Var
1	Lone Tree Way and Heidorn Ranch Road	Signal	A	3.0	A	3.6	A	4.6	1.6	A	4.8	1.2
2	Lone Tree Way and Canada Valley Road	Signal	B	13.6	B	14.4	B	13.4	-0.2	B	14.3	-0.1
3	Prewett Ranch Drive and Hillcrest Avenue	Signal (AWSC)[1]	A	9.8	A	9.8	A	9.8	0.0	A	9.7	-0.1
4	Prewett Ranch Drive and South Project Driveway	SSSC	Future Intersections				A	6.7	-	A	4.6	-
	Worst Approach						A	8.6	-	A	8.7	-
5	Prewett Ranch Drive and Heidorn Ranch Road	Signal					B	15.9	-	B	11.0	-
6	East Project Driveway and Heidorn Ranch Road	SSSC					A	2.4	-	A	1.4	-
	Worst Approach						A	8.5	-	A	8.6	-

Notes: AWSC = all-way stop-controlled; SSSC = side-street stop-controlled

[1] Prewett Ranch Drive and Hillcrest Avenue is a signalized intersection; however, it operates as an AWSC with flashing red lights

[2] AM peak period = 7:00 AM to 9:00 AM; PM peak period = 4:00 PM to 6:00 PM for typical weekday

Source: Kimley Horn, 2014

Table 11. Near-Term (2019) Plus Project Levels of Service Summary

	Intersection	Control	Near-Term (2019)				Near-Term + Project					
			AM Peak[1]		PM Peak[1]		AM Peak[1]			PM Peak[1]		
			LOS	Delay	LOS	Delay	LOS	Delay	Var	LOS	Delay	Var
1	Lone Tree Way and Heidorn Ranch Road	Signal	A	2.5	A	3.4	A	3.8	1.3	A	4.3	0.9
2	Lone Tree Way and Canada Valley Road	Signal	A	9.4	B	12.7	A	9.5	0.1	B	12.7	0.0
3	Prewett Ranch Drive and Hillcrest Avenue	Signal	B	15.2	B	16.9	B	15.3	0.1	B	16.9	0.0
4	Prewett Ranch Drive and South Project Driveway	SSSC	Future Intersections				A	6.7	-	A	4.6	-
	Worst Approach						A	8.6	-	A	8.7	-
5	Prewett Ranch Drive and Heidorn Ranch Road	Signal					B	15.9	-	B	11.0	-
6	East Project Driveway and Heidorn Ranch Road	SSSC					A	2.4	-	A	1.4	-
	Worst Approach						A	8.5	-	A	8.6	-

Notes: SSSC = side-street stop-controlled; 1 AM peak period = 7:00 AM to 9:00 AM; PM peak period = 4:00 PM to 6:00 PM for typical weekday

Source: Kimley Horn, 2014

Table 12. Near-Term (2030) Plus Project Levels of Service Summary

	Intersection	Control	Long-Term (2030)				Long-Term + Project					
			AM Peak[1]		PM Peak[1]		AM Peak[1]			PM Peak[1]		
			LOS	Delay	LOS	Delay	LOS	Delay	Var	LOS	Delay	Var
1	Lone Tree Way and Heidorn Ranch Road	Signal	A	2.3	A	3.7	A	3.1	0.8	A	4.3	0.6
2	Lone Tree Way and Canada Valley Road	Signal	A	9.6	B	12.6	A	9.5	-0.1	B	12.6	0.0
3	Prewett Ranch Drive and Hillcrest Avenue	Signal	B	17.5	B	17.1	B	19.0	1.5	B	17.2	0.1
4	Prewett Ranch Drive and South Project Driveway	SSSC	Future Intersection				A	1.0	-	A	1.2	-
	Worst Approach						B	11.9	-	A	10.3	-
5	Prewett Ranch Drive and Heidorn Ranch Road	Signal	B	11.6	A	9.6	B	11.2	-0.4	A	9.6	-4.0
6	East Project Driveway and Heidorn Ranch Road	SSSC	Future Intersection				A	1.2	-	A	1.1	-
	Worst Approach						A	8.6	-	A	9.5	-

Notes: SSSC = side-street stop-controlled

[1] AM peak period = 7:00 AM to 9:00 AM; PM peak period = 4:00 PM to 6:00 PM for typical weekday

Source: Kimley Horn, 2014

Based on the findings described above, the project would not result in substantial increases in traffic. Impacts would thus be less than significant; no mitigation would be required.

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?

No Impact. There are neither public nor private air transportation facilities within 5 miles of the project site. The nearest airports are Funny Farm Airport, a private airstrip located approximately 6 miles east of the project site, and Byron Airport, a small public airport located approximately 15 miles southeast of the project site. These airports typically handle small aircraft. Additionally, the project site is outside of any identified landing or noise-impacted zone associated with either airport. The project would thus have no impact to air traffic patterns. No mitigation would be required.

d) Substantially increase hazards due to a design feature (i.e., sharp curves or dangerous intersections) or incompatible uses (i.e., farm equipment)?

Less-than-Significant Impact. The project does not include any sharp curves or incompatible uses. Potentially hazardous conditions can be created by queues that extend beyond a turn lane, thereby blocking or disrupting through traffic in adjacent travel lanes. As stated in the Operating Conditions and Criteria section above, a significant impact would be assumed to occur if the queue would increase by one or more vehicles and the vehicle queue in turn extended beyond the turn lane. The results indicated instances where queuing in the dedicated turn lanes may exceed the storage limits of those turn lanes.

The analysis showed that existing turn lane lengths are exceeded under future traffic volumes for the southbound left turn pocket at the intersection of Canada Valley Road and Lone Tree Way and eastbound left turn pocket at Prewett Ranch Drive and Hillcrest Avenue. In all cases the increased queue lengths are not associated with the project, but are a result of pre-existing deficiencies; at locations affected by project traffic, the increase in vehicle queuing attributed to the project is less than one vehicle. Because the result is a pre-existing deficiency not associated with the project, these increased queue lengths are not an impact, and no mitigation would be necessary.

e) Result in inadequate emergency access?

Less-than-Significant Impact. The CCCFPD has established emergency access requirements for new developments that require the provision of a minimum of two emergency apparatus access points when any portion of the subdivision serves more than 25 homes. As the project would incorporate a total of three access points from adjacent roads, the project would conform to the emergency access requirements of the CCCFPD. Thus, the project would have adequate emergency access. No mitigation would be required.

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?

Less-than-Significant Impact. The Antioch General Plan calls for the maintenance of safe and convenient pedestrian and bicycle facilities and rail and bus transit. As previously discussed, existing bicycle and pedestrian facilities in the vicinity of the project site are comprised of sidewalks, pedestrian crosswalks, signalized intersections, and Class I and II bike lanes. Pedestrian sidewalks would be constructed along the entire project frontages of Prewett Ranch Drive and Heidorn Ranch Road. Pedestrian sidewalks would also be located internally along both sides of project streets. There would be a pedestrian trail connection to the Mokelumne Trail from a proposed cul-de-sac

located in the northwest portion of the project site. A new bus stop would be located on the east side Heidorn Ranch Road just north of the planned Prewett Ranch Drive/Heidorn Ranch Road intersection. With the provision of these facilities, the project would not conflict with alternative transportation policies/plans in the City. Thus, impacts would be less-than-significant and no mitigation would be required.

XVII. Utilities and Service Systems

	Significant Impact	Significant Unless 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 or expansion of existing 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 solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

and

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?

Less-than-Significant Impact. Delta Diablo Sanitation District (DDSD) provides wastewater treatment services in the project area. DDSD conveys wastewater from the point of discharge to interceptor stations. The interceptor stations then convey the sewage to pump stations and the wastewater is treated at the DDSD water treatment plant, located approximately one mile northeast of the project site near the border of the City and the City of Pittsburg. Treated effluent is then discharged into the New York Slough portion of the San Joaquin River. The treatment plant has an average dry weather design capacity of 16.5 million gallons per day (mgd). In the most recent reporting period (2013) the plant treated an average of 14.6 mgd. The plant also operates under National Pollutant Discharge Elimination System (NPDES) Permit No. CA0038547.[28]

The amount of future wastewater flows from the project were estimated through an assumption that each new residential unit would generate 220 gallons per day (gpd) of wastewater, an amount linked to regional household water consumption. With the proposed addition of 117 new single-family residential units, the project wastewater flow is anticipated to be 25,740 gpd. The wastewater treatment plant has approximately 2 mgd in unused capacity and would therefore be able to accommodate increased flows associated with the project within existing permit conditions. Overall, the project would not exceed wastewater treatment requirements or require additional capacity. Impacts would thus be less than significant; no mitigation would be required.

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?

Less-than-Significant Impact **Water Treatment:** The City provides municipal water to the project area. The City's primary water source is the Sacramento/ San Joaquin Delta. When the City cannot draw water from this source due to it being too brackish, the City purchases water from Contra Costa Water District (CCWD). CCWD provides raw water to central and eastern Contra Costa County from the Sacramento-San Joaquin Delta. Water from CCWD is delivered to the City through the Contra Costa Canal and is pumped from the western Delta through Rock Slough and Old River. The raw water is then transferred to the Antioch Water Treatment Plant (WTP) through pipelines. These pipelines have a maximum capacity of over 60 mgd, which is well above the maximum predicted future water demand.[29] Therefore, the project would not require the construction of new water treatment facilities.

Wastewater Treatment: As noted above, the operative wastewater treatment plant has approximately 2 mgd in unused capacity. The project would contribute about 25,000 gpd (or 0.0025

[28] California Regional Water Quality Control Board, San Francisco Bay Region. 2008. Order No. R2-2004-27, Waste Discharge Requirements and Water Quality Certification for U.S. Fish and Wildlife Service and California Department of Fish and Wildlife.

[29] Brown & Caldwell. 2011. *City of Antioch 2010 Urban Water Management Plan.*

mgd) of additional inflows. Given the small increment of increased flows associated with the project, the project would not require the expansion of the wastewater treatment plant.

The project would require the extension of wastewater collection facilities. The City is responsible for the collection of wastewater and sewer line maintenance within the project area. Existing sewer lines terminate at the eastern end of Prewett Ranch Drive and also run south along Heidorn Ranch Road to a point approximately 250 feet south of the Heidorn Ranch Road/Lone Tree Plaza Drive intersection.[30] To accommodate the increased wastewater generation from the development of the project site, the project would require the extension of the wastewater lines on Heidorn Ranch Road to the project site. This extension would require construction within the Heidorn Ranch Road right-of-way, but would not be expected to result in any extended lane closure or other significant interference with area traffic. The extension is within the projected range of construction activities considered as part of other analyses in this document (particularly air quality and noise).

Overall, therefore, the project would not result in the need to increase or otherwise expand water or wastewater treatment facilities. Effects of project-related extension of wastewater infrastructure are accounted for within this document. Effects would be less-than-significant; no mitigation would be required.

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Less-than-Significant Impact. The project site is located within Drainage Area 56 of the Contra Costa County Flood Control and Water Protection District (CCCFCWPD). The CCCFCWPD's Line J stormwater collection drain currently runs along Heidorn Ranch Road (up to approximately 250 feet south of the intersection between Heidorn Ranch Road and Lone Tree Plaza Drive) and terminates just north of the project site. As part of the project, Line J would need to be extended down Heidorn Ranch Road to the project site. This extension would require construction within the Heidorn Ranch Road right-of-way, but would not be expected to result in any extended lane closure or other significant interference with area traffic. The extension is within the projected range of construction activities considered as part of other analyses in this document (particularly air quality and noise).

CCCFCWPD has reported that existing stormwater collection systems in the vicinity of the project site have been engineered to accommodate high density residential development. As the project is a low-medium density residential development, the project would introduce a lower level of residential density than existing infrastructure has been sized to accommodate.

As discussed in **Section IX (Hydrology/Water Quality)**, the project includes the construction of new storm water collection swales and bioretention facilities in accordance with Contra Costa County Provision C.3 guidelines, Compliance with Provision C.3 guidelines also requires preparation of and adherence to a stormwater control plan. As noted in **Section IX**, the stormwater features would improve stormwater quality while also minimizing runoff from the property. Given the inclusion of these stormwater control features and the noted adequacy of receiving facilities, the project would

[30] Carlson, Barbee, & Gibson, Inc. 2014a. Heidorn Village Tentative Dimension Plan, Tentative Conceptual Grading Plan, Conceptual Utility Plan, and Parking Plan.

not result in any significant impacts related to the construction of stormwater facilities. No mitigation would be required.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

Less-than-Significant Impact. The City provides municipal water to the project area. The City stores raw water from all sources in the Municipal Reservoir, adjacent to the Lone Tree Golf Course. Raw water is treated at the WTP (401 Putnam Street). The WTP has a maximum output capacity of about 38 mgd. Additionally, the City purchases treated water from the CCWD's Randall-Bold Plant, which can boost total output to 50 mgd.

According to the City's Urban Water Management Plan, current water supply sources more than adequately meet the City's projected water demands through 2035. Water demand projections were calculated using the land use designations from the General Plan. Since the proposed residential use of the project site is consistent with the General Plan, the proposed development of the project site was accounted for in the UWMP's projected water demands. Therefore, the City's projected water supply would be sufficient to serve the increase in demand associated with the project. No new or expanded entitlements would be needed. Impacts would thus be less than significant. No mitigation would be required.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

Less-than-Significant Impact. Republic Services (formerly Allied Waste) provides solid waste collection, disposal, recycling, and yard waste services to the City, including the project site. Solid waste and recyclables from the City are taken to the Contra Costa Transfer and Recovery Station in Martinez. Recyclables are separated out and stored at the Transfer and Recovery Station before shipment to recycling markets. Solid waste is transferred from the Transfer and Recovery Station to the Keller Canyon Landfill in Pittsburg, which serves all of Contra Costa County.

The Contra Costa Transfer and Recovery Station is permitted to handle 1,900 tons of solid waste a day. The Keller Canyon Landfill site is 1,399 acres, 244 of which comprise the actual current disposal acreage. The landfill is permitted to accept 3,500 tons of waste per day and has a total estimated permitted capacity of approximately 75 million cubic yards with only approximately 3.1 million cubic yards (4 percent of total capacity) used to date.[31]

According to the California Integrated Waste Management Board, residential waste disposal rates for Contra Costa County are approximately 0.42 tons per resident per year (2.3 pounds per resident per day). At this rate, the project's estimated population of 374 persons would dispose of approximately 849 pounds of solid waste per day. However, the City has implemented several waste diversion programs (i.e., recycling, composting, public education, etc.) in order to encourage the diversion of solid waste from landfills. These programs have led to a diversion rate of approximately 50

[31] California Integrated Waste Management Board. 2014. Solid Waste Information System. Available: http://www.ciwmb.ca.gov/SWIS/. Accessed: August 11, 2014.

percent.[32] With or without successful diversion programs, the percentage of available capacity remaining at the Keller Canyon Landfill site would be sufficient to serve the project's solid waste disposal needs. Thus, impacts related to solid waste and landfill capacity would be less than significant. No mitigation would be required.

g) Comply with federal, state, and local statutes and regulations related to solid waste?

Less-than-Significant Impact. As the project site is vacant, no demolition of buildings, structures, or paved/hardscape areas would be required and thus no disposal of such materials would be needed.

The California Solid Waste Reuse and Recycling Access Act of 1991 (Public Resources Code Sections 42900 through 42911) requires that any development project for which an application for a building permit is submitted shall include adequate, accessible areas for collecting and loading recyclable materials.

California State Law Assembly Bill 939 (AB 939), known as the Integrated Waste Management Act, was passed to address the increases in the state waste stream and decrease in landfill capacity. As a result, the current California Integrated Waste Management Board (CIWMB) was established. AB 939 mandates a reduction of waste being disposed; jurisdictions were required to meet diversion goals of 25 percent by 1995, 50 percent by the year 2000, and 75 percent by the year 2020.

Title 6, Chapter 3 of the Antioch Municipal Code sets forth regulations regarding the collection of solid waste and recyclable materials. The regulations mandate residential participation in the City's recycling program. During the plan check process, the City will review project plans to ensure that residential units comply with all of the above-cited regulations. Project impacts would thus be less than significant. No mitigation would be required.

[32] City of Antioch. n.d. Environment: Solid Waste & Recycling. Available: http://www.ci.antioch.ca.us/Environment/SolidWaste.htm. Accessed August 11, 2014.

XVIII. Mandatory Findings of Significance

	Significant Impact	Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a) Have the potential to degrade quality of the environment, substantially reduce the habitat of a fish or 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) 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) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

a) Have the potential to degrade quality of the environment, substantially reduce the habitat of a fish or 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?

Less-than-Significant Impact. This document includes several mitigation measures, adherence to which would adequately protect habitat, wildlife populations, and plant and animal communities during project construction. There are no known cultural resources on the project site. Notwithstanding, this document includes mitigation measures related to the potential discovery of such resources below the surface of the project site. With adherence to these mitigation measures, the project would not have the potential to degrade the quality of the environment, reduce the habitat of fish or other wildlife species, or adversely affect any cultural resources. No further mitigation would be required. .

b) 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)?

Less-than-Significant Impact. The proposed residential use of the site is consistent with the City's planning policies and land use projections. These land uses have already been considered as part of overall growth in the City (including consideration of increases in traffic, noise, changes to air quality, etc.) as part of the General Plan and General Plan EIR.

The project, in conjunction with planned future development, would increase the demand on public facilities and services in the project area, specifically fire and police services.

The APD notes that full build-out of the City (to a population of about 128,000 people, a greater than 20 percent increase over estimated year 2013 population of about 107,000 people) would require expansion of existing police facilities and/or construction of new satellite facilities. Population growth associated with the proposed project would contribute incrementally to the need for expanded policing facilities. As noted earlier in this document, the project itself would not require the physical expansion of police facilities and would not contribute considerably (by adding only 374 people) towards the buildout of the City, but the project would help offset its individual effects through the participation in a land-based financing mechanism that would be established as a condition of project approval.

Similarly, the City and the CCCFPD acknowledge that existing residences and other buildings in portions of Antioch cannot be adequately served by existing fire facilities and that new facilities would be required to provide an adequate level of service. As noted in this document, the City and the CCCFPD have a fee on new development to be collected towards the ultimate construction of a new fire facility. The proposed project would offset its contribution to the need for a new fire station through the payment of fees, and as previously noted, the new fire station would be needed even if the proposed project was not constructed, given the need associated with existing development and other projects in the pipeline anticipated to be constructed. Therefore, the project's contributions to effects associated with expanded fire facilities would not be considerable. No further mitigation would be required.

c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less-than-Significant Impact. Adherence to pertinent federal, state, and local laws, mitigation measures included in this document, and various conditions of approval the City would attach to this project would avoid, minimize, or compensate for potential impacts such that all effects would be rendered to a less-than-significant level. The project would therefore not result in impacts that would cause substantial adverse effects on human beings, either directly or indirectly.

List of Appendices

The following studies and reports were prepared specifically for the project and are included as appendices to this mitigated negative declaration.

Appendix A: Air Quality Report

Appendix B: Biological Resources Evaluations

Appendix C: Geotechnical Study

Appendix D: Phase I Environmental Site Assessment

Appendix E: Stormwater Control Plan

Appendix F: Noise Assessment

Appendix G: Traffic Impact Study

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Project Site

Figure 1

Source:Circlepoint, 2014; GoogleMaps, 2014

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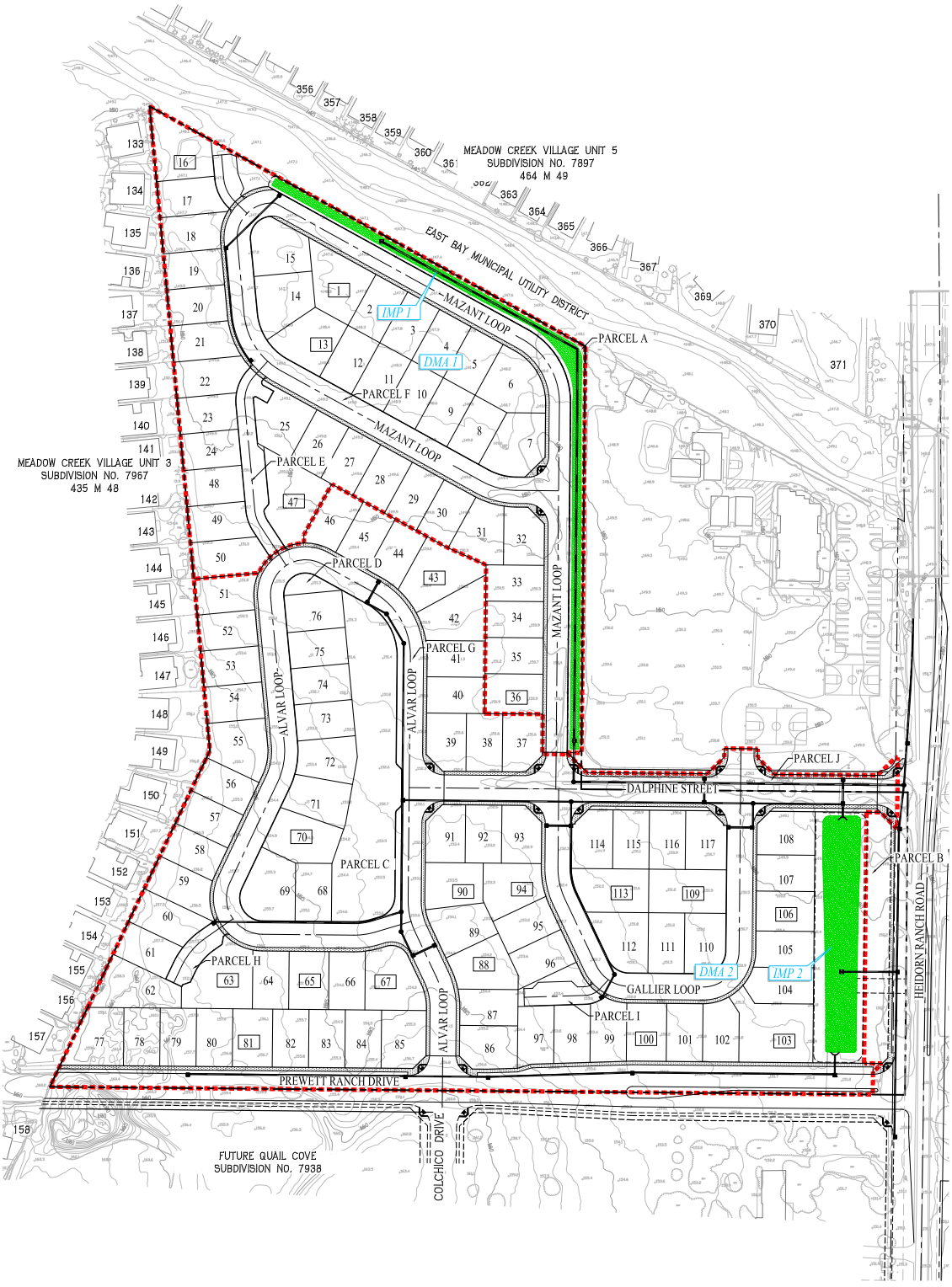

LEGEND

PROPOSED STORM DRAIN

IMP 1 — INTEGRATED MANAGEMENT PRACTICE - BIORETENTION AREA

DRAINAGE MANAGEMENT AREA BOUNDARY

DMA 1 — DRAINAGE MANAGEMENT AREA DRAINING TO BIO-RETENTION AREA OR FILTERRA BIORETENTION UNIT

N

0' 60' 180' 240'

SCALE: 1" = 60' DATE: JULY 7, 2014

Site Plans

Figure 2

Source: Carlson, Barbee & Gibson, Inc., 2014

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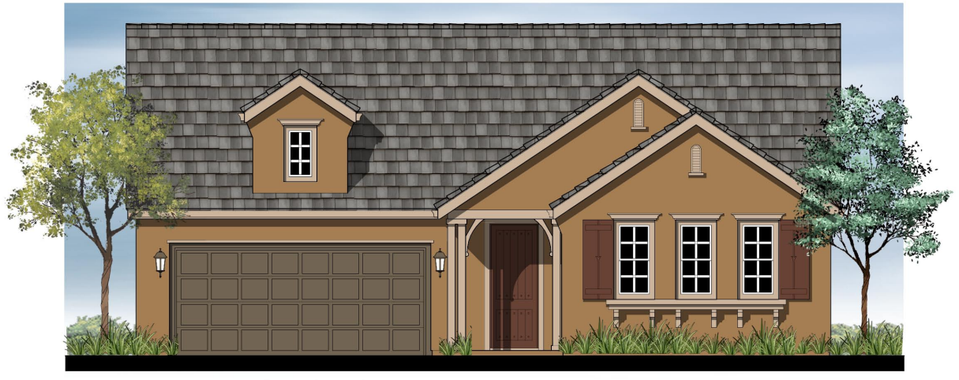

ELEVATION '1A'



ELEVATION '1B'



ELEVATION '1C'

0 2 4 8

HEIDORN VILLAGE

PLAN 1 FRONT ELEVATIONS

A1.0

Architectural Styles - Plan 1

Figure 3a

Source: KTGY Group, 2014

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ELEVATION '2A'



ELEVATION '2B'



ELEVATION '2C'

0 2 4 8

HEIDORN VILLAGE

PLAN 2 FRONT ELEVATIONS

A2.0

Architectural Styles - Plan 2

Figure 3b

Source: KTGY Group, 2014

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ELEVATION '3A'



ELEVATION '3B'



ELEVATION '3C'

0 2 4 8

HEIDORN VILLAGE

PLAN 3 FRONT ELEVATIONS

A3.0

Architectural Styles - Plan 3

Figure 3c

Source: KTGY Group, 2014

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ELEVATION '4A'



ELEVATION '4B'



ELEVATION '4C'

0 2 4 8

HEIDORN VILLAGE

PLAN 4 FRONT ELEVATIONS

A4.0

Architectural Styles - Plan 4

Figure 3d

Source: KTGY Group, 2014

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Looking north



Looking south

Existing Site Conditions

Figure 4

Source: Pacific Biology, 2014

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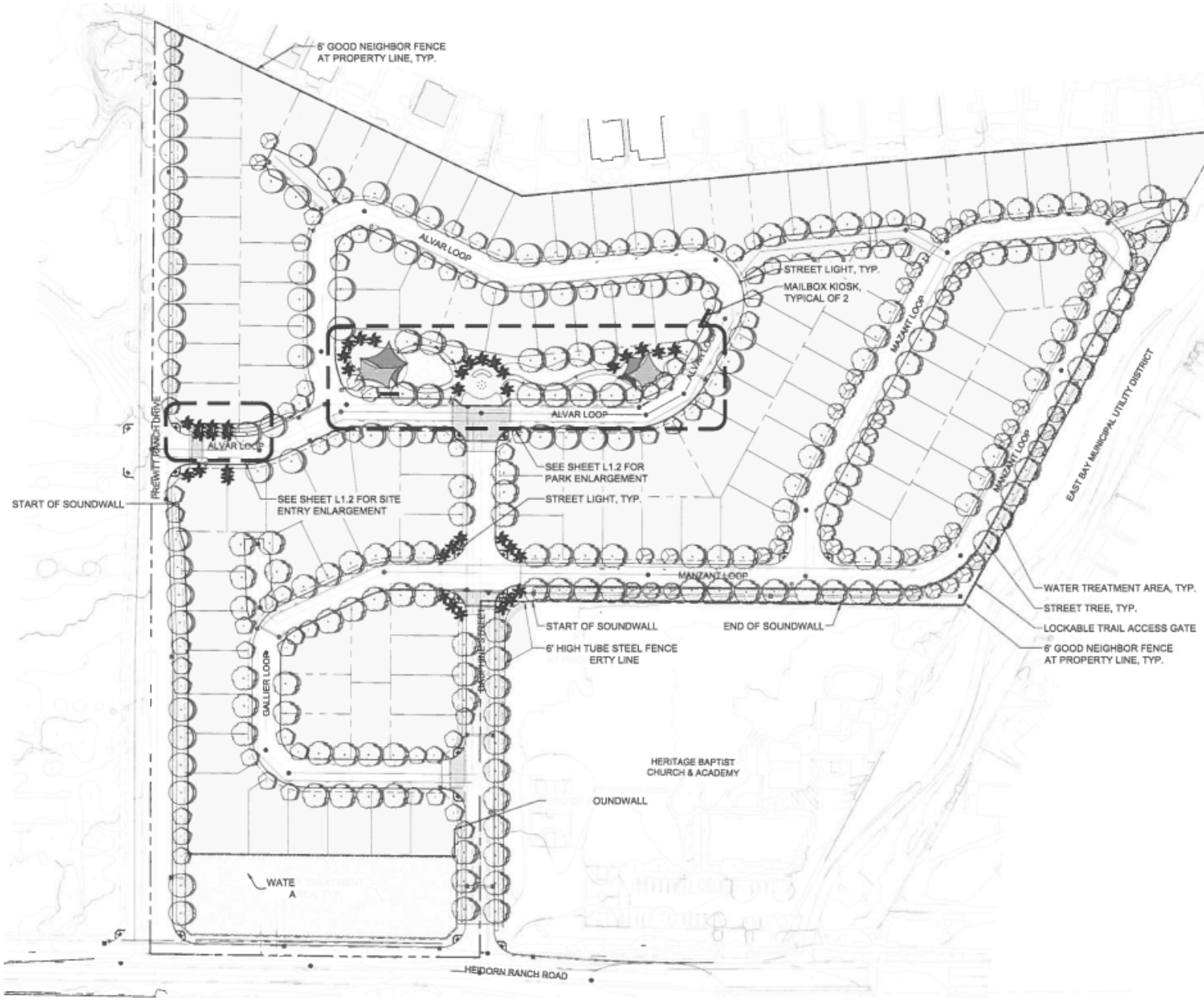

Not to scale

Preliminary Landscape Plans

Figure 5a

Source: Van Dor Abed, 2014

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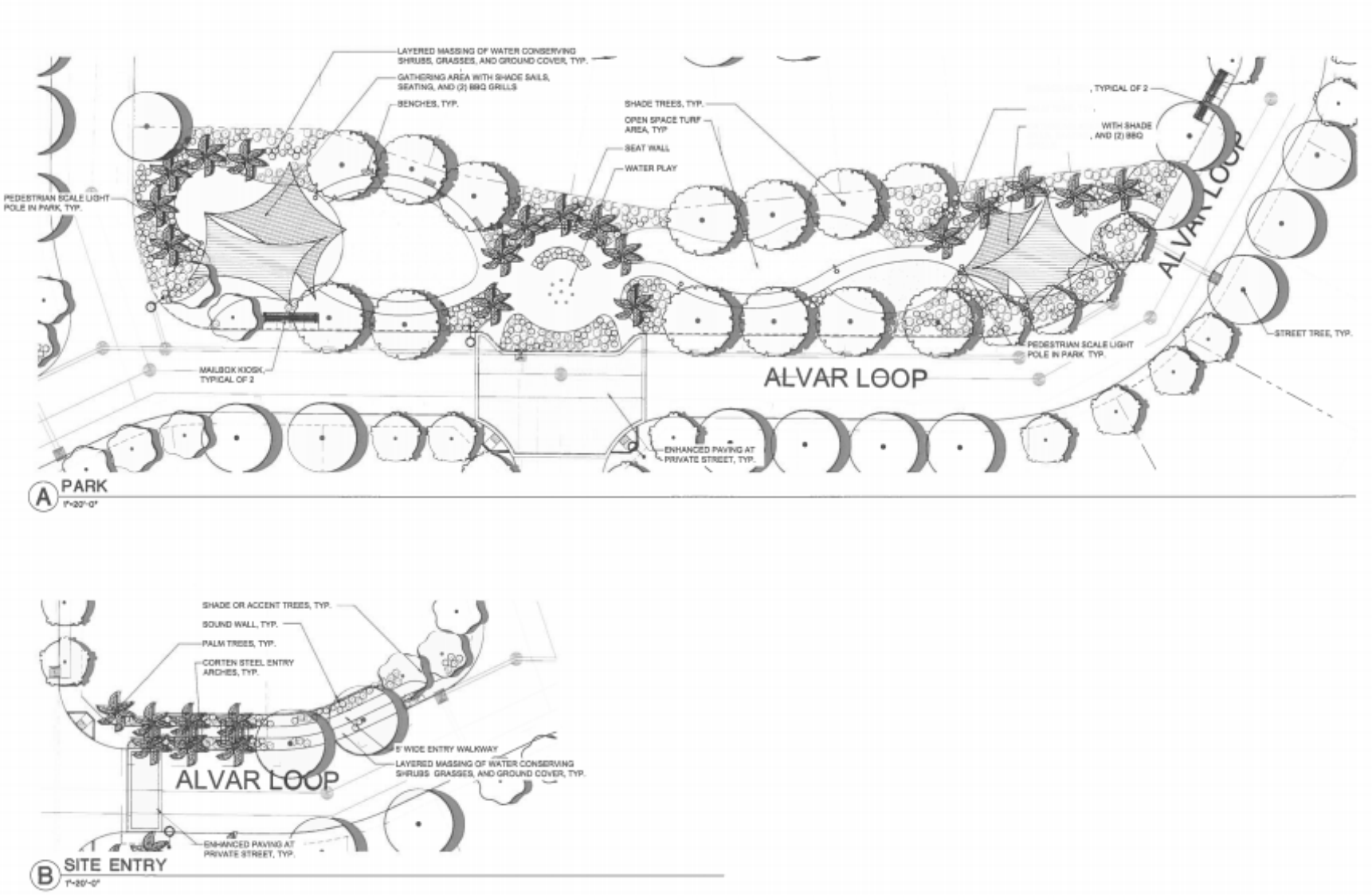

Not to scale

Preliminary Landscape Plans

Figure 5b

Source: Van Dor Abed, 2014

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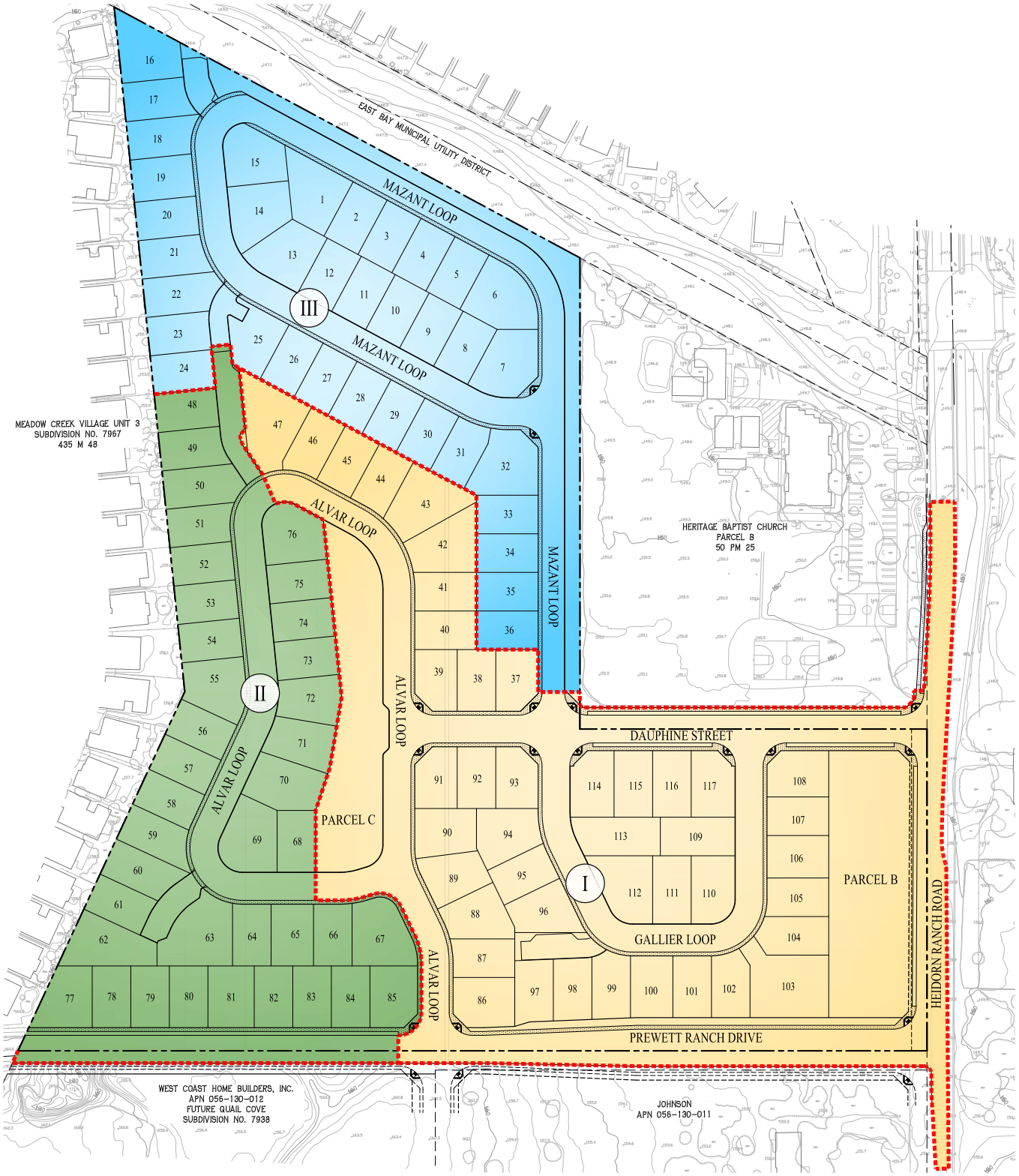


LEGEND

PHASING BOUNDARY

SUBDIVISION BOUNDARY

PHASE	UNITS
PHASE I	43
PHASE II	38
PHASE III	36
TOTAL	117

0' 50' 150' 200'

SCALE: 1" = 50' DATE: AUGUST 27, 2014

N

Preliminary Construction Phasing Plan

Figure 6

Source: Carlson, Barbee, & Gibson, Inc., 2014



N

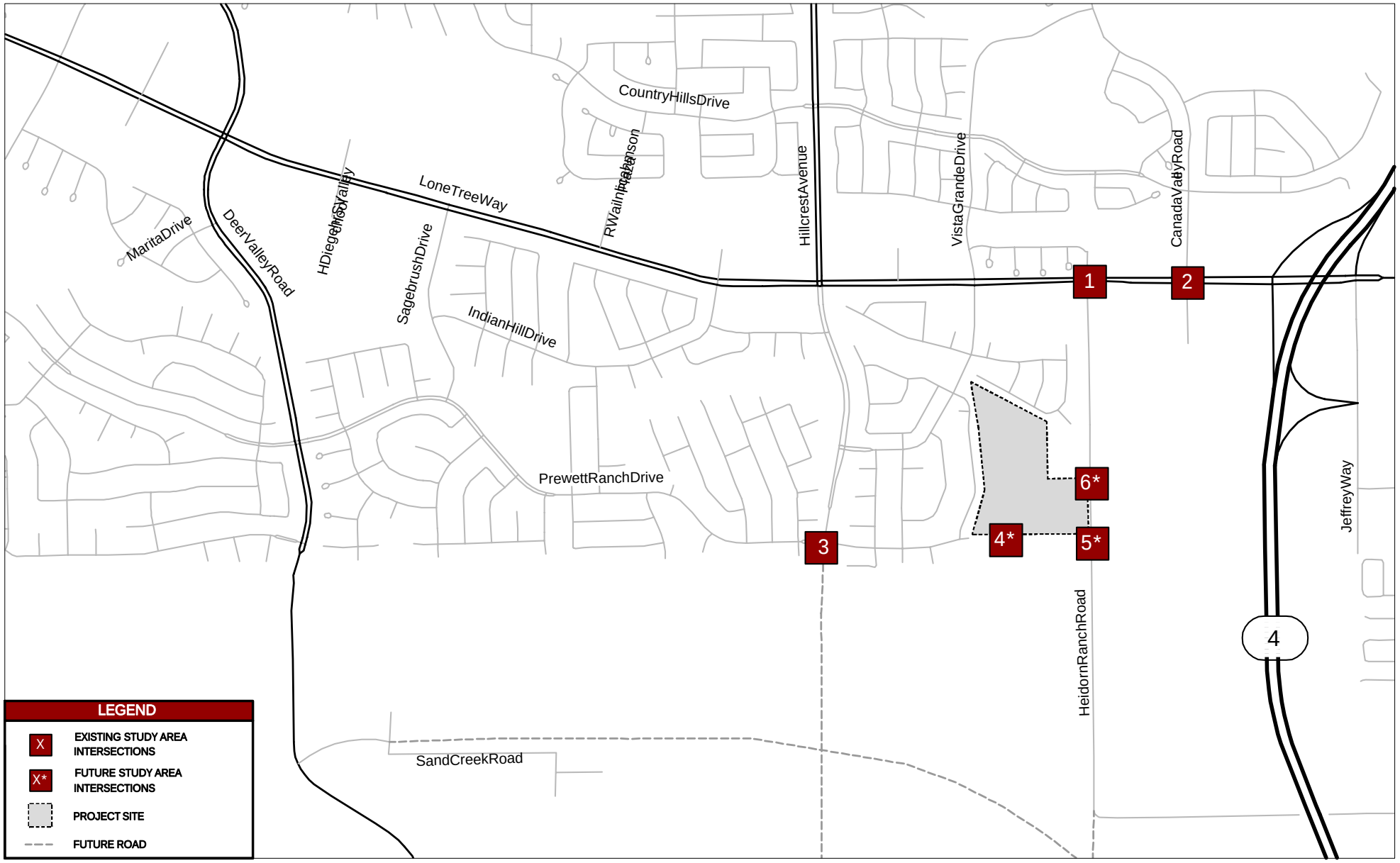
0 .125

MILES

Noise Study Locations

Figure 7

Source: Illingworth & Rodkin, 2014



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Not to scale

Study Intersections

Figure 8

Source: Kimley Horn, 2014

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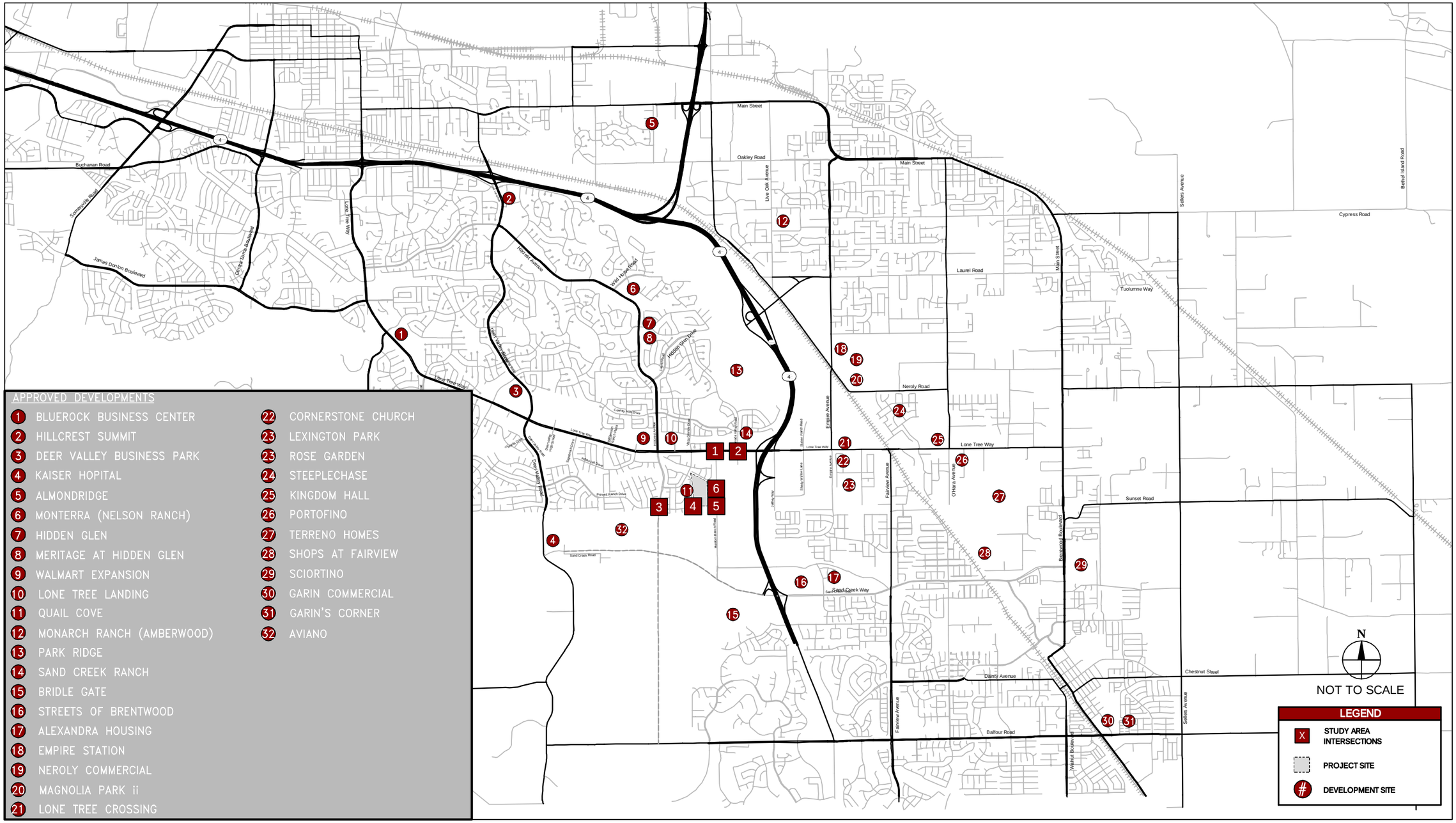

N Not to scale

Planned and Approved Developments

Figure 9

Source: Kimley Horn, 2014

Appendix A: Air Quality Report

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HEIDORN VILLAGE RESIDENTIAL DEVELOPMENT TAC AND GHG EMISSIONS ASSESSMENT ANTIOCH, CALIFORNIA

October 17, 2014

♦ ♦ ♦

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Project: 14-128

Introduction

The purpose of this report is to address toxic air contaminant (TAC) and greenhouse gas (GHG) emission impacts associated with the proposed Heidorn Village residential development project in Antioch, California. The Heidorn Village Project (project) would subdivide 20.3 acres into 117 residential lots. The project would also include park and open space areas and internal access roads.

Community risk and GHG impacts could occur due to temporary construction emissions and as a result of direct and indirect emissions from new occupants. Nearby sources of TAC emissions that could affect proposed residences were not identified. This analysis was conducted following guidance provided by the Bay Area Air Quality Management District (BAAQMD).

Setting

The project is located in Antioch, which lies in the eastern portion of the Contra Costa County. The project site is located in the eastern portion of the San Francisco Bay Area Air Basin. Ambient air quality standards have been established at both the State and federal level. The Bay Area meets all ambient air quality standards with the exception of ground-level ozone, respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$).

High ozone levels are caused by the cumulative emissions of reactive organic gases (ROG) and nitrogen oxides (NOx). These precursor pollutants react under certain meteorological conditions to form high ozone levels. Controlling the emissions of these precursor pollutants is the focus of the Bay Area's attempts to reduce ozone levels. The highest ozone levels in the Bay Area occur in the eastern and southern inland valleys that are downwind of air pollutant sources. High ozone levels aggravate respiratory and cardiovascular diseases, reduced lung function, and increase coughing and chest discomfort.

Particulate matter is another problematic air pollutant of the Bay Area. Particulate matter is assessed and measured in terms of respirable particulate matter or particles that have a diameter of 10 micrometers or less (PM_{10}) and fine particulate matter where particles have a diameter of 2.5 micrometers or less ($PM_{2.5}$). Elevated concentrations of PM_{10} and $PM_{2.5}$ are the result of both region-wide (or cumulative) emissions and localized emissions. High particulate matter levels aggravate respiratory and cardiovascular diseases, reduce lung function, increase mortality (e.g., lung cancer), and result in reduced lung function growth in children.

Toxic air contaminants (TACs) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer) and include, but are not limited to, the criteria air pollutants. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and Federal level.

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about three-quarters of the cancer risk from TACs (based on the Bay Area average). According to the California Air Resources Board (CARB), diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the state's Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB has adopted and implemented a number of regulations for stationary and mobile sources to reduce emissions of diesel particulate matter (DPM). Several of these regulatory programs affect medium and heavy duty diesel trucks that represent the bulk of DPM emissions from California highways. These regulations include the solid waste collection vehicle (SWCV) rule, in-use public and utility fleets, and the heavy-duty diesel truck and bus regulations. In 2008, CARB approved a new regulation to reduce emissions of DPM and nitrogen oxides from existing on-road heavy-duty diesel fueled vehicles.[1] The regulation requires affected vehicles to meet specific performance requirements between 2014 and 2023, with all affected diesel vehicles required to have 2010 model-year engines or equivalent by 2023. These requirements are phased in over the compliance period and depend on the model year of the vehicle.

The BAAQMD is the regional agency tasked with managing air quality in the region. At the State level, the CARB (a part of the California Environmental Protection Agency[EPA]) oversees regional air district activities and regulates air quality at the State level. The BAAQMD has recently published the California Environmental Quality Act (CEQA) Air Quality Guidelines that are used in this assessment to evaluate air quality impacts of projects.[2]

Sensitive Receptors

There are groups of people more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. The closest off-site sensitive receptors are single-family residences adjacent to the western project site boundary, residences to the north, Heritage Baptist Academy to the east, and scattered single-family residences to the southeast. The project would include residences, which are considered sensitive receptors.

Greenhouse Gases

Gases that trap heat in the atmosphere, GHGs, regulate the earth's temperature. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate. The most common GHGs are carbon dioxide (CO_2) and water vapor, but there are also several others, most importantly methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs),

[1] Available online: http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm. Accessed: July 11, 2012.
[2] Bay Area Air Quality Management District. 2011. BAAQMD CEQA Air Quality Guidelines. May.

perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These are released into the earth's atmosphere through a variety of natural processes and human activities. Sources of GHGs are generally as follows:

- CO_2 and N_2O are byproducts of fossil fuel combustion.
- N_2O is associated with agricultural operations such as fertilization of crops.
- CH_4 is commonly created by off-gassing from agricultural practices (e.g., keeping livestock) and landfill operations.
- Chlorofluorocarbons (CFCs) were widely used as refrigerants, propellants, and cleaning solvents but their production has been stopped by international treaty.
- HFCs are now used as a substitute for CFCs in refrigeration and cooling.
- PFCs and sulfur hexafluoride emissions are commonly created by industries such as aluminum production and semi-conductor manufacturing.

Each GHG has its own potency and effect upon the earth's energy balance. This is expressed in terms of a global warming potential (GWP), with CO_2 being assigned a value of 1 and sulfur hexafluoride being several orders of magnitude stronger with a GWP of 23,900. In GHG emission inventories, the weight of each gas is multiplied by its GWP and is measured in units of CO_2 equivalents (CO_2e).

An expanding body of scientific research supports the theory that global warming is currently affecting changes in weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, and that it will increasingly do so in the future. The climate and several naturally occurring resources within California could be adversely affected by the global warming trend. Increased precipitation and sea level rise could increase coastal flooding, saltwater intrusion, and degradation of wetlands. Mass migration and/or loss of plant and animal species could also occur. Potential effects of global climate change that could adversely affect human health include more extreme heat waves and heat-related stress; an increase in climate-sensitive diseases; more frequent and intense natural disasters such as flooding, hurricanes and drought; and increased levels of air pollution.

Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA. These Thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA and were posted on BAAQMD's website and included in the Air District's updated CEQA Guidelines (updated May 2011). The significance thresholds identified by BAAQMD and used in this analysis are summarized in Table 1. These thresholds are considered the best available information available to assess air quality and greenhouse gas emission impacts from land use projects.

BAAQMD's adoption of significance thresholds contained in the 2011 CEQA Air Quality Guidelines was called into question by an order issued March 5, 2012, in California Building Industry Association (CBIA) v. BAAQMD (Alameda Superior Court Case No. RGI0548693).

The order requires BAAQMD to set aside its approval of the thresholds until it has conducted environmental review under CEQA. The ruling made in the case concerned the environmental impacts of adopting the thresholds and how the thresholds would indirectly affect land use development patterns. In August 2013, the Appellate Court struck down the lower court's order to set aside the thresholds. However, this litigation remains pending as the California Supreme Court recently accepted a portion of CBIA's petition to review the appellate court's decision to uphold BAAQMD's adoption of the thresholds. The specific portion of the argument to be considered is in regard to whether CEQA requires consideration of the effects of the environment on a project (as contrasted to the effects of a proposed project on the environment). Therefore, the significance thresholds contained in the 2011 CEQA Air Quality Guidelines are applied to this project.

Table 1. Air Quality Significance Thresholds

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs./day)	Average Daily Emissions (lbs./day)	Annual Average Emissions (tons/year)
Criteria Air Pollutants			
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82	82	15
$PM_{2.5}$	54	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards for New Sources			
Excess Cancer Risk	10 per one million		
Chronic or Acute Hazard Index	1.0		
Incremental annual average $PM_{2.5}$	0.3 µg/m^3		
Health Risks and Hazards for Sensitive Receptors (Cumulative from all sources within 1,000 foot zone of influence) and Cumulative Thresholds for New Sources			
Excess Cancer Risk	100 per one million		
Chronic Hazard Index	10.0		
Annual Average $PM_{2.5}$	0.8 µg/m^3		
Greenhouse Gas Emissions			
GHG Annual Emissions	1,100 metric tons or 4.6 metric tons per capita		

Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM_{10} = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less; and GHG = greenhouse gas.

Impacts and Mitigation Measures

Impact 1: Conflict with or obstruct implementation of the applicable air quality plan? ***Less than significant***

The most recent clean air plan is the *Bay Area 2010 Clean Air Plan* that was adopted by BAAQMD in September 2010. The proposed project would not conflict with the latest Clean Air planning efforts since the project would have emissions well below the BAAQMD thresholds (see Impact 2), and development would be near existing transit with regional connections. The project, at 117 single-family residences is too small to exceed any of the significance thresholds and, thus, it is not required to incorporate project-specific transportation control measures listed in the latest Clean Air Plan

Impact 2: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? ***Less than significant with construction period best management control measures.***

The Bay Area is considered a non-attainment area for ground-level ozone and $PM_{2.5}$ under both the Federal Clean Air Act and the California Clean Air Act. The area is also considered non-attainment for PM_{10} under the California Clean Air Act, but not the Federal act. The area has attained both State and Federal ambient air quality standards for carbon monoxide. As part of an effort to attain and maintain ambient air quality standards for ozone and PM_{10}, the BAAQMD has established thresholds of significance for these air pollutants and their precursors. These thresholds are for ozone precursor pollutants (ROG and NOx), PM_{10}, and $PM_{2.5}$ and apply to both construction period and operational period impacts.

Due to the project size, construction exhaust and operational period emissions would be less than significant. In their 2011 update to the CEQA Air Quality Guidelines, BAAQMD identified the size of land use projects that could result in significant air pollutant emissions. For construction exhaust impacts, the residential single-family size was identified at 114 dwelling units. For operational impacts, the project size was identified at 325 dwelling units. Since the project proposes 117 single-family homes, an analysis of the emissions from construction of the project was analyzed using the California Emissions Estimator Model, Version 2013.2.2 (CalEEMod). The project land use types and size, and trip generation rate were input to CalEEMod.

<u>Construction period emissions</u>

The proposed project land use was input into CalEEMod, which were 117 residential units entered as "single-family" on a 20.3-acre site. The construction build-out scenario was based on the model defaults that are computed based on the project type and size, including the site acreage. No import or export of fill material was assumed and a demolition phase was not included, since the site is relatively flat and undeveloped. CalEEMod provided annual emissions for construction. CalEEMod provides emission estimates for both on-site and off-site construction activities. On-site activities are primarily made up of construction equipment

emissions, while off-site activity includes worker, hauling and vendor traffic. *Attachment 1* includes the CalEEMod input and output values for construction emissions.

The applicant provided anticipated start date of June 2015. Based on this information, the modeling scenario assumes that the project would be built out over a period of approximately 435 construction workdays. Completion would not occur until very late 2016 or 2017. Average daily emissions were computed by dividing the total construction emissions by the number of construction days. Table 2 shows average daily construction emissions of ROG, NO_X, PM_{10} exhaust, and $PM_{2.5}$ exhaust during construction of the project. As indicated in Table 2, predicted project emissions would not exceed the BAAQMD significance thresholds.

Table 2. Construction Period Emissions

Scenario	ROG	NOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
Unmitigated Construction emissions (tons)	2.70 tons	6.64 tons	0.42 tons	0.39 tons
Average daily emissions (pounds)[1]	12.4 lbs.	30.5 lbs.	1.9 lbs.	1.8 lbs.
BAAQMD Thresholds (pounds per day)	*54* lbs.	*54* lbs.	*82* lbs.	*54* lbs.
Exceed Threshold?	**No**	**No**	**No**	**No**

[1] Assumes 435 workdays.

Construction activities, particularly during site preparation and grading, would temporarily generate fugitive dust in the form of PM_{10} and $PM_{2.5}$. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. Fugitive dust emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. Fugitive dust emissions would also depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less than significant if best management practices are employed to reduce these emissions. *Mitigation Measure 1 would implement BAAQMD-recommended best management practices.*

Operational Period Emissions

Due to the project size, operational-period emissions would be less than significant. In the 2011 update to the CEQA Air Quality Guidelines, BAAQMD identifies screening criteria for the sizes of land use projects that could result in significant air pollutant emissions. For operational impacts, the screening project size is identified at 325 single-family dwelling units and the project proposes 117 units. Therefore, it is concluded that emissions would be below the BAAQMD significance thresholds for the operational period.

Mitigation Measure 1: *Construction Best Management Practices (BMPs) include measures to control dust emissions.* Implementation of the measures recommended by BAAQMD and listed below would reduce the air quality and fugitive dust-related impacts associated with grading and

new construction to a less than significant. The contractor shall implement the following Best Management Practices that are required of all projects:

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 track-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. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

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. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Impact 3: Violate any air quality standard or contribute substantially to an existing or projected air quality violation? ***Less than significant.***

As discussed under Impact 2, the project would have emissions less than the BAAQMD screening size for evaluating impacts related to ozone and particulate matter. Therefore, the project would not contribute substantially to existing or projected violations of those standards. Carbon monoxide emissions from traffic generated by the project would be the pollutant of greatest concern at the local level. Congested intersections with a large volume of traffic have the greatest potential to cause high-localized concentrations of carbon monoxide. Air pollutant monitoring data indicate that carbon monoxide levels have been at healthy levels (i.e., below State and federal standards) in the Bay Area since the early 1990s. As a result, the region has been designated as attainment for the standard. The highest measured level over any 8-hour

averaging period during the last 3 years in the Bay Area was less than 3 parts per million (ppm), compared to the ambient air quality standard of 9.0 ppm. Intersections affected by the project would have traffic volumes less than the BAAQMD screening criteria and, thus, would not cause a violation of an ambient air quality standard or have a considerable contribution to cumulative violations of these standards.[3]

Impact 4: Expose sensitive receptors to substantial pollutant concentrations? ***Less than significant with construction period mitigation measures.***

Sensitive receptors are locations where an identifiable subset of the general population (children, asthmatics, the elderly, and the chronically ill) that is at greater risk than the general population to the effects of air pollutants are likely to be exposed. These locations include residences, schools, playgrounds, childcare centers, retirement homes, hospitals, and medical clinics. The closest off-site sensitive receptors are residences adjacent to the western project site boundary. There is also the Heritage Baptist Church and Heritage Baptist Academy (K through 12th grade school) that borders the northeastern boundary of the project site.

Construction activity would generate dust and equipment exhaust on a temporary basis. Impacts from project construction and nearby operational TAC sources are addressed below. Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. In addition, there are no nearby sources of TAC emissions, such as roadways and stationary sources, which would adversely affect the project site (i.e., proposed residences).

Project Construction Activity

Construction activities, particularly during site preparation and grading would temporarily generate fugitive dust in the form of PM_{10} and $PM_{2.5}$. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. Fugitive dust emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. Fugitive dust emissions would also depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less than significant if best management practices are employed to reduce these emissions. *Mitigation Measure 1 would implement BAAQMD-required best management practices*.

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known TAC. Diesel exhaust poses both a health and nuisance impact to nearby receptors. A health risk assessment of the project construction activities was conducted that evaluated

[3] For a land-use project type, the BAAQMD CEQA Air Quality Guidelines state that a proposed project would result in a less than significant impact to localized carbon monoxide concentrations if the project would not increase traffic at affected intersections to more than 44,000 vehicles per hour.

potential health effects of sensitive receptors from construction emissions of DPM.[4] A dispersion model was used to predict the off-site DPM concentrations resulting from project construction at sensitive receptors so that lifetime cancer risks could be predicted. The closest off-site sensitive receptors are residences adjacent to the western project site boundary. There is also the Heritage Baptist Church and Heritage Baptist Academy (K through 12th grade school) that borders the northeastern boundary of the project site. Figure 1 shows the project site and sensitive receptor locations (residences and church/school) used in the air quality dispersion modeling analysis where potential health impacts were evaluated.

Construction Emissions

The refined health risk assessment focused on modeling on-site construction activity. Construction period emissions were modeled using CalEEMod defaults for a project of this type and size, as described above. Construction of the project is expected to occur over an approximate 17 month period starting in June 2015. The CalEEMod model provided total annual $PM_{2.5}$ exhaust emissions (assumed to be DPM) for the off-road construction equipment and for exhaust emissions from on-road vehicles (vendor trucks and worker vehicles), with total emissions of 0.391 tons (781 pounds). The on-road emissions are a result of worker travel and vendor deliveries during construction activities. Trip lengths of 12.4 miles for workers and 7.3 miles for vendors were used to calculate vehicle emissions. In evaluating potential impacts, it was conservatively assumed that all emissions from on-road vehicles would occur at the construction site. Fugitive $PM_{2.5}$ dust emissions were calculated by CalEEMod as 0.138 tons (275 pounds) for the overall construction period. The project emission calculations are provided in *Attachment 1*.

Dispersion Modeling

The U.S. EPA ISCST3 dispersion model was used to predict concentrations of DPM and $PM_{2.5}$ concentrations at existing sensitive receptors in the vicinity of the project construction area. The ISCST3 dispersion model is a BAAQMD-recommended model for use in modeling analysis of these types of emission activities for CEQA projects.[5] Emission sources for the construction site were grouped into two categories, exhaust emissions of DPM and fugitive $PM_{2.5}$ dust emissions. The ISCST3 modeling utilized two area sources to represent the on-site construction emissions, one for DPM exhaust emissions and the other for fugitive $PM_{2.5}$ dust emissions. For the exhaust emissions from construction equipment an emission release height of six meters was used for the area source. The elevated source height reflects the height of the equipment exhaust pipes plus an additional distance for the height of the exhaust plume above the exhaust pipes to account for plume rise of the exhaust gases. For modeling fugitive $PM_{2.5}$ emissions, a near-ground level release height of two meters was used for the area source. Emissions from vehicle travel around the project site were included in the modeled area sources. Construction emissions were modeled as occurring daily between 7 a.m. and 4 p.m. when the majority of the construction activity involving equipment usage would occur.

[4] DPM is identified by California as a toxic air contaminant due to the potential to cause cancer.
[5] Bay Area Air Quality Management District (BAAQMD), 2012, *Recommended Methods for Screening and Modeling Local Risks and Hazards, Version 3.0.* May.

The modeling used a two-year data set (2009 - 2010) of hourly meteorological data from the Contra Costa Power site located about four miles north of the project site. The meteorological data was prepared by the BAAQMD for use with the ISCST3 model. Annual DPM and $PM_{2.5}$ concentrations from construction activities in 2015 and 2016 were calculated using the model. DPM and $PM_{2.5}$ concentrations were calculated at nearby sensitive receptors using a receptor height of 1.5 meters (4.9 feet). Figure 1 shows the construction area modeled and locations of nearby sensitive receptors.

Predicted Cancer Risk and Hazards

The maximum modeled DPM and $PM_{2.5}$ concentrations occurred at a residence on the eastern side of South Winchester Boulevard, across the street from the project construction site. The location of this receptor is identified on Figure 1. Increased cancer risks were calculated using the modeled DPM concentrations and BAAQMD recommended risk assessment methods for both a child exposure (3rd trimester through 2 years of age) and adult exposure.[6] The cancer risk calculations were based on applying the BAAQMD recommended age sensitivity factors to the DPM exposures. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing TACs. BAAQMD recommended exposure parameters were used for the cancer risk calculations.[7] Infant and child exposures were assumed to occur at all residences during the entire construction period and a child exposure was assumed to occur for the students at the Heritage Baptist Academy.

Results of this assessment indicate that for project construction the incremental residential child cancer risk at the maximally exposed individual (MEI) receptor would be 22.6 in one million and the incremental residential adult cancer risk would be 1.2 in one million. The maximum school child increased cancer risk would be 4.7 in one million. While the increased cancer risks for a residential adult and school child exposures would be lower than the BAAQMD significance threshold of a cancer risk of 10 in one million or greater, the increased cancer risk for a residential child exposure would be above the significance threshold. Since the increased child cancer risk exceeds the significance threshold, this would be considered a *significant impact*.

The maximum modeled annual $PM_{2.5}$ concentration was 0.20 micrograms per cubic meter ($\mu g/m^3$) occurring at the same location where the maximum residential cancer risk would occur. This $PM_{2.5}$ concentration is lower than the BAAQMD significance threshold of 0.3 $\mu g/m^3$ used to judge the significance of health impacts from $PM_{2.5}$. This would be considered a *less than significant* impact.

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. Non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). California's Office of Environmental Health Hazard Assessment (OEHHA) has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are

[6] Bay Area Air Quality Management District (BAAQMD), 2012, *Recommended Methods for Screening and Modeling Local Risks and Hazards*, May.

[7] Bay Area Air Quality Management District (BAAQMD), 2010, *Air Toxics NSR Program Health Risk Screening Analysis Guidelines*, January.

not expected to cause adverse health impacts, even for sensitive individuals. The chronic inhalation REL for DPM is 5 $\mu g/m^3$. The maximum modeled annual residential DPM concentration was 0.15 $\mu g/m^3$, which is much lower than the REL. The maximum computed hazard index based on this DPM concentration is 0.03 which is much lower than the BAAQMD significance criterion of a hazard index greater than 1.0.

Attachment 2 includes the emission calculations used for the area source modeling and the cancer risk calculations.

The project would have a *significant impact* with respect to community risk caused by construction activities.

Mitigation Measure 2: Selection of equipment during demolition, grading, and trenching construction phases to minimize emissions. Such equipment selection would include the following:

1. All diesel-powered off-road equipment larger than 50 horsepower and operating on the site for more than two days continuously shall meet U.S. EPA particulate matter emissions standards for Tier 2 engines or equivalent;

2. All portable construction equipment shall meet CARB's most recent certification standard for particulate matter emissions; and

3. Minimize the number of hours that equipment will operate, including the use of idling restrictions.

Note that the construction contractor could use other measures to minimize construction period DPM emissions to reduce the predicted cancer risk below the thresholds. Such measures may be the use of alternative powered equipment (e.g., LPG-powered lifts), alternative fuels (e.g., biofuels), added exhaust devices, or a combination of measures, provided that these measures are approved by the City.

Implementation of *Mitigation Measure 1* is considered to reduce exhaust emissions by 5 percent and fugitive dust emissions by over 50 percent. Implementation of *Mitigation Measure 2* would further reduce on-site diesel exhaust emissions by over 60 percent. With mitigation the computed maximum increased child cancer risk would be 8.3 in one million and the maximum $PM_{2.5}$ concentration would be 0.07 $\mu g/m^3$. The maximum school child cancer risk would be reduced to 1.7 in one million, which is below the BAAQMD threshold of 10 per one million. *After implementation of these recommended measures, the project would have a less-than-significant impact with respect to community risk caused by construction activities.*

Figure 1. Project Construction Site and Locations of Sensitive Receptors and Maximum Cancer Risk



Impact 5: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? ***Less than significant.***

The BAAQMD May 2011 CEQA Guidelines included GHG emissions-based significance thresholds. These thresholds include a "bright-line" emissions level of 1,100 metric tons (MT) per year for land-use type projects and 10,000 metric tons per year for stationary sources. Land use projects with emissions above the 1,100 metric ton per year threshold would then be subject to a GHG efficiency threshold of 4.6 metric tons per year per capita. Projects with emissions above the thresholds would be considered to have an impact, which, cumulatively, would be significant.

CalEEMod Modeling

CalEEMod was also used to predict GHG emissions from operation of the site assuming full build-out of the project. The project land use types and size and other project-specific information were input to the model. The use of this model for evaluating emissions from land use projects is recommended by the BAAQMD. Unless otherwise noted below, the CalEEMod model defaults for Contra Costa County were used. CalEEMod provides emissions for transportation, areas sources, electricity consumption, natural gas combustion, electricity usage associated with water usage and wastewater discharge, and solid waste land filling and transport. CalEEMod output worksheets are included in *Attachment 1*.

Land Use Descriptions
The proposed project land uses were input into CalEEMod, which included 117 dwelling units of "Single-Family Residence" on a 20.3-acre site.

Trip Generation Rates
The default CalEEMod trip rates were used in the model: Single Family Residence – 9.52 daily trips per weekday. The default trip lengths and trip types specified by CalEEMod for Contra Costa County were used.

Model Year
The model uses mobile emission factors from the CARB's EMFAC2011 model. This model is sensitive to the year selected, since vehicle emissions have and continue to be reduced due to fuel efficiency standards and low carbon fuels. The year 2018 was analyzed since it is the first full year that the project is expected to be fully occupied.

Energy
Default rates for energy consumption were assumed in the model. Emissions rates associated with electricity consumption were adjusted to account for Pacific Gas & Electric utility's (PG&E) projected 2016 CO_2 intensity rate. This 2016 rate is based, in part, on the requirement of a renewable energy portfolio standard of 33 percent by the year 2020. CalEEMod uses a default rate of 641.35 pounds of CO_2 per megawatt of electricity produced.

Other Inputs
Default model assumptions for GHG emissions associated with area sources, solid waste

generation and water/wastewater use were applied to the project.

Service Population
Project service population is the sum of future residents and full-time employees. The number of future residences was estimated at 374 and was based on the latest US Census data for Antioch, which shows an average of 3.20 residents per household.[8]

Construction Emissions

GHG emissions associated with construction were computed to range from 273 to 274 MT of CO_2e per year over the anticipated 2-year construction period. These are the emissions from on-site operation of construction equipment, vendor truck trips, and worker trips. BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions, though the District recommends quantifying emissions and disclosing that GHG emissions would occur during construction. BAAQMD also encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable. Best management practices assumed to be incorporated into construction of the proposed project include, but are not limited to: using local building materials of at least 10 percent and recycling or reusing at least 50 percent of construction waste or demolition materials.

Operational Emissions

The CalEEMod model, along with the project vehicle trip generation rates, was used to predict daily emissions associated with operation of the fully-developed site under the proposed project. In 2018, annual emissions resulting from operation of the proposed project are predicted to be 1,554 MT of CO_2e. These emissions would exceed the BAAQMD threshold of 1,100 MT of CO_2e/yr. As discussed above, land use projects with emissions above the 1,100 metric ton per year threshold would then be subject to a GHG efficiency threshold of 4.6 metric tons per year per capita to determine impact significance. Computed project per capita emissions are 4.15 MT of CO_2e/year/service population, which would not exceed the BAAQMD threshold of 4.6 MT of CO_2e/year/service population. Table 3 shows predicted project GHG emissions.

[8] United States Census Bureau, 2014. *State & County QuickFacts: Milpitas (city), California*. Available online: http://quickfacts.census.gov/qfd/states/06/0602252.html. Accessed: October 14, 2014.

Table 3. Annual Project GHG Emissions in Metric Tons

Source Category	2018 Project Emissions
Construction 2017	273
Construction 2016	274
Operation	
Area	23
Energy Consumption	463
Mobile	978
Solid Waste Generation	64
Water Usage	26
Project Total	1,554
BAAQMD Bright-Line Threshold	***1,100 MT CO_2e/year***
Project Per Capita Emissions	4.16 MT CO_2e/year/capita
BAAQMD Per Capita Threshold	***4 6 MT CO2e/year/capita***
Significant?	***No***

Impact 6: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases? ***No Impact.***

The project would be subject to new requirements under rule making developed at the State and local level, regarding greenhouse gas emissions and be subject to local policies that may regulate emissions of greenhouse gases.

Attachment 1: CalEEMod Input and Output Worksheets and Construction Schedule

Heidorn Village Default Inputs

Contra Costa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	117.00	Dwelling Unit	20.30	210,600.00	335

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2018
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project size and acreage

Construction Phase - Use default schedule, but start date of 6/1/2015. No Demolition

Off-road Equipment -

Off-road Equipment - Default, except assume crane half time and no diesel-powered welders

Grading -

Demolition -

Trips and VMT -

Architectural Coating - VOC emission per BAAQMD Rules and Regulations

Vehicle Trips -

Construction Off-road Equipment Mitigation - Tier 2 for mobile and Tier 4 for Portable equipment plus BMPs for fugitive PM2.5

Mobile Land Use Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	150.00
tblArchitecturalCoating	EF_Residential_Interior	100.00	150.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2

tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	PhaseEndDate	1/25/2017	12/28/2016
tblConstructionPhase	PhaseEndDate	1/27/2017	12/28/2016
tblConstructionPhase	PhaseStartDate	12/29/2016	12/1/2016
tblConstructionPhase	PhaseStartDate	12/31/2016	12/1/2016
tblLandUse	LotAcreage	37.99	20.30
tblOffRoadEquipment	UsageHours	7.00	4.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2018

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.3166	3.1210	2.2264	2.9500e-003	0.2715	0.1821	0.4536	0.1205	0.1692	0.2897	0.0000	272.0435	272.0435	0.0651	0.0000	273.4109
2016	2.3799	3.5165	2.7319	4.1600e-003	0.0629	0.2368	0.2997	0.0170	0.2215	0.2385	0.0000	372.5076	372.5076	0.0741	0.0000	374.0636
Total	**2.6965**	**6.6375**	**4.9584**	**7.1100e-003**	**0.3345**	**0.4189**	**0.7533**	**0.1375**	**0.3907**	**0.5282**	**0.0000**	**644.5511**	**644.5511**	**0.1392**	**0.0000**	**647.4745**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.1008	1.9823	1.8843	2.9500e-003	0.1384	0.0609	0.1993	0.0333	0.0608	0.0941	0.0000	272.0432	272.0432	0.0651	0.0000	273.4106
2016	2.1247	2.3638	2.7230	4.1600e-003	0.0629	0.0825	0.1455	0.0170	0.0823	0.0993	0.0000	372.5073	372.5073	0.0741	0.0000	374.0633
Total	**2.2255**	**4.3461**	**4.6073**	**7.1100e-003**	**0.2013**	**0.1435**	**0.3448**	**0.0502**	**0.1431**	**0.1933**	**0.0000**	**644.5505**	**644.5505**	**0.1392**	**0.0000**	**647.4739**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**17.47**	**34.52**	**7.08**	**0.00**	**39.81**	**65.75**	**54.24**	**63.48**	**63.37**	**63.40**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.6855	0.0231	1.9315	1.1500e-003		0.1587	0.1587		0.1587	0.1587	16.1749	5.9550	22.1299	0.0362	8.6000e-004	23.1550
Energy	0.0223	0.1902	0.0809	1.2100e-003		0.0154	0.0154		0.0154	0.0154	0.0000	461.0306	461.0306	0.0151	6.2900e-003	463.2980
Mobile	0.6079	1.2974	6.0896	0.0131	0.9262	0.0163	0.9425	0.2481	0.0150	0.2631	0.0000	976.7356	976.7356	0.0405	0.0000	977.5870
Waste						0.0000	0.0000		0.0000	0.0000	28.5608	0.0000	28.5608	1.6879	0.0000	64.0067
Water						0.0000	0.0000		0.0000	0.0000	2.4184	16.8928	19.3112	0.2492	6.0200e-003	26.4108
Total	**2.3156**	**1.5107**	**8.1021**	**0.0155**	**0.9262**	**0.1904**	**1.1166**	**0.2481**	**0.1891**	**0.4372**	**47.1542**	**1,460.6140**	**1,507.7681**	**2.0289**	**0.0132**	**1,554.4575**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.6855	0.0231	1.9315	1.1500e-003		0.1587	0.1587		0.1587	0.1587	16.1749	5.9550	22.1299	0.0362	8.6000e-004	23.1550
Energy	0.0223	0.1902	0.0809	1.2100e-003		0.0154	0.0154		0.0154	0.0154	0.0000	461.0306	461.0306	0.0151	6.2900e-003	463.2980
Mobile	0.6079	1.2974	6.0896	0.0131	0.9262	0.0163	0.9425	0.2481	0.0150	0.2631	0.0000	976.7356	976.7356	0.0405	0.0000	977.5870
Waste						0.0000	0.0000		0.0000	0.0000	28.5608	0.0000	28.5608	1.6879	0.0000	64.0067
Water						0.0000	0.0000		0.0000	0.0000	2.4184	16.8928	19.3112	0.2491	6.0100e-003	26.4069
Total	**2.3156**	**1.5107**	**8.1021**	**0.0155**	**0.9262**	**0.1904**	**1.1166**	**0.2481**	**0.1891**	**0.4372**	**47.1542**	**1,460.6140**	**1,507.7681**	**2.0289**	**0.0132**	**1,554.4537**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.08**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/1/2015	6/12/2015	5	10	
2	Grading	Grading	6/13/2015	7/31/2015	5	35	
3	Building Construction	Building Construction	8/1/2015	12/30/2016	5	370	
4	Paving	Paving	12/1/2016	12/28/2016	5	20	
5	Architectural Coating	Architectural Coating	12/1/2016	12/28/2016	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 87.5

Acres of Paving: 0

Residential Indoor: 426,465; Residential Outdoor: 142,155; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Excavators	2	8.00	162	0.38
Building Construction	Cranes	1	4.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	125	0.42
Paving	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	174	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	130	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Building Construction	Welders	1	0.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	42.00	13.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	8.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0263	0.2845	0.2132	2.0000e-004		0.0154	0.0154		0.0142	0.0142	0.0000	18.6506	18.6506	5.5700e-003	0.0000	18.7675
Total	**0.0263**	**0.2845**	**0.2132**	**2.0000e-004**	**0.0903**	**0.0154**	**0.1058**	**0.0497**	**0.0142**	**0.0639**	**0.0000**	**18.6506**	**18.6506**	**5.5700e-003**	**0.0000**	**18.7675**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	5.6000e-004	5.4400e-003	1.0000e-005	8.2000e-004	1.0000e-005	8.3000e-004	2.2000e-004	1.0000e-005	2.2000e-004	0.0000	0.7662	0.7662	4.0000e-005	0.0000	0.7671
Total	**3.8000e-004**	**5.6000e-004**	**5.4400e-003**	**1.0000e-005**	**8.2000e-004**	**1.0000e-005**	**8.3000e-004**	**2.2000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**0.7662**	**0.7662**	**4.0000e-005**	**0.0000**	**0.7671**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0407	0.0000	0.0407	0.0112	0.0000	0.0112	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.1500e-003	0.1721	0.1170	2.0000e-004		4.8100e-003	4.8100e-003		4.8100e-003	4.8100e-003	0.0000	18.6505	18.6505	5.5700e-003	0.0000	18.7675
Total	**6.1500e-003**	**0.1721**	**0.1170**	**2.0000e-004**	**0.0407**	**4.8100e-003**	**0.0455**	**0.0112**	**4.8100e-003**	**0.0160**	**0.0000**	**18.6505**	**18.6505**	**5.5700e-003**	**0.0000**	**18.7675**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	5.6000e-004	5.4400e-003	1.0000e-005	8.2000e-004	1.0000e-005	8.3000e-004	2.2000e-004	1.0000e-005	2.2000e-004	0.0000	0.7662	0.7662	4.0000e-005	0.0000	0.7671
Total	**3.8000e-004**	**5.6000e-004**	**5.4400e-003**	**1.0000e-005**	**8.2000e-004**	**1.0000e-005**	**8.3000e-004**	**2.2000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**0.7662**	**0.7662**	**4.0000e-005**	**0.0000**	**0.7671**

3.3 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1518	0.0000	0.1518	0.0629	0.0000	0.0629	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1186	1.3833	0.8897	1.0800e-003		0.0665	0.0665		0.0612	0.0612	0.0000	102.9739	102.9739	0.0307	0.0000	103.6195
Total	**0.1186**	**1.3833**	**0.8897**	**1.0800e-003**	**0.1518**	**0.0665**	**0.2183**	**0.0629**	**0.0612**	**0.1242**	**0.0000**	**102.9739**	**102.9739**	**0.0307**	**0.0000**	**103.6195**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4800e-003	2.1600e-003	0.0212	4.0000e-005	3.1900e-003	3.0000e-005	3.2100e-003	8.5000e-004	3.0000e-005	8.7000e-004	0.0000	2.9797	2.9797	1.7000e-004	0.0000	2.9833
Total	**1.4800e-003**	**2.1600e-003**	**0.0212**	**4.0000e-005**	**3.1900e-003**	**3.0000e-005**	**3.2100e-003**	**8.5000e-004**	**3.0000e-005**	**8.7000e-004**	**0.0000**	**2.9797**	**2.9797**	**1.7000e-004**	**0.0000**	**2.9833**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0683	0.0000	0.0683	0.0142	0.0000	0.0142	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0331	0.8916	0.6640	1.0800e-003		0.0241	0.0241		0.0241	0.0241	0.0000	102.9737	102.9737	0.0307	0.0000	103.6193
Total	**0.0331**	**0.8916**	**0.6640**	**1.0800e-003**	**0.0683**	**0.0241**	**0.0924**	**0.0142**	**0.0241**	**0.0383**	**0.0000**	**102.9737**	**102.9737**	**0.0307**	**0.0000**	**103.6193**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4800e-003	2.1600e-003	0.0212	4.0000e-005	3.1900e-003	3.0000e-005	3.2100e-003	8.5000e-004	3.0000e-005	8.7000e-004	0.0000	2.9797	2.9797	1.7000e-004	0.0000	2.9833
Total	**1.4800e-003**	**2.1600e-003**	**0.0212**	**4.0000e-005**	**3.1900e-003**	**3.0000e-005**	**3.2100e-003**	**8.5000e-004**	**3.0000e-005**	**8.7000e-004**	**0.0000**	**2.9797**	**2.9797**	**1.7000e-004**	**0.0000**	**2.9833**

3.4 Building Construction - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1501	1.3548	0.8482	1.2100e-003		0.0986	0.0986		0.0924	0.0924	0.0000	111.7363	111.7363	0.0273	0.0000	112.3097
Total	**0.1501**	**1.3548**	**0.8482**	**1.2100e-003**		**0.0986**	**0.0986**		**0.0924**	**0.0924**	**0.0000**	**111.7363**	**111.7363**	**0.0273**	**0.0000**	**112.3097**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0101	0.0816	0.1103	1.7000e-004	4.5600e-003	1.3100e-003	5.8700e-003	1.3100e-003	1.2000e-003	2.5100e-003	0.0000	15.4500	15.4500	1.4000e-004	0.0000	15.4529
Worker	9.6500e-003	0.0141	0.1384	2.5000e-004	0.0208	1.8000e-004	0.0210	5.5400e-003	1.6000e-004	5.7100e-003	0.0000	19.4869	19.4869	1.1400e-003	0.0000	19.5109
Total	**0.0197**	**0.0957**	**0.2488**	**4.2000e-004**	**0.0254**	**1.4900e-003**	**0.0269**	**6.8500e-003**	**1.3600e-003**	**8.2200e-003**	**0.0000**	**34.9369**	**34.9369**	**1.2800e-003**	**0.0000**	**34.9638**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0400	0.8202	0.8280	1.2100e-003		0.0305	0.0305		0.0305	0.0305	0.0000	111.7362	111.7362	0.0273	0.0000	112.3096
Total	**0.0400**	**0.8202**	**0.8280**	**1.2100e-003**		**0.0305**	**0.0305**		**0.0305**	**0.0305**	**0.0000**	**111.7362**	**111.7362**	**0.0273**	**0.0000**	**112.3096**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0101	0.0816	0.1103	1.7000e-004	4.5600e-003	1.3100e-003	5.8700e-003	1.3100e-003	1.2000e-003	2.5100e-003	0.0000	15.4500	15.4500	1.4000e-004	0.0000	15.4529
Worker	9.6500e-003	0.0141	0.1384	2.5000e-004	0.0208	1.8000e-004	0.0210	5.5400e-003	1.6000e-004	5.7100e-003	0.0000	19.4869	19.4869	1.1400e-003	0.0000	19.5109
Total	**0.0197**	**0.0957**	**0.2488**	**4.2000e-004**	**0.0254**	**1.4900e-003**	**0.0269**	**6.8500e-003**	**1.3600e-003**	**8.2200e-003**	**0.0000**	**34.9369**	**34.9369**	**1.2800e-003**	**0.0000**	**34.9638**

3.4 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3359	3.0674	2.0120	2.8900e-003		0.2193	0.2193		0.2053	0.2053	0.0000	265.4215	265.4215	0.0646	0.0000	266.7773
Total	**0.3359**	**3.0674**	**2.0120**	**2.8900e-003**		**0.2193**	**0.2193**		**0.2053**	**0.2053**	**0.0000**	**265.4215**	**265.4215**	**0.0646**	**0.0000**	**266.7773**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0213	0.1699	0.2442	4.0000e-004	0.0109	2.5100e-003	0.0134	3.1300e-003	2.3100e-003	5.4400e-003	0.0000	36.5628	36.5628	2.9000e-004	0.0000	36.5689
Worker	0.0207	0.0303	0.2963	5.9000e-004	0.0499	4.1000e-004	0.0503	0.0133	3.7000e-004	0.0136	0.0000	45.0652	45.0652	2.5000e-003	0.0000	45.1176
Total	**0.0419**	**0.2003**	**0.5405**	**9.9000e-004**	**0.0608**	**2.9200e-003**	**0.0638**	**0.0164**	**2.6800e-003**	**0.0191**	**0.0000**	**81.6279**	**81.6279**	**2.7900e-003**	**0.0000**	**81.6865**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0958	1.9640	1.9825	2.8900e-003		0.0730	0.0730		0.0730	0.0730	0.0000	265.4212	265.4212	0.0646	0.0000	266.7770
Total	**0.0958**	**1.9640**	**1.9825**	**2.8900e-003**		**0.0730**	**0.0730**		**0.0730**	**0.0730**	**0.0000**	**265.4212**	**265.4212**	**0.0646**	**0.0000**	**266.7770**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0213	0.1699	0.2442	4.0000e-004	0.0109	2.5100e-003	0.0134	3.1300e-003	2.3100e-003	5.4400e-003	0.0000	36.5628	36.5628	2.9000e-004	0.0000	36.5689
Worker	0.0207	0.0303	0.2963	5.9000e-004	0.0499	4.1000e-004	0.0503	0.0133	3.7000e-004	0.0136	0.0000	45.0652	45.0652	2.5000e-003	0.0000	45.1176
Total	**0.0419**	**0.2003**	**0.5405**	**9.9000e-004**	**0.0608**	**2.9200e-003**	**0.0638**	**0.0164**	**2.6800e-003**	**0.0191**	**0.0000**	**81.6279**	**81.6279**	**2.7900e-003**	**0.0000**	**81.6865**

3.5 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0209	0.2239	0.1482	2.2000e-004		0.0126	0.0126		0.0116	0.0116	0.0000	21.0138	21.0138	6.3400e-003	0.0000	21.1469
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0209**	**0.2239**	**0.1482**	**2.2000e-004**		**0.0126**	**0.0126**		**0.0116**	**0.0116**	**0.0000**	**21.0138**	**21.0138**	**6.3400e-003**	**0.0000**	**21.1469**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.7000e-004	8.3000e-004	8.1100e-003	2.0000e-005	1.3700e-003	1.0000e-005	1.3800e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.2333	1.2333	7.0000e-005	0.0000	1.2348
Total	**5.7000e-004**	**8.3000e-004**	**8.1100e-003**	**2.0000e-005**	**1.3700e-003**	**1.0000e-005**	**1.3800e-003**	**3.6000e-004**	**1.0000e-005**	**3.7000e-004**	**0.0000**	**1.2333**	**1.2333**	**7.0000e-005**	**0.0000**	**1.2348**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.1200e-003	0.1970	0.1693	2.2000e-004		6.5400e-003	6.5400e-003		6.5400e-003	6.5400e-003	0.0000	21.0138	21.0138	6.3400e-003	0.0000	21.1469
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1200e-003**	**0.1970**	**0.1693**	**2.2000e-004**		**6.5400e-003**	**6.5400e-003**		**6.5400e-003**	**6.5400e-003**	**0.0000**	**21.0138**	**21.0138**	**6.3400e-003**	**0.0000**	**21.1469**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.7000e-004	8.3000e-004	8.1100e-003	2.0000e-005	1.3700e-003	1.0000e-005	1.3800e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.2333	1.2333	7.0000e-005	0.0000	1.2348
Total	**5.7000e-004**	**8.3000e-004**	**8.1100e-003**	**2.0000e-005**	**1.3700e-003**	**1.0000e-005**	**1.3800e-003**	**3.6000e-004**	**1.0000e-005**	**3.7000e-004**	**0.0000**	**1.2333**	**1.2333**	**7.0000e-005**	**0.0000**	**1.2348**

3.6 Architectural Coating - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.9767					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6800e-003	0.0237	0.0188	3.0000e-005		1.9700e-003	1.9700e-003		1.9700e-003	1.9700e-003	0.0000	2.5533	2.5533	3.0000e-004	0.0000	2.5596
Total	**1.9804**	**0.0237**	**0.0188**	**3.0000e-005**		**1.9700e-003**	**1.9700e-003**		**1.9700e-003**	**1.9700e-003**	**0.0000**	**2.5533**	**2.5533**	**3.0000e-004**	**0.0000**	**2.5596**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-004	4.4000e-004	4.3200e-003	1.0000e-005	7.3000e-004	1.0000e-005	7.3000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	0.6578	0.6578	4.0000e-005	0.0000	0.6585
Total	**3.0000e-004**	**4.4000e-004**	**4.3200e-003**	**1.0000e-005**	**7.3000e-004**	**1.0000e-005**	**7.3000e-004**	**1.9000e-004**	**1.0000e-005**	**2.0000e-004**	**0.0000**	**0.6578**	**0.6578**	**4.0000e-005**	**0.0000**	**0.6585**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.9767					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.0000e-004	1.2900e-003	0.0183	3.0000e-005		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	2.5533	2.5533	3.0000e-004	0.0000	2.5596
Total	**1.9770**	**1.2900e-003**	**0.0183**	**3.0000e-005**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**2.5533**	**2.5533**	**3.0000e-004**	**0.0000**	**2.5596**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-004	4.4000e-004	4.3200e-003	1.0000e-005	7.3000e-004	1.0000e-005	7.3000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	0.6578	0.6578	4.0000e-005	0.0000	0.6585
Total	**3.0000e-004**	**4.4000e-004**	**4.3200e-003**	**1.0000e-005**	**7.3000e-004**	**1.0000e-005**	**7.3000e-004**	**1.9000e-004**	**1.0000e-005**	**2.0000e-004**	**0.0000**	**0.6578**	**0.6578**	**4.0000e-005**	**0.0000**	**0.6585**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.6079	1.2974	6.0896	0.0131	0.9262	0.0163	0.9425	0.2481	0.0150	0.2631	0.0000	976.7356	976.7356	0.0405	0.0000	977.5870
Unmitigated	0.6079	1.2974	6.0896	0.0131	0.9262	0.0163	0.9425	0.2481	0.0150	0.2631	0.0000	976.7356	976.7356	0.0405	0.0000	977.5870

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	1,119.69	1,179.36	1026.09	2,488,737	2,488,737
Total	1,119.69	1,179.36	1,026.09	2,488,737	2,488,737

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-...	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	12.40	4.30	5.40	26.10	29.10	44.80	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.527213	0.065297	0.176718	0.144995	0.036242	0.004841	0.009763	0.021699	0.001225	0.001482	0.006415	0.002059	0.002052

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	240.7391	240.7391	0.0109	2.2500e-003	241.6659
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	240.7391	240.7391	0.0109	2.2500e-003	241.6659
NaturalGas Mitigated	0.0223	0.1902	0.0809	1.2100e-003		0.0154	0.0154		0.0154	0.0154	0.0000	220.2915	220.2915	4.2200e-003	4.0400e-003	221.6321
NaturalGas Unmitigated	0.0223	0.1902	0.0809	1.2100e-003		0.0154	0.0154		0.0154	0.0154	0.0000	220.2915	220.2915	4.2200e-003	4.0400e-003	221.6321

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	4.12811e+006	0.0223	0.1902	0.0809	1.2100e-003		0.0154	0.0154		0.0154	0.0154	0.0000	220.2915	220.2915	4.2200e-003	4.0400e-003	221.6321
Total		**0.0223**	**0.1902**	**0.0809**	**1.2100e-003**		**0.0154**	**0.0154**		**0.0154**	**0.0154**	**0.0000**	**220.2915**	**220.2915**	**4.2200e-003**	**4.0400e-003**	**221.6321**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					

Single Family Housing	4.12811e+006	0.0223	0.1902	0.0809	1.2100e-003		0.0154	0.0154		0.0154	0.0154	0.0000	220.2915	220.2915	4.2200e-003	4.0400e-003	221.6321
Total		**0.0223**	**0.1902**	**0.0809**	**1.2100e-003**		**0.0154**	**0.0154**		**0.0154**	**0.0154**	**0.0000**	**220.2915**	**220.2915**	**4.2200e-003**	**4.0400e-003**	**221.6321**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	827534	240.7391	0.0109	2.2500e-003	241.6659
Total		**240.7391**	**0.0109**	**2.2500e-003**	**241.6659**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	827534	240.7391	0.0109	2.2500e-003	241.6659
Total		**240.7391**	**0.0109**	**2.2500e-003**	**241.6659**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.6855	0.0231	1.9315	1.1500e-003		0.1587	0.1587		0.1587	0.1587	16.1749	5.9550	22.1299	0.0362	8.6000e-004	23.1550
Unmitigated	1.6855	0.0231	1.9315	1.1500e-003		0.1587	0.1587		0.1587	0.1587	16.1749	5.9550	22.1299	0.0362	8.6000e-004	23.1550

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1483					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Consumer Products	0.8225					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.6877	0.0129	1.0566	1.1100e-003		0.1539	0.1539		0.1539	0.1539	16.1749	4.5359	20.7108	0.0348	8.6000e-004	21.7064
Landscaping	0.0270	0.0102	0.8749	5.0000e-005		4.7700e-003	4.7700e-003		4.7700e-003	4.7700e-003	0.0000	1.4191	1.4191	1.4100e-003	0.0000	1.4486
Total	**1.6855**	**0.0231**	**1.9315**	**1.1600e-003**		**0.1587**	**0.1587**		**0.1587**	**0.1587**	**16.1749**	**5.9550**	**22.1299**	**0.0362**	**8.6000e-004**	**23.1550**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Consumer Products	0.8225					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.6877	0.0129	1.0566	1.1100e-003		0.1539	0.1539		0.1539	0.1539	16.1749	4.5359	20.7108	0.0348	8.6000e-004	21.7064
Landscaping	0.0270	0.0102	0.8749	5.0000e-005		4.7700e-003	4.7700e-003		4.7700e-003	4.7700e-003	0.0000	1.4191	1.4191	1.4100e-003	0.0000	1.4486
Architectural Coating	0.1483					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.6855**	**0.0231**	**1.9315**	**1.1600e-003**		**0.1587**	**0.1587**		**0.1587**	**0.1587**	**16.1749**	**5.9550**	**22.1299**	**0.0362**	**8.6000e-004**	**23.1550**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	19.3112	0.2491	6.0100e-003	26.4069
Unmitigated	19.3112	0.2492	6.0200e-003	26.4108

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	7.62302 / 4.80582	19.3112	0.2492	6.0200e-003	26.4108
Total		**19.3112**	**0.2492**	**6.0200e-003**	**26.4108**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e

Land Use	Mgal	MT/yr			
Single Family Housing	7.62302 / 4.80582	19.3112	0.2491	6.0100e-003	26.4069
Total		**19.3112**	**0.2491**	**6.0100e-003**	**26.4069**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	28.5608	1.6879	0.0000	64.0067
Unmitigated	28.5608	1.6879	0.0000	64.0067

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	140.7	28.5608	1.6879	0.0000	64.0067
Total		**28.5608**	**1.6879**	**0.0000**	**64.0067**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	140.7	28.5608	1.6879	0.0000	64.0067
Total		**28.5608**	**1.6879**	**0.0000**	**64.0067**

9.0 Operational Offroad

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

10.0 Vegetation

Attachment 2: Construction Health Risk Modeling Emissions and Risk Calculations

Construction Health Risk Modeling Emissions and Risk Calculations

Heidorn Village, Antioch, CA

DPM Construction Emissions and Modeling Emission Rates

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	DPM Emissions (lb/hr)	DPM Emissions (g/s)	Modeled Area (m^2)	DPM Emission Rate ($g/s/m^2$)
2015	Construction	0.1692	CON_DPM	338.4	0.10301	1.30E-02	84,432	1.54E-07
2016	Construction	0.2215	CON_DPM	443.0	0.13486	1.70E-02	84,432	2.01E-07
Total		***0.3907***		***781***	***0.2379***	***0.0300***		

Notes:

Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

PM2.5 Fugitive Dust Construction Emissions for Modeling

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	PM2.5 Emissions (lb/yr)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (g/s)	Modeled Area (m^2)	PM2.5 Emission Rate $g/s/m^2$
2015	Construction	CON_FUG	0.1205	241.0	0.07336	9.24E-03	84,432	1.09E-07
2016	Construction	CON_FUG	0.0170	34.0	0.01035	1.30E-03	84,432	1.54E-08
Total			***0.1375***	***275.0***	***0.0837***	***0.0105***		

Notes:

Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

DPM Construction Emissions and Modeling Emission Rates - With Mitigation

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	DPM Emissions (lb/hr)	DPM Emissions (g/s)	Modeled Area (m^2)	DPM Emission Rate ($g/s/m^2$)
2015	Construction	0.0608	CON_DPM	121.6	0.03702	4.66E-03	84,432	5.52E-08
2016	Construction	0.0823	CON_DPM	164.6	0.05011	6.31E-03	84,432	7.48E-08
Total		***0.1431***		***286***	***0.0871***	***0.0110***		

Notes:

Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

PM2.5 Fugitive Dust Construction Emissions for Modeling - With Mitigation

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	PM2.5 Emissions (lb/yr)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (g/s)	Modeled Area (m^2)	PM2.5 Emission Rate $g/s/m^2$
2015	Construction	CON_FUG	0.0333	66.6	0.02027	2.55E-03	84,432	3.03E-08
2016	Construction	CON_FUG	0.0170	34.0	0.01035	1.30E-03	84,432	1.54E-08
Total			***0.0503***	***100.6***	***0.0306***	***0.0039***		

Notes:

Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

Heidorn Village, Antioch, CA - Construction Health Impact Summary

Maximum Residential Impacts - Unmitigated

Construction Year	Unmitigated Emissions					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2015	0.1120	0.0895	9.81	0.51	0.022	0.202
2016	0.1462	0.0126	12.80	0.67	0.029	0.159
Total	-	-	**22.61**	**1.2**	-	-
Maximum Annual	0.1462	0.0895	-	-	**0.029**	**0.20**

Maximum Residential Impacts - Mitigated

Construction Year	Mitigated Emissions					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2015	0.0402	0.0249	3.52	0.18	0.008	0.065
2016	0.0542	0.0126	4.75	0.25	0.011	0.067
Total	-	-	**8.26**	**0.4**	-	-
Maximum Annual	0.0542	0.0249	-	-	**0.011**	**0.07**

Maximum Impacts at Heritage Baptist Academy - Student Receptors

Construction Year	UNMITIGATED				
	Maximum Concentrations		Student Cancer Risk (per million)	Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)		(-)	($\mu g/m^3$)
2015	0.0776	0.0615	2.04	0.016	0.139
2016	0.1013	0.0087	2.66	0.020	0.110
Total	-	-	**4.70**	-	-
Maximum Annual	0.1013	0.0615		**0.020**	**0.139**

Heidorn Village, Antioch, CA - Construction Impacts
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.5 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

		Child - Exposure Information				Adult - Exposure Information					
						Modeled					
Exposure	Exposure Duration	DPM Conc (ug/m3)		Exposure Adjust	Child Cancer Risk	DPM Conc (ug/m3)		Exposure Adjust	Adult Cancer Risk	Fugitive	Total
Year	(years)	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)	PM2.5	PM2.5
1	1	2015	0.1120	10	9.81	2015	0.1120	1	0.51	0.0895	0.202
2	1	2016	0.1462	10	12.80	2016	0.1462	1	0.67	0.0126	0.159
3	1		0.0000	4.75	0.00		0.0000	1	0.00		
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**22.61**				**1.18**		

Heidorn Village, Antioch, CA - Construction Impacts- Mitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.5 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

		Child - Exposure Information			Child	Adult - Exposure Information			Adult		
	Exposure			Exposure	Cancer	Modeled		Exposure	Cancer	Mitigated	
Exposure	Duration	DPM Conc (ug/m3)		Adjust	Risk	DPM Conc (ug/m3)		Adjust	Risk	Fugitive	Total
Year	(years)	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)	PM2.5	PM2.5
1	1	2015	0.0402	10	3.52	2015	0.0402	1	0.18	0.0249	0.065
2	1	2016	0.0542	10	4.75	2016	0.0542	1	0.25	0.0126	0.067
3	1		0.0000	4.75	0.00		0.0000	1	0.00		
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**8.26**				**0.43**		

Heidorn Village, Antioch, CA - Construction Impacts
Maximum DPM Cancer Risk Calculations From Construction
Heritage Baptist Academy - 1.5 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Student Exposure

Year	Exposure Exposure Duration (years)	Student - Exposure Information DPM Conc (ug/m3) Year	Conc	Exposure Adjust Factor*	Student Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
1	1	2015	0.0776	3	2.04	0.0615	0.139
2	1	2016	0.1013	3	2.66	0.0087	0.110
3	1		0.0000	3	0.00		
4	1		0.000	3	0.00		
5	1		0.000	3	0.00		
6	1		0.000	3	0.00		
7	1		0.000	1	0.00		
8	1		0.000	1	0.00		
9	1		0.000	1	0.00		
10	1		0.000	1	0.00		
11	1		0.000	1	0.00		
12	1		0.000	1	0.00		
13	1		0.000	1	0.00		
14	1		0.000	1	0.00		
15	1		0.000	1	0.00		
16	1		0.000	1	0.00		
17	1		0.000	1	0.00		
18	1		0.000	1	0.00		
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.•	.•	.•	.•	.•	.•		
65	1		0.000	1	0.00		
66	1		0.000	1	0.00		
67	1		0.000	1	0.00		
68	1		0.000	1	0.00		
69	1		0.000	1	0.00		
70	1		0.000	1	0.00		
Total Increased Cancer Risk					**4.7**		

* Assumes that students at school are 16 years of age or younger for entire construction period

Appendix B: Biological Evaluation Report

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PACIFIC BIOLOGY
635 Carmel Avenue, Albany, CA 94706

HEIDORN VILLAGE PROJECT

BIOLOGICAL EVALUATION REPORT

PREPARED FOR:

Circle Point
1814 Franklin Street, Suite 1000
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PREPARED BY:

Pacific Biology
635 Carmel Avenue
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510/527-1008

September 2014

INTRODUCTION

Pacific Biology conducted a Biological Habitat Evaluation for the Heidorn Village project site. The evaluation was conducted to provide CirclePoint with biological resources information for the California Environmental Quality Act (CEQA) document being prepared. The focus of the biological evaluation was to describe the biological resources present, identify any sensitive biological resources present or potentially present, identify project-related impacts to biological resources that could be considered significant under CEQA, and to recommend avoidance or mitigation measures that should be implemented to address potential impacts to biological resources.

The project site is 20.3 acres in size and is located in Antioch, California. As shown in **Figures 1** and **2**, the project site is bordered to the east by a church/school and Heidorn Ranch Road, to the west by single-family residences (along Summerfield Drive), to the north by a paved pedestrian/bicycle path (and Sungrove Way further to the north), and undeveloped agricultural land to the south. Prewett Ranch Drive terminates at the southwestern corner of the project site. The project site is located on the Antioch South 7.5-minute USGS quadrangles.

METHODOLOGY

Database Review

The latest version of the California Natural Diversity Data Base (CNDDB 2014) was reviewed for the project site and a surrounding five-mile area. The intent of the database review was to identify all documented occurrences of special-status species in the project area and to determine their locations relative to the project site.

Reconnaissance-Level Field Surveys

Pacific Biology conducted a reconnaissance-level survey of the project site on September 9, 2014. The habitats and plant communities present were characterized, and an evaluation of the potential of special-status plant and wildlife species and other sensitive biological resources (e.g., jurisdictional wetlands) to occur was conducted. Pacific Biology also conducted reconnaissance-level surveys on the site on February 9 and 24, 2009; these surveys were conducted for a project previously proposed on the site and information from those site visits is used to supplement this analysis as appropriate.

FIGURE 1: REGIONAL LOCATION
Heidorn Village Project

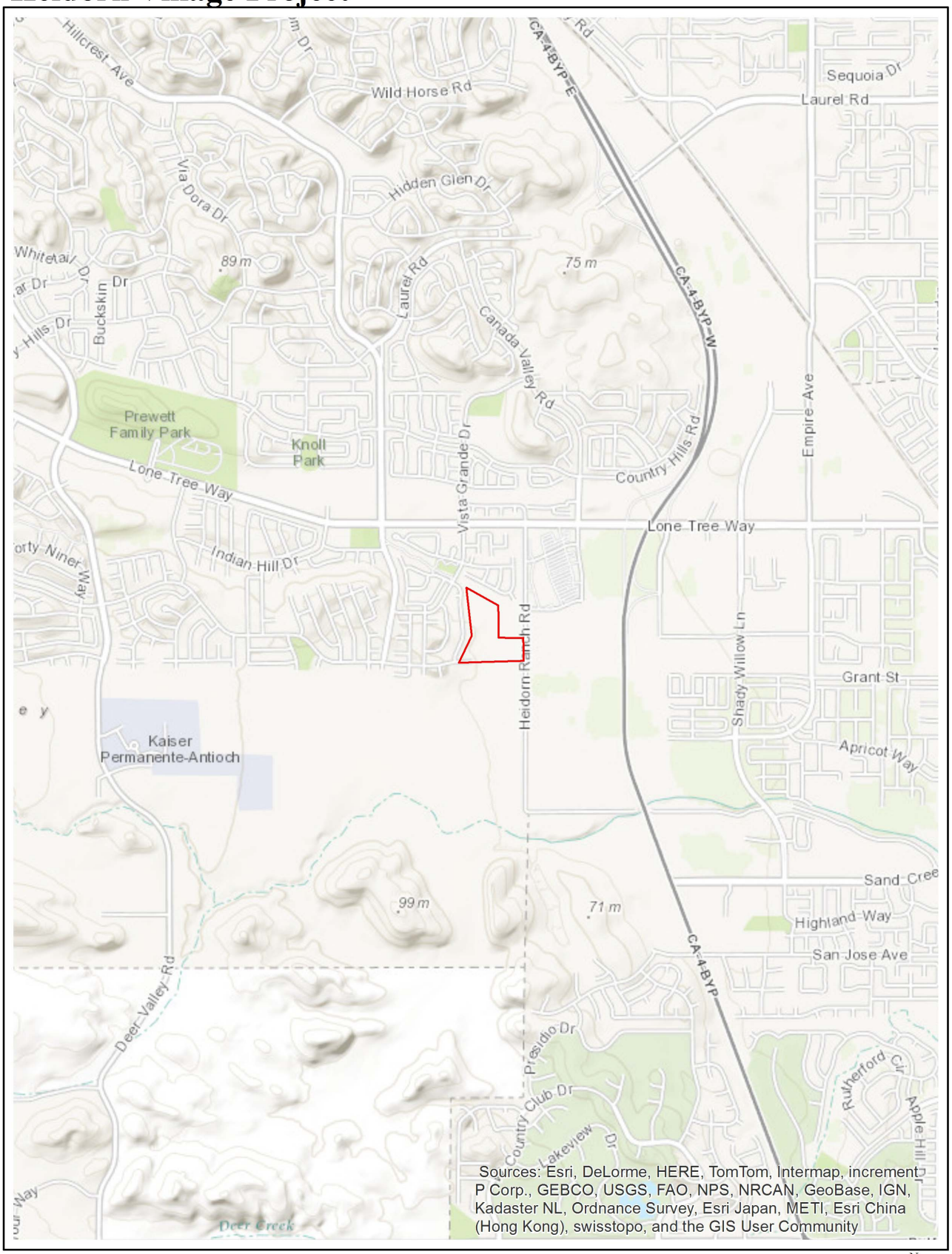
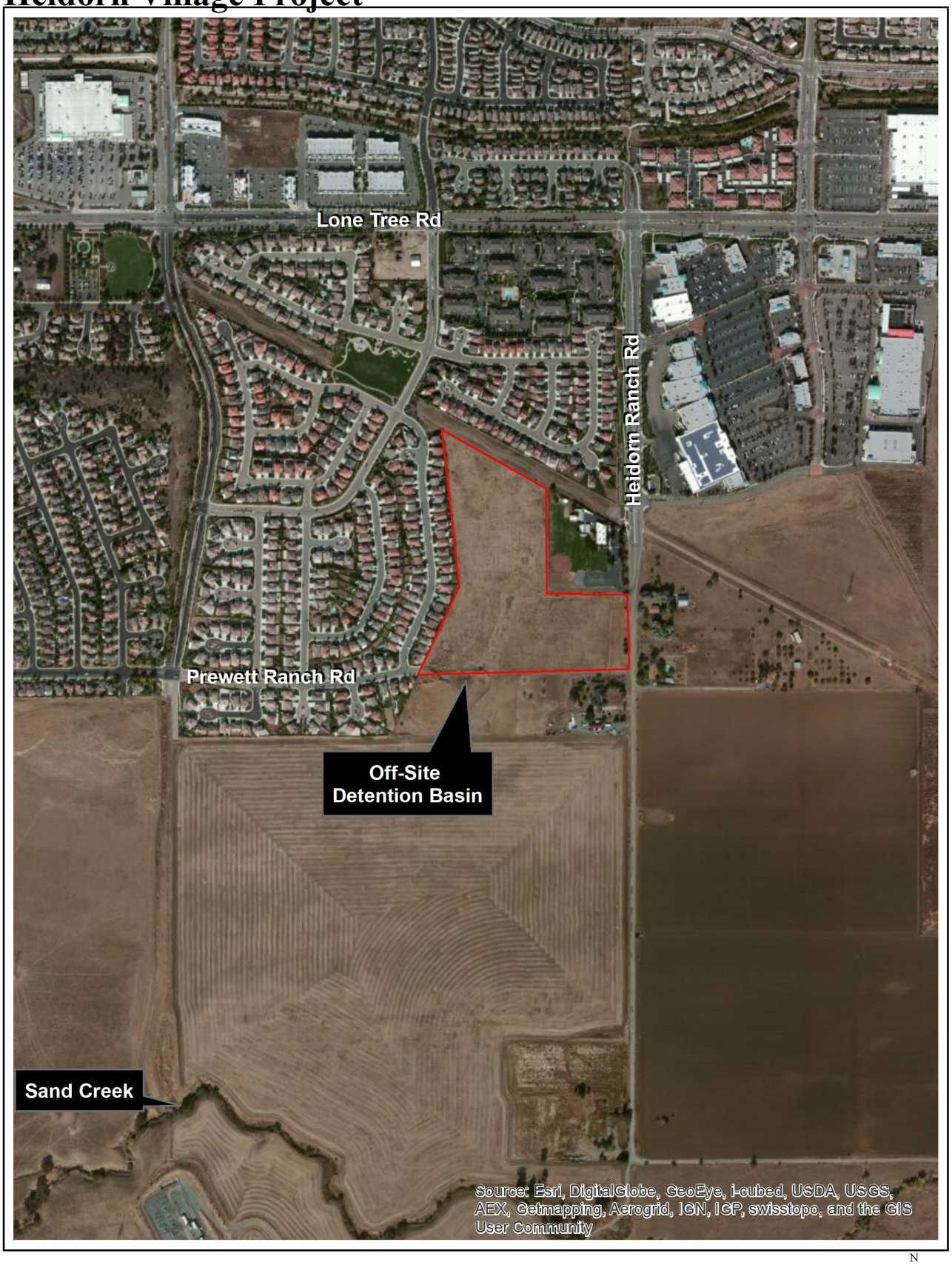


FIGURE 2: PROJECT SITE
Heidorn Village Project



GENERAL BIOLOGICAL CONDITIONS

Project Site

The project site was used as an orchard until 2003 and has been graded. The site was cleared of trees in 2003 and irrigation of the site ceased at that time. Since 2003, the project site has and continues to be regularly disked, as evidenced by the soil condition and almost complete absence of vegetation at the time of the site visit. At the time of the September 2014 site visit, disking had recently occurred and vegetation on the site was limited to several stinkwort (*Dittrichia graveolens*) plants, an invasive species. Non-native grasses and ruderal (i.e., weedy) species occur along the outer margins of the property (near existing fence lines), including species such as ripgut brome (*Bromus diandrus*), wild oat (*Avena* sp.), storks-bill (*Erodium botrys*), and mustard (*Brassica* sp.).

Photo 1: Representative photo of project site; view north



Photo 2: Representative photo of project site; view south



A drainage ditch is located on the project site that generally follows the southern boundary of the church/school. The drainage ditch is an earthen channel that is approximately 1-2 feet wide and 2-feet deep. The drainage ditch was completely dry at the time of the September 2014 site visit. It is connected to the roadside gutter along Heidorn Ranch Road, and it is expected that the ditch only contains water during storm events. Vegetation within the channel includes annual grasses, ruderal species, and some marginal wetland-associated species such as Italian ryegrass and curly dock (*Rumex crispus*). There are several small walnut trees bordering the drainage channel; these trees are likely remnant stock from when the site was used as an orchard.

Photo 3: Representative photo of drainage ditch; view east



Surrounding Area

The project site is bordered by dense residential development to the north and west (Figure 2). Some undeveloped land occurs to the east of the project site, but this land is crossed by heavily traveled roads (including Highway 4-Bypass Road) and contains areas of relatively dense urban and commercial development. A large expanse of undeveloped land occurs directly to the south of the project site, which includes agricultural lands, Los Vaqueros Reservoir and eventually reaches Livermore. At its closest point, Sand Creek is located approximately 0.5 mile to the south of the project site, and there are no barriers between the creek and the project site (Figure 2). However, the land between the creek and the project site appears to be in agricultural use, was recently disked at the time of the site visit, and vegetation was generally absent.

There is a small detention basin to the south of the project site, near Prewett Ranch Road (Figure 2). At the time of the field survey, the basin was completely dry. However, given the topography of the basin and the presence of cracks in the soil (an indication clay soils), it is expected that the detention basin holds water for periods of time during the wet season. Vegetation present in the basin included marginal wetland species such curly dock and flat sedge (*Cyperus* sp.), but species

associated with longer ponding durations (i.e., cattails) were absent. The primary water source of the basin appears to be a culvert that conveys storm-water and irrigation runoff from the nearby residential development.

SENSITIVE BIOLOGICAL RESOURCES AND AVOIDANCE MEASURES

Special-Status Wildlife Species

The latest version of the CNDDB was reviewed to identify documented occurrences of special-status wildlife species from the project area (i.e., within approximately 3 miles of the project site). The following special-status wildlife species are known from the surrounding project area: California red-legged frog, California tiger salamander, vernal pool fairy shrimp, vernal pool tadpole shrimp, San Joaquin kit fox, Swainson's hawk, burrowing owl, American badger, white-tailed kite, loggerhead shrike, and tricolored blackbird. The potential onsite occurrence of these species is further discussed below, and the locations of special-status species documented within approximately 3 miles of the project site are shown in **Figure 3**.

(i) Federally and/or State Listed Wildlife Species

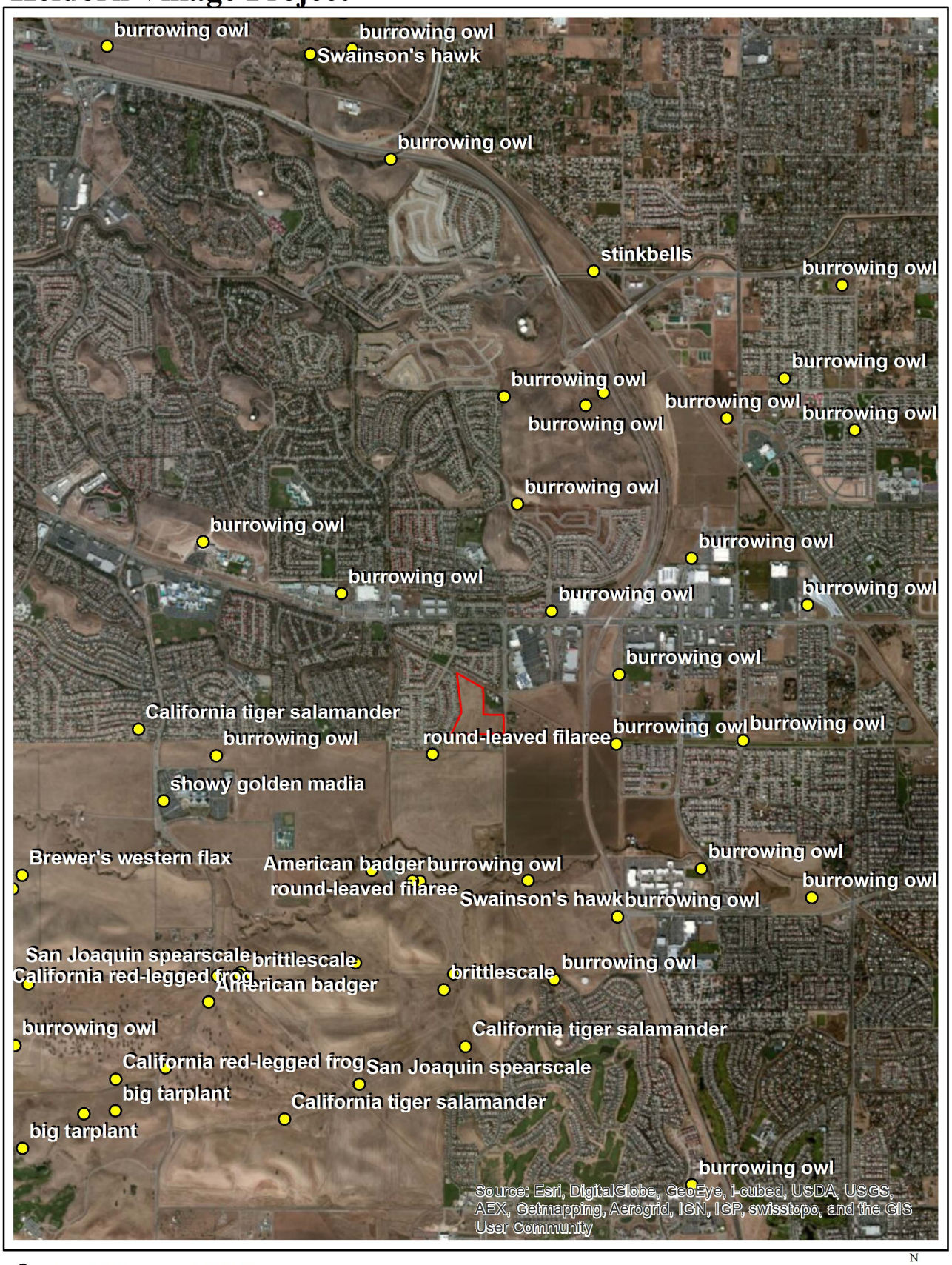
California Red-Legged Frog

Background Information

The California red-legged frog (*Rana draytonii*) is a federally-listed Threatened species and a California Species of Special Concern. Breeding occurs in streams, deep pools, backwaters within streams and creeks, ponds, marshes, sag ponds, dune ponds, lagoons, and stock ponds. California red-legged frog can occur in ephemeral ponds or permanent streams and ponds; however populations probably cannot persist in ephemeral streams (Jennings and Hayes 1985). The species generally avoids large river channels with widely fluctuating flows because such habitat does not permit successful reproductive activity (Hayes and Jennings 1988).

Breeding adults are often associated with deep (greater than 2 feet [0.7 meter]) still or slow moving water and dense, shrubby riparian or emergent vegetation (Hayes and Jennings 1988), but frogs have been observed in shallow sections of streams and ponds that are devoid of vegetative cover. Habitats with the highest densities of frogs are deep-water ponds with dense stands of overhanging willows and a fringe of cattails between the willow roots and overhanging willow limbs (Jennings 1988; Rathbun *et al*. 1993).

FIGURE 3: LOCAL CNDDB MAP
Heidorn Village Project



This semi-aquatic species also utilizes non-aquatic habitats for refuge and dispersal. It rests and feeds in riparian vegetation and the moisture and cover of the riparian zone may facilitate dispersal. The species has also been documented dispersing through areas with sparse vegetative cover and dispersal patterns are considered to be dependent on habitat availability and environmental conditions (Scott *et. al*. 1998). During periods when water is absent, California red-legged frogs may take refuge in moist areas within riparian habitats and small mammal burrows in surrounding upland areas.

Occurrences in Project Area

As shown in Figure 3, California red-legged frogs have been documented in locations to the south and west of the project site. The closest of these locations (CNDDB Occurrence #933) is located approximately 1.7 miles to the southwest of the project site. This occurrence is from Sand Creek, just east of Deer Valley Road.

Status on Project Site

The project site does not provide suitable California red-legged frog habitat given that it is regularly disked and lacks long-lasting aquatic features. It should be noted that shallow ponding was observed on portions of the project site during a period of heavy rain in February of 2009. The observed pools were shallow (less than 12-inches) and short lasting (likely only several weeks during rainy periods). These pools were not deep enough and did not hold water for sufficient duration to support California red-legged frog breeding. Additionally, it is not known if ponding would still occur on the site should heavy rain occur, as the site has continued to be disked since 2009 and no evidence of ponding (i.e., cracked soils, wetland vegetation) was observed during September 2014 site visit.

The project site also does not contain any woodland areas or springs that would provide typical refuge habitat for the species during dry periods. While ground squirrel burrows are present, it is very unlikely that red-legged frogs would use these burrows for refuge for the following reasons: (1) the project site is regularly disked; (2) the project site is greater than 0.5 mile from the closest suitable breeding habitat (i.e., Sand Creek); (3) portions of Sand Creek are perennial (thus the species would not need to move relatively long distances to marginal refuge habitat); and (4) the project site is not located between aquatic habitats and is not part of an expected dispersal pathway.

However, given that California red-legged frogs are known from Sand Creek, and that Sand Creek is located 0.5 mile to the south of the project site and no barriers to movement are present,

it is possible that dispersing frogs could infrequently occur on the project site. This would be most likely to occur during periods of rain when red-legged frogs are known to disperse across upland habitats. Also, the detention basin adjacent to the south of the project site could potentially attract frogs from nearby Sand Creek. If frogs occupy the basin, it is possible that they could disperse from the basin and temporarily occur within the project boundaries. While it is possible that red-legged frogs could disperse onto the project site and temporarily occur, the potential of this occurring is considered to be low.

Potential Project Impacts

There is a low potential that individual California red-legged frogs could disperse from Sand Creek and temporarily occur on the project site. There is also potential that individual frogs could disperse from the adjacent detention basin (if the species is present) and temporarily occur on the project site. The possibility of frogs to disperse onto the project site would be the highest during and immediately following rain when the species is more likely to disperse across upland habitats. In the event that individual California red-legged frogs are present during construction activities, individual frogs could be harmed. Therefore, construction-related impacts to California red-legged frog may be considered a potentially significant impact under CEQA.

Recommended Avoidance Measure

The implementation of the following avoidance measure would protect California red-legged frogs from harm during construction activities and reduce related impacts to a less than significant level.

1) Prior to the commencement of construction activities, temporary exclusionary fencing will be installed along the southern property boundary of the project, which separates the project site from the adjacent detention basin and Sand Creek. The fencing will be installed in a manner to prevent California red-legged frogs from dispersing from the detention basin or Sand Creek into the construction zone. The fencing will be maintained throughout the duration of construction activities. The adequacy of the fencing to prevent frogs from entering the construction zone will be approved by a qualified biologist (subject to the approval of the City of Antioch) prior to the commencement of construction activities.

   The qualified biologist will also survey the construction zone to ensure that no frogs were trapped in the construction zone during the installation of the exclusionary fencing. Should a California red-legged frog be observed during the survey, the

USFWS will be immediately contacted and construction activities will be halted. Any California red-legged frogs present may only be removed by a permitted biologist (authorized by the USFWS). Construction activities may only proceed once it is determined by the qualified biologist that California red-legged frogs are not present in the construction zone.

California Tiger Salamander

Background Information

The California tiger salamander (*Ambystoma californiense*) is a federally- and state-listed Threatened species. The California tiger salamander (CTS) is a relatively large, mostly terrestrial salamander. Sexually mature adults move at night (generally during rain events) from underground refugia (e.g., squirrel burrows) to breeding ponds from late November to early March. The species may move distances up to 1.24 miles from upland refugia to a breeding pool (USFWS 2003a), but the distance is normally less when there are large numbers of refuge sites in close proximity to breeding sites. Vernal pools or seasonal ponds are used for breeding, which occurs from late winter into early spring. The species also breeds in man-made ponds including stock ponds, reservoirs, and small lakes.

After breeding, the adults then return to their underground burrows. The eggs then hatch and the resulting gilled aquatic larvae metamorphose into juveniles. Beginning in late spring and early summer, juveniles migrate from the ponds into underground burrows often created by ground squirrels and other rodent or man-made structures where they remain until the dry season ends.

Occurrences in Project Area

As shown in Figure 3, numerous occurrences of California tiger salamander have been documented to the south and west of the project site. The two closest occurrences (CNDDB Occurrence #479 and #856) are located approximately 1.6 miles to the west and south of the project site. This distance is slightly greater than 1.24-miles, which is the maximum distance the species is known to move between breeding ponds and upland habitat.

Status on Project Site

The project site does not contain suitable breeding or upland habitat for California tiger salamander. The project site is regularly disked, which precludes its successful use by CTS as upland habitat. The agricultural fields bordering the project site to the south are also regularly disked. The species requires standing water for a minimum of 12 consecutive weeks, and the

onsite ponding observed in 2009 occurred for a much shorter duration. It is also not expected that the detention basin adjacent to the south of the project site would be used by California tiger salamanders; the pond is surrounded by large expanses of agricultural lands that are regularly disked, and therefore, suitable upland habitat (an essential habitat component) is not present.

Potential Project Impacts

No project-related impacts to California tiger salamander are expected to occur.

Recommended Mitigation Measures

No mitigation measures are required.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

Background Information

Vernal pool fairy shrimp (*Branchinecta Lynchi*) is a federally Threatened species and vernal pool tadpole shrimp (*Lepidurus Packardi)* is a federally Endangered species. These branchiopod species are associated with seasonal water features, including vernal pools and seasonal wetlands. These species lay cysts that remain dormant in soils when pools are dry and hatch when pools become inundated.

Vernal pool fairy shrimp can be found in a variety of vernal pool habitats, including small, clear, sandstone rock pools and large, turbid, alkaline, grassland valley floor pools (USFWS 2003b). The species tends to occur in smaller pools, and is most commonly found in pools that are less than 0.05 acres in grass or mud-bottomed swales or basalt flow depression pools in unplowed grasslands (USFWS 2003b). Vernal pool tadpole shrimp are generally found in vernal pools with clear to highly turbid water. They have been observed in pools ranging in size from 54 square feet to 89 acres.

Occurrences in Project Area

As shown in Figure 3, several occurrences of vernal pool fairy shrimp have been documented near the project site. Based on the CNDDB, the closest documented occurrence of vernal pool fairy shrimp is from approximately 2.5 miles to the southwest of the project site. This occurrence (CNDDB Occurrence #354) is located between Lone Tree Valley and Horse Valley within a northern claypan vernal pool. Based on the CNDDB, there is only one documented occurrence of vernal pool tadpole shrimp in Contra Costa County. This occurrence (CNDDB Occurrence #177) is from approximately 3.5 miles west of the project site, on the east side of Empire Mine Road.

Status on the Project Site

As previously discussed, shallow ponding was observed on portions of the project site during a period of heavy rain in February of 2009. The observed pools were shallow (less than 12-inches) and short lasting (likely only several weeks during rainy periods). Water was first observed in the pools during the February 9, 2009 field survey, and water was still present during the field survey conducted on February 24, 2009. This period exceeds two weeks, so the pools may provide potential habitat for the species. However, the period between February 9 and 24, 2009, was characterized by multiple days of heavy rain and the pools may not persist for prolonged periods in the absence of near continual rain. Vegetation within the pools was sparse and did not differ from the surrounding area, which indicates that the pools only recently filled, did not hold water for long enough periods to develop wetland-associated vegetation, and that the presence of standing water may closely coincide with storm events. It is not known if ponding would still occur on the site should heavy rain occur, as the site has continued to be disked since 2009 and no evidence of ponding (i.e., cracked soils, wetland vegetation) was observed during the September 2014 site visit.

If water still ponds on the site during heavy rain events, the quality of the habitat for vernal pool fairy and tadpole shrimp is compromised by the following factors: (1) the pools (observed in 2009) are within a field that is regularly disked and that was previously an orchard, and (2) the water source of the pools appeared to primarily be stormwater runoff from the road (which is carried to the pools from the onsite drainage ditch). Given the above, it is considered unlikely that suitable habitat for vernal pool fairy shrimp and/or tadpole shrimp occurs on the project site. However, further evaluation would be required to confirm this conclusion.

Potential Project Impacts

While it is unlikely that suitable habitat is present for vernal pool branchipods, further analysis is required to confirm this finding. Therefore, if present, the proposed project could result in the loss of federally listed vernal pool branchiopods and their habitat. Any loss of vernal pool fairy or tadpole shrimp would be considered a significant impact under CEQA.

Recommended Mitigation Measures

The project applicant should implement Measure 2A, and implement Measure 2B only if suitable habitat for vernal pool branchiopods is found to be present. Measure 2C would only be required in the unlikely event that federally listed vernal pool branchiopods are detected on the site or if the presence of the species is assumed (in lieu of conducting Measures 2A and/or 2B). The implementation of the below measures would reduce related impacts to a less than significant level.

2A) The project site should be monitored during the winter of 2014/2015 to determine if suitable habitat for vernal pool branchiopods occurs on the project site. Suitable habitat would include pools that persist for a minimum of three weeks before drying. If suitable habitat is found not to be present, then no further actions are required.

2B) If it is found that suitable habitat is present, then protocol surveys for vernal pool fairy shrimp and tadpole shrimp should be conducted prior to the construction of the proposed project. These surveys may be conducted concurrently with Measure 2A, above. The surveys would be conducted according to the accepted USFWS survey protocol, which includes either two wet season surveys (with eight individual surveys per wet season), or one wet season survey followed by a dry season survey. If no vernal pool fairy shrimp or tadpole shrimp are observed during the surveys, then no further action would be required. If federally-listed fairy shrimp are detected during the surveys, then the compensation outlined below in Mitigation Measure 2C would be implemented.

2C) The loss of vernal pool fairy and tadpole shrimp habitat would be compensated for by purchasing credits at a 3:1 ratio at an USFWS-approved mitigation bank. The amount of project-related habitat loss may be determined as follows: (1) any areas of suitable habitat (i.e., ponding for at least 3 weeks) on the site will be mapped during the winter months and may be assumed to be occupied habitat; or (2) the area of habitat found to be occupied during the implementation of Measure 2B (see above) would be

compensated for. The availability of credits at an USFWS-approved mitigation bank must be demonstrated prior to the issuance of a grading permit, or other equivalent compensation must be approved by the USFWS.

San Joaquin Kit Fox

Background Information

The San Joaquin kit fox (*Vulpes macrotis utica*) is a federally Endangered and state Threatened species. The species is generally associated with annual grasslands or grassy open stages with scattered shrubby vegetation. The species requires loose-textured sandy soils for burrowing, and a suitable prey base. Kit fox are known to prey on ground squirrels and to occupy enlarged ground squirrel burrows. The species may also be found in manmade structures, including abandoned pipelines, banks in roadbeds or sumps, and culverts (USFWS 1998). Dens are critical for protection from predators, but also provide shelter from inclement weather and thermal regulation. The species typically occupies a number of dens at any one time and may change dens often throughout the year.

Occurrences in Project Area

Based on the CNDDB, the closest documented occurrence of San Joaquin kit fox to the project site is located approximately 5 miles to the west of the project site. This occurrence (CNDDB Occurrence #21) was recorded from 1995 at the southern end of the Contra Loma Reservoir. The species has also been documented approximately 5 miles to the south of the project site. This occurrence (CNDDB Occurrence #936) occurred during the period of 1972 to 1975. San Joaquin kit fox was last documented at Black Diamond Mines Regional Preserve (approximately 6 miles west of the project site) in 1999. The species has not been documented in the general project area since 1999.

As discussed in the *Conservation of San Joaquin Kit Foxes in Western Merced County, California* prepared by the California State University Stanislaus Endangered Species Recovery Program (May 2009), the current status of San Joaquin kit fox in the northern range (including the project area) is unclear.

> *"The status of kit foxes from Santa Nella northward is unclear. This region is commonly referred to as the "northern range", and even the historical distribution and abundance of kit foxes in this region is uncertain. Grinnell et al. (1937) found little evidence of kit foxes north of Merced County. They speculated that the historic range may have extended further to the north along the west side of the San Joaquin Valley, but offered no*

information to support this other than the location for the type specimen near Tracy in San Joaquin County (Merriam 1902)."

"An extensive survey was conducted throughout the northern range during May 2001-February 2003. This effort likely constitutes the most comprehensive survey conducted to date in the northern range. Trained scat-detection dogs were used to survey 213 km of transects on 24 different properties. Of 17 fox scats found and genetically identified to species, all were from red foxes (Smith et al. 2006). No kit fox scats were located."

"Available data offers little support for the presence of resident kit fox populations in the northern range. Currently, kit fox presence in the northern range may consist primarily of occasional dispersing animals from populations to the south of Santa Nella. It is conceivable that such animals might even persist for multiple years resulting in reports of sightings. However, there have been no recent and indeed only two historical records of documented reproduction by kit foxes in the northern range. If self-supporting kit fox populations are not present in the northern range, then this region could be functioning as a dispersal sink, as suggested by Smith et al. (2006)."

Status on the Project Site

San Joaquin kit fox is not expected to occur on the project site for the following reasons: (1) the project site is regularly disked, which limits the abundance of prey and potential den sites; (2) the species has not been documented in the project area in approximately 15 years; (3) the project site is not part of an expected movement corridor for the species as it is bordered on three sides by development; and (4) dogs from the adjacent residential developments and bike path occur on the project site and chase wildlife (such as jackrabbits and ground squirrels).

Potential Project Impacts

No project-related impacts to San Joaquin kit fox are expected to occur.

Recommended Mitigation Measures

No mitigation measures are required.

<u>Swainson's Hawk</u>

Background Information

Swainson's hawk (*Buteo swainsoni*) is a state Threatened species and a federal Bird of Conservation Concern. This species nests in western North America from March to July and

migrates to South America for the winter starting in August. The species generally nests in riparian areas or in large isolated trees adjacent to or within easy flying distance to agricultural areas providing suitable foraging habitat. Valley oaks (*Quercus lobata*), Fremont's cottonwood (*Populus fremontii*), willows (*Salix* spp.), sycamores (*Platanus* spp.), and walnuts (J*uglans* spp.) are the preferred nest trees for Swainson's hawk (Bloom 1980, Estep 1989). The California Department of Fish and Wildlife (CDFG 1994), has identified the following vegetation types/agricultural crops as foraging habitat for Swainson's hawk: alfalfa; fallow fields; beet, tomato, and other low-growing row or field crops; dry-land and irrigated pasture, rice land (when not flooded); and cereal grain crops (including corn after harvest). Given the importance of available foraging habitat for successful nesting, the CDFW has developed policies to protect suitable Swainson's hawk foraging habitat within a 10-mile radius of an active nest (i.e., a nest used during one or more of the last five years).

Occurrences in the Project Area

Swainson's hawks are known to nest in the greater project area (Figure 3). Based on the CNDDB, the closest documented nesting of occurrence (CNDDB Occurrence #1681) is located approximately 0.8 mile south of the project site along Sand Creek. Two adults were observed nesting at this location in 2007. It is not known if recent surveys have been conducted of the nest and if the nest is still active. Another nest has been documented approximately 3.5 miles north of the project site (CNDDB Occurrence #1804). According to the CNDDB, this nest was active in 2011 and 2012, but was not active in 2013. The current status of the nest is also not known.

Status on Project Site

Suitable nesting habitat is not present on the project site as there are no trees of adequate size to support nesting. However, the species could nest near (within 500 feet of) the project site in the large eucalyptus trees along Heidorn Ranch Road. Additionally, as the project site contains suitable foraging habitat and is within 1-mile of a potentially active nest and 3.5 miles of another potentially active nest, Swainson's hawks could forage on the project site.

Potential Project Impacts

The proposed project would not result in the direct loss of an active Swainson's hawk nest, as suitable nesting habitat is not present on the project site. However, should an active nest of the species be present within 500-feet of the project site (in the off-site eucalyptus trees along Heidorn Ranch Road), construction-related activities could result in the noise-related abandonment of the nest. Additionally, given the importance of nearby foraging habitat for

successful nesting, the CDFW has developed recommendations to protect suitable Swainson's hawk foraging habitat within a 10-mile radius of an active nest (a nest used during one or more of the last five years). It is not known if either of the Swainson's hawk nest sites recorded by the CNDDB in the project area are still actively used. If either of these nest sites is still active, the project site will likely be considered to provide Swainson's hawk foraging habitat by the CDFW. Therefore, the potential noise-related abandonment of an active Swainson's hawk nest and the potential loss of 20.3 acres of foraging habitat would be considered significant impacts under CEQA.

Recommended Mitigation Measures

The implementation of the below measures would reduce potential impacts to Swainson's hawks to a less than significant level.

3A) If construction would commence anytime during the nesting/breeding season of native bird species potentially nesting on or near the site (typically February through August in the project region), a pre-construction survey of the project vicinity for nesting birds shall be conducted.

This survey shall be conducted by a qualified biologist (experienced with the nesting behavior of bird species of the region) within 14 days of the commencement of construction activities that would occur during the nesting/breeding season. The intent of the survey shall be to determine if active nests of special status bird species or other species protected by the Migratory Bird Treaty Act and/or the California Fish and Game Code are present within the construction zone or within 500 feet of the construction zone. The survey area shall include all trees and shrubs, as well as fallow fields (which could be utilized by burrowing owls) in the construction zone and a surrounding 500 feet area (were access is possible). The surveys shall be timed such that the last survey is concluded no more than two weeks prior to initiation of construction or tree removal. If ground disturbance activities are delayed following a survey, then an additional pre-construction survey shall be conducted such that no more than two weeks will have elapsed between the last survey and the commencement of ground disturbance activities.

If active nests are found in areas that could be directly affected or are within 500 feet of construction and would be subject to prolonged construction-related noise, a no-disturbance buffer zone shall be created around active nests during the breeding season

or until a qualified biologist determines that all young have fledged. The size of the buffer zones and types of construction activities restricted within them will be determined by taking into account factors such as the following:

- Noise and human disturbance levels at the construction site at the time of the survey and the noise and disturbance expected during the construction activity;
- Distance and amount of vegetation or other screening between the construction site and the nest; and
- Sensitivity of individual nesting species and behaviors of the nesting birds.

Limits of construction to avoid an active nest shall be established in the field with flagging, fencing, or another appropriate barrier, and construction personnel shall be instructed on the sensitivity of nest areas. The biologist will serve as a construction monitor during those periods when construction activities would occur near active nest areas of special-status bird species to ensure that no impacts on these nests occur.

3B) The CDFW will be contacted to determine if the Swainson's hawk nests documented in project area are still considered to be "active" based on the most recent survey information available. If it is determined that the project site is within 10 miles of an active Swainson's hawk nest, the applicant will mitigate for the loss of suitable Swainson's hawk foraging habitat by implementing one of the below measures. Measures "a", "b", and "c" are generally recommended by the CDFW (CDFG 1994), while measure "d" could benefit the species given the effort to acquire land in the project region as part of the East Contra Costa County Habitat Conservation Plan (ECCCHCP):

a. **Active nest identified within 1 mile of project site**. One acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. At least 10% of the land requirements shall be met by fee title acquisition or a conservation easement allowing the active management of the habitat, with the remaining 90% of the protected land protected by a conservation easement (subject to CDFW approval); or

   One-half acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. All of the land requirements shall be met by fee title acquisition or a conservation easement (subject to CDFW approval).

b. **Nest identified within 5 miles (but greater than 1 mile) of the project site.** 0.75 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. All of the land requirements may be met by fee title acquisition or a conservation easement (subject to CDFW approval).

c. **Nest identified within 10 miles (but greater than 5 miles) of the project site.** 0.5 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. All of the land requirements may be met by fee title acquisition or a conservation easement (subject to CDFW approval).

d. A financial contribution shall be made to a CDFG-approved entity (such as the ECCCHCP) to be used towards the protection of Swainson's hawk foraging habitat. The amount of the contribution will be determined by the CDFW based on the acreage and condition of foraging habitat to be developed by the proposed project.

(ii) Other Special-Status Wildlife Species

Burrowing Owl

Burrowing Owl (*Athene Cunicularia*) is a federal Bird of Conservation Concern and a California Species of Special Concern. The burrowing owl is a small ground-dwelling owl that lives in open, dry grasslands, agricultural and range lands, and desert habitats associated with burrowing mammals. Burrowing owls nest and shelter in ground squirrel and other suitable small mammal burrows or artificial structures. The species prefers areas of short grass or bare ground and few trees to reduce the potential for predators to hide near the nest or foraging grounds.

As shown in Figure 3, numerous occurrences of burrowing owl have been documented from within 1-mile of the project site. California ground squirrels are present on the project site to varying degree based on the frequency of disking. At the time of the September 2014 site visit, the burrows of this small mammal occurred on portions of the project site. Therefore, when ground squirrel burrows are present, the project site provides potential nesting and wintering habitat for burrowing owl.

It should be noted that given the presence of suitable habitat and nearby known occurrences, Pacific Biology conducted protocol burrowing owls surveys during the nesting season in 2009. No owls or sign of owl (e.g., molted feathers, cast pellets, prey remains, eggshell fragments, or excrement) were observed during the surveys. No burrowing owls were observed and it was concluded that while suitable burrowing owl habitat is present between disking cycles, it is likely

that the disking prevents burrowing owls from successfully colonizing the site. Additionally, several dogs (from the adjacent residential development) were frequently observed on the project site. It is possible that these dogs could further deter owls from colonizing the site.

Based on the above and because the site continues to be regularly disked, burrowing owls are not expected to permanently reside or nest on the project site. However, there is some potential that non-breeding owls could temporarily occur on the project site during winter migration or dispersal. Given these potential non-breeding uses, the nesting success or continued persistence of burrowing owls in the project region is not dependent on the habitat provided by the site. Accordingly, the *Burrowing Owl Survey Protocol and Mitigation Guidelines* (which has been adopted by the CDFW) only recommends the preservation or replacement of burrowing owl habitat if a site (to be developed) is used by nesting or resident burrowing owls. However, should non-breeding owls be present during construction activities, individual owls could be harmed. Therefore, the potential loss or harm of non-breeding burrowing owls would be a potentially significant impact under CEQA.

Recommended Mitigation Measures

4) The applicant will retain a qualified biologist, as approved by the City of Antioch, to conduct clearance surveys for burrowing owls. The survey will be conducted using CDFW accepted methods and be conducted no more than 14 days prior to commencement of construction activities. If burrowing owls are observed using burrows during the non-breeding season, or after young have fledged following the conclusion of the breeding season, owls will be excluded from all active burrows through the use of exclusion devices placed in occupied burrows in accordance with CDFW protocols (CDFG 1995). Specifically, exclusion devices, utilizing one-way doors, will be installed in the entrance of all active burrows. The devices will be left in the burrows for at least 48 hours to ensure that all owls have been excluded from the burrows. Each of the burrows will then be excavated by hand and refilled to prevent reoccupation. Exclusion will continue until the owls have been successfully excluded from the site, as determined by a qualified biologist. In the unlikely event that nesting owls are observed, then the nests will be avoided until all young have fledged.

White-Tailed Kite

White-tailed kite (*Elanus Leucurus*) is a California Fully Protected Species. This species typically nests in trees, often in isolated stands, surrounded by open foraging habitat. Nests are

built on top of oaks, willows, or other dense, broad-leafed deciduous trees within partially cleared or cultivated fields, grasslands, marsh, riparian, woodland, and savanna habitats. The proposed project would not result in the direct loss of an active white-tailed kite nest because suitable nesting habitat is not present on the project site. However, should an active nest of the species be present within 500-feet of the project site (in the off-site eucalyptus trees along Heidorn Ranch Road), construction-related activities could result in the abandonment of the nest. Therefore, the potential disturbance to an active white-tailed kite nest would be a potentially significant impact under CEQA.

Recommended Mitigation Measures

The implementation of Mitigation Measure 3A, above, would serve to prevent the loss of an active white-tailed kite nest.

Loggerhead Shrike

Loggerhead Shrike (*Lanius ludovicianus*) is a federal Bird of Conservation Concern and a California Species of Special Concern. The loggerhead shrike is a predatory passerine that is a resident in the lowlands and foothills throughout California where its' habitat consists of open spaces, such as grasslands, with scattered trees, shrubs, utility lines, and/or fences for perching. Loggerhead shrike typically nest in densely vegetated trees and shrubs. The project site provides low quality, but potential nesting habitat, with potential nesting habitat being limited to the several small shrubby trees near the drainage ditch. Should the species nest on the project site, construction activities could result in the direct loss or abandonment of an active loggerhead shrike nest. Therefore, the potential loss or disturbance to an active loggerhead shrike nest would be a potentially significant impact under CEQA.

Recommended Mitigation Measures

The implementation of Mitigation Measure 3A, above, would serve to prevent the loss of an active loggerhead shrike nest.

Tricolored Blackbird

Tricolored blackbird (*Agelaius tricolor*) is a federal Bird of Conservation Concern and a California Species of Special Concern. This species typically nests in large colonies in dense stands of cattails or tules in freshwater, emergent wetlands. It also has been observed nesting in dense stands of willows, blackberry, wild rose, and tall herbs. Suitable nesting habitat is not present on or bordering the project site. Therefore, the proposed project would not result in the

loss of a tricolored blackbird nest and related impacts would be considered less than significant under CEQA.

American Badger

American Badger (*Taxidea taxus*) is a California Species of Special Concern. American badgers are most abundant in drier open stages of shrub, forest, and herbaceous habitats with friable soils, where they dig burrows. As shown in Figure 3, American badgers are known from the project area and the closest documented occurrence of the species is from approximately 0.6 mile south of the project site (near Sand Creek). The regular disking of the site would prevent the species from colonizing the project site. Therefore, impacts to American badger would be less than significant under CEQA.

Special-Status Plant Species

Numerous special-status plant species have been documented in the project area. However, prior to 2003, the project site was an irrigated orchard, and since that time, the project site has been regularly disked. Currently, the project site is generally devoid of vegetation, with the only herbaceous vegetation consisting of non-native annual grasses and weedy vegetation. The extent of historic and ongoing disturbance to the project site has eliminated any habitat that could support special-status plant species and no special-status plant species are expected to occur. Therefore, the proposed project would not result in any impacts to special-status plant species.

Jurisdictional Resources

Wetlands and permanent and intermittent drainages, creeks, and streams are generally subject to jurisdiction of the Army Corps of Engineers (ACOE) under Section 404 of the Federal Clean Water Act. The ACOE has jurisdiction up to the "ordinary high water mark" of rivers, creeks, and streams that are considered "waters of the U.S." as defined by the Clean Water Act. If adjacent wetlands occur, the limits of jurisdiction extend beyond the ordinary high water mark to the outer edge of the wetlands. Wetlands are defined by ACOE as "those areas that are inundated or saturated by surface or groundwater at a frequency or duration to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (ACOE 1987). The presence and extent of wetland areas are normally determined by examination of the vegetation, soils, and hydrology of a site. The ACOE definition of wetlands requires that all three wetland identification parameters be met. It is also generally required that jurisdictional wetlands have a hydrologic connection, or are adjacent to a Waters of the U.S.

As previously discussed, several pools of standing water were observed on the site during periods of heavy rain in February 2009. It appeared that the onsite drainage ditch was the primary water source of the pools. The source of water for the drainage ditch appears to be roadside runoff. The drainage ditch is not a natural feature and appears to have been excavated in upland habitat. Vegetation within the areas of ponded water was sparse and did not differ from the surrounding disked fields, which may indicate that the pools generally do not hold water for long enough periods to develop wetland-associated vegetation and that the presence of standing water may closely coincide with storm events. The drainage ditch and the observed areas of ponding do not have an apparent hydrologic connection to a Waters of the U.S. It is not known if ponding would still occur on the site should heavy rain occur, as the site has continued to be disked since 2009 and no evidence of ponding (i.e., cracked soils, wetland vegetation) was observed during September 2014 site visit.

The above factors suggest that the ponded areas and drainage ditch may not be under the jurisdiction of the ACOE. However, atypical conditions occur on the project site given the regular disking, and the ACOE takes atypical conditions into consideration in making a jurisdictional determination. Additionally, only the ACOE can make the determination of if a wetland or drainage is under their jurisdiction. Therefore, there is some (although limited) potential that the ponded areas (observed in 2009) and drainage ditch may be considered to be jurisdictional wetlands by the ACOE.

In its current condition, the area where ponding occurred in 2009 does not provide habitat values that differ from the surrounding disked field. Also, it should be noted that wetland vegetation was not present in the ponded areas in 2009, that this area has continued to be regularly disked since 2003, and that prior to 2003 the project site was an orchard. Therefore, from a habitat perspective, the development of the areas where ponding occurred would not result in a substantial adverse affect to wetland habitat. Similarly, as the drainage ditch appears to have been excavated in an upland area, because vegetation within the ditch does not substantially differ from adjacent weedy habitats, and because the drainage ditch only conveys surface runoff from Heidorn Ranch Road (and is not part of a natural stream system), the loss of this feature also would not be considered substantial or a significant impact under CEQA.

Recommended Measures

For the reasons discussed above, it is unlikely that the areas where ponding occurred in 2009 and the onsite drainage ditch are under the jurisdiction of the ACOE or Regional Water Quality Control Board (RWQCB). However, only the ACOE can make the determination of if a feature

is under their jurisdiction and subject to the requirements of the federal Clean Water Act. Therefore, the following measure should be implemented.

5) A jurisdictional delineation should be conducted and the results submitted to the ACOE for verification. If it is determined that jurisdictional wetlands or other water are not present, no future actions would be required. If it is determined that jurisdictional wetlands and/or other waters are present, the applicant will apply for the required permits from the ACOE and RWQCB prior to fill of the features. The applicant will comply with all the conditions and mitigation requirements contained in the permit agreements.

Riparian and Sensitive Plant Communities

The project site does not contain any riparian or sensitive plant communities. The project site is regularly disked and vegetation is limited to non-native, annual grasses and ruderal plant species. Therefore, no project-related impacts to riparian or sensitive plant communities would occur.

Wildlife Movement Corridors

Wildlife corridors are described as pathways or habitat linkages that connect discrete areas of natural open space otherwise separated or fragmented by topography, changes in vegetation, and other natural or human induced factors such as urbanization.

The project site is located at the outer edge of a heavily developed area. The project site is immediately bordered to the north and west by dense residential development. Therefore, wildlife movement in these directions is not possible. Some undeveloped land occurs to the east of the project site, but between the project site and 0.7 mile to the east, this land is crossed by heavily traveled roads (including Highway 4-Bypass Road) and contains some areas of relatively dense urban and commercial development. Very dense development then occurs at distances of greater than 0.7 mile to the east of the project site. Therefore, wildlife movement opportunities to the east are heavily constrained and the project site does not provide habitat connectivity to open spaces to the east.

A very large expanse of undeveloped land occurs directly to the south of the project site, and there are no substantial barriers to wildlife movement from the project site south to Livermore. While open space occurs to the south of the project site, the project site is not part of a wildlife movement corridor because of its location at the outer edge of an urban area. Wildlife corridors occur where the corridor provides connectivity between two patches of large open space areas that are otherwise separated by rugged terrain, changes in vegetation, or by human disturbance.

Due to the dense developed uses to the north, west, and east of the project site, the site does not provide connectivity between large open space areas. Therefore, the project site is not considered to be part of a wildlife movement corridor. Project-related impacts to wildlife movement would therefore be considered to be less than significant under CEQA.

Compliance with a Tree Protection Ordinance

The only trees on the project site are several (two to three) small, non-native trees bordering the drainage ditch. The City of Antioch Tree Ordinance (Article 12: Tree Preservation and Regulation) does not specify what species and size of trees are protected. Therefore, the trees on the project site are assumed to be protected under the City of Antioch Tree Ordinance, despite their small size and being non-native species. Compliance with the City of Antioch Tree Ordinance would be required.

Recommended Mitigation Measures

6) The applicant shall comply with the requirements outlined in the City of Antioch Tree Ordinance (Article 12: Tree Preservation and Regulation).

Compliance with Adopted Habitat Conservation Plan

The City of Antioch has elected not to be included within the East Contra Costa County Habitat Conservation Plan (ECCCHCP) and therefore is not subject to the requirements of the ECCCHCP. Therefore, related impacts would be less than significant under CEQA.

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Appendix C: Geotechnical Study

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GEOTECHNICAL STUDY FOR PROPOSED TIERRA VILLAS SINGLE-FAMILY HOME SUBDIVISION NORTHWEST CORNER OF HEIDORN RANCH ROAD AND PREWETT RANCH DRIVE ANTIOCH, CALIFORNIA

FOR

THE MISSION PEAK COMPANY
PROJECT NO. GM-115/G240-01
JANUARY 31, 2007

The PRA Group, Inc.

PRA Group
CONSULTING ENGINEERS

No. GM-115/G240-01
January 31, 2007

Mr. Steve Allen
The Mission Peak Company
40480 Encyclopedia Circle
Fremont, CA 94538

Subject: **GEOTECHNICAL STUDY**
Proposed Tierra Villas Single-Family Home Subdivision
Northwest Corner of Heidorn Rd. and Prewett Ranch Dr.
Antioch, California

Dear Mr. Allen:

In response to your request and authorization, we are herein presenting the results of a Geotechnical Engineering Study prepared by our firm for the subdivision located at the corner of Heidorn Rd. and Prewett Ranch Drive in Antioch, California. Our report describes the services performed and presents our conclusions and recommended geotechnical design criteria.

In our opinion, the site is suitable for the proposed development provided the geotechnical recommendations in this report are incorporated into the design and followed during construction. We reserve the right to make supplemental recommendations at any time during construction based on observed or changed conditions.

It has been a pleasure to be of service to you on this project. Should you have any questions concerning the findings, recommendations or conclusions of the attached report, please contact this office.

Very truly yours,

PRA GROUP, INC.

REGISTERED PROFESSIONAL ENGINEER
DANIEL JAY RHOADES
No. GE-716
Exp. 6/30/07
GEOTECHNICAL
STATE OF CALIFORNIA

Daniel J. Rhoades, P.E.
Principal
GE-716, Expires: 06/30/07

John L. Maier
Staff Engineer

wcr/G240-01.1

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APPENDIX A - RECOMMENDED GRADING SPECIFICATIONS

INTRODUCTION

Purpose

The purpose of this study was to evaluate the soil and geologic characteristics relevant to the design of the proposed single-family home subdivision to be known as Tierra Villas Development. General foundation engineering design and geotechnical recommendations are provided based on the physical characteristics of the subsurface materials and the geotechnical limitations created by the site's surface features.

Proposed Development

The proposed Teirra Villas Development would consist of subdividing the property into 122-lots for single-family home construction using a post-tension foundation system. Structural loads for the wood frame construction are expected to be relatively light. In addition to the houses, the development would also include construction of underground utilities, public and private roadways, and open space facilities. No final grading plans were available at the time of our report with preliminary plans indicating minor cut and fills. Please contact our office, if the conditions of the project change.

Scope

The scope of or services for the proposed development, as set forth in our September 26, 2006, proposal, included the following: researching soil and geotechnical data, exploratory drilling, sampling and laboratory testing of soil encountered during drilling procedures, analyzing the soil data compiled during the exploration, and reporting our findings and recommendations. This phase of the study did not include assessments for toxic substances or soil or groundwater contamination.

SITE SETTING

Site Location and Description

The subject site is located northwest of the Intersection of Heidorn Ranch Road and Prewett Ranch Drive, which is approximately 0.7 miles south of Lone Tree Way in Antioch, California (see Figure 1, Site Location Map). The site is an irregular 'L'-shape, with an existing elementary school to the

north and east of the property separated from the subject parcel by a chain-link fence. For shape and dimensions of the proposed property, please refer to Figure 2, "Site Plan and Boring Locations".

During our Exploratory Borings, it was evident that the upper 12-inches of soil and vegetation had been ripped and left in-place. There was dead grass in the tilled material and it is understood that this material will later be removed or used in the landscaped areas. Presently, there are no trees on the site. At the southwest portion of the property, there was a natural drainage swale, where storm water collected during the seasonal wet period as indicated by tall grass.

General Geologic Setting

The subject site is situated east of the San Francisco Bay Area, in the Great Valley Geologic Province of California near the boundary of the Coast Range Geologic Province. In the geologic mapping of the Brentwood area, Brian Atwater (1982) indicated that the subject site is underlain by Holocene and upper Pleistocene alluvium deposits of Marsh Creek. The Marsh Creek Formation consists of alluvial-fan and alluvial-terrace deposits derived from unglaciated drainage basins. The younger deposits were described as over bank silt overlying channel sand and gravel, which grades into and includes gray silt and clay. Due to the general flat topographic relief of the area, no landslides were mapped on the subject site or on the adjacent properties (Nilsen, 1975). The map by Helley and Graymer (1997) describes the site area as Holocene age alluvial fan deposits (see Figure 3, Area Geology Map).

Seismic Considerations

The subject site lies within the eastern portion of the San Francisco Bay Area, a region of high seismic activity. The probability is very high for a major earthquake to occur in the Bay Area within the economic lifetime of the proposed structures. Several active and potentially active faults occur in the region. Geologic references indicate that no fault trace designated active or potentially active passes through the subject property (Brabb and Switzer, 1971). According to the Seismic Safety Element of the Contra Costa County General Plan (CCCCSSE), the nearest fault designated as active is the Marsh Creek-Greenville Fault, approximately 7 miles southwest of the site. Other active or potentially active Bay Area faults, which could also cause ground shaking at the site,

include the Concord Fault, approximately 13 miles west, the Calaveras Fault, approximately 16-1/2 miles southwest, and the Hayward Fault, approximately 26 miles west. The Antioch Fault, located approximately 1 mile west of the site is no longer considered active (CDMG, 1993).

Since the site is located in eastern Contra Costa County, we have considered a buried tectonic feature, termed the Great Valley-Coast Range (GVCR) tectonic boundary as a potential seismic source. Wakabayashi and Smith (1994) described their evaluation of recurrence intervals, characteristic earthquakes and slip rates associated with thrusting along the GVCR geomorphic boundary. In the paper of Wakabayashi and Smith (1994), they stated that the recurrence interval for the average segment is 350 to 440 years. Additionally, based upon their estimates, the GVCR, "...accommodates most of the plate convergence between the North American and Pacific Plates, indicating that the historical earthquakes efficiently released strain accumulated on the CRCV and suggesting that a seismic deformation along the CRCV is minor." Further, the California Geologic Survey (2003) had determined that movement on the Mt. Diablo Thrust justified delisting the segment in the area of the site as a potential seismic source.

The project site would be susceptible to ground shaking and ground failure during a major earthquake on the faults listed above; also, ground shaking may occur during an earthquake on other nearby faults. Ground rupture tends to occur along lines of previous fault rupture or tectonic creep. Because no known faults (active or otherwise) cross the site, this hazard is low. The seismic risk to a structure depends on the distance from the epicenter, the characteristics of the earthquake; the geologic, groundwater, and soil conditions, underlying the structures and its vicinity; and the nature of the construction.

According to the CGS interactive web site for probabilistic seismic hazards, a peak ground acceleration value of approximately 0.4g would have a 10 percent chance of being exceeded in a 50 year period. This peak value would represent a single-pulse during an earthquake, and the repeatable ground acceleration value would be approximately 65 percent of the peak value for epicenters occurring within a 20 mile radius of the site.

Liquefaction Potential - Regional

Liquefaction occurs when loose, saturated granular deposits experience substantial strength loss and consequently, flow due to increase pore pressure during cyclic seismic loading. According to Contra Costa County Seismic Element (1990), the project is located in an area with a generally moderate to low potential for liquefaction. A more recent liquefaction assessment by Witter and others (2006), did not specifically map the subject property, but determined that Holocene alluvial fan deposits, such as mapped at the subject site, had a Moderate liquefaction susceptibility with free groundwater levels of less than 30 feet below the ground surface. Areas of Holocene alluvial fan deposits with groundwater levels deeper than 30 feet were considered to have a Low susceptibility for liquefaction.

SITE EXPLORATION AND LABORATORY TESTING

Site Exploration

Field exploration of the site was conducted on September 29, 2006, and consisted of exploratory drilling with a B-24 track-mounted drill rig. Eight Borings were drilled randomly on the site, with depths ranging from 4-1/2 to 31-1/2 feet, with an average depth of 13 feet, to determine the subsurface nature of the in-situ soils through observation during drilling and recovery of the soil samples for laboratory testing and interpretation of the laboratory data. A 4-inch solid auger was used to drill the test borings to the selected depth of each boring, including the depth where each soil sample obtained for laboratory testing and evaluation. This undisturbed soil samples were recovered in a 2-inch inside diameter Modified California Sampler driven into the subsurface material by a 140-pound hammer dropped from a height of 30-inches. The number of blows necessary to advance the sample barrel 18-inches into the soil was converted to a Standard Penetration Number, which is presented on the boring logs as Figures 4 through 11.

Laboratory Testing

Samples of the subsurface soil material were collected as described above and tested under laboratory conditions to determine on-site soil properties. Tests performed were: Moisture/Density, Unconfined Compression, #200 Wash Sieve Analysis, Hydrometer, Swell, Atterberg Limits, and Modified Proctor.

Swell tests were performed in accordance with ASTM D-4545-90, Method B. Surcharge loads of 150 lb/ft^2 were applied to samples 1-inch in height and 1.94 inches in diameter, followed with the inundation of the sample. During the first test, with an applied 150 lb/ft^2 surcharge load, a total swell of 8.1 percent was observed over a total of three days, whereas, a swell of 1.7 percent was observed, during Swell Test 2, over a three day period with an applied pressure of 500 lb/ft^2. Swell Test 1 and 2 samples taken at 2 feet below grade in Boring 3 and 5, respectively had in-situ moisture contents of 18 and 20 percent and were dried back to moisture content of 11 and 14 percent, respectively. Atterberg Limit tests, ASTM D-4318, for determination of the plasticity of the soil, indicated a Plasticity Index (PI) of 18 for Boring No. 2 at 2 feet and a PI of 24 for Boring Nos. 7 and 8 at 2 feet. A Plasticity Index of 10 to 20, indicates a soil of low to medium expansion, whereas, a Plasticity Index ranging from 25 to 40, indicates an expansive to highly expansive soil. The Plasticity Index of a soil has thus a direct correlation to the expansive potential of the soil as verified by the Swell Tests mentioned above. These and all other test results are presented in the Boring Logs 4 through 11.

A Hydrometer Analysis, ASTM D-4221, was performed to determine the percentage of clay particles (diameter less than 0.002 mm) present in the subsurface material. The sample used for analysis was extracted from a depth of approximately 24-inches by sampling methods described above, at approximately the center of the site and results indicated the sample to have 74 percent clay particles. A #200 Sieve Test was performed of the soil materials at a depth of 2 feet below grade in test Borings 7 and 8, revealing a percent passing the #200 Sieve of 93% and 88% for the silty clay materials.

Subsurface Conditions

Material encountered in the center to northern area of the site, in the upper 1 to 3 feet, consisted of a silty clay of medium to high plasticity, with an average 18 percent moisture content and 106 lb/ft^3 dry density. Below the silty clay material, a fine sandy clay occurred from approximately 3 to 10 feet., with the soil becoming a silty clay to sandy silt at the maximum depth drilled of 11-1/2 ft. for Borings 5 through 8.

The southern portion of the site included Borings 1 through 4 consisted of approximately 3 ft., of silty clay with a change to a layer of fine sandy clay to an approximate depth of 11 ft., underlain by sandy silt to silty sand, which extended to the maximum 1-1/2 ft. depth for Boring 2. In general the subsoils became stiffer or dense with depth indicated by the recorded blow count data recorded on each log of boring where subsurface soil samples were obtained. Although fine sand was observed with the clay in the soil at shallow depths in the southern section of the site, the predominate soil material for this soil strata was the clay portion.

Groundwater

Groundwater was not encountered on-site in any boring, with Boring 2 extending 31-1/2 feet below grade. Groundwater levels should be expected to fluctuate seasonally, and due to the actions of man.

Liquefaction Potential - Site

In order to evaluate the liquefaction potential of the subject site, the encountered soil materials were described during exploratory drilling and the soil properties were determined from blow count data, and laboratory testing. The borings showed the absence of a free ground water level to the maximum depth explored of 31-1/2 feet below the ground surface for Boring B-2. Blow counts from the Standard Penetration Tests indicated that if groundwater had been present during a seismic event, the chance of liquefaction would be low.

A #200 Wash-Sieve Analysis was performed on a sample from Boring 2, from a depth of 31-1/2 feet. The test determined a fines content of approximately 16 percent. In general, soil with a fines content greater than 15 percent show an increased resistance to the affects of liquefaction (Borchardt and Kennedy, 1979). The high penetration resistance of these materials also indicates a Low susceptibility for liquefaction.

Therefore, based upon the classification of the subsurface materials encountered, fines content, penetration resistance, and the absence of a free ground water level, it is our opinion that the liquefaction susceptibility of the subject site would be considered Low.

Discussion

The property had been recently disced with organic contamination in the top one-foot of the disced area, which will be mitigated during the stripping portion of the grading operations.

The project soil materials in the top 4-feet for the property generally consist of moderate to expansive silty clay to sandy clay materials that impact the foundation and pavement design for the project. During grading operations, the soil material at the subgrade and final pad elevation may be altered due to the depth of cut or fill planned for the development. An inventory of the final pad grade soil condition will be required upon completion of grading operations for soil corrosion and expansive conditions in order to verify the recommendation of the report or to provide supplemental recommendations based upon changed soil conditions.

Moisture conditioning of all pad grade soils will be required, prior to foundation placement in order to reduce the future expansion potential of the pad soils due to unforseen soil moisture change from environmental conditions. This later requirement is a preventative measure to provide a more uniform moisture condition below the slab as foundation construction may occur during the Summer and Fall dry cycle resulting in a low subgrade moisture content. The post-tension slab foundation system deflection from soil movement is dependent upon many variables, both environmental and design, that are discussed in the Foundation Section of this report. It would be helpful to inform future owners of the homes to follow prudent landscaping practices to comply with the drainage intent as set for in this report. The following conclusions and recommendations address the above issues.

CONCLUSION

It is our opinion, based on an analysis of the data and information obtained from the site exploration, laboratory testing, geotechnical evaluation, and our experience and knowledge of the soil conditions in this area, the site is geotechnically suitable for the proposed development provided the recommendations contained herein are incorporated into the project designs and adhered to during construction. The principal adverse geotechnical factors affecting the development of the site are the expansion potential of the surface and subsurface soils and the potentially strong shaking due to earthquakes. The recommendations presented herein are intended to reduce th risks associated with these factors and to minimize their effects. The following conclusions are based on the results of our study of the subject site.

1. The proposed subdivision is feasible from a Geotechnical Engineering and standpoint provided the recommendations contained herein are followed in the design construction of the Tierra Villas Development.

2. Seismically induced ground shaking with minor structural damage may occur within the economic life of the development.

3. It is our opinion, that a low liquefaction hazard exists at the subject site. This opinion is based on soil and groundwater conditions encountered in our borings, the standard penetration tests obtained within each soil substrata of concern and the results of laboratory tests conducted on selected recovered soil samples.

4. Our laboratory testing and observations indicate that the near surface soil is characterized as moderate to high in expansion potential.

5. Due to the geotechnical conditions encountered at the site, it is our opinion, that the proposed single-family subdivision may be supported on a post-tensioned structural slab foundation system. Use of this foundation system is contingent on the grading and foundation recommendations, and moisture-conditioning of the pad soils prior to concrete placement as presented in this report.

6. It is our opinion, that a final lot inventory of the pad subgrade soils for corrosion and expansive soil condition is necessary for quality control purposes and to verify the geotechnical design recommendations provided in this report based upon the random surface soil sampling and testing of the existing grade materials, which change with the planned grading.

RECOMMENDATIONS

Geotechnical Hazards

Risk of geotechnical hazards will always exist due to uncertainties of geologic conditions and the unpredictability of seismic activity in the Bay Area. However, in our opinion, based on available data, there are no indications of geotechnical hazards that would preclude use of the site for the proposed development. The purposed structures should be designed to meet the current *Uniform Building Code* (UBC) requirements to limit potential damage from ground shaking and ground failure.

UBC Seismic Parameters

We have reviewed the 1997 edition of the Uniform Building Code (UBC) and our files to provide seismic shaking criteria for your structural engineer's consideration in the foundation design of the proposed development.

The nearest known seismic source is the Greenville fault (Type B), located approximately 12 km southwest of the site. The near-source factors for the Greenville fault are provided below:

SEISMIC CRITERIA	VALUE
Seismic Zone (UBC, Figure 16-2)	4
Seismic Zone Factor (UBC, Table 16-I)	0.4
Soil Profile Type (UBC, Table 16-J)	S_D
Near-Source Factor N_a (UBC, Table 16-S)	1.0
Near-Source Factor N_v (UBC, Table 16-T)	1.0
Seismic Coefficient C_a (UBC, Table 16-Q)	0.44
Seismic Coefficient C_v (UBC, Table 16-R)	0.64

Grading

We anticipate that grading will be minor for this project. Final Grading Plans were not available during preparation of this report. We recommend that Final Grading Plans be reviewed by our office prior to starting mass grading. All grading must conform to the specific recommendations in this report and to Appendix A, "Recommended Grading Specifications." The specifications are general and the grading effort is expected to vary with site and soil conditions encountered during development.

All grading must be observed by a representative of our firm, including stripping and scarification processes to observe whether undesirable materials or below grade facilities such as utilities, buried pipes, debris or similar buried materials are encountered. If loose fill or soft native soils are encountered, sub-excavation and recompaction may be required.

On-site soil generated by site grading may be used as fill provided that the soil is free of deleterious and organic materials and that it has been approved for use as fill by the Geotechnical Engineer. Our firm shall be notified one to two weeks prior to the anticipated date of grading commencement to allow for an on-site pre-construction meeting with the Grading Contractor to discuss proposed grading operations and to acquire samples of proposed fill material. This will provide sufficient time for laboratory testing and results prior to general fill placement.

The onsite soils had been disced to a depth of approximately 12-inches with concentration of organic material in the top 6-inches of the disced area. To reduce the potential of organic concentrations and to provide more uniform conditions in the building areas, we recommend that the upper 6-inches of organic contaminated type material, which has already been ripped, be removed from the building pad areas and be used in landscaping areas. Following removal of this material, the upper 12-inches of remaining soil shall be scarified, moisture-conditioned, and recompacted, to a minimum 85 percent to a maximum of 90 percent relative compaction with a minimum 5 percent over optimum moisture content in accordance with ASTM D-1557. The scarification and the recompaction should extend at least 5 feet outside the building perimeter with the balance of the pad processed to the satisfaction of the Geotechnical Engineer. The upper 2 feet of subgrade below street sections should be moisture-conditioned to 5 percent over the

optimum moisture content and compacted to a minimum of 95 percent relative compaction. The final grading report must include verification tests of the foundation pad areas of all lots in relation to potential corrosive soils, in addition to the expansion characteristics of the site soil as revealed in this study. Corrosion, Plasticity Index, and Swell Tests, on representative lots are required in the final lot inventory assessment program after completion of the grading operations.

The attached "Grading Recommendations," (Appendix A) are general in nature and intended to indicate how site preparation and grading should generally proceed. However, because of the variability of conditions on a property, all conditions, which may become exposed during grading cannot be foreseen at this time. Therefore, it is recommended, that the site preparation and grading operations be done under the observations of the PRA Group, Inc. (PRAG) so that actual conditions can be evaluated in the field as the job progresses. The Geotechnical Engineer or the Engineer's representative must be notified 48-hours prior to commencement of any grading operations os that arrangements can be made to provide observation and testing services.

Constructed slopes

Cut and fill slopes, if any, should be designed and constructed at slope gradients no steeper than 2:1 (horizontal to vertical).

Building Pad Moisture Conditioning

For the proposed structural post-tension slab foundations to perform as designed, we recommend that the existing building pad subgrade soils be moisture-conditioned with water to a minimum depth of 12-inches and be tested for acceptance by a Geo-Probe penetration of 12-inches, prior to placement of foundation concrete. We reserve the right to modify the moisture-conditioning requirements depending on the soil encountered during the final building pad inventory of site soil conditions.

The site preparation as recommended herein reduces the potential for expansion of the clay soil due to variations in moisture-conditions and replaces the lost moisture of the subgrade soil that occurs during the time period between mass grading and foundation improvements. The slabs should be placed within one week from completion of the pad preparation moisture-conditioning.

Continuous wetting of each pad is recommended for at least 24-hours prior to placement of visqueen and concrete. The use of a wetting agent in conjunction with rainbirds or berming and ponding of water on each pad is recommended to perform the moisture-conditioning. We recommend that a Geotechnical Engineer or a representative of PRAG be present to observe and verify the final moisture-conditioning of subgrade soils prior to visqueen and concrete placement.

Foundations

We understand that the proposed single-family homes will be one to two-story, and wood-framed. Structural loads for this type of construction are expected to be relatively light. Based upon the results of our study, we are recommending that the proposed structures be supported on a stiffened structural slab-on-grade foundation system reinforced with post-tension cables.

Geotechnical design criteria should be implemented at the discretion of the Structural Engineer based upon his review and design of stiffened structural slab in conformance with current industry standards and the geotechnical recommendations of this report.

If a foundation other than that recommended is desired, this office should be called for supplemental recommendations. Such recommendations would be presented as an addendum to this report. The following foundation recommendations are based on the expansive near-surface soil encountered in our exploratory borings. If the lot inventory program (discussed in the "Grading Section" of this report) reveals expansive soil types differing than planned within some building pads, the foundation design criteria outlined below may be modified for those lots. These additional design values would be provided after completion of laboratory testing of representative soil samples recovered from the building pads. Recommendation for post-tensioned slab-on-grade foundations, based on the more conservative soil conditions encountered at the subject site, are discussed below.

Slab-On-Grade Foundation System

We recommend the following geotechnical design criteria in Table I be used by the Structural Engineer for design of the foundations system.

TABLE I
STRUCTURAL MAT FOUNDATION RECOMMENDATIONS

	Design Factor	
1	Pad Moisture-Conditioning, Top 12-inches	Required
2	Max, Allowable bearing pressure, psf (Dead Load and Live Load)	2500
3	Subgrade Modulus (K) - pci	150
4	External Cantilever -ft. (Random 10' length)	4
5	Interior span - ft.	12
6	Max. Deflection -any 10' span - inches	1/4
7	Edge uplift pressure -psf to 0 at 10'	250
8	External Thickened Edge - in.	12 x 12 i.e., an additional 2-inches of slab thickness)
9a	Visqueen - 10 mil minimum	Required
9b	Min. Visqueen cover, sand - inches	2
10	Min. Slab Thickness - inches	10

The above values are based upon the average soil conditions expected within the soil materials located within the top 3 feet of pad grade. A capillary break of 10 mil. Visqueen type vapor barrier must be utilized to prevent moisture transmission through the slab and also to protect the concrete from potentially corrosive soils. Surface drainage will be required; with all gutters tied into a tight line discharging to a suitable discharge point. The liberal use of Swales with drop inlet facilities are desirable in order to facilitate the rapid removal of all surface storm or irrigation water.

The following geotechnical design parameters are provided for use by the Structural Engineer for design of the foundation system using the post-tension slab-on-grade criteria in the Second Edition, Post Tension Design Manual with modifications set forth in the 3rd Edition as necessary for a balanced design. The design values provided are based on our experience with other developments in the general Antioch and San Francisco Bay Area.

POST-TENSION FOUNDATION DESIGN CRITERIA*

Swelling Parameters	Center Lift	Edge Lift
Edge Moisture Variation Distance, e_m	4.2 ft.	4.0 ft.
Differential Soil Movement, y_m	2.2 in.	1.7 in.

Refer to Table I for additional geotechnical design criteria. The post-tension foundation slab must be designed as a rigid, structural slab with adequate strength to resist excessive deflection from soil shrinkage or heave forces.

If, after grading, building pads become severely rutted from equipment operations during wet weather periods or if pads have erosion ditches generated from pad drainage, these areas will require reworking and acceptance by the Geotechnical Engineer prior to foundation construction.

The Post-Tensioned Institute (PTI), Second Edition manual and the 1997 Edition of the *Uniform Building Code* (UBC) manual indicate that the differential soil movement factor (y_m), derived by empirical methodology in the PTI Manual, does not account for factors not related to climate. The 3rd Edition, PTI Manual states: "Factors not related to climate, if not properly controlled, may induce movements potentially larger than those resulting from climatic influences alone. Tables 3.2 through 3.6 on pages 24 and 25 of the 3rd Edition, PTI Manual consider alternative moisture variation influences that need to be accounted for during design. "Dry Periods," Section 4.4 "Site Parameters" on Page 30, through Section 4.4.11 on Page 31, provide a good overview of environmental changes that impact a post-tension slab system. In a section titled, "Time of Construction," on page 30, Section 4.4.7, it is stated:

> "If the slab is cast at the end of a lengthy dry period, it may experience greater uplift around the edges when the soil becomes wetter at the conclusion of the dry period. Similarly, a slab cast at the end of a wet period, may experience greater drying around the edges during the subsequent period of dryness."

As a result of controversy involving what was considered excessive cracking of both interior and exterior elements of the superstructure placed upon the flexible PT-Slab-On-Grade system, a new provision was included in the 2005 Edition of the PTI Manual on page 52, that discussed Compatibility Considerations." A description of this is as follows:

"Post-tensioned foundations as well as other non-prestressed shallow foundation systems constructed on expansive or compressible soils are expected to deform. The foundation flexibility distributed localized soil movements to a more uniform slab shape (edge lift, center lift). It is important to advise other consultants and suppliers to consider compatible design or products for the selected foundation system. In particular, deformation compatibility should be addressed for roof trusses, load concentrations, non-flexible exterior siding, brittle floor coverings, and areas that slope to drain or where utility connections be located."

Section 6.10 of the 3rd Edition, PTI Manual, "Stiffeners" on Page 45 and 46 discuss the differential foundation deflection and means to minimize future damage to more brittle sidings or rigid framing materials. Table 6.2, page 48 of the Post-Tensioned Manual (below) indicates stiffener coefficients for various building components.

RECOMMENDED VALUES OF STIFFENER COEFFICIENT C_Δ

Material	Center Lift	Edge Lift
Wood Frame	240	480
Stucco or Plaster	360	720
Brick Veneer	480	960
Concrete Masonry Units	960	1920
Prefab Roof Trusses*	1000	2000

* - Trusses with clearspan the full-length or width of the foundation from edge to edge.

Section 3 through 5 of the 3rd Edition, PTI Manual consider the requirements for the construction of a post-tensioned slab from a geotechnical standpoint and was used in conjunction with the 2nd Edition PIT, in the derivation of the above data for differential soil movement, y_m, and edge moisture movement, e_m set forth on Page 14 of this report. The y_m values are results which are based on Stress Change Factor (SCF) influenced by a situation where a flower bed were planted adjacent to the structure. Although the data was derived as such, it is not recommended that extensive vegetation be planted within 5 feet of the structure due to the increased change of soil swelling and movement with irrigation water required for

plant maintenance. We urge the landscape planting use a drought resistant design with a drip irrigation system for irrigation.

We recommend that the Structural Engineer design the structural slabs based on current industry standards, the stated geotechnical criteria, and using a cantilever design for soil shrinkage and uplift forces. The structural slabs should be designed to resist uplift forces to maintain planarity for the maximum differential vertical movement set forth in Table I of this Report.

Prior to placement of the sand and structural elements in the slab area, the subgrade must be moisture-conditioned by the use of a wetting agent and extended sprinkling. We recommend that an impermeable membrane of 10 millimeter minimum thickness visqueen be placed on the pad soil or on the crushed capillary break rock, if used to further reduce vapor transmission, and overlain at the Structural Engineer's option by 1 or 2-inches of clean sand to assist in the proper curing of the slab. The length of overlap for the impermeable membrane should conform to the manufacturer's specifications or a minimum of 12-inches, whichever is greater. Furthermore, at no time should the membrane be punctured during the construction of the concrete slab-on-grade. Where Geo-probe penetration tests are required to verify the moisture conditioning of the pad soils, visqueen removal areas must be made available with no random punctures of the visqueen by the Geo-probe testing permitted. We recommend that if the membrane is punctured, the repair conform with the manufacturer's specifications and be observed by a representative of our firm. Improper placement of the membrane may results in adverse moisture-conditions that could contribute to heaving of the slab. Excess moisture could also pass through the slab resulting in moisture vapor conditions in the residence.

Recommendations presented in the American Concrete Institute manual should be complied with for all concrete placement and curing operations. Improper curing techniques and/or excessive slump (water-cemented ratio) could cause excessive shrinkage, cracking, or curling. Concrete slabs should be allowed to cure adequately before placing vinyl or other moisture sensitive floor coverings. We recommend that the project Structural Engineer also consider

specifying air-entrainment for the concrete mix design to reduce the permeability of the concrete slab.

We recommend isolated exterior footings be structurally tied to the exterior perimeter footings as set forth by the Project Structural Engineer.

The excavations for footings should be cleaned of loose material and debris prior to placement of concrete. All footing excavations must be observed by a representative of our firm to verify the compatibility of the foundation and to observe the competence and moisture-condition of the soil material in the excavations. The excavations should be kept moist until the foundation concrete is placed.

Garage Floors and Driveways

We recommend that garage floor slab-on-grade be incorporated into the main foundation system and be designed in accordance with the geotechnical requirements of this report. The driveway should be a minimum thickness of 4-inches and be underlain by a 4-inch thick cushion of "pea gravel" or Class II Aggregate Base Rock placed upon a 12-inch deep section of pre-saturated subgrade. Extending the outer edge of the slab 6 to 8-inches into the ground would assist in preventing moisture variation at the outer edge of the slab and help prevent soil and slab movement. Reinforcement of the concrete slabs shall be as directed by the Project Structural Engineer.

Miscellaneous Flatwork

Exterior flatwork should be designed as follows:

1. It is recommended that the exterior slab-on-grade flatwork be a minimum thickness of 4-inches and be structurally independent of the foundation to provide freedom of movement due to soil volume changes.

2. Reinforcement of the concrete and construction of crack control joints shall be as directed by the Project Structural Engineer.

3. Ponding of storm or irrigation water adjacent to the exterior slabs must be prevented by use of area drains or liberal surface drainage to a suitable controlled discharge point. Liberal surface slope of all exterior slab work is necessary to prevent reverse

drainage toward the structural improvement.

Pavement Design

Due to the expansive soils at the site, we recommend that the pavement section planning consist of a minimum 3-1/2-inches asphaltic concrete over a minimum of 12-inches Aggregate Base Rock. The final pavement design template will require an 'R'-Value test of the subgrade and a Traffic Index to be assigned by the City of Antioch. Grade elevation changes should be anticipated to accommodate a modified pavement thickness unless a pre-determined can be agreed upon during the map approval process. To perform to its greatest efficiency, the pavement section requires the following construction criteria:

(a) Remove organic and deleterious materials from all pavement subgrade.
(b) Moisture-condition the upper 12-inches of subgrade soil and compact it to a minimum relative compaction of 95 percent at a moisture content of 2 percent over the optimum moisture content. All pavement subgrade should be stable with no "pumping" at the time base rock is placed.
(c) Use only good quality materials of the type and minimum thickness specified. All base rock should meet the Standard Specifications of the State of California for Class II Base Rock and be angular in shape.
(d) Compact the base rock uniformly to a minimum relative compaction of 95 percent.
(e) Place the asphaltic concrete only during periods of fair weather, when the free air temperature is within the prescribed limits as set forth by the Asphalt Concrete Institute.
(f) Compact all trench backfill under the pavement to reduce fill settlement and minimize pavement damage that may results from such settlement. Trench backfill must be performed in accordance with the recommendations in the Utility Trench Section of this report. Mechanical compaction is recommended because material placed by jetting or ponding will probably not attain satisfactory density.
(g) Provide adequate drainage to prevent surface water from migrating into the pavement subgrade soils from behind curb-and-gutter sections. The need for curb-and-gutter subdrains should be evaluated based on the results of mass grading.

Retaining Walls

Free-standing retaining walls on the site should be designed to maximum height of 5 feet based on the following parameters:

Active Earth Pressure	
Horizontal Backfill	50 (pcf)EFP)
Sloping Backfill (maximum 2:1 Slope)	65 pcf (EFP)
Surcharge, if present	Variable
Passive Earth Pressure*	300 pcf (EFP)
Coefficient of Sliding Friction (concrete-soil)	0.30
Allowable Bearing Capacity	2,000 psf (18" depth)

*Acting at a minimum depth of 12-inches below lowest adjacent grade. (Where EFP=Equivalent Fluid Pressure).

The retaining wall footing should consist of a conventional footing placed 18-inches minimum below lowest adjacent grade.

Retaining walls should be designed to resist the surcharge of foundation elements that are located within a distance equal to the height of the retaining wall from the wall. Alternatively, the depth of the foundation elements can be increased so that they derive their support below the bottom of the wall.

Adequate drainage is required behind the walls to prevent build-up of hydrostatic water pressure. All retaining walls should be drained by providing a perforated horizontal pipe behind the all or other method deemed acceptable by the Geotechnical Engineer. Where a drain pipe is used, we recommend placing the pipe near the bottom of a vertical gravel drain blanket and at the base of the footing. The perforated solid pipe should be a minimum of 4-inches in diameter and lie at a 1 percent slope commencing at the heel of the footing elevation, so as to drain to a suitable outlet and should be covered with drain rock to within 18-inches of the surface. The top 18-inches of backfill should consist of compacted, relatively impervious, native soil material. The gravel drains

should be a minimum of 12-inches in width. The filter material should be imported, graded aggregate, conforming to gradation of Class II Permeable material as listed in Section 68-11.025 of the January 1988 CalTrans Standard Specifications, or as otherwise approved by the Geotechnical Engineer.

Free Standing Sound Walls

Free standing sound walls should be founded on piers based on the following parameters:

Diameter	Minimum 16-inches
Friction Value	Allowable friction value of 400 psf, which may be increased by 1/3 for wind and seismic loads.
Passive Value	300 pcf to be taken over 1-1/2 times, the pier diameter commencing 2 feet below lowest adjacent grade.
Depth:	Minimum depth equal to height of sound wall, or as specified by the Design Engineer, whichever depth is greater.

The depth of pier embedment is measured from the lowest adjacent soil grade to the bottom of the pier hole. The load-carrying capacity of the upper 2 feet of soil should be omitted in selecting the allowable pier capacity. We recommend that all pier holes be cleaned of slough and loose material prior to placing steel reinforcement and concrete. Care should be taken to avoid "mushrooming" at the tops of piers when placing concrete. Care should also be used to prevent or remove concrete spillage around piers to avoid an increase in uplift pressure.

Depending on the time of year of drilling and the pier locations, groundwater may be encountered in some pier holes. In such cases, the pier holes should be cleaned of loose slough and either pumped dry just prior to pouring concrete or tremied with concrete to "float" the water above the concrete with the tremie hose maintaining a minimum 5 foot head of concrete at all times during hose removal.

Utility Trenches

All trenches should be backfilled with native materials compacted uniformly to the relative compaction specified in the "Grading Section" presented in this report. If local building codes require the usage of sand as the trench backfill, all utility trenches entering the building must be provided with an impervious seal of either cohesive or lean concrete where the trench passes under the building perimeter. The impervious plug should extend 2 feet into, and out of, the building perimeter. Jetting of trench backfill is not recommended as it may result in an unsatisfactory degree of compaction. All disturbed areas within 5 feet of the foundation from trench excavation, including electric lines, must be reprocessed as engineered fill to prevent a localized soft soil area that could serve as a moisture accumulation zone resulting in potential impact an movement of the foundation system.

Utility trench safety is the responsibility of the underground utility contractor. It is their responsibility to ensure that ll Cal/OSHA regulations regarding site safety and tench stability are adhered to during trenching, placement of utilities and placement of compacted trench backfill. The contractor's designated Competent Person must monitor the soil conditions as required by Cal/OSHA.

Drainage

Surface water must not be allowed to pond or saturate soils adjacent to the building foundations. To preclude this, it will be necessary to direct all water collected from roof downspouts into tightlines that will direct the collected drainage away from the building foundation and into suitable discharge points.

Due to lot size restrictions, the minimum available side lot distance may be 5 feet or less from the structure. We recommend that where 5 feet to property line is present, a positive slope gradient of 3 to 5 percent down and away from the structure perimeter be applied to the finished subgrade (including topsoil) for a distance of at least 3 feet at which point a drainage swale or other drainage method deemed acceptable by the Geotechnical Engineer should be provided to remove surface water from the structure to an acceptable discharge pont or storm drain inlet.

As mentioned above, planted areas located immediately adjacent to the structure should be avoided. If vegetation must be planted adjacent to the structure, plants that require very little moisture should be considered. Again, if vegetation must be planted adjacent to the structure, a drip irrigation system is recommended unless drop inlets or area drains are utilized to control drainage around the foundation; sprinkler heads should not be placed where they would saturate the foundation soil. No flatwork should be placed adjacent to the foundation where a trapped water condition could occur. The use of drop inlets in such areas would control the discharge of irrigation or storm water at these locations and help reduce the expansion potential of the pad subgrade soils.

Plan Review

Before submitting design drawings and construction documents to the appropriate local agency for approval, we recommend that copies of the documents be reviewed by our firm to confirm that the recommendations in this report have been effectively incorporated into the design.

Construction Observations

Our representative must be present during grading to observe the work performed and to perform whatever testing is necessary to properly evaluate the quality of the materials and their relative compaction. A final lot survey assessment program is required upon completion of grading for verification tests for corrosion and expansion potential of the pad subgrade soil. Foundation observations by our representative is recommended so that the foundation pads are properly moisture-conditioned. The depth of foundation pre-soaking is also dependent upon site grading and other unforeseen local anomalies, and thus the actual moisture-conditioning depths may vary.

At the completion of the site grading operations and foundation excavations, we will submit a report that summarizes the work observed and the results of all tests performed by our firm during the construction phase of the project, along with any supplemental recommendations that may be warranted. To allow proper scheduling so that our personnel are present at the job site when needed, we should be furnished no less than two (2) working days advance notice of when work requiring our presence will be accomplished.

Furthermore, we recommend that our representative perform a final site visit at the completion of the project to confirm that the drainage, soil conditions, and, if necessary, landscaping are in conformance with our recommendations presented in this report.

Construction During Fall and Winter Seasons

Wet weather may raise the moisture content of the soil well above optimum conditions and earthwork construction may be difficult or impossible. Supplemental recommendations should be provided by the Geotechnical Engineer if grading operations are planned in the Winter season.

Site Safety

All excavations and site work must comply with applicable local, state, and federal safety regulations. Construction site safety is the responsibility of the Contractor, who shall be solely responsible for the means, methods, and sequencing of construction operations. Our services and recommendations for site safety are advisory and not supervisory. PRA Group, Inc. Assumes no responsibility for construction, site safety, or the Contractor's activities during any phase of the construction project.

Miscellaneous

Our exploration did not reveal the presence of buried items such as leaching fields, septic tanks, storage tanks, etc., at the location of the borings. If such items are encountered during grading or demolition, our firm should be notified immediately to provide recommendations for proper disposal procedures.

This phase of the study did not include investigations for toxic substances or soil or groundwater contamination of any type. If such conditions are encountered during the site development, additional studies may be recommended.

LIMITATIONS

This report has been prepared for the exclusive use of The Mission Peak Company and their consultants for specific application to the proposed development. If changes occur in the nature design location, or configuration of the proposed development, the conclusions and recommendations contained herein shall not be considered valid. Changes must be reviewed by our firm.

The analysis, opinions, conclusions, and recommendations, submitted in this report are based in part on the referenced materials, site visit, and evaluation, and subsurface exploration. The nature and extent of variation among exploratory borings may not become evident until construction. If variations appear, it will be necessary to re-evaluate or revise recommendations made in this report.

The recommendations in this report are contingent on conducting an adequate testing and monitoring program during construction of the proposed development. Unless the construction monitoring and testing program is provide by or coordinated with our firm. PRA Group, Inc. Will not be held responsible for compliance with design recommendations presented in this report and other supplemental reports submitted as part of this report. Our services have been provided in accordance with generally accepted geotechnical engineering practices. No warranties are made, expressed or implied, as to the professional opinions or advice provided. Recommendations contained in this report are valid for a period of 2 years, after 2 years they must be reviewed by this firm to determine whether or not they still apply.

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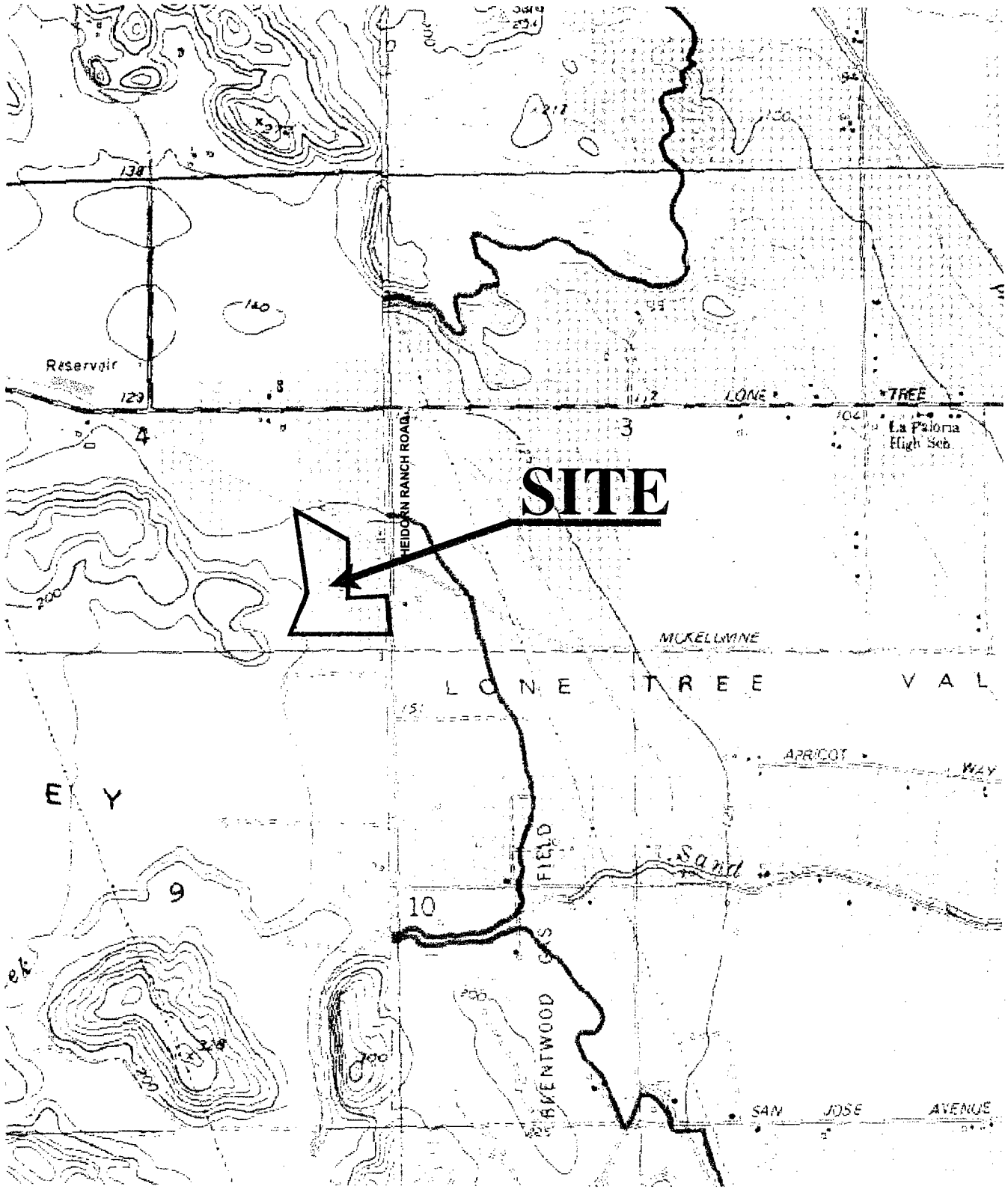
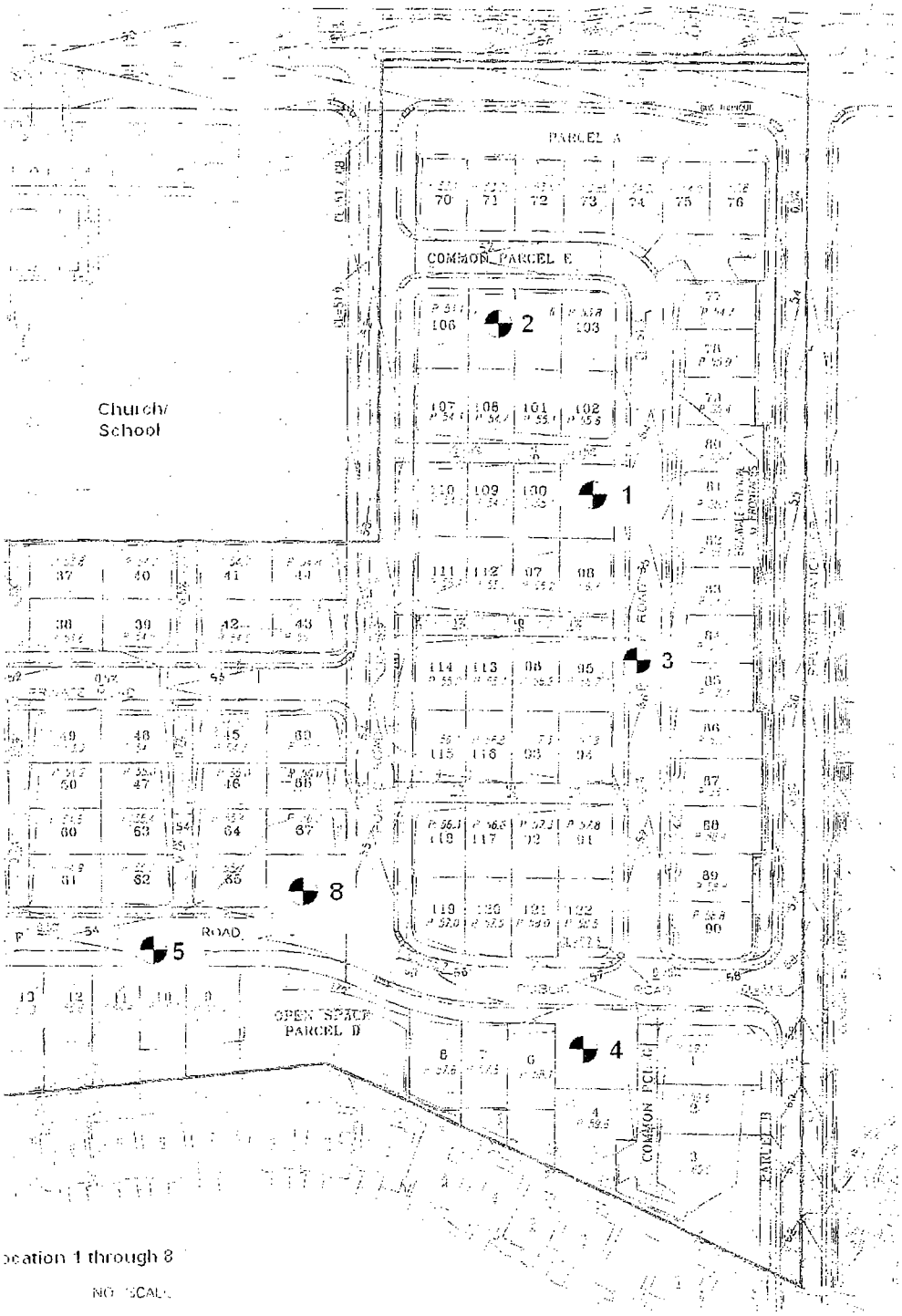


NOT TO SCALE

NOTES	DATE	JANUARY 2007	PRA Group CONSULTING ENGINEERS
SOURCE:	JOB NO	G240-01	
TOPOZONE - ANTIOCH SOUTH QUAD	DWG NO	G24001FIG1	**SITE LOCATION MAP**
	DRAWN	IDA	TIERRA VILLAS - HEIDORN RANCH ROAD
	CHK'D	DJR	ANTIOCH, CALIFORNIA
	APP'D	DJR	FIGURE NO 1
	CLIENT	MISSION PEAK HOMES	REV. NO.



ocation 1 through 8

NO SCALE

PRA Group
CONSULTING ENGINEERS

FIGURE NO.

SITE PLAN AND BORING LOCATIONS

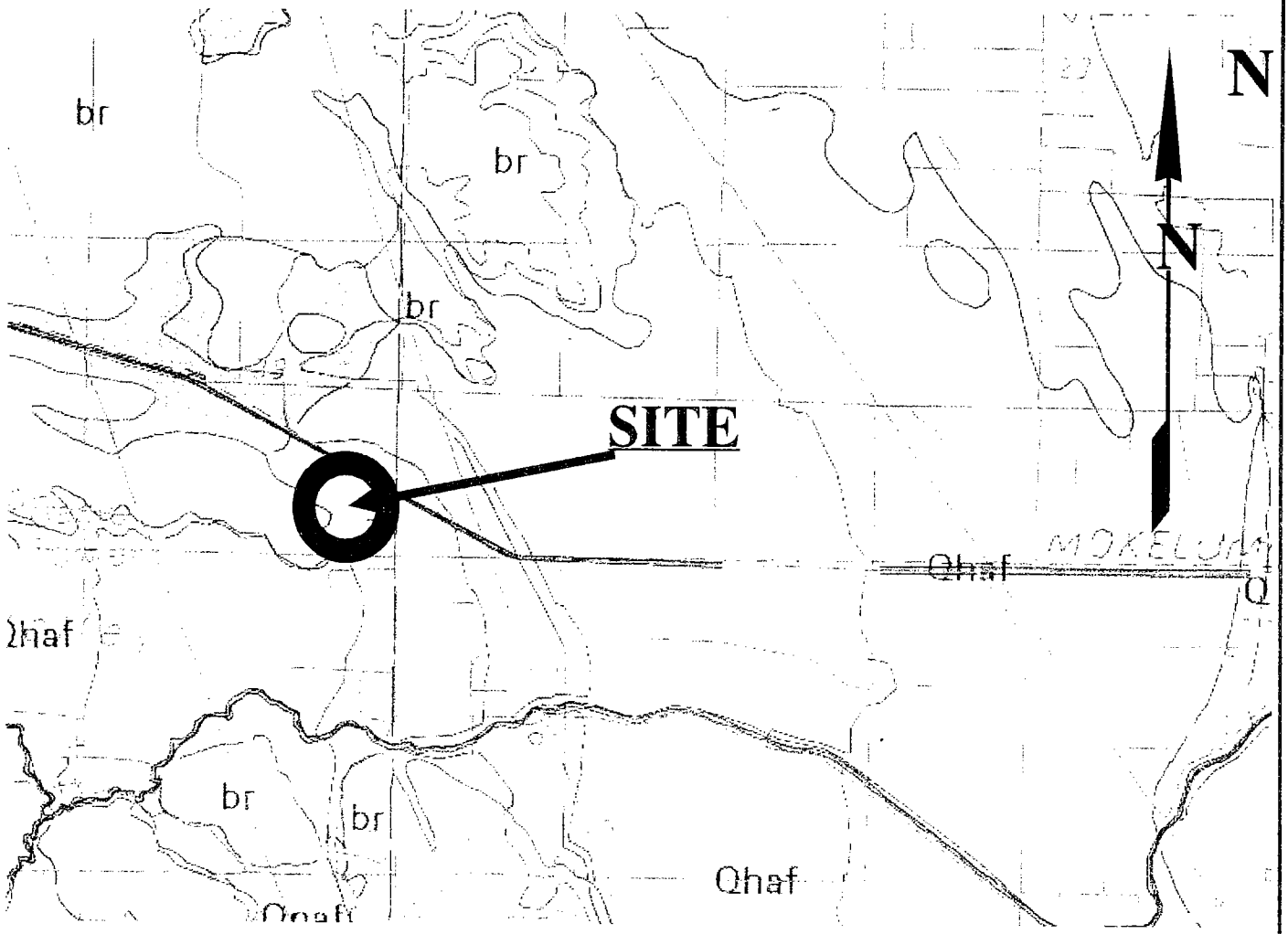
TIERRA VILLAS - HEIDORN RANCH ROAD
ANTIOCH, CALIFORNIA

2

CLIENT

MISSION PEAK HOMES

REV. NO.



EXPLANATION

Qhl	Holocene Natural Levee Deposits
Qhb	Holocene Basin Deposits
Qhaf	Holocene Alluvial Fan and Fluvial Deposits
br	Bedrock

NOTES

SOURCE: HELLEY AND GRAYMER (1997)

DATE	FEBRUARY 2007
JOB NO.	G240-01
DWG NO.	G24001FIG3
DRAWN	IDA
CHK'D	DJR
APP'D	DJR

PRA Group
CONSULTING ENGINEERS

AREA GEOLOGY MAP

TIERRA VILLAS
HEIDORN RANCH ROAD
ANTIOCH, CALIFORNIA

CLIENT MISSION PEAK

FIGURE NO
3

REV. NO.

EXPLORATORY BORING LOG

CLIENT: Mission Peak PROJECT NO.: G240-01	LOGGED BY: jlm	DATE DRILLED: 9/29/06	PAGE 1 OF 1
DRILL: B-24 Truck Mounted Rig DRILLER: RAM Geotechnical Drilling WEIGHT OF HAMMER: 140 lbs Note: Blow counts converted standard pen.	DROP: 30 in	BORING ELEV.: E.G. BORING DIAM.: 3.5 INCHES	BORING NO. **B-1**

FIELD				DESCRIPTION	LABORATORY							
DEPTH (FT.)	SAMPLE	SAMPLE NO.	BLOWS / FT.	MATERIAL DESCRIPTION AND REMARKS	CONSISTENCY	USCS LETTER SYMBOL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	COHESION	PLASTICITY INDEX	UNCONFINED COMPRESSIVE STRENGHT (PSF)	PERCENT PASSING NO. 200 SIEVE
1				Silty Clay, light to medium brown, dry (Easy drilling)								
2		1-1	14	Fine Sandy Clay, medium rust brown. Moist	Stiff	CL	112	17		18	8290	
3												
4		1-2	18		Very Stiff	CL	114	15				
5												
6												
7												
8												
9												
10		1-3	14		Stiff	CL	104	9				
11				BORING TERMINATED AT 10 ft. NO GROUNDWATER ENCOUNTERED								
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
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26												
27												
28												
29												
30												
31												
32												

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EXPLORATORY BORING LOG B-1
Heidron Ranch Rd. and Prewett Ranch Dr.
Antioch, California

Client: Mission Peak

FIGURE NO.
4

EXPLORATORY BORING LOG

CLIENT: Mission Peak PROJECT NO.: G240-01	LOGGED BY: jlm	DATE DRILLED: 9/29/06	PAGE 1 OF 1
DRILL: B-24 Truck Mounted Rig DRILLER: RAM Geotechnical Drilling WEIGHT OF HAMMER: 140 lbs Note: Blow counts converted standard pen. DROP: 30 in		BORING ELEV.: E.G. BORING DIAM.: 3.5 INCHES	BORING NO. **B-2**

FIELD				DESCRIPTION	LABORATORY							
DEPTH (FT.)	SAMPLE	SAMPLE NO.	BLOWS / FT.	MATERIAL DESCRIPTION AND REMARKS	CONSISTENCY	USCS LETTER SYMBOL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	SWELL %/ SURCHARGE LOAD (PSF)	PLASTICITY INDEX	UNCONFINED COMPRESSIVE STRENGHT (PSF)	PERCENT PASSING NO. 200 SIEVE
1				Silty Clay, light to medium brown, dry (Easy drilling)								
2		2-1	18	Sandy Clay, medium to dark brown/rust, moist	Very Stiff	CL	111	18			5790	
4		2-2	15		Stiff	CL	112	16				
10		2-3	16		Stiff to Very Stiff	CL	105	19				
16		2-4	15	Sandy Silt, medium to dark brown/rust, moist	Stiff	SM	102	20				
21		2-5	20									
26		2-6	44									
31		2-7	48	Silty Sand,mottled brown, moist	Dense	SM	115	9				16
32				**BORING TERMINATED AT 31.5 ft.** **NO GROUNDWATER ENCOUNTERED**								

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EXPLORATORY BORING LOG B-2
Heidron Ranch Rd. and Prewett Ranch Dr.
Antioch, California

Client: Mission Peak

FIGURE NO.
5

EXPLORATORY BORING LOG

CLIENT: Mission Peak PROJECT NO.: G240-01	LOGGED BY: jlm	DATE DRILLED: 9/29/06	PAGE 1 OF 1
DRILL: B-24 Truck Mounted Rig DRILLER: RAM Geotechnical Drilling WEIGHT OF HAMMER: 140 lbs Note: Blow counts converted standard pen	DROP: 30 in	BORING ELEV.: E.G. BORING DIAM.: 3.5 INCHES	BORING NO. **B-3**

FIELD				DESCRIPTION	LABORATORY								
DEPTH (FT.)	SAMPLE	SAMPLE NO.	BLOWS / FT.	MATERIAL DESCRIPTION AND REMARKS	CONSISTENCY	USCS LETTER SYMBOL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	SWELL %/ SURCHARGE LOAD (PSF)	HYDROMETER (Clay/Total)%	UNCONFINED COMPRESSIVE STRENGHT (PSF)	PERCENT PASSING NO. 200 SIEVE	
1				Silty Clay, light to medium brown, dry (Easy drilling)									
2		3-1	11	Silty Clay, medium to dark brown, moist	Stiff	CL			8.1/ 250	74			
3													
4		3-2	20	Fine Sandy Clay, medium brown to rust, moist	Very Stiff			14					
5				**BORING TERMINATED AT 4.5 ft.** **NO GROUNDWATER ENCOUNTERED**									
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
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31													
32													

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EXPLORATORY BORING LOG B-3
Heidron Ranch Rd. and Prewett Ranch Dr.
Antioch, California

Client: Mission Peak

FIGURE NO.
6

EXPLORATORY BORING LOG

CLIENT: Mission Peak PROJECT NO.: G240-01	LOGGED BY: jlm	DATE DRILLED: 9/29/06	PAGE 1 OF 1
DRILL: B-24 Truck Mounted Rig DRILLER: RAM Geotechnical Drilling WEIGHT OF HAMMER: 140 lbs Note: Blow counts converted standard pen	DROP: 30 in	BORING ELEV.: E.G. BORING DIAM.: 3.5 INCHES	BORING NO. **B-4**

FIELD				DESCRIPTION	LABORATORY							
DEPTH (FT.)	SAMPLE	SAMPLE NO.	BLOWS / FT.	MATERIAL DESCRIPTION AND REMARKS	CONSISTENCY	USCS LETTER SYMBOL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	COHESION	PLASTICITY INDEX	UNCONFINED COMPRESSIVE STRENGHT (PSF)	PERCENT PASSING NO. 200 SIEVE
1				Silty Clay, light to medium brown, dry (Easy drilling)								
2		4-1	19	Fine Sandy Clay, medium brown, moist	Very Stiff	CL						
3												
4		4-2	14		Stiff	CL	98	22				
5												
6												
7												
8												
9												
10												
11		4-3	44/ 11"	Silty Clay, light to medium brown, dry	Hard	CL	112	15				
12												
13												
14												
15												
16		4-4	14	Fine Sandy Clay, medium brown/rust, moist	Stiff	CL	97	22				
17				**BORING TERMINATED AT 16.5 ft.** **NO GROUNDWATER ENCOUNTERED**								
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
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31												
32												

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EXPLORATORY BORING LOG B-4
Heidron Ranch Rd. and Prewett Ranch Dr.
Antioch, California

Client: Mission Peak

FIGURE NO.
7

EXPLORATORY BORING LOG

CLIENT: Mission Peak PROJECT NO.: G240-01	LOGGED BY: jlm	DATE DRILLED: 9/29/06	PAGE 1 OF 1
DRILL: B-24 Truck Mounted Rig DRILLER: RAM Geotechnical Drilling WEIGHT OF HAMMER: 140 lbs Note: Blow counts converted standard pen	DROP: 30 in	BORING ELEV.: E.G. BORING DIAM.: 3.5 INCHES	BORING NO. **B-5**

FIELD				DESCRIPTION	LABORATORY							
DEPTH (FT.)	SAMPLE	SAMPLE NO.	BLOWS / FT.	MATERIAL DESCRIPTION AND REMARKS	CONSISTENCY	USCS LETTER SYMBOL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	SWELL %/ SURCHARGE LOAD (PSF)	PLASTICITY INDEX	UNCONFINED COMPRESSIVE STRENGHT (PSF)	PERCENT PASSING NO. 200 SIEVE
1				Silty Clay, light to medium brown, dry (Easy drilling)								
2		5-1	13	Fine Sandy Clay, medium brown to rust, moist	Stiff	CL	103	20	1.7/ 500			
3												
4		5-2	20		Very Stiff	CL	109	16				
5												
6												
7												
8												
9												
10												
11		5-3	33	Silty Clay, medium brown to rust, moist	Hard	CL	111	13				
12				**BORING TERMINATED AT 11.5 ft.** **NO GROUNDWATER ENCOUNTERED**								
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
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32												

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EXPLORATORY BORING LOG B-5
Heidron Ranch Rd. and Prewett Ranch Dr.
Antioch, California

Client: Mission Peak

FIGURE NO.
8

EXPLORATORY BORING LOG

CLIENT: Mission Peak PROJECT NO.: G240-01	LOGGED BY: jlm	DATE DRILLED: 9/29/06	PAGE 1 OF 1
DRILL: B-24 Truck Mounted Rig DRILLER: RAM Geotechnical Drilling WEIGHT OF HAMMER: 140 lbs Note. Blow counts converted standard pen. DROP: 30 in		BORING ELEV.: E.G. BORING DIAM.: 3.5 INCHES	BORING NO. **B-6**

FIELD				DESCRIPTION	LABORATORY							
DEPTH (FT.)	SAMPLE	SAMPLE NO.	BLOWS / FT.	MATERIAL DESCRIPTION AND REMARKS	CONSISTENCY	USCS LETTER SYMBOL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	SWELL %/ SURCHARGE LOAD (PSF)	PLASTICITY INDEX	UNCONFINED COMPRESSIVE STRENGHT (PSF)	PERCENT PASSING NO. 200 SIEVE
1				Silty Clay, light to medium brown, dry (Easy drilling)								
2		6-1	16	Fine Sandy Clay, medium to dark brown, moist	Stiff to Very Stiff	CL	103	20				
3												
4		6-2	15		Stiff	CL	107	19				
5												
6												
7												
8				Sandy Silt, rust brown, moist								
9												
10												
11		6-3	12		Stiff	SM	103	15				
12				BORING TERMINATED AT 11.5 ft. NO GROUNDWATER ENCOUNTERED								
13												
14												
15												
16												
17												
18												
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EXPLORATORY BORING LOG B-6
Heidron Ranch Rd. and Prewett Ranch Dr.
Antioch, California

Client: Mission Peak

FIGURE NO.
9

EXPLORATORY BORING LOG

CLIENT: Mission Peak PROJECT NO.: G240-01	LOGGED BY: jlm	DATE DRILLED: 9/29/06	PAGE 1 OF 1
DRILL: B-24 Truck Mounted Rig DRILLER: RAM Geotechnical Drilling WEIGHT OF HAMMER: 140 lbs Note: Blow counts converted standard pen.	DROP: 30 in	BORING ELEV.: E.G. BORING DIAM.: 3.5 INCHES	BORING NO. **B-7**

FIELD				DESCRIPTION	LABORATORY							
DEPTH (FT.)	SAMPLE	SAMPLE NO.	BLOWS / FT.	MATERIAL DESCRIPTION AND REMARKS	CONSISTENCY	USCS LETTER SYMBOL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	SWELL %/ SURCHARGE LOAD (PSF)	PLASTICITY INDEX	UNCONFINED COMPRESSIVE STRENGHT (PSF)	PERCENT PASSING NO. 200 SIEVE
1				Silty Clay, light to medium brown, dry (Easy drilling)								
2		7-1	17	Silty Clay, medium brown, moist	Very Stiff	CL	106	19		24		93
3												
4		7-2	20	Fine Sandy Clay, mottled brown, moist	Very Stiff	CL		12				
5												
6												
7												
8												
9												
10												
11		7-3	30	Fine Sandy Clay, medium brown to rust, moist	Very Stiff	SM	103	22				
12				**BORING TERMINATED AT 11.5 ft.** **NO GROUNDWATER ENCOUNTERED**								
13												
14												
15												
16												
17												
18												
19												
20												
21												
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EXPLORATORY BORING LOG B-7
Heidron Ranch Rd. and Prewett Ranch Dr.
Antioch, California

Client: Mission Peak

FIGURE NO.
10

EXPLORATORY BORING LOG

CLIENT: Mission Peak PROJECT NO.: G240-01	LOGGED BY: jlm	DATE DRILLED: 9/29/06	PAGE 1 OF 1
DRILL: B-24 Truck Mounted Rig DRILLER: RAM Geotechnical Drilling WEIGHT OF HAMMER: 140 lbs Note: Blow counts converted standard pen. DROP: 30 in		BORING ELEV.: E.G. BORING DIAM.: 3.5 INCHES	BORING NO. **B-8**

FIELD				DESCRIPTION	LABORATORY							
DEPTH (FT.)	SAMPLE	SAMPLE NO.	BLOWS / FT.	MATERIAL DESCRIPTION AND REMARKS	CONSISTENCY	USCS LETTER SYMBOL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	SWELL %/ SURCHARGE LOAD (PSF)	PLASTICITY INDEX	UNCONFINED COMPRESSIVE STRENGHT (PSF)	PERCENT PASSING NO. 200 SIEVE
1				Silty Clay, light to medium brown, dry (Easy drilling)								
2		8-1	13	Silty Clay, medium to dark brown, moist	Stiff	CL	101	21		24	4730	88
3												
4		8-2	26	Fine Sandy Clay, medium brown to rust, moist	Very Stiff		109	16				
5												
6												
7												
8												
9												
10												
11		8-3	66/ 11"		Hard		103	25				
12				BORING TERMINATED AT 11.5 ft. NO GROUNDWATER ENCOUNTERED								
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
32												

PRA Group
Consultants in the Applied Earth Sciences

EXPLORATORY BORING LOG B-8
Heidron Ranch Rd. and Prewett Ranch Dr.
Antioch, California

Client: Mission Peak

FIGURE NO.
11

APPENDIX A

RECOMMENDED GRADING SPECIFICATIONS
For
Tierra Villas Development
Proposed Single-Family Home Subdivision
Northwest Corner of Heidron Ranch Road and
Prewett Ranch Drive
Antioch, California
For
The Mission Peak Company

- The pipe shall be removed, and the trench shall be filled and compacted according to applicable requirements for compacting native soil (Section 3) or fill (Section 5).

- The pipe shall be crushed in the trench, and the trench shall be filled and compacted according to applicable portions of Sections 3 and 5.

- The ends of the pipes shall be capped with concrete to prevent entrance of water. The length of the cap shall be at least 5 feet.

7.2 Any existing wells on the site shall be filled, buried and capped according to the requirements of the local regulatory agency. The final elevation of the top of the well casing shall be a minimum of 36 inches below any adjacent grade at the completion of grading or filling. Under no circumstances should structural foundations be placed over the capped wells.

8. Grading Slopes

8.1 Slopes shall be graded at gradients no steeper than 2:1 (horizontal to vertical) for fill and cut, except as noted in the referenced report.

8.2 After the slopes have been graded, they shall be track-rolled, and provisions shall be made for planting the slopes for erosion control. Drainage facilities shall be constructed to prevent water from flowing over slopes. No slope shall be left to stand through a winter season without erosion control.

9. Installing Subdrains

9.1 For subdrains, the contractor shall provide and install perforated pipe Standard Designation Ratio (SDR) 23.5 or equivalent approved by the Geotechnical Engineer or the Engineer's Representative and filter material for subdrains as shown on the plans or as directed by the PRA Group, Inc. The following restrictions apply:

9.1.1 Clay drain tile, concrete drain tile and perforated clay pipe shall not be permitted. Use no wyes, tees, or other joints of these materials.

9.1.2 Porous concrete pipe, perforated asbestos-cement pipe, bituminous fiber or pipe of other materials shall be permitted only on written authorization of the Geotechnical Engineer.

9.1.3 The contractor shall use ½ by 3/4 inch drain rock wrapped within a filter fabric approved by our Geotechnical Engineer, unless otherwise permitted by written authorization from the Geotechnical Engineer.

9.1.4 Unless recommended otherwise by the Geotechnical Engineer or the Engineer's Representative, the contractor shall use pipes not less than 4 inches in diameter

for lateral drains up to 50 feet in length. Use pipes of not less than 6 inches in diameter for lateral drains greater than 50 feet in length. Larger minimum pipe diameters may be specified by the Geotechnical Engineer or the Engineer's Representative during construction.

10. Unusual Conditions

10.1 If unusual conditions occur during grading, the Geotechnical Engineer shall be immediately notified for recommendations.

Appendix D: Phase I Environmental Site Assessment

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Aqua Science Engineers, Inc.
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(925) 820-9391
www.aquascienceengineers.com

July 17, 2014



Phase I Environmental Site Assessment

of

Heidorn Village
5220-5306 Heidorn Ranch Road
Antioch, California

Prepared for:

Mission Peak Homes, Inc.
47289 Mission Falls Court
Fremont, CA 94539

ASE Job No. 4612

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EXECUTIVE SUMMARY

Findings and Opinions

Based on the site reconnaissance and observations of neighboring properties, historical and regulatory agency research, and interviews conducted by Aqua Science Engineers Inc, (ASE), the following issues were identified in regard to the subject site.

The following Potential Environmental Conditions (PECs) were identified during this Phase I ESA:

- The site and general vicinity has been used for agricultural usage, row crops, from the early 1900's to the 1990's. Although there is no data to support the usage of pesticides or herbicides on the subject site, it is widely recognized in the environmental industry that toxic chemicals have historically been used on soil at agricultural properties to control pests and unwanted weeds. No sampling or sample analysis was conducted by ASE during this Phase I ESA.

- Small stockpiles of what appear to be concrete rubble exist in the southeast corner of the site and in the northernmost quadrant of the property. ASE is unable to determine the makeup of the debris or where such debris came from.

- The subsurface vault usage is unknown.

It is the opinion of ASE that the conditions identified above have the potential to impact the subject site if (a) toxic chemicals were actually used historically at the site for purposes of rodent and weed control, (b) the debris is of a hazardous nature, or (c) the vault was somehow used for hazardous materials.

Conclusions

ASE performed a Phase I Environmental Site Assessment (Phase I ESA) in conformance with the scope and limitations of ASTM Practice E 1527-13 for the property located at 5220 to 5306 Heidorn Ranch Road in Antioch, California. Any exceptions to, or deletions from, this practice are described in Sections 1.3 and 1.4 of this report. Potential environmental conditions (PECs) were identified by ASE in regard to the subject site.

1.0 INTRODUCTION

1.1 Purpose

The objective of this Phase I Environmental Site Assessment (Phase I ESA) is to identify recognized environmental conditions (RECs) and/or potential environmental concerns (PECs) in connection with the subject site. This Phase I ESA contains four major components (1) site reconnaissance; (2) records review; (3) interviews with regulatory agencies and site owners/occupants; and (4) preparation of this Phase I ESA. It is ASE's understanding that the purpose of this Phase I report is for a future property redevelopment as a residential community.

1.2 Scope of Services

This Phase I ESA was performed in accordance with ASE's original proposal #2014-117 dated June 6, 2014 and following the guidelines of the American Society for Testing and Materials (ASTM) *Standard Practice for Environmental Assessment: Phase I Environmental Site Assessment Process* (Designation: E 1527–13).

As defined by ASTM E 1527-13, a "recognized environmental condition" (REC) is a term defined as the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis* are not recognized environmental conditions.

As defined by ASTM E 1527-13, a "controlled recognized environmental condition" (CREC) is a REC resulting from a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority with hazardous substances or petroleum products allowed to remain in place subject to implementation of required controls.

As defined by ASTM E 1527-13, a "historical recognized environmental condition" (HREC) is a term defined as a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (ie. property use restrictions, activity and use limitations, institutional or engineering controls). The final decision rests with the environmental professional and will be influenced by the current impact of the historical recognized environmental condition on the property. If a past release of any hazardous substances or petroleum products has occurred in connection with the property and has been remediated, with such remediation accepted by the responsible regulatory agency (for example, as evidenced by the issuance of a "no further action letter" or equivalent), this condition shall be considered an historical recognized

environmental condition and included in the findings section of the Phase I ESA Report. The environmental professional shall provide an opinion of the current impact to the property of this historical recognized environmental condition. If this historical recognized environmental condition remains as a current recognized environmental condition at the time the Phase I ESA is conducted, the condition shall be identified as such and listed in the conclusions section of the report.

The scope of this Phase I ESA did not include sample collection or testing. The following ASTM Non-Scope Items were not included in the scope of this Phase I ESA:

- Asbestos-containing Materials (ACM)
- Mold and Moisture Intrusion
- Lead-based Paint (LBP)
- Radon
- Wetlands
- Lead in Drinking Water
- Regulatory Compliance
- Health and Safety and Industrial Hygiene
- Cultural and Historic Resources
- Ecological Resources and Endangered Species
- Indoor Air Quality and Vapor Intrusion
- Biological Agents

1.3 Limitations and Exceptions

This Phase I ESA report has been prepared by the professional staff of ASE in accordance with generally accepted professional practices following the guidance of the standard practice ASTM E 1527-13.

The reasonably ascertainable information obtained for this Phase I ESA was provided by our client Mission Peak Homes, Inc., Environmental Data Resources, Inc (EDR), and collected from ASE's interviews and research of available documents and records held by government agencies or private parties. The integrity of the information obtained is subject to the accuracy and limitations of the documentation provided by EDR and the agencies or private parties consulted by ASE. The findings, opinions and conclusions presented in this Phase I ESA report were developed using our environmental professional judgment based on the reasonably ascertainable information obtained for the subject site in accordance with the guidelines of the standard practice ASTM E 1527-13. ASE assumes no responsibility or liability for the documents' accuracy or for the withholding by any of the involved parties of any reports or other information that could affect this transaction or this Phase I. As stated in ASTM E 1527-13 Section 4.5.1, Uncertainty Not Eliminated – No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with a property. No warranty or guarantee is expressed or implied.

As with all environmental assessments, it is inconceivable to define all negative impacts that may exist on, near or beneath a property. There is always a possibility that unknown issues such as unidentified tanks, subsurface pollution, unpermitted historical activities, and the like could exist on

a property without any current or historical documented evidence. ASE can assume no liability for negative impacts on a property that may be present where no current or historical documented evidence or records were made available to ASE.

The findings, opinions and conclusions set forth in this report are strictly limited in time and scope to the date of the evaluation and for the sole use of our Client. Use of this report by any third party is at their sole risk. ASE's liability is limited to the monetary fees received for this Phase I.

1.4 Special Terms and Reliance

No special terms or conditions were made between ASE and Mr. John Wong of Mission Peak Homes, Inc. (client) or Mr. Doug Krah. This report shall not be relied upon by or transferred to any other party, or used for any other purpose, without the expressed written authorization of ASE.

1.5 Information Supplied By User/Client

Documents and information pertaining to the property's size and title were supplied to ASE by Mr. John Wong of Mission Peak Homes, Inc. and Mr. Doug Krah. An Environmental Questionnaire was completed by Mr. John Wong of Mission Peak Homes, Inc., the current property owner. Mr. Wong and Mr. Krah provided information regarding their knowledge of the property, and did not indicate to ASE the presence of any liens or activity or use limitations (AULs) for the site.

2.0 SITE RECONNAISSANCE

2.1 Site Description Summary

Current Site Name	Heidorn Village
Site Address	5220-5306 Heidorn Ranch Road, Antioch, CA
Parcel Number	056-130-013, 015, 017 & 018
Property Owner	Mission Peak Homes, Inc.
Site Contacts	Mr. John Wong, Mr. Doug Krah
Site Observation Date	June 20, 2014
ASE Field Representative	David Allen
Weather Conditions	Sunny, 75°F
Current Site Use	Vacant land
Site Area	The property is approximately 20 acres
Site Elevation (above mean sea level)	151 feet
Geology and Surficial Soils	The subject site is located in an area identified within the EDR as CAPAY, which is a clay with very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer. Moderately well drained.
Hydrogeology	The beneficial uses within this area, per the RWQCB, is potential drinking water. Per the EDR report, the site lies within a 100-year flood zone.
Estimated Groundwater Depth (below ground surface)	Based on information within the file, the groundwater depth in the area can range between 30 and 55-feet bgs.
Estimated Groundwater	Based on information within the EDR, groundwater in the area typically flows in a

Flow Direction	northeastward direction.
Building Area	No structures exist at site
Year Built	NA
Number of Buildings	0
Number of Stories	NA
Number of Units	NA
Electricity Provider	None
Natural Gas Provider	None
Water and Sewer Supplier	None
Solid Waste/Recycling Removal Company	None

Site maps and figures are included in Appendix A. Site Photographs are included in Appendix B.

2.2 Description of Site and Improvements

The subject site exists in a rural to suburban setting in the city of Antioch, Contra Costa County, California, as vacant land south of the intersection between Lone Tree Way and Heidorn Ranch Road. The property is fenced along Heidorn Ranch Road, and bound by neighboring properties (residential and church) and an EBMUD easement/walking trail. Entry to the site is from a gravel road off of Heidorn Ranch Road. No utilities were observed at the site. The property is basically flat, vacant land with no visible structures or buildings, and several trees. Several piles of debris exist (possibly concrete rubble) in the southwest corner and northern quadrant of the site (suspected to be remnants of former structures on the site). An underground wooden-framed structure was identified in the northeastern quadrant of the site that measured approximately 4-feet by 4-feet by 3-feet deep. A 4-inch plastic pipe was found entering the structure (septic system?). Three utility poles were noted along the northeastern property line.

2.3 ASTM Scope Items

CURRENT or FORMER Hazardous Materials Usage, Storage, and Disposal and Other Recognized Environmental Concerns (RECs) or Potential Environmental Concerns (PEC)

Hazardous Materials		
Description	**Container Type/Size**	**CONDITION**
Paints, primers, lubricants, cleaners, solvents, oils, fuels, cylinders, wastes	None Observed	No REC Identified
Underground storage tanks (USTs) and Aboveground storage tanks (ASTs)	None Observed	No REC Identified
Drains, septic systems, sumps, interceptors, separators, clarifiers or other below-ground features	None observed currently. Historical septic system removed under permit. A subsurface vault exists in the northernmost portion of the property	PEC Identified
Polychlorinated Biphenyls (PCBs)	None Observed	No REC Identified

(Used prior to 7/19/1979)		
Surface staining on building materials and/or stained soil or pavement	None Observed	No REC Identified
Lead based paint and asbestos containing material	None observed currently. Historical homes demolished under permit, ACM removed.	No REC Identified
Poor housekeeping	None observed	No REC Identified
Pools of liquid, pits, ponds or lagoons	None observed	No REC Identified
Odors	None observed	No REC Identified
Drums, unidentified substance containers	None observed	No REC Identified
Stressed vegetation	None observed	No REC Identified
Solid waste, construction debris, fill material	Stockpiled debris and concrete rubble	PEC Identified
Discharge of wastewater or other liquid to drains or ditch, or stream	None observed	No REC Identified

2.4 Conditions of Environmental Concern

Vapor Intrusion

Based on the historical usage of the site, vapor intrusion of pollution into a structure would not be considered a threat at this site.

No other conditions of environmental concerns were observed by ASE during the site visit.

2.5 Surrounding Properties

A general description of the usage of the adjoining properties and surrounding areas was accomplished by the environmental professional during the site visit through observations, available interviews and review of available records. This task was performed to help identify environmental concerns that may have the potential to impact the subject site.

Adjoining Properties Properties that are listed in the EDR regulatory database report are discussed in Section 4.0			
Name and Address	**Operation**	**Direction**	**CONDITION**
Varies	Residential and Retail	North	No REC Identified
Varies	Residential	West	No REC Identified
Varies	Residential and Vacant land	South	No REC Identified
Varies	Church, Residential and Retail	East	No REC Identified
Surrounding Properties (Properties beyond adjoining properties) Properties that are listed in the EDR regulatory database report are discussed in Section 4.0			
Operation			**CONDITION**
Commercial, Office, Retail, Recreational and Residential			No REC Identified

2.6 Data Gaps

No significant data gaps were identified by ASE during execution of this Phase I ESA.

3.0 SITE HISTORY AND RESEARCH

The purpose of the historical records review is to research available records including aerial photographs, topographic and fire insurance maps, city directories, building permits, tax records, environmental lien records, local agency records, other related historical documents and interviews that will assist in the identification of past uses having led to potential RECs in connection with the subject site. The following sources were used to investigate the history of the subject site.

3.1 Aerial Photographs

Aerial Photograph Review Aerial photographs were obtained from Environmental Data Research, Inc. (EDR). Copies of selected aerial photographs are included in Appendix C.	
Year	**Findings**
1939	Subject site and surrounding areas all appear to be used as agricultural/row crops. No structures onsite. Lone Tree Way and Heidorn Ranch Road are visible. The Mokelumne Aqueduct is in place. The residence at 5225 Heidorn Ranch Road is visible.
1950	Subject site and surrounding areas all appear to be used as agricultural/row crops.
1959	The subject site and surrounding area appears as it did in the previous photo.
1966	The subject site and surrounding area appears as it did in the previous photo.
1968	The subject site and surrounding area appears as it did in the previous photo.
1979	The subject site and surrounding area appears as it did in the previous photo.
1981	The subject site's two southern parcels remain undeveloped, while portions of the northernmost parcels appear to be developed with a dwelling. The west and north adjacent sites remain agricultural. The southern residence at 5320 is now visible. The east adjacent site continues with its residence and cropland. The vicinity remained a mixture of suburban development and agricultural land.
1993	The subject site and surrounding area appears as it did in the previous photo.
1998	The subject site and surrounding area appears as it did in the previous photo.
2005	The subject site has no structures any longer. The church property at 5200 is now developed. Major residential development to the north and west, retail to the northeast.
2006	The subject site and surrounding area appears as it does today.
2009	The subject site and surrounding area appears as it does today.
2010	The subject site and surrounding area appears as it does today.

3.2 Fire Insurance Maps (Sanborn Maps)

ASE reviewed available historical fire insurance maps (Sanborn Maps) for the subject site and surrounding areas from Environmental Data Research, Inc. (EDR).

Sanborn Map Review, Appendix D	
Year	**Findings**
NA	The subject site is not covered by Sanborn Fire Insurance Maps.

3.3 Topographic Maps

Topographic Map Review Topographic maps were obtained from Environmental Data Research, Inc. (EDR). A copy of the topographic maps is included in Appendix E.	
Years	**Findings**
1896, 1912, 1914, 1916, 1943, 1947, 1953, 1954, 1968, 1973, 1980	Topo Maps for these dates were labeled MOUNT DIABLO, LONE TREE VALLEY, ANTIOCH SOUTH, BRENTWOOD and BYRON. No subject site buildings, structures or landmarks were observed on these maps.

3.4 City Directories

City Directories Review City Directories were obtained from Environmental Data Research, Inc. (EDR). A copy of the report is included in Appendix F. Notes: W=West, N=North, E=East, S=South, Adj= Adjoining Property
Findings
No issues were identified in the report.

3.5 Agency Research and Interviews

Agency Research and Interviews Copies of information/records obtained are included in Appendix G	
Name, Contact, Phone No.	**Findings**
City of Antioch Business Tax Office, Lisa Saunders	Phone conversation with Ms. Saunders on 6/23/14. There were no business records for site APN's.
City of Antioch Building Department, Gene Vigil	Email provided by Mr. Vigil on 6/24/14. There were no building department records for site APN's.
Contra Costa County Fire Protection Bureau Jo Ann West	Phone conversation with Ms. West on 6/25/14. There were no records for the subject site.
Contra Costa Health Services, Hazardous Materials Program, Octavious Blocker	Email from Mr. Blocker on 6/24/14. No files for subject site.
California Regional Water Quality Control Board (RWQCB) Ms. Melinda Wong	ASE sent an email to Ms. Wong on 6/23/14 requesting to review any files for the subject addresses. Ms. Wong responded to the ASE request by telephone on 7-17-14 stating that her agency had no files for the site.
California Department of Conservation DOGGR Website	The Division of Oil, Gas, and Geothermal Resources online mapping services was viewed. No such wells were identified on the property. However, there are several wells in the vicinity.
RWQCB GeoTracker Database	ASE visited the GEOTRACKER online website. No files were listed.
ENVIROSTOR (DTSC) Database	The addresses of the subject site was not shown on the ENVIROSTOR database. ASE emailed a letter to the DTSC on 6/23/14 requesting to review any files for the subject addresses. The DTSC responded in a letter dated 7/10/14 that they had no files.

Agency Research and Interviews Copies of information/records obtained are included in Appendix G	
Name, Contact, Phone No.	**Findings**
Environmental Questionnaire	Mr. John Wong completed the questionnaire on 6/16/14. No environmental issues were noted by Mr. Wong. A copy of the questionnaire is attached in Appendix G.

Interviews

Key Site Person, Developer

- ASE spoke several times in June 2014 with Mr. Doug Krah, by telephone. Mr. Krah is the site developer, assisting the Mission Peak Company, Inc. in preparing the property for development. Mr. Krah was unaware of any environmental issues at the site. He stated that he was unaware of any existing wells on the site. The 3 power poles are to be removed, and future electrical service will be buried. An EBMUD easement exists at the northern property line, where a walking trail exists.

Tenants

- None

Agency Representatives

- Due to the fact that no environmental files were present at the local regulatory agencies, no interviews were conducted with case workers that would handle the subject site addresses.

3.6 Previous Environmental Reports

Previous Environmental Reports		
Title, Author and Date	**Findings**	**CONDITION**
Phase I Environmental Site Assessment, 5220-5300 Heidorn Ranch Road, Antioch, CA 94513, dated July 8, 2003, by Aqua Science Engineers, Inc.		See Note Below

NOTE:

It was noted in a 2003 Phase I ESA, written by ASE, that historically a conventional house and mobile home with associated sheds were located on the northernmost two parcels. It was also noted that a septic system and possibly two wells existed on the property. In documents supplied to ASE, the structures were sampled for asbestos, and demolished properly under permit from the Bay Area Air Quality Management District by Delta Construction and Engineering in 2004. Delta also removed the septic system under permit from Contra Costa Health Services in 2004. Based on a conversation with Mr. Leroy Chancellor of Martell Water Systems (the well removal company) on July 1, 2014, only one well existed at the site. Mr. Chancellor provided a Well Completion Report, dated 9/27/04, detailing the drill-out of one 144' well at 5020 Heidorn Ranch Road. This address is located directly in the middle of the subject property boundaries when viewed in Google Maps. See Appendix G for copies of records described above. All of these issues would be considered historical recognized environmental conditions (HRECs) that are not considered an REC at this time or within this report.

3.7 Historical Research Summary

Historical Research Summary				
Period	**Subject Site**	**CONDITION**	**Adjoining/Neighboring Properties**	**CONDITION**
1930's to Present	Agricultural	PEC Identified See Note Below	Raw land, agricultural land, residential, commercial/retail development in vicinity	No REC Identified

NOTE:

A potential environmental concern (PEC) is noted above in the following areas:

- The site and general vicinity has been used for agricultural usage, row crops, from the early 1900's to the 1990's. Although there is no data to support the usage of pesticides or herbicides on the subject site, it is widely recognized in the environmental industry that toxic chemicals have historically been used on soil at agricultural properties to control pests and unwanted weeds. No sampling or sample analysis was conducted by ASE during this Phase I ESA.

3.8 Data Failure

A data failure exists for this Phase I in the fact that there was no historical data obtained or reviewed that could identify the historical usage of the property dating back prior to 1940.

4.0 REGULATORY DATABASE

The purpose of the regulatory database review is to identify environmental concerns in connection with the subject site and neighboring properties typically within a one-mile radius. ASE obtained an environmental database report from EDR. The regulatory review is performed at four jurisdiction levels: (1) federal records; (2) state and local records; (3) tribal records; and (4) EDR proprietary records. The radius distances for the various databases were selected following the standard practice ASTM E 1527-13. Based on their nature, some database distances were limited to only include the subject site and adjoining properties. The list of orphan sites (sites that could not be plotted accurately by EDR) was reviewed and sites that were identified by ASE at the site or vicinity were included in the appropriate listing. A copy of the EDR database report is included in Appendix H. The following information is based on the database report supplied by EDR.

THE SUBJECT SITE WAS NOT LISTED ON ANY OF THE EDR DATABASES LISTED BELOW.

Regulatory Database Review
Notes: adj=adjoining property; Neigh=neighboring property (less than 1/4 mile); >= more than; DG= down-gradient; UG= up-gradient; XG= cross-gradient; RP= responsible party; NFA= no further action; REC=Recognized Environmental Condition

Jurisdiction/ Listing	Search Distance (miles)	Subject Site	Adj	Neigh	Comments	REC
Federal Listings						
National Priority List (NPL)	1	0	0	0		
Delisted NPL	1	0	0	0		
CERCLIS	1/2	0	0	0		
CERC-NFRAP	1/2	0	0	0		
RCRA-CORRACTS	1	0	0	0		
RCRA-NonGen	1/4	0	0	0		
RCRA-SQG (Small Quantity Generator)	1/4	0	0	0		
RCRA-CESQC	1/4	0	0	0		
RESPONSE	1	0	0	0		
State and Local Listings & Additional Listings						
US Brownfields	1/2	0	0	0		
ENVIROSTOR	1	0	0	0		
Historical Cal-Sites	1	0	0	0		
Solid Waste Landfills	1/2	0	0	0		

Regulatory Database Review Notes: adj=adjoining property; Neigh=neighboring property (less than 1/4 mile); >= more than; DG= down-gradient; UG= up-gradient; XG= cross-gradient; RP= responsible party; NFA= no further action; REC=Recognized Environmental Condition						
Jurisdiction/ Listing	**Search Distance (miles)**	**Subject Site**	**Adj**	**Neigh**	**Comments**	**REC**
Alameda County CS	1/2	0	0	0		
AST	1/4	0	0	0		
LUST	1/2	0	0	0		
Spills and Investigations SLIC	1/2	0	0	0		
UST and CA FID	Subject site and adj	0	0	0		
HIST UST and SWEEPS	Subject site and adj	0	0	0		
HIST CORTESE	1/2	0	0	0		
FINDS	Subject site	0	0	0		
EMI	Subject site	0	0	0		
HAZNET	Subject site	0				
Dry Cleaners	1/4	0	0	0		
Tribal Records						
Indian LUST	1/2	0	0	0		
Indian UST	1/2	0	0	0		
EDR Proprietary Records						
Historical Dry Cleaners	1/4	0	0	0		
Historical Auto Stations	1/4	0	0	2	Two sites are included in this database. Both sites existed where the residential community currently exists to the west of the site. These would not be considered a threat to the subject site.	No REC

5.0 FINDINGS

The following Potential Environmental Conditions (PECs) were identified during this Phase I ESA:

- The site and general vicinity has been used for agricultural usage, row crops, from the early 1900's to the 1990's. Although there is no data to support the usage of pesticides or herbicides on the subject site, it is widely recognized in the environmental industry that toxic chemicals have historically been used on soil at agricultural properties to control pests and unwanted weeds. No sampling or sample analysis was conducted by ASE during this Phase I ESA.

- Small stockpiles of what appear to be concrete rubble exist in the southeast corner of the site and in the northernmost quadrant of the property. ASE is unable to determine the makeup of the debris or where such debris came from.

- The subsurface vault usage is unknown.

6.0 OPINION

It is the opinion of ASE that the conditions identified above have the potential to impact the subject site if (a) toxic chemicals were actually used historically at the site for purposes of rodent and weed control, (b) the debris is of a hazardous nature, or (c) the vault was somehow used for hazardous materials.

7.0 CONCLUSIONS

The following Potential Environmental Conditions (PECs) were identified during this Phase I ESA:

- The site and general vicinity has been used for agricultural usage, row crops, from the early 1900's to the 1990's. Although there is no data to support the usage of pesticides or herbicides on the subject site, it is widely recognized in the environmental industry that toxic chemicals have historically been used on soil at agricultural properties to control pests and unwanted weeds. No sampling or sample analysis was conducted by ASE during this Phase I ESA.

- Small stockpiles of what appear to be concrete rubble exist in the southeast corner of the site and in the northernmost quadrant of the property. ASE is unable to determine the makeup of the debris or where such debris came from.

- The subsurface vault usage is unknown.

8.0 SIGNATURE OF PROFESSIONAL

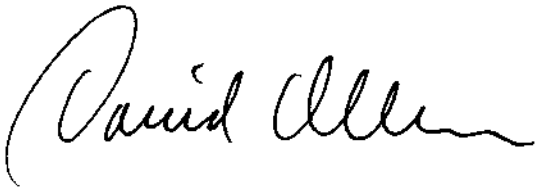
I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in Section 312.10 of 40 CFR, Part 312.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history and setting of the subject property. I have developed and performed the "all appropriate inquiries" in conformance with the standards and practices set forth in 40 CFR, Part 312.

The qualifications of the professionals involved on this project are included in Appendix I. ASE appreciates the opportunity to have prepared this Phase I Environmental Site Assessment for our Client. Should any questions or comments arise, please feel free to call us at (925) 820-9391.

Respectfully submitted,

AQUA SCIENCE ENGINEERS, INC.



David Allen
Vice President

9.0 REFERENCES

The following published reference sources were used in the preparation of this Phase I ESA:

1. EDR's Environmental Database, Radius Map Report.
2. Geotracker, www.geotracker.swrcb.ca.gov
3. DTSC's ENVIROSTOR webpage, www.**envirostor**.dtsc.ca.gov
4. RWQCB, San Francisco Bay Region
5. Wikipedia, www.wikepedia.org
6. State of California Department of Conservation DOGGR
7. City of Antioch Business License and Building Permit Records
8. Contra Costa Health Services-Hazmat Division
9. Contra Costa Fire Protection Bureau

Aqua Science Engineers, Inc.
55 Oak Court, Suite 220, Danville, CA 94526
(925) 820-9391
www.aquascienceengineers.com

APPENDIX A

Site Maps and Figures



NORTH

NOT TO SCALE

SITE LOCATION MAP

Heidorn Village
5220 - 5306 Heidorn Ranch Road
Antioch, California

Aqua Science Engineers	Figure 1

Aqua Science Engineers, Inc.
55 Oak Court, Suite 220, Danville, CA 94526
(925) 820-9391
www.aquascienceengineers.com

APPENDIX B

Site Photographs

View looking north from entrance road on property at residential and church properties.



View looking south from entrance road on property at residence 5320.



View looking east from entrance road on property at property entrance and adjacent eastern properties.



View looking west from entrance road on property at adjacent residential community.



View looking at debris piles located in southwestern corner of site.



View looking at debris pile located in northern quadrant of site.



View of in-ground vault.



View of interior of in-ground vault.



View of miscellaneous items at 5320.



Aqua Science Engineers, Inc.
55 Oak Court, Suite 220, Danville, CA 94526
(925) 820-9391
www.aquascienceengineers.com

APPENDIX C

Aerial Photographs

Heidorn Ranch Road
5220 - 5300 Heidorn Ranch Road
Antioch, CA 94531

Inquiry Number: 3976090.9
June 23, 2014

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

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Date EDR Searched Historical Sources:

Aerial Photography June 23, 2014

Target Property:

5220 - 5300 Heidorn Ranch Road

Antioch, CA 94531

Year	***Scale***	***Details***	***Source***
1939	Aerial Photograph. Scale: 1"=500'	Flight Year: 1939	EDR
1950	Aerial Photograph. Scale: 1"=500'	Flight Year: 1950	EDR
1959	Aerial Photograph. Scale: 1"=500'	Flight Year: 1959	EDR
1966	Aerial Photograph. Scale: 1"=500'	Flight Year: 1966	EDR
1968	Aerial Photograph. Scale: 1"=500'	Flight Year: 1968	EDR
1979	Aerial Photograph. Scale: 1"=500'	Flight Year: 1979	EDR
1981	Aerial Photograph. Scale: 1"=500'	Flight Year: 1981	USGS
1993	Aerial Photograph. Scale: 1"=500'	/DOQQ - acquisition dates: 1993	EDR
1998	Aerial Photograph. Scale: 1"=500'	Flight Year: 1998 Best Copy Available from original source	USGS
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	EDR
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	EDR
2009	Aerial Photograph. Scale: 1"=500'	Flight Year: 2009	EDR
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	EDR
2012	Aerial Photograph. Scale: 1"=500'	Flight Year: 2012	EDR



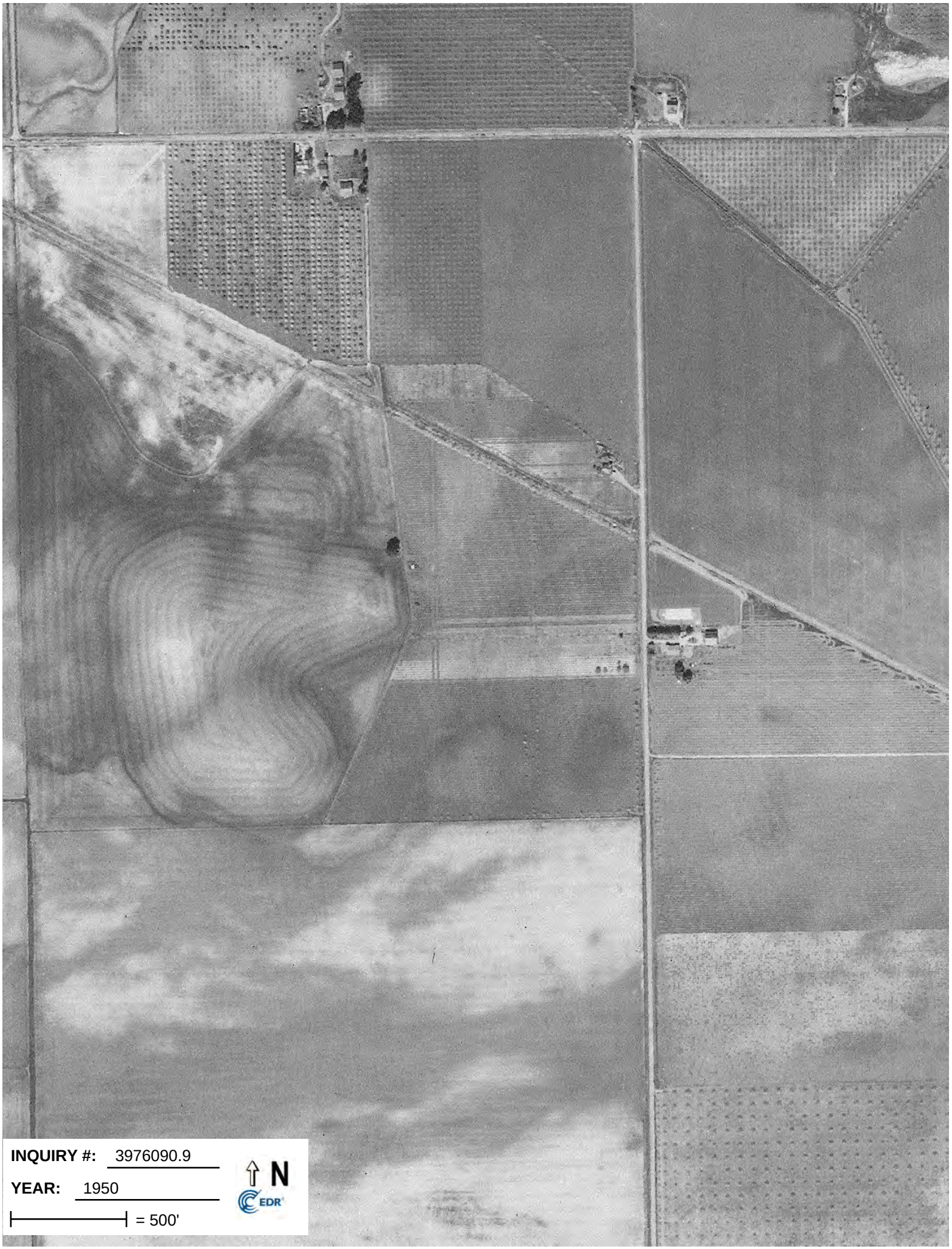
INQUIRY #: 3976090.9

YEAR: 1939

= 500'

N

EDR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YEAR: 1950
= 500'
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EDR


INQUIRY #: 3976090.9
YEAR: 1959
= 500'
N
EDR


INQUIRY #: 3976090.9
YEAR: 1966
= 500'
N
EDR


INQUIRY #: 3976090.9
YEAR: 1968
= 500'
N
EDR


INQUIRY #: 3976090.9
YEAR: 1979
= 500'
N
EDR


INQUIRY #: 3976090.9
YEAR: 1981
= 500'
N
EDR


INQUIRY #: 3976090.9
YEAR: 1993
= 500'
N
EDR



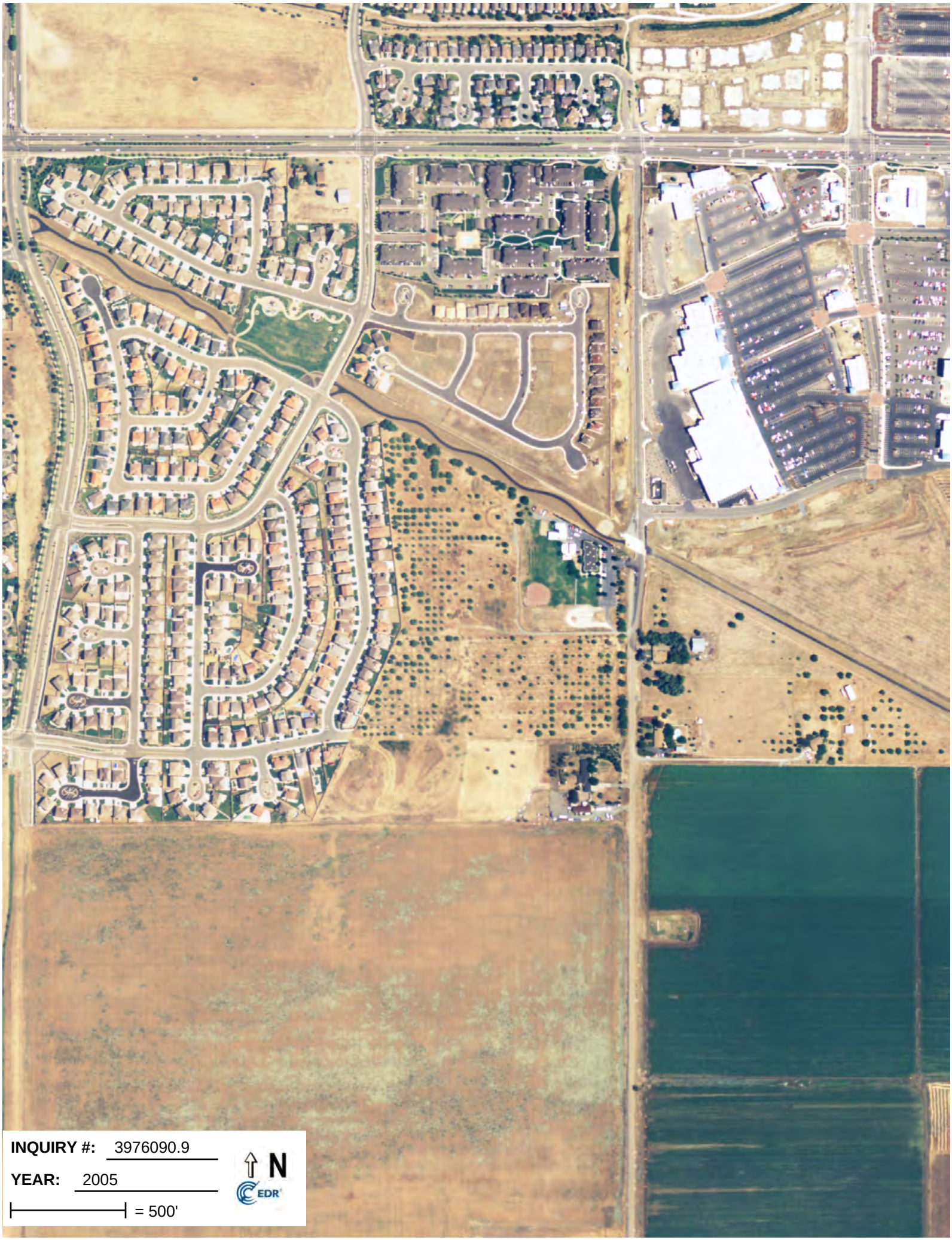
INQUIRY #: 3976090.9

YEAR: 1998

= 500'

N

EDR


INQUIRY #: 3976090.9
YEAR: 2005
= 500'
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EDR


INQUIRY #: 3976090.9
YEAR: 2006
= 500'
N
EDR


INQUIRY #: 3976090.9
YEAR: 2009
= 500'
N
EDR


INQUIRY #: 3976090.9
YEAR: 2010
= 500'
N
EDR

Aqua Science Engineers, Inc.
55 Oak Court, Suite 220, Danville, CA 94526
(925) 820-9391
www.aquascienceengineers.com

APPENDIX D

Sanborn Fire Insurance Map Report

Heidorn Ranch Road
5220 - 5300 Heidorn Ranch Road
Antioch, CA 94531

Inquiry Number: 3976090.3
June 18, 2014

Certified Sanborn® Map Report

6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

6/18/14

Site Name:
Heidorn Ranch Road
5220 - 5300 Heidorn Ranch
Antioch, CA 94531

Client Name:
Aqua Science Engineers Inc.
55 Oak Court
Danville, CA 94526

EDR Inquiry # 3976090.3

Contact: Dave Allen

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Aqua Science Engineers Inc. were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Site Name: Heidorn Ranch Road
Address: 5220 - 5300 Heidorn Ranch Road
City, State, Zip: Antioch, CA 94531
Cross Street:
P.O. # 4612
Project: MP-Heidorn Ranch Road
Certification # 7A25-4802-BE89

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results
Certification # 7A25-4802-BE89

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✓ Library of Congress
- ✓ University Publications of America
- ✓ EDR Private Collection

The Sanborn Library LLC Since 1866™

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Aqua Science Engineers, Inc.
55 Oak Court, Suite 220, Danville, CA 94526
(925) 820-9391
www.aquascienceengineers.com

APPENDIX E

Topographic Maps

Heidorn Ranch Road
5220 - 5300 Heidorn Ranch Road
Antioch, CA 94531

Inquiry Number: 3976090.4
June 20, 2014

EDR Historical Topographic Map Report

6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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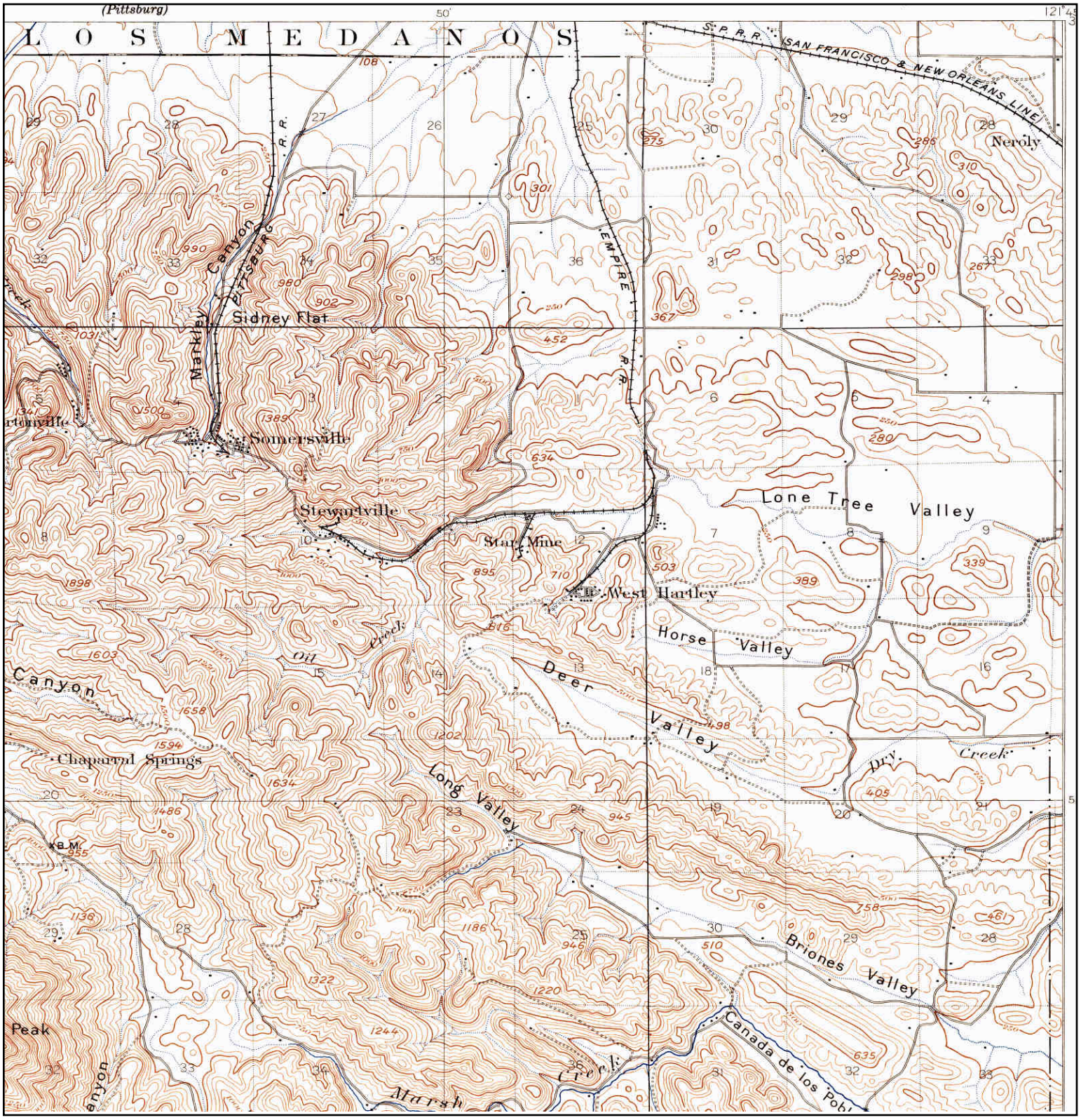
Historical Topographic Map



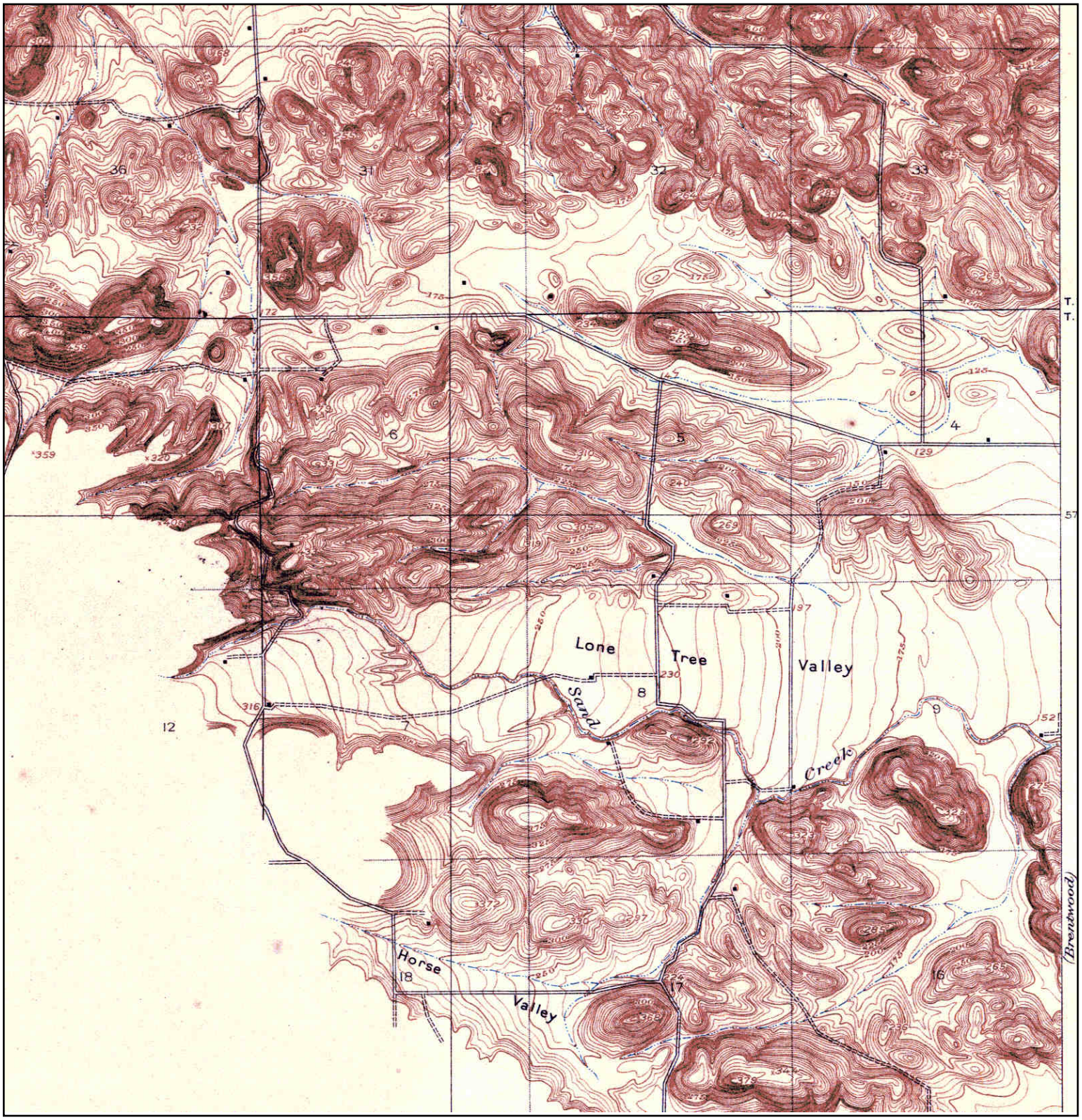
N	TARGET QUAD NAME: MOUNT DIABLO MAP YEAR: 1896 SERIES: 15 SCALE: 1:62500	SITE NAME: Heidorn Ranch Road ADDRESS: 5220 - 5300 Heidorn Ranch Road Antioch, CA 94531 LAT/LONG: 37.9561 / -121.7532	CLIENT: Aqua Science Engineers Inc. CONTACT: Dave Allen INQUIRY#: 3976090.4 RESEARCH DATE: 06/20/2014

Historical Topographic Map



N	TARGET QUAD NAME: MT. DIABLO MAP YEAR: 1912 SERIES: 15 SCALE: 1:62500	SITE NAME: Heidorn Ranch Road ADDRESS: 5220 - 5300 Heidorn Ranch Road Antioch, CA 94531 LAT/LONG: 37.9561 / -121.7532	CLIENT: Aqua Science Engineers Inc. CONTACT: Dave Allen INQUIRY#: 3976090.4 RESEARCH DATE: 06/20/2014

Historical Topographic Map



Unsurveyed Area on the Topographic Map

N

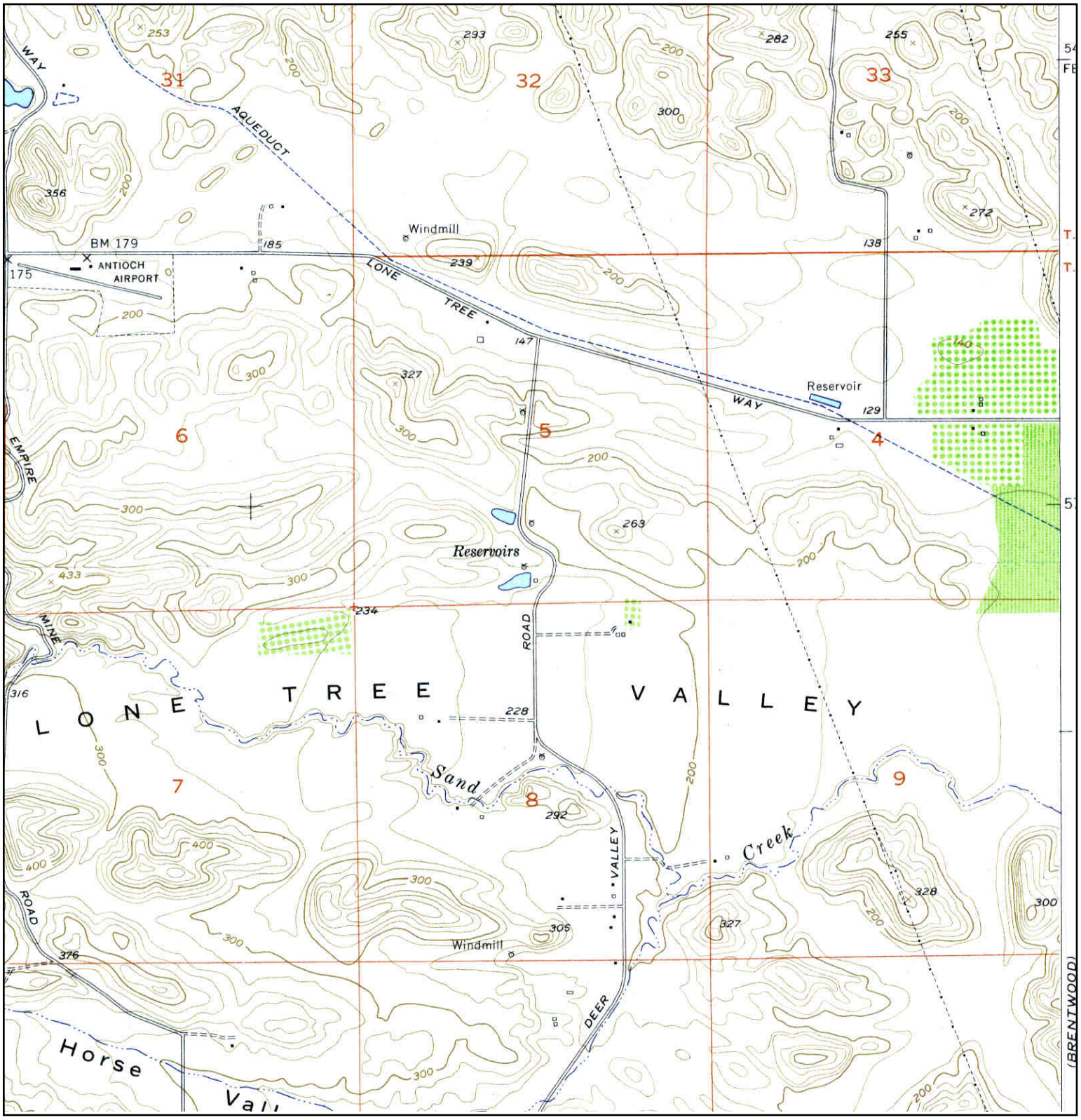
TARGET QUAD					
NAME:	LONE TREE VALLEY	SITE NAME:	Heidorn Ranch Road	CLIENT:	Aqua Science Engineers Inc.
MAP YEAR:	1916	ADDRESS:	5220 - 5300 Heidorn Ranch Road Antioch, CA 94531	CONTACT:	Dave Allen
PRELIMINARY				INQUIRY#:	3976090.4
SERIES:	7.5	LAT/LONG:	37.9561 / -121.7532	RESEARCH DATE:	06/20/2014
SCALE:	1:31680				

Historical Topographic Map



N	TARGET QUAD NAME: MT. DIABLO MAP YEAR: 1947 SERIES: 15 SCALE: 1:50000	SITE NAME: Heidorn Ranch Road ADDRESS: 5220 - 5300 Heidorn Ranch Road Antioch, CA 94531 LAT/LONG: 37.9561 / -121.7532	CLIENT: Aqua Science Engineers Inc. CONTACT: Dave Allen INQUIRY#: 3976090.4 RESEARCH DATE: 06/20/2014

Historical Topographic Map



N	TARGET QUAD NAME: ANTIOCH SOUTH MAP YEAR: 1953 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Heidorn Ranch Road ADDRESS: 5220 - 5300 Heidorn Ranch Road Antioch, CA 94531 LAT/LONG: 37.9561 / -121.7532	CLIENT: Aqua Science Engineers Inc. CONTACT: Dave Allen INQUIRY#: 3976090.4 RESEARCH DATE: 06/20/2014

Historical Topographic Map



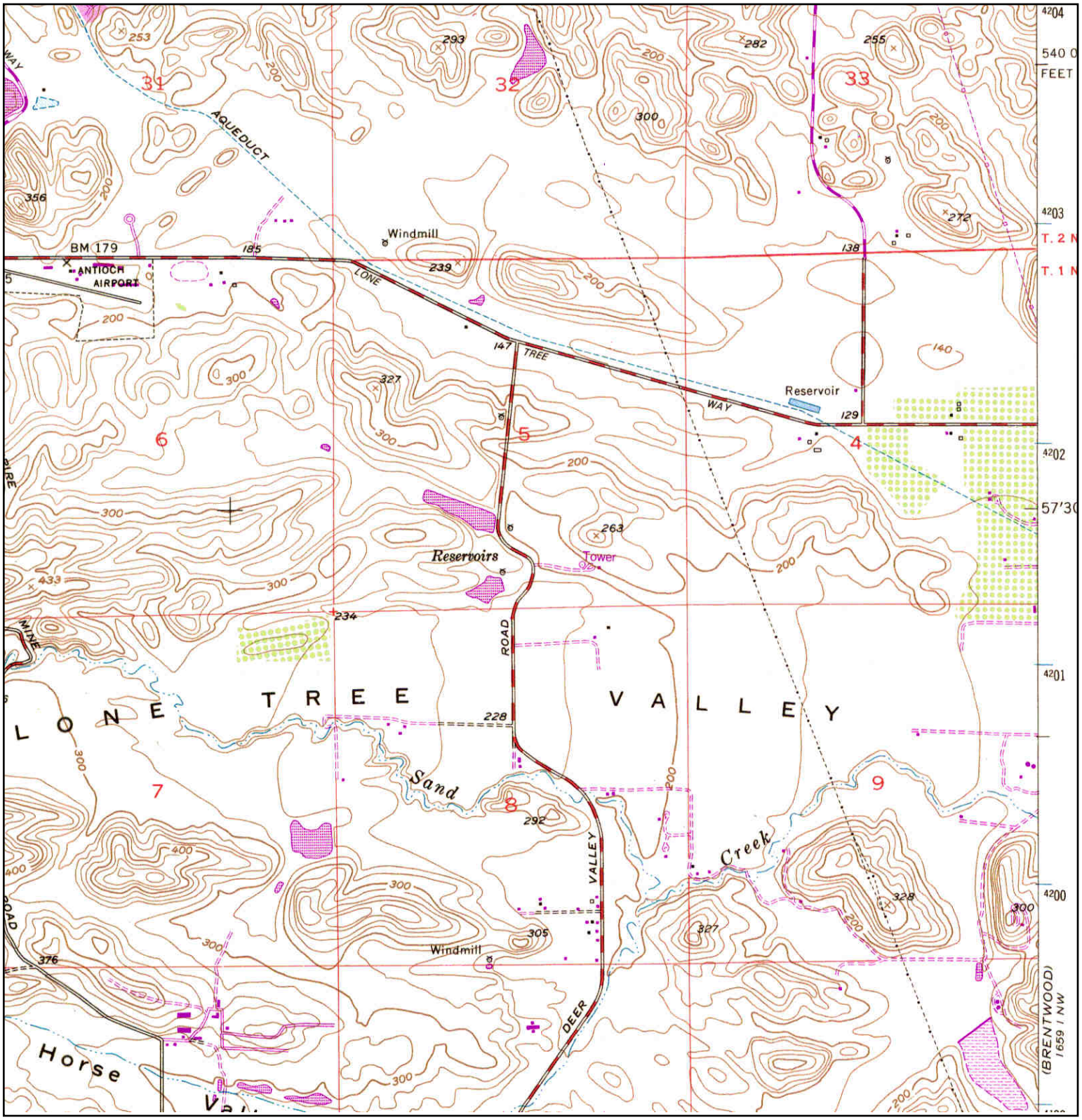
N	TARGET QUAD NAME: ANTIOCH SOUTH MAP YEAR: 1968 PHOTOREVISED FROM :1953 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Heidorn Ranch Road ADDRESS: 5220 - 5300 Heidorn Ranch Road Antioch, CA 94531 LAT/LONG: 37.9561 / -121.7532	CLIENT: Aqua Science Engineers Inc. CONTACT: Dave Allen INQUIRY#: 3976090.4 RESEARCH DATE: 06/20/2014

Historical Topographic Map



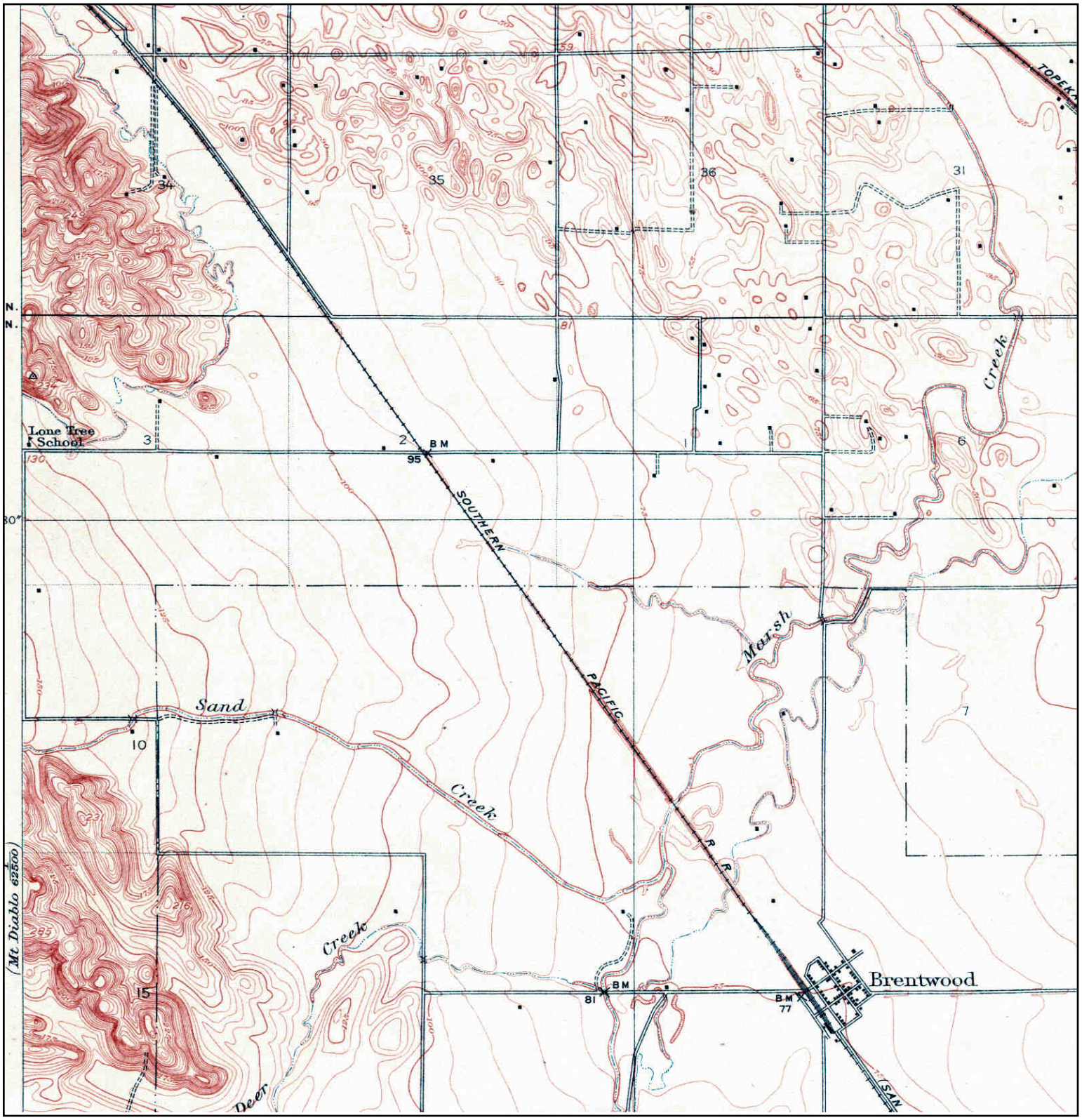
N	TARGET QUAD NAME: ANTIOCH SOUTH MAP YEAR: 1973 PHOTOREVISED FROM :1953 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Heidorn Ranch Road ADDRESS: 5220 - 5300 Heidorn Ranch Road Antioch, CA 94531 LAT/LONG: 37.9561 / -121.7532	CLIENT: Aqua Science Engineers Inc. CONTACT: Dave Allen INQUIRY#: 3976090.4 RESEARCH DATE: 06/20/2014

Historical Topographic Map



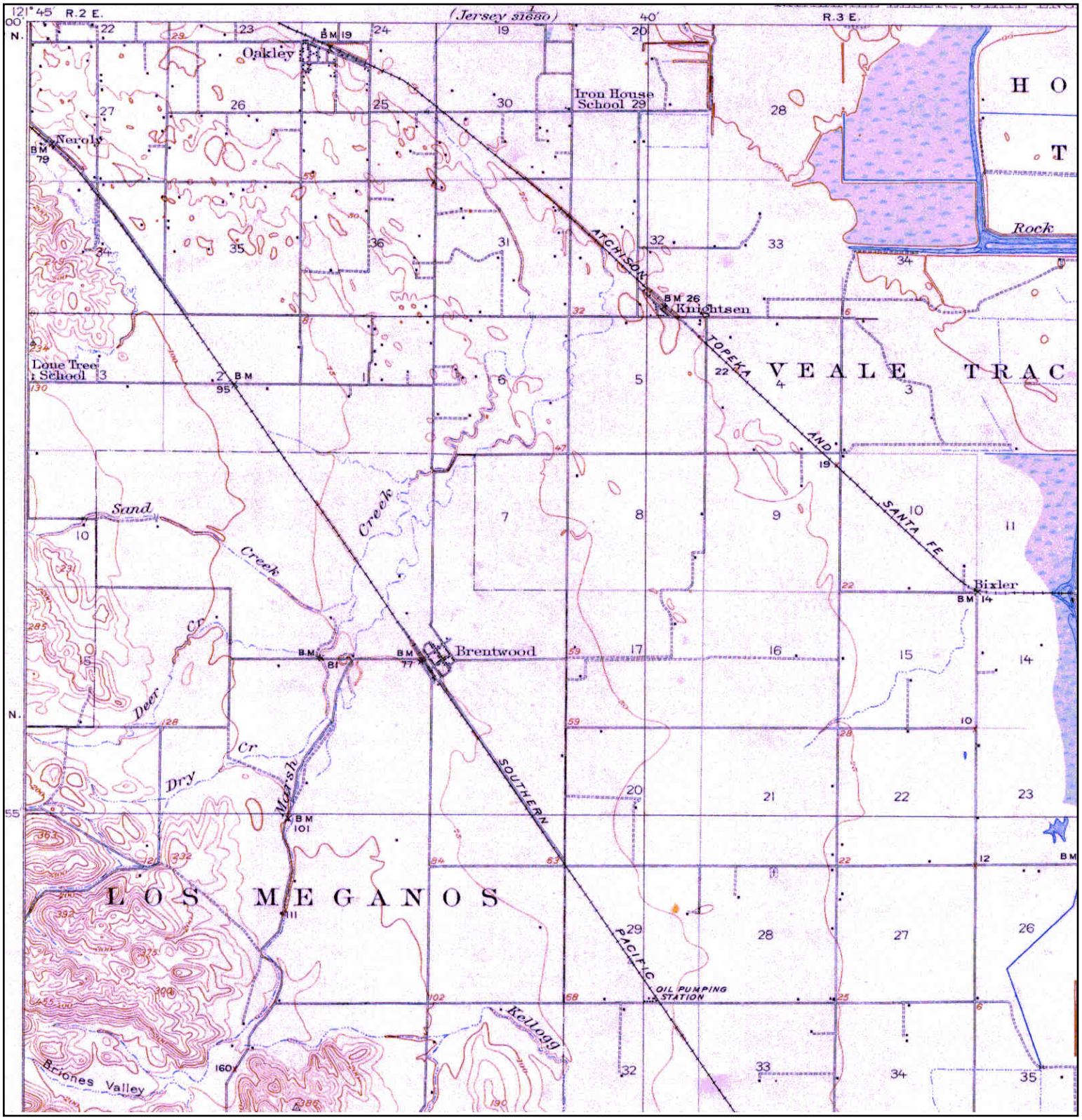
N	TARGET QUAD				
	NAME:	ANTIOCH SOUTH	SITE NAME:	Heidorn Ranch Road	CLIENT: Aqua Science Engineers Inc.
	MAP YEAR:	1980	ADDRESS:	5220 - 5300 Heidorn Ranch Road	CONTACT: Dave Allen
	PHOTOREVISED FROM:	1953		Antioch, CA 94531	INQUIRY#: 3976090.4
	SERIES:	7.5	LAT/LONG:	37.9561 / -121.7532	RESEARCH DATE: 06/20/2014
	SCALE:	1:24000			

Historical Topographic Map



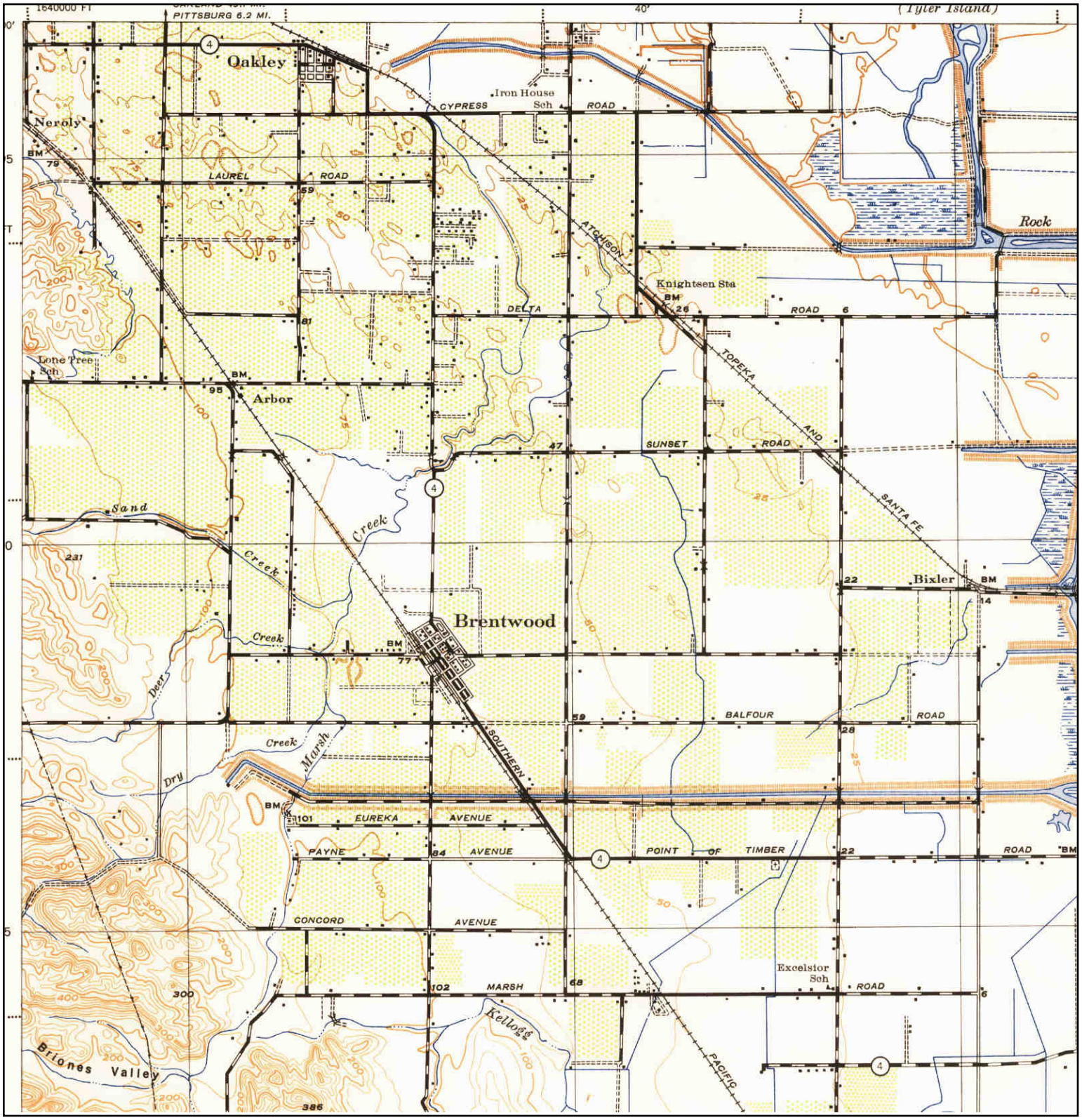
N	ADJOINING QUAD NAME: BRENTWOOD MAP YEAR: 1914 SERIES: 7.5 SCALE: 1:31680	SITE NAME: Heidorn Ranch Road ADDRESS: 5220 - 5300 Heidorn Ranch Road Antioch, CA 94531 LAT/LONG: 37.9561 / -121.7532	CLIENT: Aqua Science Engineers Inc. CONTACT: Dave Allen INQUIRY#: 3976090.4 RESEARCH DATE: 06/20/2014

Historical Topographic Map



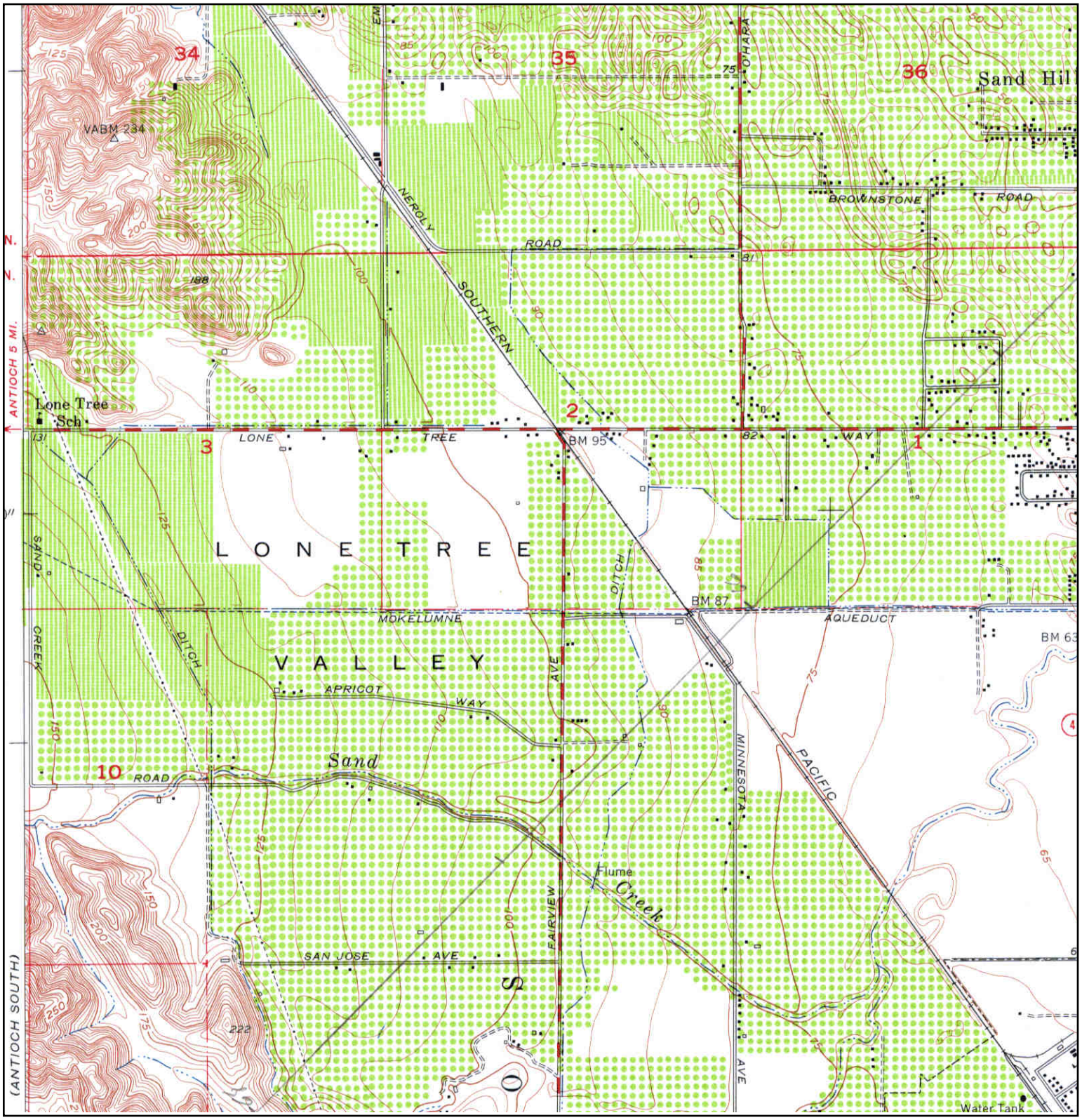
N	ADJOINING QUAD				
	NAME:	BYRON	SITE NAME:	Heidorn Ranch Road	CLIENT: Aqua Science Engineers Inc.
	MAP YEAR:	1916	ADDRESS:	5220 - 5300 Heidorn Ranch Road	CONTACT: Dave Allen
				Antioch, CA 94531	INQUIRY#: 3976090.4
	SERIES:	15	LAT/LONG:	37.9561 / -121.7532	RESEARCH DATE: 06/20/2014
	SCALE:	1:62500			

Historical Topographic Map



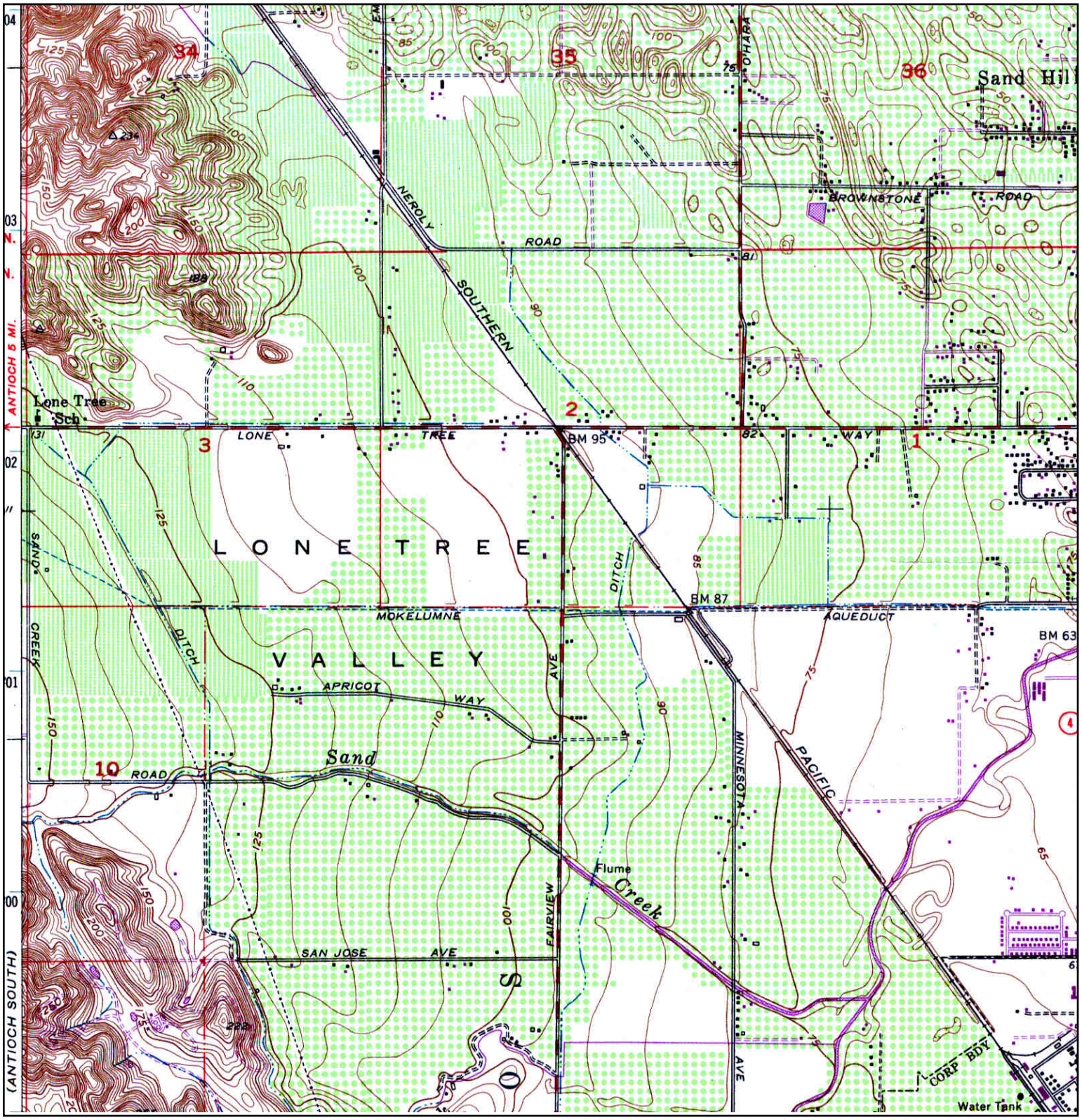
N	ADJOINING QUAD		SITE NAME:	Heidorn Ranch Road	CLIENT: Aqua Science Engineers Inc.
	NAME:	BYRON	ADDRESS:	5220 - 5300 Heidorn Ranch Road	CONTACT: Dave Allen
	MAP YEAR:	1943		Antioch, CA 94531	INQUIRY#: 3976090.4
	SERIES:	15	LAT/LONG:	37.9561 / -121.7532	RESEARCH DATE: 06/20/2014
	SCALE:	1:62500			

Historical Topographic Map



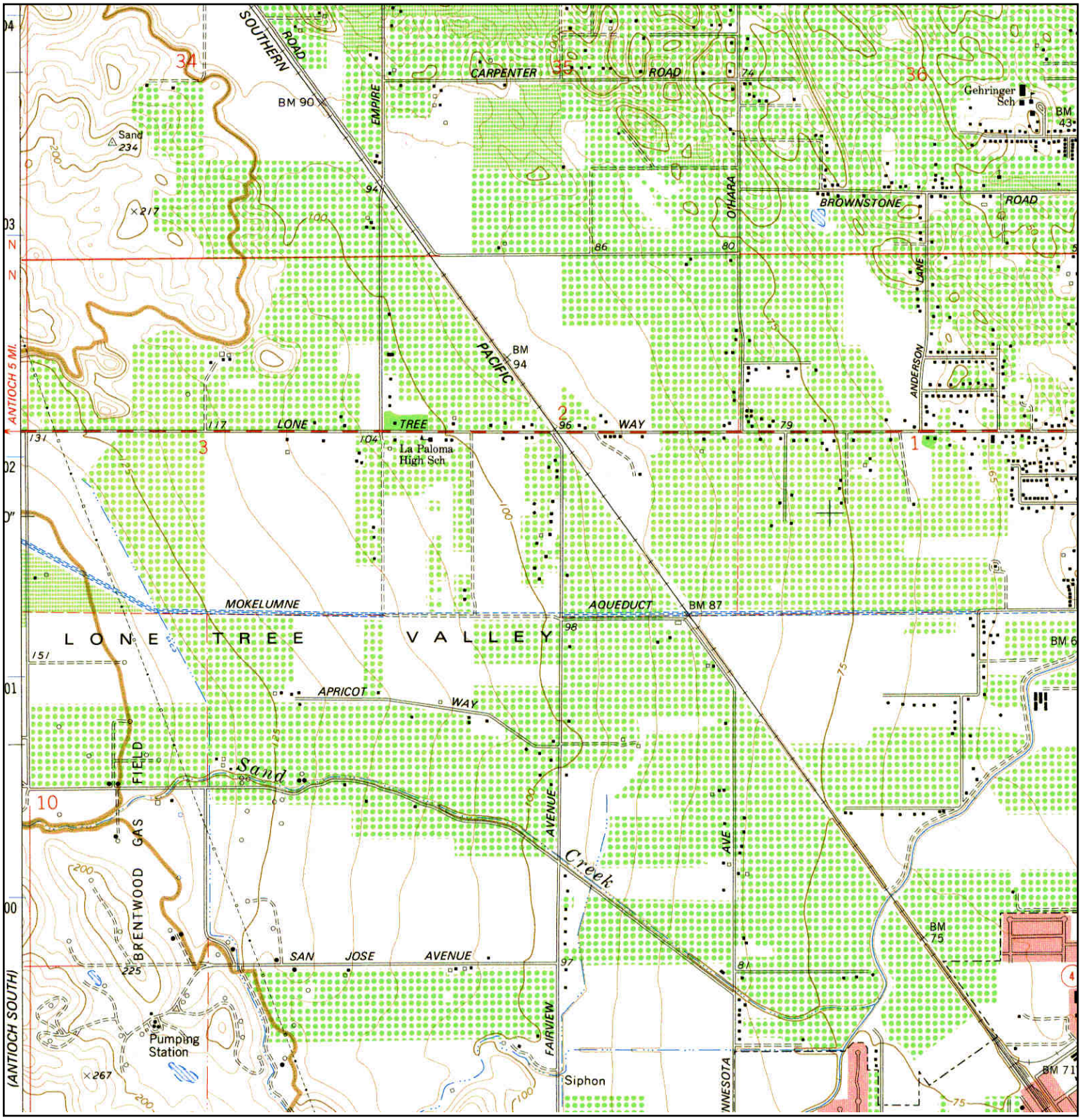
N	ADJOINING QUAD NAME: BRENTWOOD MAP YEAR: 1954 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Heidorn Ranch Road ADDRESS: 5220 - 5300 Heidorn Ranch Road Antioch, CA 94531 LAT/LONG: 37.9561 / -121.7532	CLIENT: Aqua Science Engineers Inc. CONTACT: Dave Allen INQUIRY#: 3976090.4 RESEARCH DATE: 06/20/2014

Historical Topographic Map



N	ADJOINING QUAD NAME: BRENTWOOD MAP YEAR: 1968 PHOTOREVISED FROM :1954 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Heidorn Ranch Road ADDRESS: 5220 - 5300 Heidorn Ranch Road Antioch, CA 94531 LAT/LONG: 37.9561 / -121.7532	CLIENT: Aqua Science Engineers Inc. CONTACT: Dave Allen INQUIRY#: 3976090.4 RESEARCH DATE: 06/20/2014

Historical Topographic Map



N	ADJOINING QUAD		
	NAME: BRENTWOOD	SITE NAME: Heidorn Ranch Road	CLIENT: Aqua Science Engineers Inc.
	MAP YEAR: 1978	ADDRESS: 5220 - 5300 Heidorn Ranch Road	CONTACT: Dave Allen
		Antioch, CA 94531	INQUIRY#: 3976090.4
	SERIES: 7.5	LAT/LONG: 37.9561 / -121.7532	RESEARCH DATE: 06/20/2014
	SCALE: 1:24000		

Aqua Science Engineers, Inc.
55 Oak Court, Suite 220, Danville, CA 94526
(925) 820-9391
www.aquascienceengineers.com

APPENDIX F

City Directory Report

Heidorn Ranch Road
5220 - 5300 Heidorn Ranch Road
Antioch, CA 94531

Inquiry Number: 3976090.5
June 24, 2014

The EDR-City Directory Image Report

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Executive Summary

Findings

City Directory Images

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Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	*Target Street*	*Cross Street*	*Source*
2013	☑	☐	Cole Information Services
2008	☑	☐	Cole Information Services
2003	☑	☐	Cole Information Services
1999	☑	☐	Cole Information Services
1994	☐	☐	Haines Criss-Cross Directory
1989	☐	☐	Haines Criss-Cross Directory
1985	☐	☐	Haines Criss-Cross Directory
1980	☐	☐	Haines Criss-Cross Directory
1975	☐	☐	Haines Criss-Cross Directory

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FINDINGS

TARGET PROPERTY STREET

5220 - 5300 Heidorn Ranch Road
Antioch, CA 94531

Year	*CD Image*	*Source*	
HEIDORN RANCH RD			
2013	pg A1	Cole Information Services	
2008	pg A2	Cole Information Services	
2003	pg A3	Cole Information Services	
1999	pg A4	Cole Information Services	
1994	-	Haines Criss-Cross Directory	Street not listed in Source
1989	-	Haines Criss-Cross Directory	Street not listed in Source
1985	-	Haines Criss-Cross Directory	Street not listed in Source
1980	-	Haines Criss-Cross Directory	Street not listed in Source
1975	-	Haines Criss-Cross Directory	Street not listed in Source

FINDINGS

CROSS STREETS

No Cross Streets Identified

City Directory Images

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEIDORN RANCH RD 2013

5030	LUCIA JOBE
5200	HERITAGE BAPTIST ACADEMY
	HERITAGE BAPTIST CHURCH
5320	RICHARD JOHNSON

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEIDORN RANCH RD 2008

5030	LUCIA JOBE
5200	HERITAGE BAPTIST ACADEMY
5320	RICHARD JOHNSON

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEIDORN RANCH RD 2003

5020	OCCUPANT UNKNOWN
5030	LUCIA JOBE
5200	HERITAGE BAPTIST ACADEMY
	HERITAGE BAPTIST CHURCH
	OCCUPANT UNKNOWN
5320	RICHARD JOHNSON

Target Street	Cross Street	Source
✓	-	Cole Information Services

HEIDORN RANCH RD 1999

5030	LUCIA JOBE
5320	RICHARD JOHNSON

Aqua Science Engineers, Inc.
55 Oak Court, Suite 220, Danville, CA 94526
(925) 820-9391
www.aquascienceengineers.com

APPENDIX G

Research Records

55 Oak Court, Suite 220
Danville, CA 94526
(925) 820-9391 phone
(925) 837-4853 fax
www.aquascienceengineers.com

Environmental and Engineering Consulting Services

PHASE I ENVIRONMENTAL SITE ASSESSMENT QUESTIONNAIRE

The purpose of the Environmental Site Assessment Questionnaire is to collect information regarding the subject site in accordance with ASTM Standard Practice for Environmental Assessments Designation E 1527-13. The questionnaire should be completed by the person(s) most knowledgeable with the subject site. The information in the questionnaire should be completed in a true and accurate manner to the best of the person's knowledge. If the answer to a question is not known indicate NK. If a question does not apply to the subject site, indicate NA.

Please return the completed and signed questionnaire to ASE as soon as possible.

1. OWNER/MANAGER INFORMATION

Position	Name	Phone, Fax & Email	Time at Site
Owner	Mission Peak Homes Inc.	(510) 354-0888	
Tenant	N.A.		
Site Contact	John S. Wong	(510) 714-3947	

2. GENERAL SITE INFORMATION

Purpose for Conducting Phase I ESA (acquisition, refinance, etc)	pursuit of a Tentative Map as a part of the subdivision entitlement process.
Site Name	Heidorn Village
Full Street Address	Heidorn Ranch Road
City, County, State, ZIP	Antioch CA. 94513
Assessor Parcel No.	056-130-013, 015, 017 + 018
Site Area	20 Acres
Number of Buildings	N.A.

Number of Stories	
Individual and Total Building Square Footage	
Year(s) of Construction	
Renovation date(s)	
Number of Units/Tenant Spaces (Attach Tenant List or Rent Roll)	
Current Site Use	
Historical Site Uses	
List Previous Phase I Environmental Assessment(s) (Provide Copies of Reports)	
Electricity Provider	
Natural Gas Provider	
Propane/Heating Oil Supplier	
Potable Water Supplier	
Sanitary Sewer Provider	
Solid Waste Removal Company	
Recycling Company	

3. ENVIRONMENTAL SITE INFORMATION

Item	Are any of the following features occurring ~~or have occurred~~ at the subject site? (BW) If yes, explain below and attach available information	Yes	No
3.1	Gasoline service station, auto repair, dump or landfill		✓
3.2	Dry cleaning, printing, photo developing or medical activities		✓
3.3	Manufacturing		✓

Item	Are any of the following features occurring or have occurred <u>at the subject site</u>? If yes, explain below and attach available information	Yes	No
3.4	Underground storage tanks (USTs)		✓
3.5	Above ground storage tanks (ASTs)		✓
3.6	Electrical transformers and other potential PCB-containing equipment		✓
3.7	Hydraulic equipment (elevators, escalators, truck dock levelers). Provide name of company providing maintenance		✓
3.8	Chemicals storage. If yes, attach list and approximate "on hand" quantities		✓
3.9	Generation of Hazardous waste. If yes, attach list and approximate "on hand" quantities Provide names of waste removal/recycling company		✓
3.10	Active or inactive water wells or groundwater monitoring wells		✓
3.11	Regulated operations requiring discharge permits (i.e., air, storm water, sewer)		✓
3.12	Drains, sumps, separators, interceptors, clarifiers, septic tanks, cesspools		✓
3.13	Wetlands, flood zone, or other specially-designated areas		✓
3.14	High radon levels, high voltage electrical power lines or pipelines		✓
3.15	Asbestos-containing materials		✓
3.16	Lead-based paint		✓
3.17	Water intrusion and/or suspected mold conditions		✓
3.18	Environmental investigations and/or remediation, related to the items listed above and/or for other reasons		✓
3.19	Known or suspected conditions at the subject site or at adjoining properties that could have caused a potential environmental impact on the subject site or the environment (i.e., surface staining, leaks, spills, improper disposal or discharges, etc)		✓
3.20	Be named as potential responsible party in an environmental action, or be cited by an agency or a third party		✓
3.21	Is there a reduction of property value due to environmental issues?		✓
3.22	Do you have specialized knowledge regarding environmental conditions at the subject site?		✓

Item	Are any of the following features occurring or have occurred <u>at the subject site</u>? If yes, explain below and attach available information	Yes	No
3.23	Are there reported environmental liens or activity and use limitations (AULs) related to the subject site?		✓
3.24	Is there currently or has there been historically any pesticide or herbicide usage at the subject site?		✓
3.25	Has any fill material been deposited at the subject site?		✓
3.26	Please use a separate piece of paper to **<u>describe any and all processes</u>** conducted at the site historically and currently. Please emphasize your answer on hazardous materials, machinery, chemical usage, etc.		

Item	Additional Information (Include explanations for questions answered "yes". Use additional sheets, if necessary. Attach available documentation)
	Aqua Science Engineers Inc. report dated July 8, 2003

4. PREVIOUS OWNERSHIP/TENANT INFORMATION

Name	Owner or Tenant	Operations/Activities Conducted	Time Period
La Vasse, etal APN 056-130-013	owner	ASE report July 8, 2003	
LaHue Family Trust APN 056-130-015	owner	"	
Wenk Trust APN 056-130-017 -018	owner	"	

5. SIGNATURE

The information provided in this questionnaire is accurate to the best of my knowledge.

John S. Wong
Signature

6-16-2014
Date

John S. Wong
Print Name

President
Title

Mission Peak Homes Inc.
Company

JUL 28 2004

HEIDORN RANCH "ANTIOCH" ADMIN P. G. & E.

ALSO DEMOLITION

MISSION PEAK CONSTRUCTION INCORPORATED

July 26, 2004

Mr. Bruce Ghiselli
Pacific Gas & Electric
2111 Hillcrest Ave.
Antioch, Ca. 94509

Re: Request to disconnect services 5020 Heidorn Ranch Road, Antioch CA

Dear Mr. Ghiselli,

We have recently purchased the above referenced property. We are anxious to start demolition of all existing structures and are hereby requesting to have all utility's disconnected.

We are currently in process of obtaining a demolition permit from the City of Antioch, however, we must first receive permits from Bay Area Air Quality, and the Contra Costa County Health Department prior to the City permit. I anticipate it will take approximately three to four weeks for all of this to take place. Therefore, I am requesting, if possible, to have the services disconnected by August 27, 2004.

Should you need any additional information you may contact me at 510-354-0885.

Sincerely

Stephen M. Allen
Director of Operations

DISCONNECT Aug 3 2004

40480 Encyclopedia Circle, Fremont, California 94538, Telephone 510/354•0888, Facsimile 510/354•0889

G.5.



THE
MISSION PEAK
COMPANY

COPY

LETTER OF TRANSMITTAL

To: Denise Thompson
Bay Area Air Quality District
939 Ellis Street
San Francisco, CA 94109

Date: September 9, 2004

Re: Heidron Ranch Road
Antioch

☐ Enclosed ☐ Via FAX No. Pages Including This One _____

☐ Copy of Letter ☐ Prints ☐ Plans ☐ Specs.
☐ Change Order ☐ Contract ☐ Other _____

Copies	Date	Description

Transmitted as checked below:

☐ For Approval ☐ For Your Use ☐ As Requested
☐ Approved as Submitted ☐ For Review & Comment
☐ Approved as Noted ☐ For Bids Due _____

Remarks: Enclosed please find the Notification Form for Demolition and a check in the amount of $43.00.

Copy To: _____ Signed: Mary Piccinini

40480 Encyclopedia Circle, Fremont, CA 94538
510/354.0888 • FAX 510/354.0889

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

DEMOLITION

REGULATION 11, Rule 2

Notification Form

For Office Use Only
J#
I#

Site of Demolition

Site Address: 5020 Heidron Ranch Road Cross Street: Lone Tree Way
City: Antioch Zip:
(Owner)/Operator Mission Peak Construction, Inc. Phone (510) 354-0888
Specific Location of Project within Building/Address:
Check One: ☒ Single Family Dwelling ☐ Commercial ☐ Multifamily Dwelling ☐ Govt Bldg ☐ School

Contractor/Individual Performing Demolition

Name: Company/Individual Mission Peak Construction, Inc. Contact: Steve Allen
Mailing Address: 40480 Encyclopedia Circle
City: Fremont Zip: CA Phone: (510) 354-0888
Have you previously submitted notifications for other sites? ☒ Yes ☐ No

Description of Demolition

Is this Demolition by Fire for Fire Training purposes? ☐ yes ☐ No
Is this Demolition ordered by a Government Agency? ☐ yes ☐ No
(Emergency only – attach copy of order)
If not Demolition for Fire Training, check applicable method:
☒ Heavy Equipment ☐ Implosion ☒ By Hand ☐ Other

Dates of Demolition: (*Actual* dates must be entered, *"ASAP"* or *"SOON"* will be rejected.)
Start: Nov. 1, 2004 Completion: Dec. 1, 2004 ☐ Weekend Work? ☐ Night Work *(After 5 PM)?*

Asbestos Survey Report

Name of company that conducted survey: David W. Sweet
Address: 714 Taylor Avenue
City: Alameda Zip: 94501 Phone: ( )
Name of person who completed the survey: David Sweet CAC/SST #: 02-3259
Is /was asbestos present? ☒ Yes ☐ No
If yes, who will remove/has removed prior to demo? R.G. Construction

Form Preparation Information

This form prepared by: Steve Allen Title: Director of Operations
Name: Company/Individual Mission Peak Construction, Inc. Phone: (510) 354-0888
Address: 40480 Encyclopedia Circle City: Fremont State: CA Zip: 94538

See Page Two to Complete This Form

Required Information

Payment must be received before J# will be assigned. See Schedule L of Regulation 3 for appropriate fees.

Payment type: ☐ Cash ☒ Check ☐ Money Order ☐ Credit Card *(Visa, MasterCard Only)*
(Complete attached authorization form)

I certify that the above information is correct and that I will comply with all of the requirements of the BAAQMD's regulations, as well as all other applicable federal, state and local requirements.

Signature of Contractor or Person Performing Demolition: _____

G:\\Form:Demo-01:7/25/2003

GENERAL INFORMATION

- This notification form shall be used to notify the BAAQMD of a **demolition** operation only. Notification is required for every demolition. All boxes must be completed. Appropriate fee payment must accompany each notification. Notifications may be faxed to (415) 749-4658 or (415) 928-0338, but faxed notifications will only be accepted if accompanied by a valid credit card authorization for applicable fees.
- Notification shall be provided to the District at least 10 working days prior to commencement of demolition, or as early as possible prior to commencement of emergency demolition. The notification period will not start until a complete notification is submitted (see above).
- An Acknowledgement Letter is mailed to the contractor/person listed within 3 days of receipt of a complete notification. This should be checked for accuracy of data.
- If the job is postponed or cancelled, the District **must** be notified of a revision; the Acknowledgement Letter should be used to fax or mail the revision information. When cancelled, a cancellation fee will apply.
- For specifically-defined "Emergency" conditions, the 10 working day period will be waived. Notification must be made by fax, but the job number will not be issued until the applicable fees are received by a valid credit card authorization. Following authorization approval, the job number will be issued and the notification form must be completed and returned, with the job number (" J#_____") filled in.
- For 4 or fewer unit residences, the 10 working day period may be reduced to 72 hours for an additional fee.

INSTRUCTIONS

- **SPECIFIC LOCATION OF PROJECT:** Identify where the demolition is taking place if the site contains more than one building.
- **START AND COMPLETION DATES:** The start date is the date on which demolition of the facility or structure commences. Any revision to the start or completion dates must be submitted prior to the previously notified date(s). Under no circumstances may the revised start date be earlier than the 10th working day following the postmark or fax date of the original notification. If the start date is unknown, enter an estimated start date and revise the notification when the actual start date is known, but not later than the estimated start date.
- **FIRE TRAINING:** Reg. 11-2-206 includes "intentional burning" in the definition of demolition. Notification is required, the 10 working day requirement must be met and all Asbestos-Containing Material (ACM) >1% must be removed prior to fire training. The District's Open Burning Notification form must also be filed and the applicable requirements of Regulation 5 must be met.
- **SURVEY REPORT:** Provide information showing that prior to commencement of the demolition, a survey was performed to determine the presence of Regulated ACM (RACM). Indicate if there was/was not suspected ACM.
- **GOVERNMENT ORDERED DEMOLITION:** If an "Emergency" demolition (see above) is the result of a state or local agency declaring the building a public nuisance or structurally unsound and in danger of imminent collapse, a copy of the written order must accompany this notification.

FEES APPLICABLE TO DEMOLITION OPERATIONS (FROM REGULATION 3, SCHEDULE L)

Demolition **conducted at a single family** dwelling is subject to the following fee:

OPERATION FEE: $43

Cancellation: $43 (100% of fee) non-refundable, for notification processing.

Demolition **conducted at a single family dwelling or multiple family dwelling with four or fewer units with 72 hours instead of 10 days prior notice (excluding emergencies)** is allowed upon payment of the following **additional** fee:

OPERATION FEE: $297

Demolition, **other than those conducted at a single family dwelling**, is subject to the following fee:

OPERATION FEE: $179

Cancellation: $120 of above amount non-refundable for notification processing.

Demolition conducted for the purpose of **fire training** is exempt from fee.

SURVEY REQUIREMENTS FOR DEMOLITION OPERATION (FROM REGULATION 11, RULE 2)

303.8 Surveys: Except for ordered demolitions, prior to commencement of any demolition or renovation, the owner or operator shall thoroughly survey the affected structure or portion thereof for the presence of asbestos-containing material, including Category I and Category II nonfriable asbestos-containing material. The survey shall be performed by a person who is certified by the Division of Occupational Safety and Health, and who has taken and passed an EPA-approved Building Inspector course and who conforms to the procedures outlined in the course. The survey shall include sampling and the results of laboratory analysis of the asbestos content of all suspected asbestos-containing materials. This survey shall be made available, upon request by the APCO, prior to the commencement of any RACM removal or any demolition. This subsection shall not apply if the owner or operator asserts that the material to be renovated is RACM and will be handled in accordance with the provisions of Sections 11-2-303, 304 and 401. The requirement for certification by the Division of Occupational Safety and Health shall not apply to in-house health professionals within a specific nonasbestos related company who perform occasional surveys only for that company as part of their regular job responsibilities

8.1 When a structure, or portion thereof, is demolished under an ordered demolition, the survey must be done prior to, during, or after the demolition but prior to loading or removal of any demolition debris. If the debris contains regulated asbestos-containing material, all of the debris shall be treated as asbestos-containing waste material pursuant to Section 11-2-304.

8.2 For renovation or demolition of residential buildings having four or fewer dwelling units, a survey is not required. A sample and test of the material will be required only when any of the following will be removed or disturbed: heating, ventilation, air conditioning ducting and systems; acoustic ceiling material or acoustic plaster; textured or skim coated wall surfaces, cement siding or stucco, or resilient flooring. Where the material is found to contain greater than 1 percent asbestos and is friable, the material must be handled in accordance with Section 11-2-303.

MISSION PEAK HOMES, INC.

Vendor: 5360 BAY AREA AIR QUALITY MANAGEMEN Check Date: 09/09/2004 14

DATE	DESCRIPTION	AMOUNT	DEDUCTION	NET
09/08/2004	090804 DEMO PERMIT	43.00	.00	

DATE	CONTROL NUMBER				
09/09/2004		TOTALS →	43.00	.00	

ORIGINAL DOCUMENT PRINTED ON CHEMICAL REACTIVE PAPER WITH MICROPRINTED ORDER. SEE REVERSE SIDE FOR COMPLETE SECURITY FEATURE

MISSION PEAK HOMES, INC.
40480 ENCYCLOPEDIA CIRCLE
FREMONT, CA 94538
(510) 354-0888

HERITAGE
BANK EAST BAY
A DIVISION OF HERITAGE BANK OF COMMERCE
3077 Stevenson Blvd, Fremont, CA 94538

14288

14

90-4285/1211

PAY TO THE ORDER OF **FORTY-THREE DOLLARS EXACTLY**

DATE 09/09/2004 CONTROL NO. AMOUNT ********$43.

BAY AREA AIR QUALITY MANAGEMEN

THIS DOCUMENT CONTAINS HEAT SENSITIVE INK. TOUCH OR PRESS HERE. RED IMAGE DISAPPEARS WITH HEAT

⑈014288⑈ ⑆121142287⑆ 001307511⑈

Demolition

ASBESTOS DEMOLITION SURVEY REPORT

for

5020 Hendron Ranch Road
Antioch, California

Prepared for:

Mission Peak Construction, Inc.
40480 Encyclopedia Circle
Fremont, CA 94538

Prepared By:

David W. Sweet, C.A.C.
714 Taylor Avenue
Alameda, California

September 7, 2004

DWS Job No: 350.008

Prepared By: _____

David W. Sweet, C.A.C.
Certified Asbestos Consultant
Certification No. 02-3259

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Section 1

Introduction

David W. Sweet, C.A.C. (DWS) performed a survey of the structures located at **5020 Hendron Ranch Road, Antioch, California**, to identify asbestos-containing building materials (ACBM). This report identifies the locations and asbestos content of friable and non-friable ACBM. This report was requested for the purpose of identifying ACBM which must be removed prior to the demolition of the building.

This survey addresses friable and non-friable suspect asbestos-containing building materials.

> Friable materials include: materials that can be crumbled, pulverized or reduced to powder, when dry, by hand pressure, such as spray-applied acoustical ceiling tile and damaged thermal systems insulation.
>
> Non-friable materials can become friable by: being rendered to a crumbled, pulverized or powdered state, when dry, by crushing, sanding, sawing, shot-blasting, severe weathering or by other mechanically induced means.

This report is prepared for the express use and benefit of **Mission Peak Construction, Inc.**, its agents and employees. The information in this report or portions thereof may be required to be included in notifications to employees, contractors or other visitors to the building. This report is not intended to be used by the Owner or its agents as a specification or work plan for any of the work suggested or recommended in this report.

This report is based upon conditions and practices observed at the property and information made available to DWS. This report does not purport to identify all hazards or unsafe practices, nor to indicate that other hazards or unsafe practices do not exist at the premises.

Reasonable effort is made by DWS to locate and sample suspect materials. However, for any facility the existence of unique or concealed asbestos-containing materials and debris is a possibility. In addition, sampling and laboratory analysis constraints typically hinder the investigation. DWS does not warrant, guarantee, or profess to have the ability to locate or identify all asbestos-containing materials in a facility. This report is intended to be used in planning for construction or demolition. This report is not intended to be a construction document.

Removal cost estimates for the ACBM identified at the property have not been included in this report.

On **August 30, 2004**, David W. Sweet, C.A.C., an independent Certified Asbestos Consultant performed an asbestos survey of the building in accordance with the U.S.

Section 2

Bulk Sampling Protocol & Analytical Methods

Bulk samples of suspect asbestos-containing materials were obtained using standard industrial hygiene techniques to minimize fiber release.

DWS bases the sampling strategy for suspect friable surfacing materials on the guidelines outlined in the EPA publication Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials, and the procedures outlined in 40 CFR 763, Subpart E (AHERA). For non-friable suspect materials, AHERA requires the building inspector to determine the appropriate number of samples to obtain and analyze. Usually one to three (1-3) samples of materials are collected.

For each homogenous material identified by visual inspection as suspect material, random samples are obtained. Every sample must be reported negative if the material is to be considered non-asbestos containing.

The bulk samples were delivered to an independent laboratory that participates in the bulk sample proficiency analysis program conducted by the United States Environmental Protection Agency and is accredited by the National Voluntary Laboratory Program (NVLAP). The samples were analyzed using Polarized Light Microscopy (PLM) with dispersion staining to estimate the percent of asbestos composition by volume. Samples in which asbestiform minerals are observed, but exist in concentrations of less than one percent (<1%), are designated as present in Trace amounts; all other samples are designated as asbestos-containing with the appropriate percent of asbestos noted.

Section 3

Summary of Findings

The following is a list of materials which were tested for the presence of asbestos at the property located at **5020 Hendron Ranch Road, Antioch, California**. Each is sorted by building unit at various locations throughout the property. A complete description of sampled ACBM is included in Section 7.

Suspect Material Collected	Material Location	Asbestos Present
Stucco	Exterior Walls	NO
Ceramic Roof Tile	Roof	NO
Linoleum	Kitchen	YES
Drywall w/Texturing & Joint Tape Compound	Walls & Ceilings Throughout	NO
Linoleum	Bathroom	YES
Acoustical Sprayed-on Ceiling Material	Ceilings	NO
Linoleum	Master Bathroom	YES
Ceramic Tile & Grout	Kitchen	NO
Drywall w/Joint Tape Compound	Garage	NO

Friable ACBM:
(RACM) ➢ Linoleum Flooring (Approx. 450 sq. ft.)

Non-Friable ACBM:
(Category I) N/A
(Category II) N/A

< 1% Asbestos or Trace: N/A

Section 4

Recommendations

Asbestos is a hazardous substance. Its condition, handling and disposal are regulated by federal, state, and local agencies. Asbestos-containing materials (ACM) generally do not pose a health threat unless the asbestos fibers are disturbed, become airborne, and are inhaled. Contractors working in the facility must be informed of the type and location of ACM. Abatement of ACM, including non-friable ACM, must be performed by a licensed, certified, and registered abatement contractor in accordance with OSHA and local regulations and should be overseen by a CAL OSHA Certified Asbestos Consultant (CAC) or Site Surveillance Technician (SST). An operations and maintenance program need not be implemented since the buildings are scheduled for demolition.

Section 5

Conclusions

Pursuant to this Asbestos Demolition Survey, there were a total of **eleven (11)** separate suspect materials identified and **sixteen (16)** samples collected.

The linoleum flooring products throughout the structure are all RACM, friable in nature, and are required to be removed by a Qualified Asbestos Contractor licensed in the State of California prior to demolition.

Section 6

Sample Request Forms - Chain of Custody

Chain of Custody Form:

MICRO ANALYTICAL LABORATORIES, INC.

5900 Hollis St., Suite M, Emeryville, CA 94608
(510) 653-0824 · (510) 653-1361 · FAX

Log in # 62912

Name / Client / Address:

DWS

Project

~~[illegible]~~
5020 Hermosa
Ranch Rd.
Antioch CA.

Tel. _____ Job No. _____

Fax _____ E-mail _____

Asbestos (TEM) AHERA Yamate II NIOSH 7402 Other

Asbestos PLM PCM

Lead Only _____ Total Lead STLC TCLP

Metals (Specify) _____ Total Metals STLC TCLP

Mold, Non-Viable _____ Tape Lift Air-O-Cell Other

Other (Specify) _____

Number of Samples _____ Turn-around Time 24 Hrs

Matrix Type Bulk Dust Paint Soil Wipe Air Water Other

Micro ID # (For Lab Use Only)	Client Sample ID#	Description	Date Sampled	Time Sampled Start / Stop / Total Minutes	Average LPM	Total Liters	Filter Pore Size
62912-01	08304-01	EXTERIOR STUCCO	08/30/04	: :			
-02	08304-02	EXTERIOR STUCCO		: :			
-03	08304-03	EXTERIOR STUCCO		: :			
-04	08304-04	ROOF CERAMIC TILE		: :			
-05	08304-05	LINOLEUM IN KITCHEN		: :			
-06	083004-06	DRY WALL W/JOINT TAPE AND TEXTURE		: :			
-07	083004-07	DRY WALL W/JOINT TAPE AND TEXTURE		: :			
-08	083004-08	TEXTURE ON WALLS		: :			
		VOID		: :			
-09	083004-~~09~~ -09	LINOLEUM IN RESTROOM		: :			

Instructions / Comments: ☐ Fax ☐ E-mail

Sample Return: YES NO If "YES" is checked, samples will be returned to the client or archived at Micro Analytical if required.
If "NO" is checked, soil samples may be disposed of within three months (one week for liquid samples, lab suspensions, and digestates).

Sampler's Signature / Name

Note to Lab: If any samples are not acceptable, record reasons for rejection.

Relinquished By Date / Time Dispatched / Courier Received By 8/31/04 3:10 pm Date / Time

Relinquished By Date / Time Received By Date / Time

Chain of Custody Form

MICRO ANALYTICAL LABORATORIES, INC.

5900 Hollis St., Suite M, Emeryville, CA 94608
(510) 653-0824 · (510) 653-1361 · FAX

Log in # 62912

Name / Client / Address: DWS

Project: 5020 HEINDRON RANCH RD. Antioch CA

Tel.

Job No

Fax

E-mail

Matrix Type: Bulk Dust Paint Soil Wipe Air Water Other

Asbestos (TEM): AHERA Yamate II NIOSH 7402 Other

Asbestos: PLM PCM

Lead Only: Total Lead STLC TCLP

Metals (Specify): Total Metals STLC TCLP

Mold, Non-Viable: Tape Lift Air-O-Cell Other

Other (Specify)

Number of Samples

Turn-Around Time: 24 Hrs

Micro ID # (For Lab Use Only)	Client Sample ID#	Description	Date Sampled	Time Sampled Start / Stop / Total Minutes	Average LPM	Total Liters	Filter Pore Size
62912-10	08304-10	Accoustical Spray on Ceiling	08/30/04				
-11	-11	↓					
-12	-12	↓					
-13	08304-13	Linoleum in Rest Room					
-14	08304-14	Ceramic Tile Adhesive Rest Room Wall					
-15	08304-15	Ceramic Tile Grout - Kitchen Wall					
-16	08304-16	~~[illegible]~~ Drywall with Joint Tape Garage Walls					

Instructions / Comments: ☐ Fax ☐ E-mail

Sample Return: YES NO If "YES" is checked, samples will be returned to the client or archived at Micro Analytical if required.
If "NO" is checked, solid samples may be disposed of within three months (one week for liquid samples, lab suspensions, and digestates).

Sampler's Signature / Name

Note to Lab: If any samples are not acceptable, record reasons for rejection.

Relinquished By Date / Time Drop Box / Courier Received By 8/31/04 3:10 pm Date / Time

Relinquished By Date / Time Received By Date / Time

Section 7

Laboratory Sampling Results

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - PLM (EPA/600/R-93/116, 1993)

1073

Dave Sweet
714 Taylor Avenue
Alameda, CA 94501

PROJECT:
5020 HEINDRON RANCH ROAD
ANTIOCH, CA

Micro Log In 62912
Total Samples 16
Date Sampled 08/30/2004
Date Received 08/31/2004
Date Analyzed 08/31/2004

SAMPLE INFORMATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client: 08304-01 Micro: 62912-01 Analyst: GR EXTERIOR STUCCO	BEIGE STUCCO: NONE DETECTED GRAY STUCCO: NONE DETECTED	CARBONATE ROCK FRAGMENTS SYNTHETIC MATERIAL
Client: 08304-02 Micro: 62912-02 Analyst: GR EXTERIOR STUCCO	WHITE STUCCO: NONE DETECTED GRAY STUCCO: NONE DETECTED	CARBONATE ROCK FRAGMENTS SYNTHETIC MATERIAL
Client: 08304-03 Micro: 62912-03 Analyst: GR EXTERIOR STUCCO	WHITE STUCCO: NONE DETECTED GRAY STUCCO: NONE DETECTED	CARBONATE ROCK FRAGMENTS SYNTHETIC MATERIAL
Client: 08304-04 Micro: 62912-04 Analyst: GR ROOF CERAMIC TILE	NONE DETECTED	ROCK FRAGMENTS SYNTHETIC MATERIAL
Client: 08304-05 Micro: 62912-05 Analyst: GR LINOLEUM IN KITCHEN	LINOLEUM: NONE DETECTED BACKING AND MASTIC: 40% CHRYSOTILE	15 % CELLULOSE ROCK FRAGMENTS SYNTHETIC MATERIAL

Technical Supervisor: _____ 8/31/2004
Baoja Ke, Ph. D. Date Reported

NOTES: Weight % cannot be determined by PLM estimation of point counts. Asbestos fibers with diameter below ~1 µm may not be detected by PLM. The absence of asbestos in dust or debris (including wipe or microvacuum), and in some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Only dominant non-asbestos materials are indicated. This report must not be interpreted as a conclusive identification of non-asbestos (fibrous or not). Preparation (all samples): grinding, milling, teasing bundles apart; drying, if needed, by hotplate. Acid dissolution, ashing, or other matrix reduction techniques may be applied to some samples; residue asbestos % is corrected for amount of matrix removed. Various sample interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Notes are made if point counting is used, otherwise, asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (<<1%) may not be reliable or reproducible by PLM. Lower quantitation limit (reporting limit) of PLM estimation is 1%. The 95% UCL and LCL (Upper and Lower Confidence Limits) represent the highest and lowest expected concentrations for an asbestos point count based on reported concentration and Poisson statistics. The Cal-OSHA definition of asbestos-containing construction materials is 0.1% asbestos by weight; however, reliable determination of asbestos weight percent at this level cannot be done by PLM, and TEM is recommended. Layers of heterogeneous samples are analyzed separately, asbestos percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. Composite asbestos percentages on multilayered samples are applicable only to layered wall systems (wallboard, joint compound, and related materials); compositing is based on clients' descriptions of a material as "joint compound". Clients are solely responsible for identification and description of bulk materials listed on field forms. Laboratory sample descriptions may differ from descriptions given by the client. "Quality Control (QC) Codes: A = results confirmed (within acceptance limits), B = no asbestos detected in lab blank (SRM 1866a Fibrous Glass or equivalent); R = all materials confirmed after multiple result resolutions. NIST / NVLAP Accreditation Lab Code #101072-0. California ELAP Certification #1037. EPA test method is based on the EPA Interim Method (1982), with several improvements in analytical techniques. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report must not be reproduced except in full, with approval of Micro Analytical Laboratories.

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - PLM (EPA/600/R-93/116, 1993)

1073

Dave Sweet
714 Taylor Avenue
Alameda, CA 94501

PROJECT:
5020 HEINDRON RANCH ROAD
ANTIOCH, CA

Micro Log In: **62912**
Total Samples: 16
Date Sampled: 08/30/2004
Date Received: 08/31/2004
Date Analyzed: 08/31/2004

SAMPLE INFORMATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client: 08304-06 Micro: 62912-06 Analyst: GR AF DRYWALL WITH JOINT TAPE AND TEXTURE	QC: A DRYWALL: NONE DETECTED TEXTURE: NONE DETECTED PAINT: NONE DETECTED NO JOINT COMPOUND / TAPE IN THE SAMPLE	20 % CELLULOSE GYPSUM CARBONATE
Client: 08304-07 Micro: 62912-07 Analyst: GR DRYWALL WITH JOINT TAPE AND TEXTURE	DRYWALL: NONE DETECTED JOINT COMPOUND / TEXTURE: NONE DETECTED PAINT: NONE DETECTED JOINT COMPOUND & TEXTURE ARE INDISTINGUISHABLE	30 % CELLULOSE GYPSUM CARBONATE
Client: 08304-08 Micro: 62912-08 Analyst: GR TEXTURE ON WALLS	DRYWALL: NONE DETECTED TEXTURE: NONE DETECTED PAINT: NONE DETECTED	30 % CELLULOSE GYPSUM CARBONATE
Client: 08304-09 Micro: 62912-09 Analyst: GR LINOLEUM IN RESTROOM	LINOLEUM: NONE DETECTED BACKING AND MASTIC: 40% CHRYSOTILE	15 % CELLULOSE ROCK FRAGMENTS SYNTHETIC MATERIAL
Client: 08304-10 Micro: 62912-10 Analyst: GR AF ACOUSTICAL SPRAY ON CEILING	QC: A NONE DETECTED	5 % CELLULOSE 10 % POLYETHYLENE CARBONATE SYNTHETIC MATERIAL PAINT

Technical Supervisor: _____ 9/1/2004
Baojia Ke, Ph. D. Date Reported

NOTES: Weight % cannot be determined by PLM estimation or point counts. Asbestos fibers with diameter below ~1 µm may not be detected by PLM. The absence of asbestos in dust or debris (including wipe or microvacuum), and in some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Only dominant non-asbestos materials are indicated. This report must not be interpreted as a conclusive identification of non-asbestos (fibrous or not). Preparation (all samples): grinding, milling; teasing bundles apart, drying, if needed, by hotplate. Acid dissolution, ashing, or other matrix reduction techniques may be applied to some samples; residue asbestos % is corrected for amount of matrix removed. Various sample interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Notes are made if point counting is used; otherwise, asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (<<1%) may not be reliable or reproducible by PLM. Lower quantitation limit (reporting limit) of PLM estimation is 1%. The 95% UCL and LCL (Upper and Lower Confidence Limits) represent the highest and lowest expected concentrations for an asbestos point count, based on reported concentration and Poisson statistics. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos by weight; however, reliable determination of asbestos weight percent at this level cannot be done by PLM, and TEM is recommended. Layers of heterogeneous samples are analyzed separately; asbestos percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. Composite asbestos percentages on multilayered samples are applicable only to layered wall systems (wallboard, joint compound, and related materials), compositing is based on clients' descriptions of a material as "joint compound". Clients are solely responsible for identification and description of bulk materials listed on field forms. Laboratory sample descriptions may differ from descriptions given by the client. "Quality Control" (QC) Codes: A = results confirmed (within acceptance limits); B = no asbestos detected in lab blank (SRM 1866a Fibrous Glass or equivalent); R = all materials confirmed after multiple result resolutions. NIST / NVLAP Accreditation Lab Code: #101872-0. California ELAP Certification #: 037. EPA test method is based on the EPA Interim Method (1982), with several improvements in analytical techniques. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report must not be reproduced except in full, with approval of Micro Analytical Laboratories.

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - PLM (EPA/600/R-93/116, 1993)

1073

Dave Sweet
714 Taylor Avenue
Alameda, CA 94501

PROJECT:
5020 HEINDRON RANCH ROAD
ANTIOCH, CA

Micro Log In 62912
Total Samples 16
Date Sampled 08/30/2004
Date Received 08/31/2004
Date Analyzed 08/31/2004

SAMPLE INFORMATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client: 08304-11 Micro: 62912-11 Analyst: GR ACOUSTICAL SPRAY ON CEILING	NONE DETECTED	5 % CELLULOSE 10 % POLYETHYLENE CARBONATE SYNTHETIC MATERIAL PAINT
Client: 08304-12 Micro: 62912-12 Analyst: GR ACOUSTICAL SPRAY ON CEILING	NONE DETECTED	5 % CELLULOSE 10 % POLYETHYLENE CARBONATE SYNTHETIC MATERIAL PAINT
Client: 08304-13 Micro: 62912-13 Analyst: GR LINOLEUM IN RESTROOM	LINOLEUM: NONE DETECTED BACKING AND MASTIC: 40% CHRYSOTILE	5 % CELLULOSE ROCK FRAGMENTS SYNTHETIC MATERIAL
Client: 08304-14 Micro: 62912-14 Analyst: GR CERAMIC TILE ADHESIVE RESTROOM WALL	CERAMIC TILE: NONE DETECTED WHITE / BEIGE / ADHESIVE : NONE DETECTED	CARBONATE SYNTHETIC MATERIAL GLASS FRAGMENTS
Client: 08304-15 Micro: 62912-15 Analyst: GR CERAMIC TILE / GROUT KITCHEN WALL	BROWN GROUT: NONE DETECTED NO CERAMIC TILE IN THE SAMPLE	ROCK FRAGMENTS SYNTHETIC MATERIAL

Technical Supervisor: 9/1/2004
Baojia Ke, Ph. D. Date Reported

NOTES: Weight % cannot be determined by PLM estimation or point counts. Asbestos fibers with diameter below ~1 µm may not be detected by PLM. The absence of asbestos in dust or debris (including wipe or microvacuum), and in some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Only dominant non-asbestos materials are indicated. This report must not be interpreted as a conclusive identification of non-asbestos (fibrous or not). Preparation (all samples): grinding, milling, teasing bundles apart, drying, if needed, by hotplate. Acid dissolution, ashing, or other matrix reduction techniques may be applied to some samples; residue asbestos % is corrected for amount of matrix removed. Various sample interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Notes are made if point counting is used; otherwise, asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (<<1%) may not be reliable or reproducible by PLM. Lower quantitation limit (reporting limit) of PLM estimation is 1%. The 95% UCL and LCL (Upper and Lower Confidence Limits) represent the highest and lowest expected concentrations for an asbestos point count, based on reported concentration and Poisson statistics. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos by weight; however, reliable determination of asbestos weight percent at this level cannot be done by PLM, and TEM is recommended. Layers of heterogeneous samples are analyzed separately; asbestos percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. Composite asbestos percentages on multilayered samples are applicable only to layered wall systems (wallboard, joint compound, and related materials); compositing is based on clients' descriptions of a material as "joint compound". Clients are solely responsible for identification and description of bulk materials listed on field forms. Laboratory sample descriptions may differ from descriptions given by the client. *Quality Control (QC) Codes: A = results confirmed (within acceptance limits); B = no asbestos detected in lab blank (SRM 1866a Fibrous Glass or equivalent); R = all materials confirmed after multiple result resolutions. NIST / NVLAP Accreditation Lab Code #101872-0. California ELAP Certification #1037. EPA test method is based on the EPA Interim Method (1982), with several improvements in analytical techniques. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report must not be reproduced except in full, with approval of Micro Analytical Laboratories.

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - PLM (EPA/600/R-93/116, 1993)

1073

Dave Sweet
714 Taylor Avenue
Alameda, CA 94501

PROJECT:
5020 HEINDRON RANCH ROAD
ANTIOCH, CA

Micro Log In **62912**
Total Samples 16
Date Sampled 08/30/2004
Date Received 08/31/2004
Date Analyzed 08/31/2004

SAMPLE INFORMATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client: 08304-16 Micro: 62912-16 Analyst: GR DRYWALL WITH JOINT TAPE GARAGE WALLS	DRYWALL: NONE DETECTED JOINT COMPOUND: NONE DETECTED PAINT: NONE DETECTED	30 % CELLULOSE GYPSUM ROCK FRAGMENTS SYNTHETIC MATERIAL

Technical Supervisor: _____ 8/31/2004
Baojia Ke, Ph. D. Date Reported

NOTES: Weight % cannot be determined by PLM estimation or point counts. Asbestos fibers with diameter below ~ 1 um may not be detected by PLM. The absence of asbestos in dust or deposits (including wipe or microvacuum), and in some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Only dominant non-asbestos materials are indicated. This report must not be interpreted as a conclusive identification of non-asbestos (fibrous or not). Preparation (all samples: grinding, milling; teasing bundles apart; drying, if needed, by hotplate. Acid dissolution, ashing, or other matrix reduction techniques may be applied to some samples; residue asbestos % is corrected for amount of matrix removed. Various sample interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Notes are made if point counting is used, otherwise, asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (<<1%) may not be reliable or reproducible by PLM. Lower quantitation limit (reporting limit) of PLM estimation is 1%. The 95% UCL and LCL (Upper and Lower Confidence Limits) represent the highest and lowest expected concentrations for an asbestos point count, based on reported concentration and Poisson statistics. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos by weight; however, reliable determination of asbestos weight percent at this level cannot be done by PLM, and TEM is recommended. Layers of heterogeneous samples are analyzed separately; asbestos percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. Composite asbestos percentages on multilayered samples are applicable only to layered wall systems (wallboard, joint compound, and related materials); compositing is based on clients' descriptions of a material as "joint compound." Clients are solely responsible for identification and description of bulk materials listed on field forms. Laboratory sample descriptions may differ from descriptions given by the client. *Quality Control (QC) Codes: A = results confirmed (within acceptance limits); B = no asbestos detected in lab blank (SRM 1866a Fibrous Glass or equivalent); R = all materials confirmed after multiple result resolutions. NIST / NVLAP Accreditation Lab Code: #101872-0. California ELAP Certification #1037. EPA test method is based on the EPA Interim Method (1982), with several improvements in analytical techniques. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report must not be reproduced except in full, with approval of Micro Analytical Laboratories.

Antioch Demolition

Mission Peak Construction, Inc.
40480 Encyclopedia Circle
Fremont, Ca. 94538

December 1, 2004

Delta Construction & Engineering Inc.
3870 Oakley Road
Antioch, Ca. 94509

Steve
Here are copies of the finals on 5020 Heidorn. Let me know if you need the originals or more information.

Duanne Shoemake
DCE

DEC 0 6 2004

BUILDING PERMIT

Inspection (925) 779-7066

CITY OF ANTIOCH CALIFORNIA

CITY HALL THIRD & H STREETS
P.O. Box 5007 ANTIOCH CA 94531-5007
Office (925) 779-7065

Business License _____YES _____NO
PERMIT #: B0410-0096

Job Address	5020 HEIDORN RANCH RD
Assessor's Parcel #	056130013
Tract #	Lot #
Property Owner(s)	The Mission Peak Company
Mailing Address	40480 Encyclopedia Circle
	FREMONT, CA 94538
Contractor	Delta Construction and Enginee
Mailing Address	P.O. Box 222
	OAKLEY, CA 94561
License #	10369
Project Description	
Demo old farm house	

Setbacks: Front Rear Left Right

LICENSED CONTRACTOR DECLARATION

I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

Lic. Class Lic. Number
Date 10/13/2004 Contractor 10369

OWNER-BUILDER DECLARATION

I hereby affirm under penalty of perjury that I am exempt from the Contractors' State License Law for the following reason (Section 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for the permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors' State License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars ($500).):

[ ] I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Section 7044, Business and Professions Code: The Contractors' State License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or herself through his or her own employees, provided that such improvements are not intended or offered for sale. If however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.).

[ ] I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Section 7044, Business and Professions Code: The Contractors' State License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors' State License Law.).

[ ] I am exempt under Sec. _____ B.& P.C. for this reason:

Date 10/13/2004 Owner _____

WORKERS' COMPENSATION DECLARATION

I hereby affirm under penalty of perjury one of the following declarations:

[ ] I have and will maintain a certificate of consent to self insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued.

[ ] I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:

Policy No:
Company:

(This section need not be completed if the permit value is for one hundred dollars ($100) or less.)

[ ] I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the workers' compensation laws of California, and agree that, if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with these provisions.

Date 10/13/2004 Applicant _____

WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (100,000). IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.

VALUATION

Living Sq. Ft.	0
Garage Sq. Ft.	0
Porch Sq. Ft.	0
Total Value:	$20,000.00

FEES

170b	aa-Building Permit	$321.25
720c	ac-SMIP Commercial	$4.20
170T	ac-Technology Fee	$6.43
170a	ad-Accessibility Fee(non res)	$3.21
170ec	ad-Energy Inspection Fee	$3.21

Total Fees	$338.30
~~Balance Due~~	~~$338.30~~

INSPECTIONS

Foundation		Plumbing	
Under floor		Mechanical	
Insulation	UF W	Electrical	
Frame		Other	
Shear		FINAL	11-24-04 MS

I certify that I have read this application and state that the information given is true and correct. I agree to comply with all local ordinances and state laws relating to building construction and I make this statement under penalty of law. I hereby authorize representatives of this City/County to enter upon the above-mentioned property for inspection purposes. This permit will expire by limitation if work is not started in 180 days or if work is abandoned for more than 180 days. **Do not conceal or cover any construction until the work is inspected and the inspection is recorded on the permit.**

SIGNED _____ 10/13/2004 _____

APPLICANT DATE BUILDING OFFICIAL

White – Office Pink – Assessor Yellow – Job Green – Finance

CONTRA COSTA
HEALTH SERVICES

CONTRA COSTA
ENVIRONMENTAL HEALTH DIVISION
2120 DIAMOND BOULEVARD, SUITE 200
CONCORD, CA 94520
(925) 646-5225
www.cocoeh.org

Well Permit

WP0002878

OCT 0 1 2004

PR Number: 20459
PE Number: 4368
Date Received: 10 AUG 04
Permit Number: 04-0210
Permit Approved/Issued by: _____ Date Issued: 8/20/04
Environmental Health Specialist

NEW WELL	( ) SOIL BORINGS	WELL ABANDONMENT	REPAIR

The issuance of this permit by Contra Costa County Environmental Health Division does not guarantee a satisfactory and an indefinite operation of any well. Permit expires in 180 calendar days from date of approval. Permits are non-transferable, and can be suspended or revoked. If more time is required for the project, a time extension may be granted if reasons warrant it in writing.

PROJECT SITE INFORMATION

Site Address: 5020 HEIDORN RANCH RD., ANTIOCH
APN: 056-130-013
Lot/Parcel #:
Subdivision #:
Minor Subdivision #:

DRILLER / CONSULTANT INFORMATION

Driller: MARTELL WATER SYSTEMS
Contact Person: LEROY CHANCELLOR
Phone #: 925-432-4282
FAX#: 925-432-8149
Consultant:
Contact Person:
Phone #:
FAX#:

LEGAL OWNER INFORMATION

Legal Owner Name: MISSION PEAK COMPANY
Owner Address: 40460 ENCYLOPEDIA CIR
City/State/Zip: FREMONT, CA 94538
Phone #:
Alternate Phone #:

Contact the Contra Costa County Environmental Health Division appointment desk and obtain a confirmed appointment time and date prior to any drilling construction or destruction of a well. ***Voice mail messages are not acceptable.*** The appointment desk sends confirmation via telephone or fax.
Well drillers must posses a valid C-57 license and must have on file a performance bond of $5,000.00 with Contra Costa County before commencing with any well construction, destruction or repairs.

WELL PERMIT CONDITIONS:

1. Proper annular seals and surface construction features are to be installed and required water analyses completed within 30 days of commencing drilling.
2. Monitoring well/soil boring shall be destroyed pursuant to County regulations within 30 days of completing monitoring activities.
3. Other: _____

Final Approval by: _____ Date: 10/5/04

(08/02)

CONTRA COSTA
HEALTH SERVICES

CONTRA COSTA
ENVIRONMENTAL HEALTH DIVISION EH
2120 DIAMOND BOULEVARD, SUITE 200
CONCORD, CA 94520
(925) 646-5225
www.cocoeh.org

AUG 0 6 2004
REC'D

Septic System

SEPTIC SYSTEM PERMIT APPLICATION

Type of Work
- ☐ New Conv / Alt (12,15)
- ☐ Repair (19)
- ☐ Expansion (11)
- ☐ Alternative Replacement (20)
- ☐ Conventional Replacement (14)
- ☒ Abandonment (21)
- ☐ Plan Check (41)
- ☐ Other_____

Type of Building
- ☐ Single-Family Dwelling
- ☐ Multiple-Family Dwelling
- ☐ Commercial
- ☐ Industrial
- ☐ Other_____

Projected Sewage Flow
- ☐ No. of Bedrooms _____
- ☐ No. of Employees _____
- ☐ No. of Seats _____
- ☐ Other_____

Water Supply
- ☐ Off-site Public Water
- ☐ On-site Public Water
  Name of Supplier_____
- ☐ Private Well
  Number of Wells_____

(ATTACH PLOT PLAN – for instructions see "The Septic System Permit Process" handout)

PLEASE PRINT CLEARLY. *REQUIRED FIELDS MUST BE COMPLETED.

*Legal Owner's Name: Mission Peak Company		
*Legal Owner Address: 40460 Encyclopedia Circle		
*City/ State/ Zip: Fremont CA 94538	Country:	*Owner Telephone: 510 354 0885
*Owner Billing Address (if different from above)		
Site Name (if different from above)	Assessor's Parcel #: 096 130 013-8	Subdivision/Minor Subdivision #
*Site Address (if different from above): 5020 Heidorn Ranch Road		Lot/Parcel #
*Contractor's Name: Delta Construction & Engineering, Inc		*Site Telephone: 925-980-0956
*Contractor's Address: 3870 Oakley Rd, Antioch CA 94509	*Contractor's License #: A410369	*Contact Person's Telepone: 925-980 0956

I hereby certify that the above information and submitted plans are true and correct and that the proposed work will comply with all permit conditions and applicable laws and regulations. I agree to obtain all required inspections, maintain a copy of the approved permit and plans at the job site until final approval, and obtain written authorization prior to deviating from the approved permit or plans, or placing the well in service. The issuance of this permit by Contra Costa Environmental Health Division does not guarantee a satisfactory and an indefinite operation of any septic system.

Signature of Owner/Agent Duane Thomke — Date 8-6-04

Signature of Contractor — Date

FOR OFFICE USE ONLY

Facility ID#:	PR#:	P/E: 42-21	Census Tract:	REHS: LM
Amount Due: $ 242 Amount Paid: $ 242		Receipt #: G113614		Received By: DMW
Check #: 1868 CASH / Credit Card: MC___ VISA___		Date Received: 8-6-04		Supervisor: SQ

Insp Type	Inspector	Sched	Time	Compl Date	Time	Depth	Remarks	Dur	LOD	R
FINAL**	MB	11/24/2004	AM	11/24/2004	AM	OK	TAKE	0	☐	D

Inspection Details for Inspection Selected Above

Type of Inspection	FINAL**
Inspector	MB
Date/Time Scheduled	11/24/2004 AM
Date/Time Completed	11/24/2004 AM
Results	OK
Comments / Remarks	TAKE YELLOW PERMIT FROM OUR OFFICE

Check Schedule

Add to Timesheet

Add Inspections

Select Other Inspections

Batch Scheduling

Plan Location

Print

Close

More Info | Notes | Attachments | Void Inspection

Permit Number, Type and Status

B0410-0086 | Find | Go To | Recent

Demo old farm house

Shift for: << < > >>

Type: DEMOLITION

SubType: RESIDENTIAL

Permit Dates

Applied	10/13/2004	LM
Approved	N/A	
Issued	10/13/2004	LM
Finaled	11/24/2004	MB
Expiration	11/24/2004	MB
InitialWR	N/A	

Status: FINALED

Name and Address Information

Site Address	6020 HEIDORN RANCH RD
Owner	The Mission Peak Company
Applicant	Delta Construction and Engineering
Parcel Number	056-130-013

Restrictions

(a) Parent Project and (b) Parent Permit

(a) | Find | Go

(b) | Find | Go

Show Sub-Permits

More Info ** | Site Info **

Contacts ** | Plan Reviews **

Description ** | Inspections **

FINANCIAL INFORMATION

Job Value	$20,000.00
Fees	$338.30
Fees Pd	$0.00

Valuation Details | Fee Details | Fee Payment Details

Print | CLOSE

10.1.04 C. Wilson
Bldg. Sec.
City of Antioch

STATE OF CALIFORNIA

WELL COMPLETION REPORT

No. 0964841

DWR USE ONLY --- DO NOT FILL IN

STATE WELL NO. STATION NO.

LATITUDE LONGITUDE

APN / TRS / OTHER

OWNER'S WELL No.

Date Work Began 9/1/04 Ended 9/3/04

Local Permit Agency Contra Costa County

Permit No. 04-0210 Permit Date 8/20/2004

GEOLOGIC LOG

ORIENTATION VERTICAL Degree of Angle .....

DEPTH TO FIRST WATER .....(ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	Ft.	DESCRIPTION
		Well Destruction
		6" PVC x 144' Wekk
		- Cleaned Out Well by Bailing
		- Rip casing from bottom with Mills Knife and
		Pumped Neat Cement to fill well
		- Excavated & Removed casing to 5' + B.G.L.
		- Backfilled with Native Soil

TOTAL DEPTH OF BORING (Feet)

TOTAL DEPTH OF COMPLETED WELL 144 (Feet)

WELL OWNER

Mission Peak Company

40460 Encyclopedia Circ.

Fremont CA 94538

WELL LOCATION

Address 5020 Heidorn Ranch Rd.

City Antioch County Contra Cosra

Apn Book 056 Page 130 Parcel 013

or

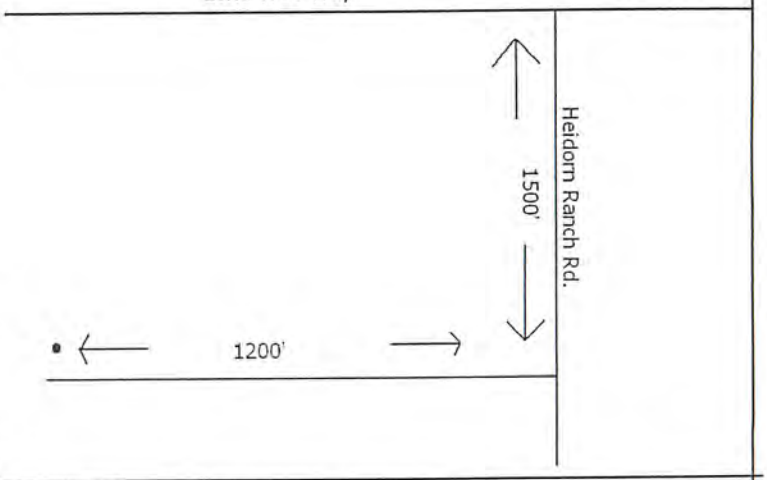
Township S Range E Section 1/4 1/4

or

Latitude ... ... NORTH Longitude ... ... WEST

Deg. Min. Sec. Deg. Min. Sec.

LOCATION SKETCH



ACTIVITY Destruction PLANNED USE(S) Domestic Water

DRILLING METHOD N/A FLUID N/A

DEPTH OF STATIC WATER LEVEL 35' (Ft.) & DATE MEASURED .....

ESTIMATED YIELD * .....(G.P.M.) & TEST TYPE .....

TEST LEGENTH. ..... (Hrs.) TOTAL DRAWDOWN ..... (FT.)

*May not be representative of a well's long-term yield.

CASING

DEPTH FROM SURFACE Ft.	To Ft.	BORE-HOLE DIA.	TYPE	Material / Grade	Dia.	Gage	Slot size
0	144'	UNKN.		PVC	6		

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	To Ft.	Seal Material	Filter Pack (Type / Size)
144	0	Cement	

Attachments

no Geologic Log

no Well Construction Diagram

no Geophysical Logs

no Soil Water Chemical Analyses

no Other

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Martell Water Systems, Inc.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

1818 Loveridge Rd. Pittsburg CA 94565

Signed [signature] 9/27/04 510952

WELL DRILLER / AUTHORIZED REPRESENTATIVE DATE SIGNED C- 57 LICENSE NUMBER

From: Octavius.Blocker@hsd.cccounty.us
Subject: Records Request for1990 Olivera Rd
Date: May 24, 2013 at 10:01 AM
To: dallen@aquascienceengineers.com

Hello,

I have checked our database for the address you mentioned and have come up empty Let me know if you have any other questions.

Octavius Blocker, Senior Clerk
Contra Costa Health Services
Hazardous Materials Program
4585 Pacheco Blvd., Suite 100
Martinez, CA 94553

Phone (925) 335-3200
Fax (925) 646-2073
Email octavius.blocker@hsd.cccounty.us

From: **Vigil, Gene** gvigil@ci.antioch.ca.us
Subject: Permits
Date: June 24, 2014 at 10:29 AM
To: dallen@aquascienceengineers.com

Dave,
There are NO permits issued for the address range 5220-5306 Heidorn Ranch Rd, Antioch CA.

Gene Vigil
Building Inspector
(925)779-6162

City offices are closed every friday. We thank you for your understanding.
The community development department has the following hours.
8:00am – 11:30am: Full service counter hours
12:00pm – 1:00pm: Closed for lunch
1:00pm – 5:00pm: By appointment only

Aqua Science Engineers, Inc.
55 Oak Court, Suite 220, Danville, CA 94526
(925) 820-9391
www.aquascienceengineers.com

APPENDIX H

Regulatory Research Database Report

Heidorn Ranch Road
5220 - 5300 Heidorn Ranch Road
Antioch, CA 94531

Inquiry Number: 3976090.2s
June 18, 2014

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

5220 - 5300 HEIDORN RANCH ROAD
ANTIOCH, CA 94531

COORDINATES

Latitude (North):	37.9561000 - 37° 57' 21.96''
Longitude (West):	121.7532000 - 121° 45' 11.52''
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	609535.8
UTM Y (Meters):	4201472.0
Elevation:	151 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	37121-H7 ANTIOCH SOUTH, CA
Most Recent Revision:	1980
East Map:	37121-H6 BRENTWOOD, CA
Most Recent Revision:	1978

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year:	2012
Source:	USDA

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL---------- National Priority List

EXECUTIVE SUMMARY

Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls
LUCIS ---------- Land Use Control Information System

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE ---------- State Response Sites

State- and tribal - equivalent CERCLIS

ENVIROSTOR ---------- EnviroStor Database

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Solid Waste Information System

State and tribal leaking storage tank lists

LUST ---------- Geotracker's Leaking Underground Fuel Tank Report

INDIAN LUST - Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST - Active UST Facilities
AST - Aboveground Petroleum Storage Tank Facilities
INDIAN UST - Underground Storage Tanks on Indian Land
FEMA UST - Underground Storage Tank Listing

State and tribal voluntary cleanup sites

VCP - Voluntary Cleanup Program Properties
INDIAN VCP - Voluntary Cleanup Priority Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS - A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

ODI - Open Dump Inventory
DEBRIS REGION 9 - Torres Martinez Reservation Illegal Dump Site Locations
WMUDS/SWAT - Waste Management Unit Database
HAULERS - Registered Waste Tire Haulers Listing
INDIAN ODI - Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL - Clandestine Drug Labs
HIST Cal-Sites - Historical Calsites Database
SCH - School Property Evaluation Program
Toxic Pits - Toxic Pits Cleanup Act Sites
CDL - Clandestine Drug Labs
US HIST CDL - National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

CA FID UST - Facility Inventory Database
HIST UST - Hazardous Substance Storage Container Database
SWEEPS UST - SWEEPS UST Listing

Local Land Records

LIENS 2 - CERCLA Lien Information
LIENS - Environmental Liens Listing
DEED - Deed Restriction Listing

Records of Emergency Release Reports

HMIRS - Hazardous Materials Information Reporting System
CHMIRS - California Hazardous Material Incident Report System
LDS - Land Disposal Sites Listing

MCS	Military Cleanup Sites Listing
SPILLS 90	SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated
DOT OPS	Incident and Accident Data
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans
CA BOND EXP. PLAN	Bond Expenditure Plan
NPDES	NPDES Permits Listing
UIC	UIC Listing
Cortese	"Cortese" Hazardous Waste & Substances Sites List
HIST CORTESE	Hazardous Waste & Substance Site List
CUPA Listings	CUPA Resources List
Notify 65	Proposition 65 Records
DRYCLEANERS	Cleaner Facilities
WIP	Well Investigation Program Case List
ENF	Enforcement Action Listing
HAZNET	Facility and Manifest Data
EMI	Emissions Inventory Data
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
2020 COR ACTION	2020 Corrective Action Program List
LEAD SMELTERS	Lead Smelter Sites
PRP	Potentially Responsible Parties
US AIRS	Aerometric Information Retrieval System Facility Subsystem
WDS	Waste Discharge System
US FIN ASSUR	Financial Assurance Information
PCB TRANSFORMER	PCB Transformer Registration Database
Financial Assurance	Financial Assurance Information Listing
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
MWMP	Medical Waste Management Program Listing
COAL ASH DOE	Steam-Electric Plant Operation Data
HWT	Registered Hazardous Waste Transporter Database
HWP	EnviroStor Permitted Facilities Listing
PROC	Certified Processors Database
EPA WATCH LIST	EPA WATCH LIST

EXECUTIVE SUMMARY

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP---------- EDR Proprietary Manufactured Gas Plants
EDR US Hist Cleaners-------- EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF---------- Recovered Government Archive Solid Waste Facilities List
RGA LUST---------- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

State and tribal leaking storage tank lists

SLIC: SLIC Region comes from the California Regional Water Quality Control Board.

A review of the SLIC list, as provided by EDR, and dated 05/01/2014 has revealed that there is 1 SLIC site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
SHELL YARD	***3052 HEIDORN RANCH RD***	***SSE 1/4 - 1/2 (0.462 mi.)***	***6***	***9***
Facility Status: Completed - Case Closed				

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY: A listing of recycling facilities in California.

A review of the SWRCY list, as provided by EDR, and dated 03/17/2014 has revealed that there is 1

SWRCY site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
REPLANET LLC	5451 LONE TREE WAY	NNE 1/4 - 1/2 (0.332 mi.)	5	9

Other Ascertainable Records

CONTRA COSTA CO. SITE LIST: Lists includes sites from the Underground Tank Program, Hazardous Waste Generator Program & Business Plan 12185 Program

A review of the CONTRA COSTA CO. SITE LIST list, as provided by EDR, and dated 02/24/2014 has revealed that there are 2 CONTRA COSTA CO. SITE LIST sites within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
HEIDRON FARM	5200 LONE TREE WY	NNW 1/8 - 1/4 (0.224 mi.)	3	8
MICHAELS STORE #5706	5501 LONE TREE WY	NE 1/8 - 1/4 (0.230 mi.)	4	8

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR US Hist Auto Stat: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR US Hist Auto Stat list, as provided by EDR, has revealed that there are 2 EDR US Hist Auto Stat sites within approximately 0.25 miles of the target property.

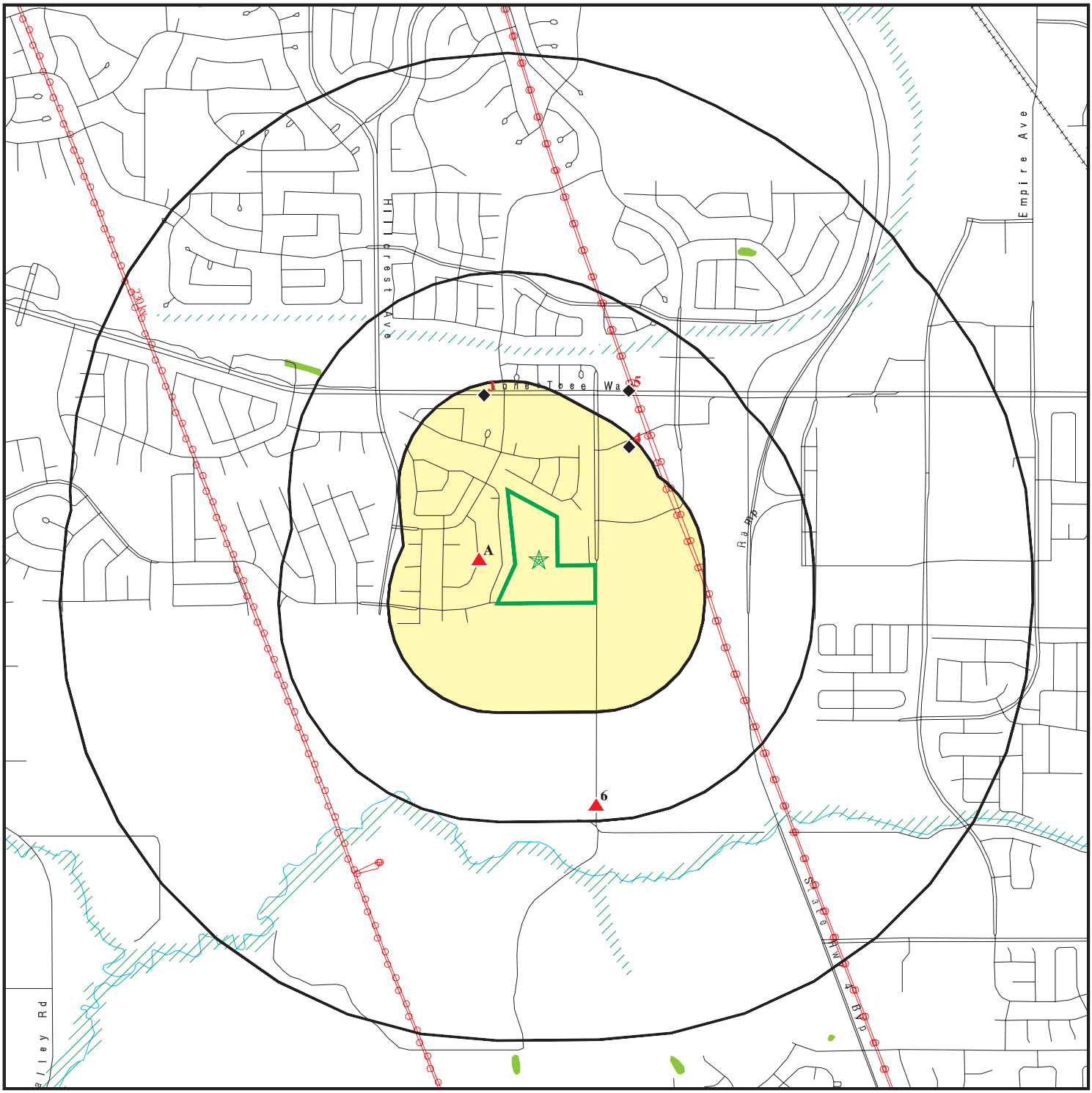
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
Not reported	5466 BENTTREE WAY	WSW 0 - 1/8 (0.077 mi.)	A1	8
Not reported	5446 BENTTREE WAY	W 0 - 1/8 (0.080 mi.)	A2	8

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 20 records.

Site Name	Database(s)
PREWETT RANCH UNIT 2	NPDES
PREWETT RANCH	NPDES
NORMAN'S BRENTWOOD NURSERY	CA FID UST, CONTRA COSTA CO. SITE LIST, SWEEPS UST
MANGINI BROS	HIST UST, SWEEPS UST
DELTA FENCE CO., INC.	SWEEPS UST
BILL BRANDT FORD, INC.	CA FID UST, CONTRA COSTA CO. SITE LIST, SWEEPS UST
SAVERS GAS	CA FID UST, SWEEPS UST
LADD, L. JORDAN	SWEEPS UST
SANTA FE PACIFIC PIPELINE PARTNERS	CERC-NFRAP
MANGINI BROS	UST, CONTRA COSTA CO. SITE LIST
LADD, L. JORDAN	UST, CONTRA COSTA CO. SITE LIST
L. JORDAN LADD	HIST UST
CALIFORNIA ORGANICS	RCRA NonGen / NLR, FINDS
MAGNET HIGH SCHOOL SITE	SCH, ENVIROSTOR
CHEVRON SS# 96946	CONTRA COSTA CO. SITE LIST
PG&E LONE TREE SUBSTATION	CONTRA COSTA CO. SITE LIST
VERIZON WIRELESS/BRENTWOOD WEST	CONTRA COSTA CO. SITE LIST
AT&T MOBILITY/BRENTWOOD (45459)	CONTRA COSTA CO. SITE LIST
CITY OF BRENTWOOD PW PUMP STATION/	CONTRA COSTA CO. SITE LIST
VERIZON WIRELESS/BRENTWOOD WEST	CONTRA COSTA CO. SITE LIST

OVERVIEW MAP - 3976090.2s



0 1/4 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Heidorn Ranch Road ADDRESS: 5220 - 5300 Heidorn Ranch Road Antioch CA 94531 LAT/LONG: 37.9561 / 121.7532	CLIENT: Aqua Science Engineers Inc. CONTACT: Dave Allen INQUIRY #: 3976090.2s DATE: June 18, 2014 2:59 pm

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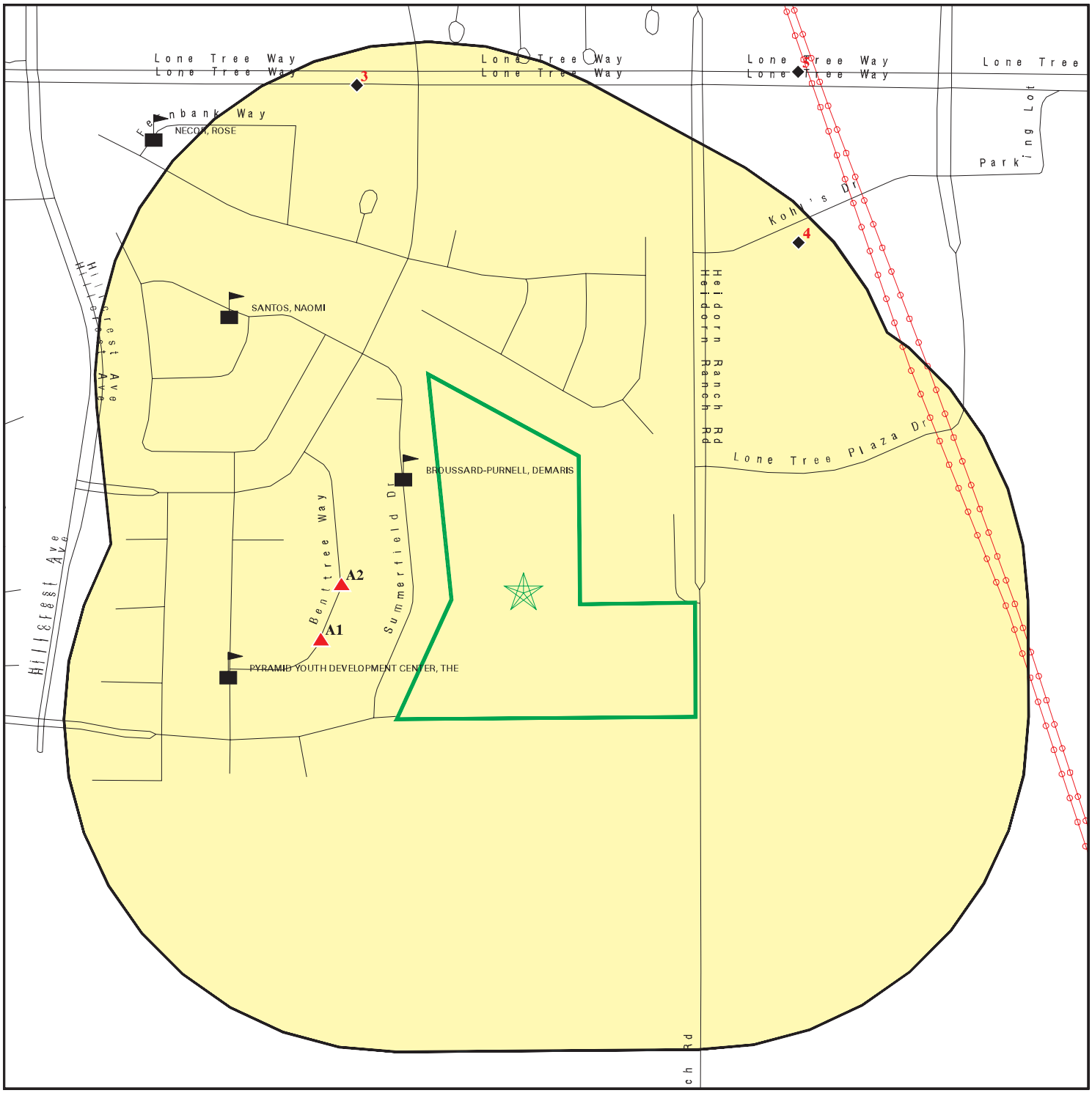
DETAIL MAP - 3976090.2s



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

Sensitive Receptors

National Priority List Sites

Dept. Defense Sites

0 1/16 1/8 1/4 Miles

Indian Reservations BIA

Power transmission lines

Oil & Gas pipelines from USGS

100-year flood zone

500-year flood zone

Areas of Concern

N

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Heidorn Ranch Road ADDRESS: 5220 - 5300 Heidorn Ranch Road Antioch CA 94531 LAT/LONG: 37.9561 / 121.7532	CLIENT: Aqua Science Engineers Inc. CONTACT: Dave Allen INQUIRY #: 3976090.2s DATE: June 18, 2014 3:02 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS	0.500		0	0	0	NR	NR	0
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
LUCIS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SLIC	0.500		0	0	1	NR	NR	1
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
FEMA UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
VCP	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	1	NR	NR	1
HAULERS	TP		NR	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL	TP		NR	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		0	0	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
US HIST CDL	TP		NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST	0.250		0	0	NR	NR	NR	0
HIST UST	0.250		0	0	NR	NR	NR	0
SWEEPS UST	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
LIENS	TP		NR	NR	NR	NR	NR	0
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
CHMIRS	TP		NR	NR	NR	NR	NR	0
LDS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
MCS	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
DOD	1.000		0	0	0	0	NR	0
FUDS	1.000		0	0	0	0	NR	0
CONSENT	1.000		0	0	0	0	NR	0
ROD	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
Cortese	0.500		0	0	0	NR	NR	0
HIST CORTESE	0.500		0	0	0	NR	NR	0
CONTRA COSTA CO. SITE LIST	0.250		0	2	NR	NR	NR	2
CUPA Listings	0.250		0	0	NR	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
HAZNET	TP		NR	NR	NR	NR	NR	0
EMI	TP		NR	NR	NR	NR	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
WDS	TP		NR	NR	NR	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
HWT	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
HWP	1.000		0	0	0	0	NR	0
PROC	0.500		0	0	0	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR US Hist Auto Stat	0.250		2	0	NR	NR	NR	2
EDR US Hist Cleaners	0.250		0	0	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

A1 **EDR US Hist Auto Stat** **1015548620**
WSW **5466 BENTTREE WAY** **N/A**
< 1/8 **ANTIOCH, CA 94531**
0.077 mi.
406 ft. **Site 1 of 2 in cluster A**

Relative: EDR Historical Auto Stations:
Higher Name: K & G AUTO BODY SHOP
Year: 2006
Actual: Address: 5466 BENTTREE WAY
183 ft.

A2 **EDR US Hist Auto Stat** **1015547991**
West **5446 BENTTREE WAY** **N/A**
< 1/8 **ANTIOCH, CA 94531**
0.080 mi.
422 ft. **Site 2 of 2 in cluster A**

Relative: EDR Historical Auto Stations:
Higher Name: D & H AUTO BODY SHOP
Year: 2004
Actual: Address: 5446 BENTTREE WAY
185 ft.

---

3 **HEIDRON FARM** **CONTRA COSTA CO. SITE LIST** **S101294046**
NNW **5200 LONE TREE WY** **N/A**
1/8-1/4 **ANTIOCH, CA 94531**
0.224 mi.
1181 ft.

Relative: CONTRA COSTA CO. SITE LIST:
Lower Facility ID: 07000722928
Billing Status: INACTIVE, NON-BILLABLE
Actual: Program Status: CONTRA COSTA CO. SITE LIST
134 ft. Program/Elements: UNDERGROUND STORAGE TANK SITE
Region: CONTRA COSTA

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4 **MICHAELS STORE #5706** **CONTRA COSTA CO. SITE LIST** **S111859594**
NE **5501 LONE TREE WY** **N/A**
1/8-1/4 **BRENTWOOD, CA 94513**
0.230 mi.
1216 ft.

Relative: CONTRA COSTA CO. SITE LIST:
Lower Facility ID: 07000774508
Billing Status: ACTIVE, BILLABLE
Actual: Program Status: CONTRA COSTA CO. SITE LIST
135 ft. Program/Elements: HWG: REPORTED ZERO
Region: CONTRA COSTA

5
NNE
1/4-1/2
0.332 mi.
1754 ft.

REPLANET LLC
5451 LONE TREE WAY
BRENTWOOD, CA 94513

SWRCY **S108418450**
N/A

Relative:
Lower

Actual:
131 ft.

SWRCY:

Reg Id:	158581
Cert Id:	RC158581.001
Mailing Address:	9910 E 6th St
Mailing City:	Rancho Cucamonga
Mailing State:	CA
Mailing Zip Code:	91730
Website:	http://www.replanetusa.com
Phone Number:	(951) 520-1700
Grand Father:	N
Rural:	N
Operation Begin Date:	05/01/2012
Aluminium:	Y
Glass:	Y
Plastic:	Y
Bimetal:	Y
Agency:	N/A
Monday Hours Of Operation:	CLOSED
Tuesday Hours Of Operation:	10:00 am - 4:30 pm; Closed 1:00 pm - 1:30 pm
Wednesday Hours Of Operation:	10:00 am - 4:30 pm; Closed 1:00 pm - 1:30 pm
Thursday Hours Of Operation:	10:00 am - 4:30 pm; Closed 1:00 pm - 1:30 pm
Friday Hours Of Operation:	10:00 am - 4:30 pm; Closed 1:00 pm - 1:30 pm
Saturday Hours Of Operation:	10:00 am - 4:30 pm; Closed 1:00 pm - 1:30 pm
Sunday Hours Of Operation:	CLOSED
Cert Status:	Operational
Organization ID:	151891
Organization Name:	rePLANET LLC
Agency Reg ID:	N/A
Operation End Date:	Not reported

6
SSE
1/4-1/2
0.462 mi.
2438 ft.

SHELL YARD
3052 HEIDORN RANCH RD
ANTIOCH, CA 94531

SLIC **S106230276**
CDL **N/A**

Relative:
Higher

Actual:
153 ft.

SLIC:

Region:	STATE
Facility Status:	**Completed - Case Closed**
Status Date:	02/17/2011
Global Id:	SL0601369421
Lead Agency:	CENTRAL VALLEY RWQCB (REGION 5S)
Lead Agency Case Number:	Not reported
Latitude:	37.94806
Longitude:	-121.751851
Case Type:	Cleanup Program Site
Case Worker:	KAS
Local Agency:	Not reported
RB Case Number:	SL0601369421
File Location:	Regional Board
Potential Media Affected:	Aquifer used for drinking water supply
Potential Contaminants of Concern:	* Petroleum - Automotive gasolines, * Petroleum - Diesel fuels, * Petroleum - Waste oil
Site History:	The Site is at the intersection of Heidorn Ranch Road and Sand Creek

SHELL YARD (Continued) **S106230276**

Road in Antioch. The 10-acre lot was formerly used as an office and maintenance yard for pipeline operations, with secondary use as a support area for oil and gas production operations. The Site is bounded on all sides by agricultural fields.

Click here to access the California GeoTracker records for this facility:

SLIC REG 5:

Region:	5
Facility Status:	Preliminary Assessment
Unit:	Facility is a Spill or site
Pollutant:	TPH g,d, BTEX
Lead Agency:	MES
Date Filed:	/ /
Report Date:	/ /
Date Added:	Not reported
Date Closed:	Not reported

CDL:

Facility ID:	200011134
Date:	11/26/2000
Lab Type:	Abandoned Drug Lab Waste (A) - location away from an actual illegal drug lab where drug lab waste and/or equipment were abandoned.

Count: 20 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
ANTIOCH	S106666501	CHEVRON SS# 96946	BRIDGEHEAD RD & HWY 4	94531	CONTRA COSTA CO. SITE LIST
ANTIOCH	S116165425	MAGNET HIGH SCHOOL SITE	DEER VALLEY ROAD/LONE TREE WAY	94531	SCH, ENVIROSTOR
ANTIOCH	S109548490	PG&E LONE TREE SUBSTATION	HEIDORN RANCH RD	94531	CONTRA COSTA CO. SITE LIST
ANTIOCH	1000252416	CALIFORNIA ORGANICS	445 A OLD HWY 4		RCRA NonGen / NLR, FINDS
BRENTWOOD	S101580870	NORMAN'S BRENTWOOD NURSERY	RR 3 BOX 526 HWY 4	94513	CA FID UST, CONTRA COSTA CO. SITE LIST, SWEEPS UST
BRENTWOOD	U003784124	MANGINI BROS	HWY 4	94513	UST, CONTRA COSTA CO. SITE LIST
BRENTWOOD	U001596363	MANGINI BROS	HIGHWAY 4	94513	HIST UST, SWEEPS UST
BRENTWOOD	S108974760	VERIZON WIRELESS/BRENTWOOD WEST	HWY 4 & SAN JOSE AVE	94513	CONTRA COSTA CO. SITE LIST
BRENTWOOD	S106925285	DELTA FENCE CO., INC.	HIGHWAY 4	94513	SWEEPS UST
BRENTWOOD	S101623515	BILL BRANDT FORD, INC.	1245 HIGHWAY 4	94513	CA FID UST, CONTRA COSTA CO. SITE LIST, SWEEPS UST
BRENTWOOD	S101580795	SAVERS GAS	2323 HIGHWAY 4	94513	CA FID UST, SWEEPS UST
BRENTWOOD	S109420875	AT&T MOBILITY/BRENTWOOD (45459)	BALFOUR RD & HWY 4 BYPASS	94513	CONTRA COSTA CO. SITE LIST
BRENTWOOD	U003784169	LADD, L. JORDAN	BYRON HWY	94513	UST, CONTRA COSTA CO. SITE LIST
BRENTWOOD	U001596356	L. JORDAN LADD	BYRON HIGHWAY AT	94513	HIST UST
BRENTWOOD	S106928458	LADD, L. JORDAN	BYRON HIGHWAY AT	94513	SWEEPS UST
BRENTWOOD	1003879687	SANTA FE PACIFIC PIPELINE PARTNERS	SE CORNER OF BALFOUR RD & FAIR	94513	CERC-NFRAP
BRENTWOOD	S107591823	CITY OF BRENTWOOD PW PUMP STATION/	5531 HEIDORN RANCH RD	94513	CONTRA COSTA CO. SITE LIST
BRENTWOOD	S111459854	PREWETT RANCH UNIT 2	LONE TREE WAY EAST TILTON LANE	94513	NPDES
BRENTWOOD	S111292481	PREWETT RANCH	LONE TREE WAY E OF TILTON LANE	94513	NPDES
BRENTWOOD	S109548463	VERIZON WIRELESS/BRENTWOOD WEST	SAN JOSE AVE & HWY 4 BYPA	94513	CONTRA COSTA CO. SITE LIST

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 01/28/2014
Number of Days to Update: 78

Source: EPA
Telephone: N/A
Last EDR Contact: 06/10/2014
Next Scheduled EDR Contact: 07/21/2014
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 01/28/2014
Number of Days to Update: 78

Source: EPA
Telephone: N/A
Last EDR Contact: 06/10/2014
Next Scheduled EDR Contact: 07/21/2014
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 01/28/2014
Number of Days to Update: 78

Source: EPA
Telephone: N/A
Last EDR Contact: 06/10/2014
Next Scheduled EDR Contact: 07/21/2014
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/29/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 05/31/2013
Date Data Arrived at EDR: 07/08/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 151

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 04/11/2014
Next Scheduled EDR Contact: 07/21/2014
Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/29/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/11/2014
Date Data Arrived at EDR: 03/13/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 27

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 03/11/2014
Date Data Arrived at EDR: 03/13/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/11/2014
Date Data Arrived at EDR: 03/13/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/11/2014
Date Data Arrived at EDR: 03/13/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/11/2014
Date Data Arrived at EDR: 03/13/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 12/17/2013
Date Data Arrived at EDR: 01/14/2014
Date Made Active in Reports: 01/28/2014
Number of Days to Update: 14

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/05/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 12/17/2013
Date Data Arrived at EDR: 01/14/2014
Date Made Active in Reports: 01/28/2014
Number of Days to Update: 14

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/05/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 02/26/2014
Date Data Arrived at EDR: 02/28/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 55

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/19/2014
Next Scheduled EDR Contact: 09/01/2014
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/30/2013
Date Data Arrived at EDR: 10/01/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 66

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/06/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 05/05/2014
Date Data Arrived at EDR: 05/06/2014
Date Made Active in Reports: 05/19/2014
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/06/2014
Next Scheduled EDR Contact: 08/18/2014
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 05/05/2014
Date Data Arrived at EDR: 05/06/2014
Date Made Active in Reports: 05/19/2014
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/06/2014
Next Scheduled EDR Contact: 08/18/2014
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/19/2014
Date Data Arrived at EDR: 05/20/2014
Date Made Active in Reports: 05/22/2014
Number of Days to Update: 2

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 05/20/2014
Next Scheduled EDR Contact: 09/01/2014
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 05/01/2014
Date Data Arrived at EDR: 05/01/2014
Date Made Active in Reports: 05/13/2014
Number of Days to Update: 12

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 06/17/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Quarterly

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC: Statewide SLIC Cases

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/01/2014
Date Data Arrived at EDR: 05/01/2014
Date Made Active in Reports: 05/13/2014
Number of Days to Update: 12

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 11/06/2013
Date Data Arrived at EDR: 11/07/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 29

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Quarterly

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 02/13/2014
Date Data Arrived at EDR: 02/14/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 10

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 184

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/02/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 11/21/2013
Date Data Arrived at EDR: 11/26/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 04/22/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Semi-Annually

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 02/20/2014
Date Data Arrived at EDR: 02/21/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 62

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 59

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 02/21/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 03/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Quarterly

State and tribal registered storage tank lists

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 03/17/2014
Date Data Arrived at EDR: 03/19/2014
Date Made Active in Reports: 04/25/2014
Number of Days to Update: 37

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 06/17/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21

Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 04/07/2014
Next Scheduled EDR Contact: 07/21/2014
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 01/27/2014
Number of Days to Update: 271

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/02/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 11/21/2013
Date Data Arrived at EDR: 11/26/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 04/22/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 02/13/2014
Date Data Arrived at EDR: 02/14/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 10

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 01/29/2014
Date Data Arrived at EDR: 01/29/2014
Date Made Active in Reports: 03/12/2014
Number of Days to Update: 42

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 02/20/2014
Date Data Arrived at EDR: 02/21/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 62

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 07/29/2013
Date Data Arrived at EDR: 08/01/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 92

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 07/29/2013
Date Data Arrived at EDR: 07/30/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 129

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 65

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Quarterly

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55
Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 04/15/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/17/2013
Date Data Arrived at EDR: 10/01/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 66
Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 04/01/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27
Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 05/05/2014
Date Data Arrived at EDR: 05/06/2014
Date Made Active in Reports: 05/19/2014
Number of Days to Update: 13
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/06/2014
Next Scheduled EDR Contact: 08/18/2014
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 03/20/2014
Date Data Arrived at EDR: 03/20/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 20
Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/20/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39
Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137
Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: No Update Planned

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30
Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 05/07/2014
Next Scheduled EDR Contact: 08/25/2014
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 03/17/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/17/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 02/20/2014
Date Made Active in Reports: 03/27/2014
Number of Days to Update: 35
Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 05/19/2014
Next Scheduled EDR Contact: 09/01/2014
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52
Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/02/2014
Next Scheduled EDR Contact: 08/18/2014
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 12/04/2013
Date Data Arrived at EDR: 12/10/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 65

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 06/04/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 05/05/2014
Date Data Arrived at EDR: 05/06/2014
Date Made Active in Reports: 05/19/2014
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/06/2014
Next Scheduled EDR Contact: 08/18/2014
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/28/2014
Date Made Active in Reports: 03/20/2014
Number of Days to Update: 20

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 04/10/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 06/04/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: No Update Planned

Local Lists of Registered Storage Tanks

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 06/02/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 05/05/2014
Date Data Arrived at EDR: 05/06/2014
Date Made Active in Reports: 05/19/2014
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/09/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 03/10/2014
Date Data Arrived at EDR: 03/11/2014
Date Made Active in Reports: 04/10/2014
Number of Days to Update: 30

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 06/11/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 01/03/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 52

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 04/01/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 02/04/2014
Date Data Arrived at EDR: 04/29/2014
Date Made Active in Reports: 05/09/2014
Number of Days to Update: 10

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 04/29/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 05/01/2014
Date Data Arrived at EDR: 05/01/2014
Date Made Active in Reports: 05/13/2014
Number of Days to Update: 12

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 05/01/2014
Date Data Arrived at EDR: 05/01/2014
Date Made Active in Reports: 05/13/2014
Number of Days to Update: 12

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 03/11/2014
Date Data Arrived at EDR: 03/13/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/06/2014
Next Scheduled EDR Contact: 08/18/2014
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/18/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/28/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 55

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 06/04/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 01/24/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 31

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 06/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/10/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 02/25/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/01/2013
Date Data Arrived at EDR: 09/05/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 28

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 06/06/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/31/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 44

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/28/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 05/22/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 05/22/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/29/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/20/2011
Date Data Arrived at EDR: 11/10/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 61

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 10/09/2014
Next Scheduled EDR Contact: 07/21/2014
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2013
Date Data Arrived at EDR: 07/17/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 107

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/18/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/22/2013
Date Data Arrived at EDR: 08/02/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 91

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 06/05/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/09/2014
Date Data Arrived at EDR: 01/10/2014
Date Made Active in Reports: 03/12/2014
Number of Days to Update: 61

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/09/2014
Next Scheduled EDR Contact: 07/21/2014
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 11/18/2013
Date Data Arrived at EDR: 02/27/2014
Date Made Active in Reports: 03/12/2014
Number of Days to Update: 13

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/13/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/01/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/19/2013
Number of Days to Update: 52

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 05/19/2014
Date Data Arrived at EDR: 05/20/2014
Date Made Active in Reports: 05/28/2014
Number of Days to Update: 8

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 05/20/2014
Next Scheduled EDR Contact: 09/01/2014
Data Release Frequency: Quarterly

UIC: UIC Listing
A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 01/15/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37
Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 03/18/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Varies

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 03/31/2014
Date Data Arrived at EDR: 04/02/2014
Date Made Active in Reports: 04/29/2014
Number of Days to Update: 27
Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 04/01/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List
The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18
Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 06/17/2014
Next Scheduled EDR Contact: 10/06/2014
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 09/11/2013
Date Made Active in Reports: 10/16/2013
Number of Days to Update: 35
Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 06/09/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Annually

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13
Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 02/25/2014
Date Data Arrived at EDR: 02/27/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 19

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 07/16/2013
Date Made Active in Reports: 08/26/2013
Number of Days to Update: 41

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 04/18/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 03/25/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 34

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 03/25/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/18/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 04/21/2014
Next Scheduled EDR Contact: 08/04/2014
Data Release Frequency: Varies

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 11/11/2011
Date Data Arrived at EDR: 05/18/2012
Date Made Active in Reports: 05/25/2012
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/16/2014
Next Scheduled EDR Contact: 08/25/2014
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 01/29/2013
Date Data Arrived at EDR: 02/14/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 04/04/2014
Next Scheduled EDR Contact: 07/21/2014
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 04/15/2013
Date Data Arrived at EDR: 07/03/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 72

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 04/04/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 05/22/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Quarterly

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/18/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: N/A

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/23/2013
Date Data Arrived at EDR: 11/06/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 30

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/23/2013
Date Data Arrived at EDR: 11/06/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 30

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Annually

US FIN ASSUR: Financial Assurance Information
All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 02/25/2014
Date Data Arrived at EDR: 02/27/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 41

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 05/16/2014
Next Scheduled EDR Contact: 09/01/2014
Data Release Frequency: Quarterly

Financial Assurance 2: Financial Assurance Information Listing
A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 05/19/2014
Date Data Arrived at EDR: 05/20/2014
Date Made Active in Reports: 05/22/2014
Number of Days to Update: 2

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 05/19/2014
Next Scheduled EDR Contact: 09/01/2014
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 05/02/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 05/05/2014
Date Data Arrived at EDR: 05/14/2014
Date Made Active in Reports: 05/22/2014
Number of Days to Update: 8

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 08/17/2010
Date Data Arrived at EDR: 01/03/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/11/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Varies

MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 02/21/2014
Date Data Arrived at EDR: 03/12/2014
Date Made Active in Reports: 04/14/2014
Number of Days to Update: 33

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 06/09/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 04/18/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: Varies

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 04/14/2014
Date Data Arrived at EDR: 04/15/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 04/15/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: Quarterly

HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 02/24/2014
Date Data Arrived at EDR: 02/25/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 21

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/28/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Quarterly

PROC: Certified Processors Database

A listing of certified processors.

Date of Government Version: 03/17/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/17/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 06/30/2013
Date Data Arrived at EDR: 08/13/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/16/2014
Next Scheduled EDR Contact: 08/25/2014
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Proprietary Historic Dry Cleaners - Cole

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Auto Stat: EDR Proprietary Historic Gas Stations - Cole

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 04/22/2014
Date Data Arrived at EDR: 04/24/2014
Date Made Active in Reports: 05/09/2014
Number of Days to Update: 15

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 04/22/2014
Date Data Arrived at EDR: 04/24/2014
Date Made Active in Reports: 05/12/2014
Number of Days to Update: 18

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List
Cupa Facility List

Date of Government Version: 03/24/2014
Date Data Arrived at EDR: 03/24/2014
Date Made Active in Reports: 04/30/2014
Number of Days to Update: 37

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 06/09/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing
Cupa facility list.

Date of Government Version: 08/01/2013
Date Data Arrived at EDR: 08/02/2013
Date Made Active in Reports: 08/22/2013
Number of Days to Update: 20

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 04/10/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 04/03/2014
Date Made Active in Reports: 04/29/2014
Number of Days to Update: 26

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 12/05/2013
Date Data Arrived at EDR: 12/05/2013
Date Made Active in Reports: 01/27/2014
Number of Days to Update: 53

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 08/25/2014
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 02/24/2014
Date Data Arrived at EDR: 02/25/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 21

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 05/05/2014
Next Scheduled EDR Contact: 08/18/2014
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 05/05/2014
Date Data Arrived at EDR: 05/06/2014
Date Made Active in Reports: 05/13/2014
Number of Days to Update: 7

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 05/05/2014
Next Scheduled EDR Contact: 08/18/2014
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 02/20/2014
Date Data Arrived at EDR: 02/21/2014
Date Made Active in Reports: 03/20/2014
Number of Days to Update: 27

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 05/05/2014
Next Scheduled EDR Contact: 08/18/2014
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 03/31/2014
Date Data Arrived at EDR: 04/15/2014
Date Made Active in Reports: 05/01/2014
Number of Days to Update: 16

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 04/14/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 03/20/2014
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 38

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 05/22/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 04/28/2014
Date Data Arrived at EDR: 04/30/2014
Date Made Active in Reports: 05/13/2014
Number of Days to Update: 13

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 09/11/2013
Date Made Active in Reports: 10/14/2013
Number of Days to Update: 33

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 05/22/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 08/31/2010
Date Data Arrived at EDR: 09/01/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 29

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 05/12/2014
Next Scheduled EDR Contact: 08/25/2014
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 02/25/2014
Date Data Arrived at EDR: 02/27/2014
Date Made Active in Reports: 03/20/2014
Number of Days to Update: 21

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 05/27/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 04/22/2014
Date Data Arrived at EDR: 04/24/2014
Date Made Active in Reports: 05/13/2014
Number of Days to Update: 19

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 04/21/2014
Next Scheduled EDR Contact: 08/04/2014
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 03/24/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 12/06/2013
Date Data Arrived at EDR: 01/28/2014
Date Made Active in Reports: 03/17/2014
Number of Days to Update: 48
Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 04/02/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 04/21/2014
Date Data Arrived at EDR: 04/22/2014
Date Made Active in Reports: 05/19/2014
Number of Days to Update: 27
Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 04/22/2014
Next Scheduled EDR Contact: 08/04/2014
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29
Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 04/17/2014
Next Scheduled EDR Contact: 08/04/2014
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/07/2014
Date Data Arrived at EDR: 02/25/2014
Date Made Active in Reports: 03/25/2014
Number of Days to Update: 28
Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 04/17/2014
Next Scheduled EDR Contact: 08/04/2014
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 04/23/2014
Date Data Arrived at EDR: 04/25/2014
Date Made Active in Reports: 05/22/2014
Number of Days to Update: 27
Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 04/21/2014
Next Scheduled EDR Contact: 08/04/2014
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 02/25/2014
Date Data Arrived at EDR: 02/27/2014
Date Made Active in Reports: 04/14/2014
Number of Days to Update: 46
Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 01/13/2014
Date Data Arrived at EDR: 03/27/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 32
Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 04/14/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List

A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 03/26/2014
Date Data Arrived at EDR: 03/27/2014
Date Made Active in Reports: 04/29/2014
Number of Days to Update: 33

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 05/02/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites

Currently permitted USTs in Marin County.

Date of Government Version: 01/03/2014
Date Data Arrived at EDR: 01/09/2014
Date Made Active in Reports: 02/12/2014
Number of Days to Update: 34

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 04/07/2014
Next Scheduled EDR Contact: 07/21/2014
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 03/10/2014
Date Data Arrived at EDR: 03/11/2014
Date Made Active in Reports: 04/10/2014
Number of Days to Update: 30

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 05/27/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List

CUPA Facility List

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/04/2014
Date Made Active in Reports: 04/01/2014
Number of Days to Update: 28

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 06/02/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing

CUPA Program listing from the Environmental Health Division.

Date of Government Version: 03/18/2014
Date Data Arrived at EDR: 03/20/2014
Date Made Active in Reports: 04/25/2014
Number of Days to Update: 36

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 05/22/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 12/05/2011
Date Data Arrived at EDR: 12/06/2011
Date Made Active in Reports: 02/07/2012
Number of Days to Update: 63
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 11/06/2013
Date Data Arrived at EDR: 11/07/2013
Date Made Active in Reports: 12/04/2013
Number of Days to Update: 27
Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 05/13/2014
Next Scheduled EDR Contact: 08/18/2014
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 05/01/2014
Date Data Arrived at EDR: 05/15/2014
Date Made Active in Reports: 05/22/2014
Number of Days to Update: 7
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/07/2014
Next Scheduled EDR Contact: 08/28/2014
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 05/01/2014
Date Data Arrived at EDR: 05/15/2014
Date Made Active in Reports: 05/28/2014
Number of Days to Update: 13
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/07/2014
Next Scheduled EDR Contact: 08/25/2014
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 05/01/2014
Date Data Arrived at EDR: 05/14/2014
Date Made Active in Reports: 05/21/2014
Number of Days to Update: 7
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/07/2014
Next Scheduled EDR Contact: 08/25/2014
Data Release Frequency: Quarterly

PLACER COUNTY:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 03/10/2014
Date Data Arrived at EDR: 03/11/2014
Date Made Active in Reports: 04/10/2014
Number of Days to Update: 30
Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 06/09/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 04/15/2014
Date Data Arrived at EDR: 04/17/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 7
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/02/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 04/15/2014
Date Data Arrived at EDR: 04/17/2014
Date Made Active in Reports: 05/09/2014
Number of Days to Update: 22
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/24/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 02/06/2014
Date Data Arrived at EDR: 04/08/2014
Date Made Active in Reports: 04/29/2014
Number of Days to Update: 21
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/04/2014
Next Scheduled EDR Contact: 07/21/2014
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 02/06/2014
Date Data Arrived at EDR: 04/08/2014
Date Made Active in Reports: 04/29/2014
Number of Days to Update: 21
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/04/2014
Next Scheduled EDR Contact: 07/21/2014
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 03/18/2014
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 04/25/2014
Number of Days to Update: 35

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 05/12/2014
Next Scheduled EDR Contact: 08/25/2014
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 09/23/2013
Date Data Arrived at EDR: 09/24/2013
Date Made Active in Reports: 10/17/2013
Number of Days to Update: 23

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 06/09/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2013
Date Data Arrived at EDR: 11/19/2013
Date Made Active in Reports: 12/31/2013
Number of Days to Update: 42

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 06/04/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 05/09/2014
Next Scheduled EDR Contact: 08/25/2014
Data Release Frequency: Quarterly

Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/29/2010
Date Data Arrived at EDR: 03/10/2011
Date Made Active in Reports: 03/15/2011
Number of Days to Update: 5

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 05/09/2014
Next Scheduled EDR Contact: 08/25/2014
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 04/10/2014
Date Data Arrived at EDR: 04/11/2014
Date Made Active in Reports: 04/29/2014
Number of Days to Update: 18
Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 04/07/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 02/24/2014
Date Data Arrived at EDR: 02/26/2014
Date Made Active in Reports: 03/26/2014
Number of Days to Update: 28
Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 06/09/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 04/03/2014
Date Data Arrived at EDR: 04/04/2014
Date Made Active in Reports: 05/01/2014
Number of Days to Update: 27
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/16/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/17/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/13/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28
Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 05/22/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 03/04/2014
Date Data Arrived at EDR: 03/06/2014
Date Made Active in Reports: 03/20/2014
Number of Days to Update: 14

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 06/02/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 06/02/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 05/12/2014
Date Data Arrived at EDR: 05/19/2014
Date Made Active in Reports: 05/28/2014
Number of Days to Update: 9

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 05/12/2014
Next Scheduled EDR Contact: 08/25/2014
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 02/24/2014
Date Data Arrived at EDR: 02/25/2014
Date Made Active in Reports: 03/20/2014
Number of Days to Update: 23

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 05/27/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 03/17/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 05/22/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 04/25/2014
Date Data Arrived at EDR: 04/01/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 27

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/13/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 03/25/2014
Date Data Arrived at EDR: 04/01/2014
Date Made Active in Reports: 05/05/2014
Number of Days to Update: 34

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/13/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 01/02/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 40

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 04/03/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 25

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 03/24/2014
Date Data Arrived at EDR: 03/24/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 35

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 06/09/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Semi-Annually

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 05/16/2014
Date Data Arrived at EDR: 05/16/2014
Date Made Active in Reports: 06/13/2014
Number of Days to Update: 28

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks

The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 04/28/2014
Date Data Arrived at EDR: 05/20/2014
Date Made Active in Reports: 05/27/2014
Number of Days to Update: 7

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/16/2014
Next Scheduled EDR Contact: 09/01/2014
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites

Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 04/04/2014
Next Scheduled EDR Contact: 07/21/2014
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites

Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/16/2014
Next Scheduled EDR Contact: 09/01/2014
Data Release Frequency: Quarterly

Medical Waste Program List

To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 04/28/2014
Date Data Arrived at EDR: 04/30/2014
Date Made Active in Reports: 05/19/2014
Number of Days to Update: 19

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Quarterly

Underground Tank Closed Sites List

Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 03/06/2014
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 38

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/16/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report

Underground storage tank sites located in Yolo county.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 04/08/2014
Date Made Active in Reports: 05/05/2014
Number of Days to Update: 27

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 03/24/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 02/11/2014
Date Data Arrived at EDR: 02/13/2014
Date Made Active in Reports: 03/17/2014
Number of Days to Update: 32

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 05/19/2014
Next Scheduled EDR Contact: 08/18/2014
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/23/2014
Next Scheduled EDR Contact: 09/01/2014
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/19/2012
Date Made Active in Reports: 08/28/2012
Number of Days to Update: 40

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 04/18/2014
Next Scheduled EDR Contact: 07/28/2014
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 05/01/2014
Date Data Arrived at EDR: 05/07/2014
Date Made Active in Reports: 06/10/2014
Number of Days to Update: 34

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/07/2014
Next Scheduled EDR Contact: 08/18/2014
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 07/24/2013
Date Made Active in Reports: 08/19/2013
Number of Days to Update: 26

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 04/21/2014
Next Scheduled EDR Contact: 08/04/2014
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 06/21/2013
Date Made Active in Reports: 08/05/2013
Number of Days to Update: 45

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/27/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 08/09/2013
Date Made Active in Reports: 09/27/2013
Number of Days to Update: 49

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/16/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: Rextag Strategies Corp.
Telephone: (281) 769-2247
U.S. Electric Transmission and Power Plants Systems Digital GIS Data

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

HEIDORN RANCH ROAD
5220 - 5300 HEIDORN RANCH ROAD
ANTIOCH, CA 94531

TARGET PROPERTY COORDINATES

Latitude (North):	37.9561 - 37° 57' 21.96''
Longitude (West):	121.7532 - 121° 45' 11.52''
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	609535.8
UTM Y (Meters):	4201472.0
Elevation:	151 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	37121-H7 ANTIOCH SOUTH, CA
Most Recent Revision:	1980
East Map:	37121-H6 BRENTWOOD, CA
Most Recent Revision:	1978

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

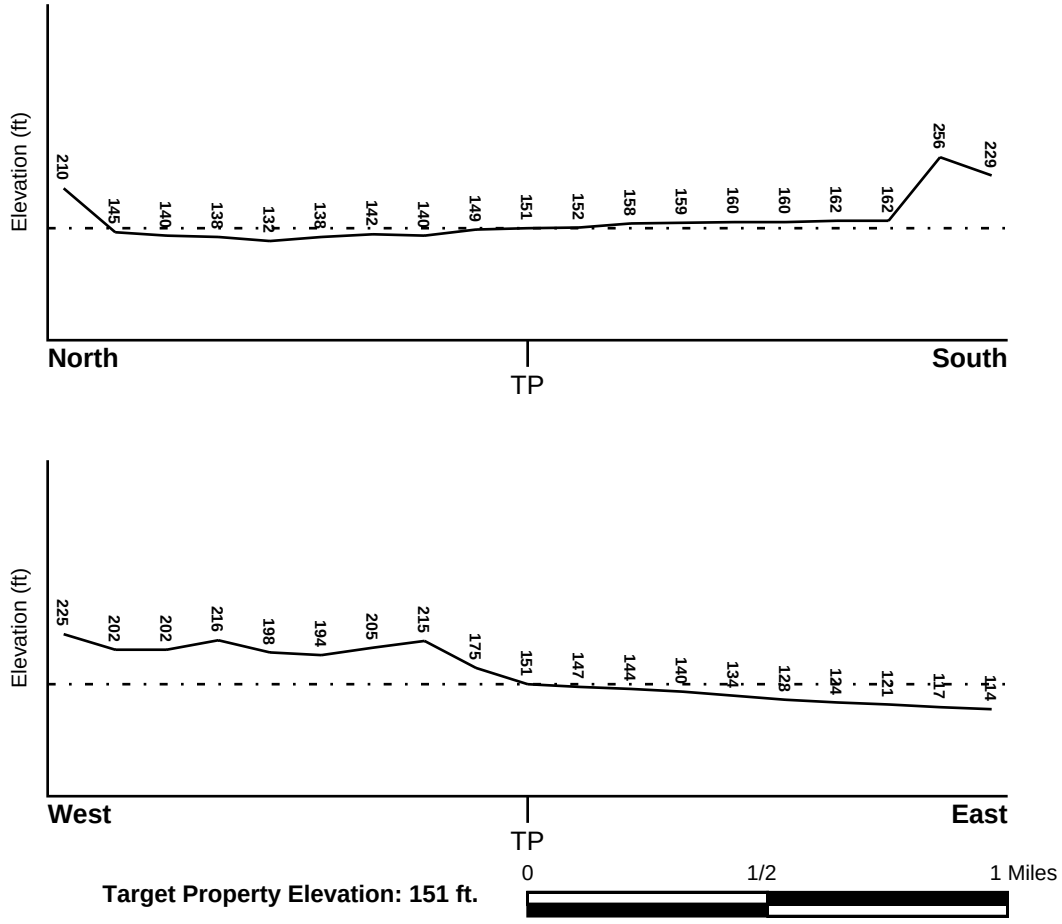
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General ENE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
CONTRA COSTA, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 06013C - FEMA DFIRM Flood data

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
ANTIOCH SOUTH	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

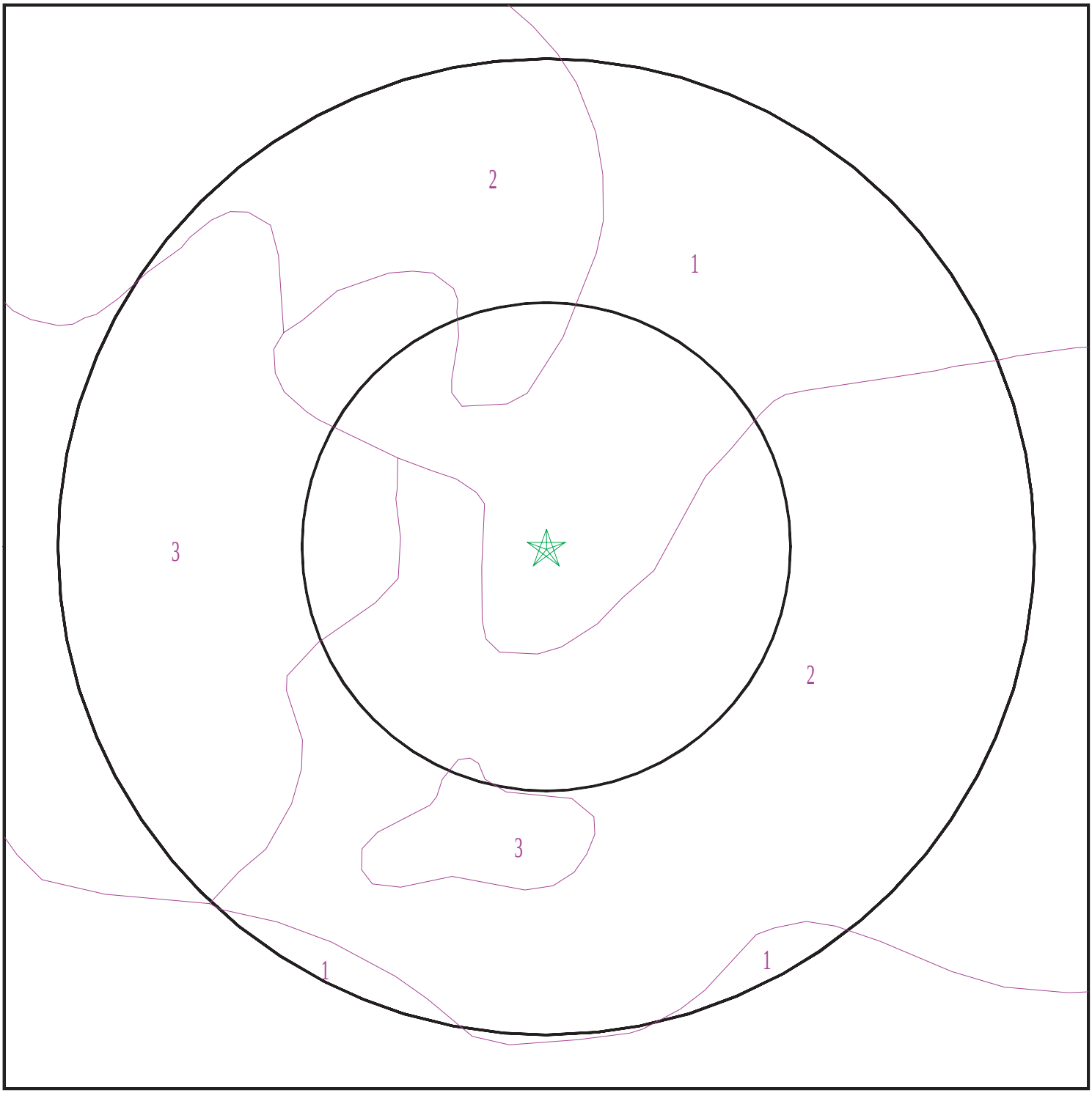
Era:	Cenozoic
System:	Tertiary
Series:	Miocene
Code:	Tm *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 3976090.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	Heidorn Ranch Road	CLIENT:	Aqua Science Engineers Inc.
ADDRESS:	5220 - 5300 Heidorn Ranch Road Antioch CA 94531	CONTACT:	Dave Allen
LAT/LONG:	37.9561 / 121.7532	INQUIRY #:	3976090.2s
		DATE:	June 18, 2014 3:03 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: CAPAY

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	35 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.6
2	35 inches	51 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.6
3	51 inches	72 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.6

Soil Map ID: 2

Soil Component Name: RINCON

Soil Surface Texture: clay loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 7.8 Min: 6.1
2	11 inches	29 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.6
3	29 inches	59 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.9

Soil Map ID: 3

Soil Component Name: ALTAMONT

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	25 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.6
2	25 inches	48 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.4
3	48 inches	51 inches	weathered bedrock	Not reported	Not reported	Max: 1.4 Min: 0	Max: Min:

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	USGS40000186287	1/2 - 1 Mile ENE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

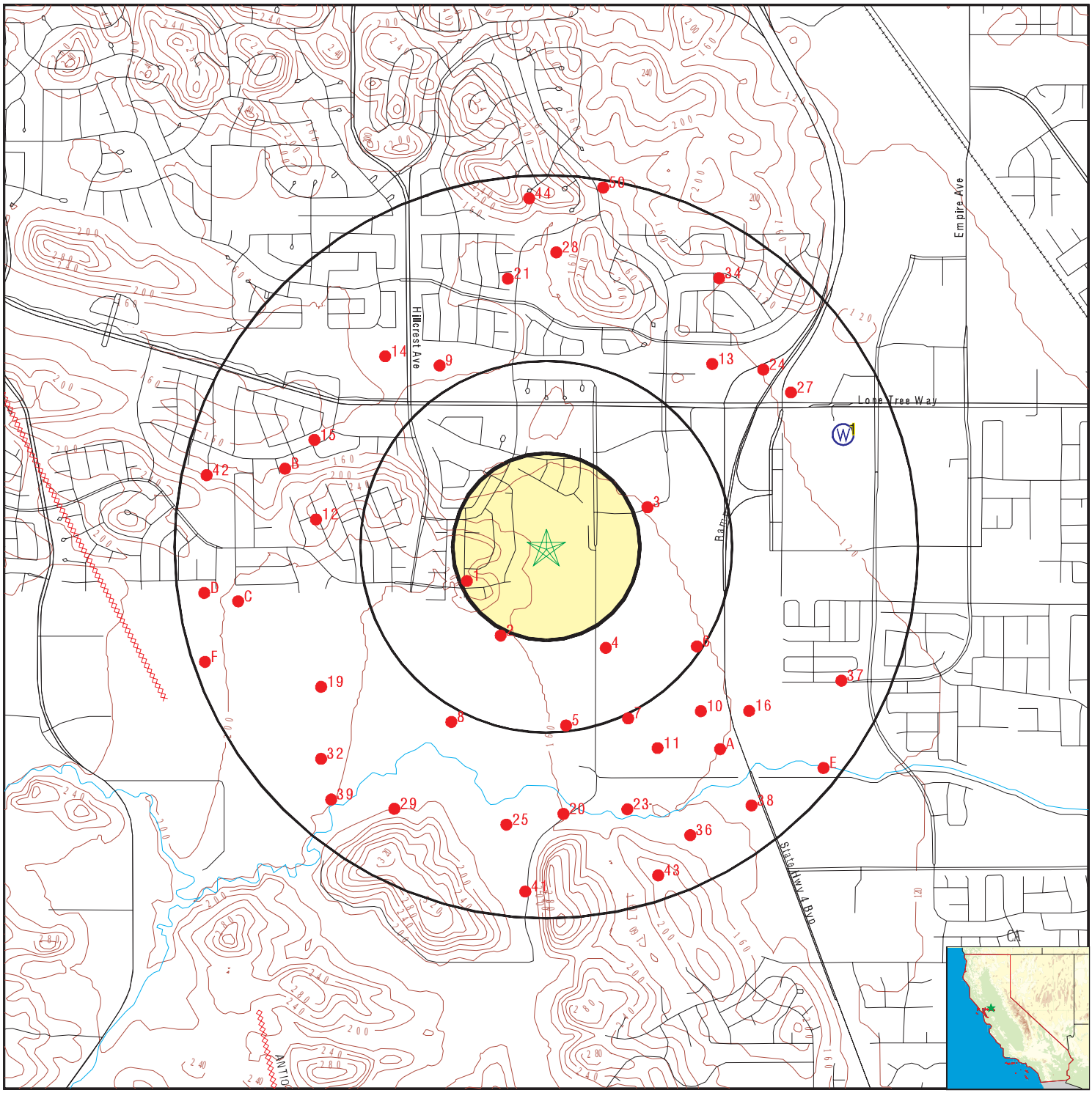
MAP ID	WELL ID	LOCATION FROM TP
1	CAOG9A000207835	1/8 - 1/4 Mile WSW
2	CAOG9A000207812	1/4 - 1/2 Mile SSW
3	CAOG9A000207862	1/4 - 1/2 Mile ENE
4	CAOG9A000207804	1/4 - 1/2 Mile SSE
5	CAOG9A000207778	1/4 - 1/2 Mile South
6	CAOG9A000207805	1/4 - 1/2 Mile ESE
7	CAOG9A000207782	1/2 - 1 Mile SSE
8	CAOG9A000207780	1/2 - 1 Mile SSW
9	CAOG9A000207908	1/2 - 1 Mile NNW
10	CAOG9A000207783	1/2 - 1 Mile SE
11	CAOG9A000207775	1/2 - 1 Mile SSE
12	CAOG9A000207855	1/2 - 1 Mile West
13	CAOG9A000207909	1/2 - 1 Mile NE
14	CAOG9A000207913	1/2 - 1 Mile NW
15	CAOG9A000207891	1/2 - 1 Mile WNW
16	CAOG9A000207784	1/2 - 1 Mile SE
A17	CAOG9A000207776	1/2 - 1 Mile SE
B18	CAOG9A000207880	1/2 - 1 Mile WNW
19	CAOG9A000207789	1/2 - 1 Mile WSW
20	CAOG9A000207742	1/2 - 1 Mile South
21	CAOG9A000207934	1/2 - 1 Mile North
A22	CAOG9A000207774	1/2 - 1 Mile SE
23	CAOG9A000207746	1/2 - 1 Mile SSE
24	CAOG9A000207907	1/2 - 1 Mile NE
25	CAOG9A000207737	1/2 - 1 Mile South
B26	CAOG9A000207877	1/2 - 1 Mile WNW
27	CAOG9A000207900	1/2 - 1 Mile ENE
28	CAOG9A000207940	1/2 - 1 Mile North
29	CAOG9A000207747	1/2 - 1 Mile SSW
C30	CAOG9A000207829	1/2 - 1 Mile West
C31	CAOG9A000207818	1/2 - 1 Mile WSW
32	CAOG9A000207771	1/2 - 1 Mile SW
C33	CAOG9A000207832	1/2 - 1 Mile West
34	CAOG9A000207935	1/2 - 1 Mile NNE
C35	CAOG9A000207828	1/2 - 1 Mile West
36	CAOG9A000207733	1/2 - 1 Mile SSE
37	CAOG9A000207791	1/2 - 1 Mile ESE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
38	CAOG9A000207750	1/2 - 1 Mile SE
39	CAOG9A000207752	1/2 - 1 Mile SW
D40	CAOG9A000207833	1/2 - 1 Mile West
41	CAOG9A000207711	1/2 - 1 Mile South
42	CAOG9A000207876	1/2 - 1 Mile WNW
43	CAOG9A000207714	1/2 - 1 Mile SSE
44	CAOG9A000207955	1/2 - 1 Mile North
D45	CAOG9A000207826	1/2 - 1 Mile West
E46	CAOG9A000207765	1/2 - 1 Mile SE
E47	CAOG9A000207766	1/2 - 1 Mile SE
F48	CAOG9A000207793	1/2 - 1 Mile WSW
F49	CAOG9A000207801	1/2 - 1 Mile WSW
50	CAOG9A000207959	1/2 - 1 Mile North

PHYSICAL SETTING SOURCE MAP - 3976090.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- Indeterminate Groundwater Flow at Location
- Groundwater Flow Varies at Location
- Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME:	Heidorn Ranch Road	CLIENT:	Aqua Science Engineers Inc.
ADDRESS:	5220 - 5300 Heidorn Ranch Road Antioch CA 94531	CONTACT:	Dave Allen
LAT/LONG:	37.9561 / 121.7532	INQUIRY #:	3976090.2s
		DATE:	June 18, 2014 3:03 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

1
ENE **FED USGS** **USGS40000186287**
1/2 - 1 Mile
Lower

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-375738121441501		
Monloc name:	001N002E03K001M		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18040003	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	37.9604783
Longitude:	-121.7385648	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	112.00
Vert measure units:	feet	Vertacc measure val:	2.5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Central Valley aquifer system		
Formation type:	Alluvium of the Coast Range, Younger (Pleistocene-Holocene)		
Aquifer type:	Not Reported		
Construction date:	19760615	Welldepth:	80
Welldepth units:	ft	Wellholedepth:	113
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1976-06-15	30.00	

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

1
WSW **OIL_GAS** **CAOG9A000207835**
1/8 - 1/4 Mile

Districtnu:	6	Apinumber:	01300048
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Shell Western Exploration & Production Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	4		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.954764		
Glong:	-121.75711		
Gissourcec:	gps		
Comments:	GPS Date 04/02/2002, Status Code 024		
Leasename:	Heidorn	Wellnumber:	4-4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDG	Site id:	CAOG9A000207835

2
SSW **OIL_GAS** **CAOG9A000207812**
1/4 - 1/2 Mile

Districtnu:	6	Apinumber:	01300038
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.952633		
Glong:	-121.755445		
Gissourcec:	hud		
Comments:	Status Code 024		
Leasename:	Ginochio	Wellnumber:	2-9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDG	Site id:	CAOG9A000207812

3
ENE **OIL_GAS** **CAOG9A000207862**
1/4 - 1/2 Mile

Districtnu:	6	Apinumber:	01300032
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	Y	Wellstatus:	P
Operatorna:	Shell Western Exploration & Production Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	3		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.957643		
Glong:	-121.748215		
Gissourcec:	hud		
Comments:	Status Code 006		
Leasename:	Dempsey	Wellnumber:	3-3
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207862

4
SSE **OIL_GAS** **CAOG9A000207804**
1/4 - 1/2 Mile

Districtnu:	6	Apinumber:	01320340
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	EOG Resources, Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	164
Locationde:	Not Reported		
Glat:	37.952153		
Glong:	-121.750265		
Gissourcec:	hud		
Comments:	Status Code 025		
Leasename:	Sunset-Graham	Wellnumber:	1-10D
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDG	Site id:	CAOG9A000207804

5
South **OIL_GAS** **CAOG9A000207778**
1/4 - 1/2 Mile

Districtnu:	6	Apinumber:	01300039
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.949123		
Glong:	-121.752225		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Ginochio	Wellnumber:	21-9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207778

6
ESE **OIL_GAS** **CAOG9A000207805**
1/4 - 1/2 Mile

Districtnu:	6	Apinumber:	01300030
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Production Specialties Company		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.95221		
Glong:	-121.745781		
Gissourcec:	gps		
Comments:	GPS Date 04/02/2002, Status Code 024		
Leasename:	Continente	Wellnumber:	1-10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDG	Site id:	CAOG9A000207805

7
SSE **OIL_GAS** **CAOG9A000207782**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01300036
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.949403		
Glong:	-121.749165		
Gissourcec:	hud		
Comments:	Status Code 024		
Leasename:	Garaventa	Wellnumber:	14-10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDG	Site id:	CAOG9A000207782

8
SSW **OIL_GAS** **CAOG9A000207780**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01320005
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.949263		
Glong:	-121.757875		
Gissourcec:	hud		
Comments:	Status Code 024		
Leasename:	Ginochio	Wellnumber:	22-9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDG	Site id:	CAOG9A000207780

9
NNW **OIL_GAS** **CAOG9A000207908**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01300047
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Shell Western Exploration & Production Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	4		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.963173		
Glong:	-121.758455		
Gissourcec:	hud		
Comments:	Status Code 024		
Leasename:	Heidorn	Wellnumber:	2-4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207908

10
SE **OIL_GAS** **CAOG9A000207783**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01300053
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.949683		
Glong:	-121.745585		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Maggiora-Capital Co.	Wellnumber:	33X-10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207783

11
SSE **OIL_GAS** **CAOG9A000207775**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01300035
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.948243		
Glong:	-121.747715		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Garaventa	Wellnumber:	12-10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207775

12
West
1/2 - 1 Mile

OIL_GAS **CAOG9A000207855**

Districtnu:	6	Apinumber:	01320004
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	Y	Wellstatus:	P
Operatorna:	Shell Western Exploration & Production Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	4		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.957163		
Glong:	-121.764545		
Gissourcec:	hud		
Comments:	Status Code 006		
Leasename:	Williamson	Wellnumber:	3-4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207855

13
NE
1/2 - 1 Mile

OIL_GAS **CAOG9A000207909**

Districtnu:	6	Apinumber:	01320187
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	Y	Wellstatus:	P
Operatorna:	Natural Gas Corp. of Calif.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	3		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.963233		
Glong:	-121.745025		
Gissourcec:	gps		
Comments:	GPS Date 09/29/2004, Status Code 006		
Leasename:	Transamerica	Wellnumber:	2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207909

14
NW
1/2 - 1 Mile

OIL_GAS **CAOG9A000207913**

Districtnu:	6	Apinumber:	01320065
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	Y	Wellstatus:	P
Operatorna:	Sinco Oil Corp.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	4		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.963533		
Glong:	-121.761135		
Gissourcec:	hud		
Comments:	Status Code 006		
Leasename:	Williamson	Wellnumber:	2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207913

15
WNW
1/2 - 1 Mile

OIL_GAS **CAOG9A000207891**

Districtnu:	6	Apinumber:	01320029
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	4		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.960273		
Glong:	-121.764625		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Williamson	Wellnumber:	31-4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207891

16
SE
1/2 - 1 Mile

OIL_GAS **CAOG9A000207784**

Districtnu:	6	Apinumber:	01300054
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	Y	Wellstatus:	P
Operatorna:	Shell Western Exploration & Production Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.949693		
Glong:	-121.743205		
Gissourcec:	hud		
Comments:	Status Code 006		
Leasename:	Maggiora-Capital Co.	Wellnumber:	43X-10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207784

A17
SE
1/2 - 1 Mile

OIL_GAS **CAOG9A000207776**

Districtnu:	6	Apinumber:	01300052
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.948323		
Glong:	-121.744825		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Maggiora-Capital Co.	Wellnumber:	13-10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDG	Site id:	CAOG9A000207776

B18
WNW **OIL_GAS** **CAOG9A000207880**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01320068
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	4		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.959263		
Glong:	-121.765515		
Gissourcec:	hud		
Comments:	Status Code 015		
Leasename:	Williamson	Wellnumber:	33-4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207880

19
WSW **OIL_GAS** **CAOG9A000207789**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01300067
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	Y	Wellstatus:	P
Operatorna:	Shell Western Exploration & Production Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.950633		
Glong:	-121.764295		
Gissourcec:	hud		
Comments:	Status Code 006		
Leasename:	Williamson	Wellnumber:	1-9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207789

20
South
1/2 - 1 Mile

OIL_GAS **CAOG9A000207742**

Districtnu:	6	Apinumber:	01300045
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.945673		
Glong:	-121.752355		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Ginochio-Shellenberger	Wellnumber:	43-9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207742

21
North
1/2 - 1 Mile

OIL_GAS **CAOG9A000207934**

Districtnu:	6	Apinumber:	01300046
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	Y	Wellstatus:	P
Operatorna:	Shell Western Exploration & Production Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	4		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.966563		
Glong:	-121.755095		
Gissourcec:	hud		
Comments:	Status Code 006		
Leasename:	Heidorn	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207934

A22
SE
1/2 - 1 Mile

OIL_GAS **CAOG9A000207774**

Districtnu:	6	Apinumber:	01300051
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.948083		
Glong:	-121.744445		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Maggiora-Capital Co.	Wellnumber:	11-10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207774

23
SSE
1/2 - 1 Mile

OIL_GAS **CAOG9A000207746**

Districtnu:	6	Apinumber:	01300071
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.945853		
Glong:	-121.749205		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Ward	Wellnumber:	34-10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207746

24
NE
1/2 - 1 Mile

OIL_GAS **CAOG9A000207907**

Districtnu:	6	Apinumber:	01320026
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Western Continental Operating Company		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	3		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.963013		
Glong:	-121.742505		
Gissourcec:	hud		
Comments:	Status Code 024		
Leasename:	Transamerica	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDG	Site id:	CAOG9A000207907

25
South
1/2 - 1 Mile

OIL_GAS **CAOG9A000207737**

Districtnu:	6	Apinumber:	01300041
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.945253		
Glong:	-121.755165		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Ginochio-Shellenberger	Wellnumber:	4-9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207737

B26
WNW **OIL_GAS** **CAOG9A000207877**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01320042
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	4		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.959033		
Glong:	-121.766625		
Gissourcec:	hud		
Comments:	Status Code 015		
Leasename:	Williamson	Wellnumber:	32-4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207877

27
ENE **OIL_GAS** **CAOG9A000207900**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01320323
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Western Continental Operating Company		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	3		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	127
Locationde:	Not Reported		
Glat:	37.962123		
Glong:	-121.741145		
Gissourcec:	hud		
Comments:	Status Code 007		
Leasename:	Transamerica	Wellnumber:	3
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207900

28
North **OIL_GAS** **CAOG9A000207940**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01300049
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	Y	Wellstatus:	P
Operatorna:	Shell Western Exploration & Production Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	4		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.967592		
Glong:	-121.752705		
Gissourcec:	hud		
Comments:	Status Code 006		
Leasename:	Heidorn	Wellnumber:	21-4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207940

29
SSW **OIL_GAS** **CAOG9A000207747**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01320053
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Sinco Oil Corp.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.945873		
Glong:	-121.760685		
Gissourcec:	hud		
Comments:	Status Code 007		
Leasename:	Williamson	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207747

C30
West
1/2 - 1 Mile

OIL_GAS **CAOG9A000207829**

Districtnu:	6	Apinumber:	01320250
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Venturini Associates Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.954083		
Glong:	-121.768075		
Gissourcec:	hud		
Comments:	Status Code 015		
Leasename:	Williamson	Wellnumber:	4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207829

C31
WSW
1/2 - 1 Mile

OIL_GAS **CAOG9A000207818**

Districtnu:	6	Apinumber:	01320226
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Venturini Associates Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.953263		
Glong:	-121.767865		
Gissourcec:	hud		
Comments:	Status Code 015		
Leasename:	Williamson	Wellnumber:	2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207818

32
SW
1/2 - 1 Mile

OIL_GAS **CAOG9A000207771**

Districtnu:	6	Apinumber:	01300068
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	Y	Wellstatus:	P
Operatorna:	Shell Western Exploration & Production Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.947823		
Glong:	-121.764295		
Gissourcec:	hud		
Comments:	Status Code 006		
Leasename:	Williamson	Wellnumber:	11-9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207771

C33
West
1/2 - 1 Mile

OIL_GAS **CAOG9A000207832**

Districtnu:	6	Apinumber:	01320252
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	4		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.954593		
Glong:	-121.768795		
Gissourcec:	hud		
Comments:	Status Code 015		
Leasename:	Williamson	Wellnumber:	34-4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207832

34
NNE **OIL_GAS** **CAOG9A000207935**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01300029
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Western Continental Operating Company		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	3		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.966583		
Glong:	-121.744685		
Gissourcec:	gps		
Comments:	GPS Date 04/11/2003, Status Code 024		
Leasename:	Napolitano	Wellnumber:	4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDG	Site id:	CAOG9A000207935

C35
West **OIL_GAS** **CAOG9A000207828**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01320240
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Venturini Associates Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.953953		
Glong:	-121.768795		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Williamson	Wellnumber:	3
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207828

36
SSE **OIL_GAS** **CAOG9A000207733**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01300066
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.944843		
Glong:	-121.746105		
Gissourcec:	hud		
Comments:	Status Code 024		
Leasename:	Ward	Wellnumber:	3-10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207733

37
ESE **OIL_GAS** **CAOG9A000207791**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01320339
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	EOG Resources, Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	144
Locationde:	Not Reported		
Glat:	37.950873		
Glong:	-121.738655		
Gissourcec:	hud		
Comments:	Status Code 007		
Leasename:	Sunset-Nunn	Wellnumber:	1-10D
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207791

38
SE
1/2 - 1 Mile

OIL_GAS **CAOG9A000207750**

Districtnu:	6	Apinumber:	01300072
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.946003		
Glong:	-121.743085		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Ward	Wellnumber:	35-10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207750

39
SW
1/2 - 1 Mile

OIL_GAS **CAOG9A000207752**

Districtnu:	6	Apinumber:	01320212
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Venturini Associates Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Any Area		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.946233		
Glong:	-121.763795		
Gissourcec:	hud		
Comments:	Status Code 007		
Leasename:	Williamson	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207752

D40
West
1/2 - 1 Mile

OIL_GAS **CAOG9A000207833**

Districtnu:	6	Apinumber:	01320235
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Venada National		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	5		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.954703		
Glong:	-121.769905		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Prewett	Wellnumber:	5-6
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207833

41
South
1/2 - 1 Mile

OIL_GAS **CAOG9A000207711**

Districtnu:	6	Apinumber:	01300044
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	9		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.942643		
Glong:	-121.754235		
Gissourcec:	hud		
Comments:	Status Code 025		
Leasename:	Ginochio-Shellenberger	Wellnumber:	41-9
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207711

42
WNW **OIL_GAS** **CAOG9A000207876**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01320197
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Venada National		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	5		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.958893		
Glong:	-121.769936		
Gissourcec:	hud		
Comments:	Status Code 015		
Leasename:	Prewett	Wellnumber:	5-5
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207876

43
SSE **OIL_GAS** **CAOG9A000207714**
1/2 - 1 Mile

Districtnu:	6	Apinumber:	01300085
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Occidental Petroleum Corporation		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.943273		
Glong:	-121.747685		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Ward	Wellnumber:	38-10
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207714

44
North
1/2 - 1 Mile

OIL_GAS **CAOG9A000207955**

Districtnu:	6	Apinumber:	01300279
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	S. M. Reynolds, Opr.		
Countyname:	Contra Costa	Fieldname:	Any Field
Areaname:	Any Area		
Section:	33		
Township:	02N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.969702		
Glong:	-121.754045		
Gissourcec:	hud		
Comments:	Status Code 007		
Leasename:	Brazos-Canada	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207955

D45
West
1/2 - 1 Mile

OIL_GAS **CAOG9A000207826**

Districtnu:	6	Apinumber:	01320264
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Venturini Associates Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	8		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.953893		
Glong:	-121.770206		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Enea	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207826

E46
SE
1/2 - 1 Mile

OIL_GAS **CAOG9A000207765**

Districtnu:	6	Apinumber:	01320008
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Allied Energy Corp.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	139
Locationde:	Not Reported		
Glat:	37.947457		
Glong:	-121.739664		
Gissourcec:	gps		
Comments:	GPS Date 06/11/1997, Status Code 014		
Leasename:	Transamerica-Maggiora	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207765

E47
SE
1/2 - 1 Mile

OIL_GAS **CAOG9A000207766**

Districtnu:	6	Apinumber:	01320020
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Allied Energy Corp.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	Main		
Section:	10		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	139
Locationde:	Not Reported		
Glat:	37.947472		
Glong:	-121.739419		
Gissourcec:	gps		
Comments:	GPS Date 06/11/1997, Status Code 014		
Leasename:	Transamerica-Maggiora	Wellnumber:	2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207766

F48
WSW
1/2 - 1 Mile

OIL_GAS **CAOG9A000207793**

Districtnu:	6	Apinumber:	01320269
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Venturini Associates Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	West		
Section:	8		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.951353		
Glong:	-121.769825		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Capital-Enea	Wellnumber:	3
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207793

F49
WSW
1/2 - 1 Mile

OIL_GAS **CAOG9A000207801**

Districtnu:	6	Apinumber:	01320265
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	N	Wellstatus:	P
Operatorna:	Venturini Associates Inc.		
Countyname:	Contra Costa	Fieldname:	Brentwood (ABD)
Areaname:	West		
Section:	8		
Township:	01N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.951863		
Glong:	-121.770205		
Gissourcec:	hud		
Comments:	Status Code 014		
Leasename:	Enea	Wellnumber:	2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	POG	Site id:	CAOG9A000207801

50
North
1/2 - 1 Mile

OIL_GAS **CAOG9A000207959**

Districtnu:	6	Apinumber:	01300281
Blmwell:	N	Redrillcan:	Not Reported
Dryhole:	Y	Wellstatus:	P
Operatorna:	Chevron U.S.A. Inc.		
Countyname:	Contra Costa	Fieldname:	Any Field
Areaname:	Any Area		
Section:	34		
Township:	02N	Range:	02E
Basemeridi:	MD	Elevation:	Not Reported
Locationde:	Not Reported		
Glat:	37.970122		
Glong:	-121.750395		
Gissourcec:	hud		
Comments:	Status Code 006		
Leasename:	Canada Community	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	Not Reported	Redrillfoo:	Not Reported
Abandonedd:	/ /	Completion:	/ /
Gissymbol:	PDH	Site id:	CAOG9A000207959

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
94531	2	0

Federal EPA Radon Zone for CONTRA COSTA County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for CONTRA COSTA COUNTY, CA

Number of sites tested: 55

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.760 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.300 pCi/L	100%	0%	0%
Basement	0.525 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

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APPENDIX I

Qualifications

Aqua Science Engineers, Inc. 55 Oak Court, Suite 220, Danville, CA 94526
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DAVID ALLEN, R.E.A.
Vice President

Education
B.S. Industrial Technology, San Jose State University

Professional Registration
Registered Environmental Assessor, California #06211

Experience
Mr. Allen manages operations for ASE's Northern California Office. He is responsible for coordinating and managing all of ASE's Phase I and Phase II investigations involving the integration of ASE's engineering, drilling and field services departments. Mr. Allen manages all risk-based assessment projects, on-going in-situ remediation projects, and industrial process engineering contracts. Mr. Allen is responsible for the design, installation, and operation of all remediation equipment for ASE's Northern California office.

Mr. Allen has over 20 years in the environmental contracting industry. His specialties include the assessment and remediation of properties impacted by petroleum, heavy metals and chlorinated solvents at service-stations and commercial properties.

Appendix E: Stormwater Control Plan

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Preliminary
Post Construction
Stormwater Control Plan

Heidorn Village

CITY OF ANTIOCH, CONTRA COSTA COUNTY, CALIFORNIA
APN'S 056-130-013, 056-130-015, 056-130-017 AND 056-130-018

Dated: July 7, 2014

Prepared For:

MISSION PEAK COMPANY
47289, Mission Falls Court
Fremont, CA 94539

Prepared By:

cbg Carlson, Barbee & Gibson, Inc.
CIVIL ENGINEERS • SURVEYORS • PLANNERS

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I. PROJECT SETTING

A. Project Name, Location and Description

This Stormwater Control Plan for the proposed Heidorn Village improvements is submitted to the Engineering Department of the City of Antioch (City) as a recommendation for the post construction Best Management Practices (BMPs) at the Heidorn Village project site (site). Probable design storm flows and permanent BMP selection are presented in this report. BMP technical requirements are presented in the Contra Costa Countywide Clean Water Program C.3 Stormwater Technical Guidance Version 6.0 dated February 15, 2012.

The Heidorn Village project site is located southwest of the intersection of Heidorn Ranch Road and Lone Tree Way, in the City of Antioch, as shown on Exhibit 1 Vicinity Map. The total project area is approximately 20.04 acres and is zoned as a Planned Development District (PD). The project is proposing 117 single-family residential units consistent with the density and use outlined in the PD.

The project site is vacant with limited vegetation and is tilled regularly. The proposed development will increase the impervious surface at the site from the previous land use. Proposed impervious surfaces will include roofs, concrete flatwork, and asphalt pavement. Pervious surfaces will consist of bio-retention areas and landscaping.

B. Existing Site Conditions

The site fronts onto Proposed Prewett Ranch Drive and Heidorn Ranch Road. The site is vacant with sparse vegetation due to tilling. The site is bordered by an existing development to the west and agricultural lands to the south. There is a preliminary plan for a small subdivision directly to the south of Future Prewett Ranch Drive. There is an EBMUD aqueduct to the north of the site and an existing church and Heidorn Ranch Road to the east. The site generally slopes from the southwest to the northeast. Exhibit 2 – Existing Site Aerial illustrates the existing project site.

The site is classified as having hydrologic type C soils. The depth to groundwater at the site is assumed to be greater than 10 feet. Existing soil conditions at the site were researched using the NRCS Web Soil Survey website, the findings are provided in Appendix B.

The existing site is split into two water sheds, a northern shed and eastern shed. The northern watershed flows towards the East Bay Municipal Utility District Corridor and then heads west towards Vista Grande before being collected in Lone Tree Way. The eastern watershed flows towards Heidorn Ranch Road where it is collected by an existing inlet and conveyed in a 30 inch storm drain pipe to the downstream system in Lone Tree Way. Flow from the sites to the drainage water sheds ultimately reach the Lindsey Basin.

C. Compliance with Municipal Regional Permit (MRP) C.3 Guidelines

1. The "50% Rule" For Projects on Previously Developed Sites

The project site was previously undeveloped agricultural land. The Proposed Development will introduce all new impervious surfaces. Therefore, the 50% rule does not apply. New impervious surfaces will be directed to an integrated management practice (IMP) area for treatment.

2. Treatment

The project is subject to compliance with the treatment requirements set forth in the MRP. The proposed project will introduce approximately 514,818 SF± of impervious surfaces. Therefore, per the County's C.3 Guidebook, this project is required to include treatment measures.

3. Flow Control

The project is not subject to the flow control requirements set forth in the MRP. Stormwater runoff from the site is conveyed to the Lindsey Basin. The Lindsey Basin mitigates stormwater runoff from development on a regional level. Because the sites future residential development is mitigated for by the Lindsey Basin the project is not subject to Hydromod requirements.

D. Constraints and Opportunities for Stormwater Control

The following are the site-specific underlying constraints and opportunities affecting the selection of treatment and flow control facilities for the project. Table 1 below illustrates the constraints and opportunities for each IMP. This table was used as a guideline for the selection of the IMP facilities that are proposed for the site.

Table 1 – Integrated Management Practices (IMPs) Matrix

Site Features/Issues	Pervious Pavement	Green Roof	Disperse Runoff to Landscape	Storage For Later Use	Bioretention Facility	Flow-Through Planter	Dry Well	Cistern + Bioretention	Bioretention + Vault
Clayey Native Soils		X	X	X	X	X		X	X
Permeable Native Soils	X	X	X	X	X	X	X		
Very Steep Slopes		X		X		X			
Shallow Depth to Groundwater		X		X		X			
Roof Drainage			X	X	X	X	X	X	
Parking Lots	X		X	X	X		X		X
Extensive Landscaping			X	X	X				
Densely Developed Sites with Limited Space/Landscape	X	X		X		X	X	X	X

1. Constraints

a. <u>*Low Infiltrating Soils*</u> – The existing underlying soils at the site can be highly expansive and do not allow for infiltration for water quality.

b. <u>*Roof Drainage*</u> – The architecture roofs make up a significant portion of the projects impervious area.

c. <u>*Placement of C.3 Facilities*</u> – Due to the density of the site available space for water quality facilities is limited. C.3 facilities have been kept out of the park areas and concentrated along the north and east boundaries.

d. *Rain Cycle* – Opportunities for storage and reuse are hindered by the rain cycle of the bay area. The time periods between the rain season and the dry season are long enough to make storage of rain water for reuse infeasible.

2. Opportunities

a. *Existing Site Topography* – The project site has considerable grade providing for good hydraulics in the storm drain pipe.

b. *Disconnected Impervious Areas* – Disconnected impervious areas have been incorporated into the site design to promote the dispersion of runoff and to promote infiltration.

Bioretention areas have been chosen to meet the requirements of the MRP. Bioretention facilities can be incorporated into the sites landscape theme and provide significant freedom in the finished product appearance. Bioretention facilities provide an opportunity to treat an area where runoff can collect some of the worst pollutants in high concentrations without impacting the usefulness of the limited open space areas. Details for the Bioretention areas have been included in Appendix D of this report for reference.

II. LOW IMPACT DEVELOPMENT DESIGN STRATEGIES

A. Optimization of Site Layout

1. Limitation of Development Envelope

The project site is 20.04 acres and will be completely impacted by site development. A central park area is proposed to provide green space and bioretention areas will be placed in the open space along the north and east boundaries.

2. Preservation of Natural Drainage Patterns

The existing natural drainage pattern will be maintained at the site. Drainage will be collected by the existing 30 inch storm drain line in Heidorn Ranch Road and conveyed to the north. The proposed storm system is depicted on Exhibit 3 – Stormwater Control Plan Exhibit.

3. Setbacks from Creeks, Wetlands, and Riparian Habitats

The project is not expected to impact any creeks, wetlands or riparian habitats.

4. Minimization of Imperviousness

Impervious surfaces have been limited where possible and disconnected impervious surfaces have been implemented into the site design.

5. Using Drainage as a Design Element

There will be two bioretention IMP areas to treat and mitigate increased storm runoff. Site runoff from impervious areas will be directed to one of the bioretention facilities. The bioretention area landscaping will be integrated into the sites overall landscaping theme.

B. Use of Permeable Pavements

Due to the impermeable nature of the underlying soils, pervious surfaces would require increased depths of base course and inclusion of a sub-drain system. These measures would increase the cost of development significantly, making this design infeasible. Therefore, this Stormwater Control Plan assumes no permeable pavements will be used.

C. Direct Runoff to Integrated Management Practices

The proposed project's grading and storm drainage plan is designed to direct site runoff from impervious areas to a designated IMP area. The site is broken up into two drainage management areas. Each DMA has a designated IMP. The drainage areas and treatment facilities are shown on Exhibit 3 – Stormwater Control Plan Exhibit. Roof drainage will generally be routed via roof leaders to drain pipes connected directly to the designated IMP area. Runoff from vehicle and pedestrian surfaces will be directed to IMP areas utilizing a combination of pipe networks and overland flow. Landscape areas entering the IMP's have been minimized where possible on-site. Where feasible, landscape areas will drain directly to the storm drain system. The project's proposed grading and storm drainage design will allow drainage to flow into, through, and out of the IMP facilities by gravity flow. A description of the proposed IMP facilities and a breakdown of the impervious and pervious areas collected by each are provided below.

D. Assessment of Infiltration / Rainwater Harvesting and Reuse Feasibility

1. Infiltration

The existing site soil conditions are classified has being Type C soils with very low infiltration capacity by the NRCS web soil survey. Based on these findings infiltration will not be counted as a feasible LID option.

2. Harvesting and Reuse

Harvesting and reuse of runoff was analyzed per the methods outlined in Chapter 4, of the C.3 manual. The landscaping area proposed for the project is not sufficient to warrant reuse for irrigation purposes. The toilet flushing demand is not large enough to warrant the capture and reuse of water for this purpose either. Below is a table summarizing the findings:

Impervious area description	Area (sf)	Area (ac)	Use rates (resident - residents/dwelling unit)	Daily Use/Unit (gal/day/unit)	Water use per acre (gal/day/acre)	Is projected use> required demand (4,200 gpd/acre	Can runoff be piped to an irrigated area 2.5x the impervious area?	Is there any other consistent, reliable demand for the quantity of runoff?
Roof	244,800	5.62	2.8	8.6	50	No	No	No
Concrete/Asphalt	269,386	6.18	2.8	8.6	50	No	No	No

III. DOCUMENTATION OF DRAINAGE DESIGN

The following outlines the stormwater management facilities within the project site necessary to comply with the applicable C.3 guidelines. The project site design and its stormwater features balance the constraints of the site, the land use planning objectives for the site, and the MRP C.3 requirements.

The stormwater management plan for compliance with treatment requirements is described below:

A. Drainage Management Area's (DMA's)

The proposed project has been broken up into two drainage management areas (DMA's). DMA's one and two have been delineated into discrete areas based on four different surface types. The surface types include roads, concrete, roof, or landscaping. For DMAs one and two treatment requirements are met using bioretention areas. Each DMA is tabulated in Table 2 below. Exhibit 3 – The Stormwater Control Plan illustrates the boundaries and surface types of each DMA.

Table 2 – DMA Tabulation

DMA	*Concrete (SF)*	*Pavement (SF)*	*Roof (SF)*	*Landscaping (SF)*	*Total Area (SF)*
1	27,742	57,319	85,700	106,762	277,523
2	56,153	128,172	159,100	219,384	562,809

B. Integrated Management Practices (IMP)

The proposed project will utilize bioretention areas to treat stormwater runoff per the applicable C.3 guidelines. The project is proposing two bioretention areas. The bioretention areas were designed using flow and volume capacity calculations to minimize the footprints, the flow and volume calculations are consistent with the California BMP method and the Water Boards C.3 requirements. Each IMP is tabulated in Table 3 below. Calculations are provided in Appendix A for review. Exhibit 3 – Stormwater Control Plan Exhibit depicts the proposed locations of the bio-retention areas designated as IMPs.

Table 3 – IMP Tabulation

IMP	*Proposed Area (SF)*	*Description*	*Collects DMA*
1	11,806	Bioretention Facility	1
2	14,546	Bioretention Facility	2

IV. SOURCE CONTROL MEASURES

The proposed project will create few potential sources of stormwater pollution. Sources to be controlled include but are not limited to:

SOURCES AND SOURCE CONTROL BMP'S

Potential Source of Runoff Pollutants	Permanent Source Control BMP's	Operational Source Control BMP's
Onsite storm drain inlets	Mark all accessible onsite inlets with the words "No Dumping! Flows to Creek" or approved equivalent language. Detail location of all onsite storm drain inlets on Stormwater Control Plan Drawings.	Maintain and periodically replace inlet markings as needed. Provide stormwater pollution prevention information to new site owners, lessees, or operators. Include the following in lease agreement "Tenant shall not discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains." Inlets and pipes conveying stormwater to BMPs shall be inspected and maintained as part of the Project Operation and Maintenance Plan.
Interior floor drains	Interior floor drains shall be plumbed to drain directly to the sanitary sewer system.	Inspect and maintain drains to prevent blockages and overflows.
Need for future indoor or structural pest control	Project construction drawings shall incorporate features that discourage entry of pests.	Provide Integrated Pest Management (IPM) information to owners, lessees, and operators.

Potential Source of Runoff Pollutants	Permanent Source Control BMP's	Operational Source Control BMP's
Landscape/outdoor pesticide use	Final project landscape plans shall reflect the following: Design that minimizes need for irrigation; minimizes runoff; promotes surface infiltration where appropriate; and details the use of planting material that minimizes the amount of fertilizers and pesticides that are needed. Where landscaped areas are used to retain and detain stormwater, project landscape plans shall specify the use of plants that are tolerant of saturated soil conditions. Project landscape plans shall detail use of plantings appropriate to site soils, slopes, climate, sun, land use, air movement, ecological consistency, and plant interactions. Detail locations of stormwater treatment and hydrograph modification management BMPs on Stormwater Control Plan Drawings.	Maintain landscaping using minimum or no pesticides. Provide Integrated Pest Management information to new owners, lessees and operators. See applicable BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks www.babmphandbooks.com
Water features (fountains)	Where architectural water features are incorporated, plumb such features directly to the sanitary sewer system.	Inspect and maintain drains to prevent blockage and overflows.

Potential Source of Runoff Pollutants	Permanent Source Control BMP's	Operational Source Control BMP's
Roofing, gutters, and trim	Do not utilize roofing, gutter, or architectural trim materials made of copper or other unprotected metals that would leach into the storm water runoff.	
Plazas, sidewalks, and parking lots		Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.
Fire Sprinkler Test Water	Provide means to drain fire sprinkler test water to sanitary sewer system.	See note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Air Conditioning	Air conditioner condensation shall be directed to landscaped areas or plumbed to the sanitary sewer.	

V. FACILITIES MAINTENANCE REQUIREMENTS

A. Ownership and Responsibility for Maintenance in Perpetuity

As part of the C.3 stormwater requirements municipalities must verify stormwater treatment and flow-control facilities function and our maintained as intended by their design. Facilities on site will be maintained and the responsibility in their entirety of the Home Owner's Association (HOA).

The owner will prepare and provide a Storm Water Control Operation and Maintenance (O&M) Plan for review of the City of Antioch, Public Works Department, and record an Operation and Maintenance Agreement, including any necessary rights-of-entry, prior to issuance of a building permit.

B. Summary of Maintenance Requirements

Bioretention facilities require routine maintenance to prevent a loss in the rate of infiltration, insure unobstructed flow, prevent erosion, and keep plants healthy and the engineered soil biologically active. Typical maintenance requirements of bioretention facilities will include:

- Inspection of inlets for channels, exposure of soils, and other evidence of erosion.
- Replenishment of all erosion control measures necessary.
- Inspect outlets to ensure that planter has not clogged or that excessive erosion has not inhibited flow.
- Inspection of facility side slopes for evidence of erosion.
- Observe percolation in treatment areas to verify design percolation rates are met (i.e., whether a 48 hour percolation window is exceeded).
- Till or replace engineered soil in treatment areas where design percolation rates are not met.
- Examine all vegetation to insure it is healthy and dense enough to provide filtering. Replenish mulch as necessary, remove fallen leaves and debris and prune large shrubs and trees. Replace dead plants and remove noxious and invasive vegetation.
- Confirm irrigation is adequate but not excessive.
- Remove any invasive plans that might be present.

- Abate any potential vectors by insuring there are no areas where water stands longer than 48 hours following a storm. If mosquito larvae are present and persistent, contact the Contra Costa Mosquito and Vector Control District for information and advice. Mosquito larvicides shall be applied only when absolutely necessary and then, only by a licensed individual or contractor.

VI. CONSTRUCTION PLAN C.3 CHECKLIST

Stormwater Control Plan Page No.	BMP Description	Construction Documents Sheet #
Section III, Page 7-8	IMP 1 – Collects DMA 1 11,806 *SF* *Bioretention Facility*	
Section III, Page 7-8	IMP 2 – Collects DMA 2 *14,546 SF* *Bioretention Facility*	
Section IV, Page 9-11	Project complies with complete list of Source control measures outlined in the SWCP.	
Section II, Page 5	Final drainage plan conforms to the delineation of drainage areas in the SWCP, i.e. drainage from impervious areas, including building roofs, is routed to bioretention areas, as shown in the SWCP.	

VII. CERTIFICATION

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan meet the requirements of Regional Water Quality Control Board Order R2-2009-0074 and subsequent amendments.

Justin R. DeKnoblough, P.E.
RCE# 79604 Expires 09/30/2014

Date

Appendix A

Sizing Calculations

DRAINAGE MANAGEMENT AREA 2

BIORETENTION FOOTPRINT OPTIMIZATION SPREADSHEET - PRELIMINARY CALCULATIONS

Drainage Management Area:	562,809	sf	12.92 ac
Impervious Percentage:	0.61	decimal	
Pervious Percentage:	0.39	decimal	
Rainfall Intensity:	0.2	in/hr	
MAP:	14.4	in	
Proposed Treatment Area:	14,546	sf	

Calculations:

1 Composite Runoff Coefficient

Impervious:	342,751	sf	7.87 ac
Pervious:	22,006	sf	0.51 ac
Composite C:	0.65		

2 Rainfall Amount

Rainfall Depth:	0.36	in
Adjust for MAP:	0.36	in
Total Rainfall during Treatment Storm:	0.56	in
Rainfall Duration:	2.80	hr

3 Volume

Storm Volume:	17,022	cf

4 Treatment Measure Sizing

Treated Storm Volume w/out Storage:	16,970	cf
Storage Volume Required:	52	cf
Storage Volume Provided:	TBD	cf
Drawdown Time:	3	hrs

DRAINAGE MANAGEMENT AREA 1

BIORETENTION FOOTPRINT OPTIMIZATION SPREADSHEET - PRELIMINARY CALCULATIONS

Drainage Management Area:	277,523	sf	6.37 ac
Impervious Percentage:	0.62	decimal	
Pervious Percentage:	0.38	decimal	
Rainfall Intensity:	0.2	in/hr	
MAP:	13.3	in	
Proposed Treatment Area:	11,806	sf	

Calculations:

1 Composite Runoff Coefficient

Impervious:	172,064	sf	3.95 ac
Pervious:	10,546	sf	0.24 ac
Composite C:	0.66		

2 Rainfall Amount

Rainfall Depth:	0.37	in
Adjust for MAP:	0.34	in
Total Rainfall during Treatment Storm:	0.52	in
Rainfall Duration:	2.59	hr

3 Volume

Storm Volume:	7,871	cf

4 Treatment Measure Sizing

Treated Storm Volume w/out Storage:	12,722	cf
Storage Volume Required:	0	cf
Storage Volume Provided:	5,903	cf
Drawdown Time:	3	hrs

Appendix B

NRCS Soil Survey Data

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Contra Costa County, California



June 20, 2014

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Contra Costa County, California
Survey Area Data: Version 9, Nov 25, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 12, 2010—Nov 15, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Contra Costa County, California (CA013)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
CaA	Capay clay, 0 to 2 percent slopes	8.3	40.4%
RbA	Rincon clay loam, 0 to 2 percent slopes	12.3	59.6%
Totals for Area of Interest		**20.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Erosion

This folder contains a collection of tabular reports that present soil erosion factors and groupings. The reports (tables) include all selected map units and components for each map unit. Soil erosion factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

RUSLE2 Related Attributes

This report summarizes those soil attributes used by the Revised Universal Soil Loss Equation Version 2 (RUSLE2) for the map units in the selected area. The report includes the map unit symbol, the component name, and the percent of the component in the map unit. Soil property data for each map unit component include the hydrologic soil group, erosion factors Kf for the surface horizon, erosion factor T, and the representative percentage of sand, silt, and clay in the surface horizon.

Report—RUSLE2 Related Attributes

RUSLE2 Related Attributes–Contra Costa County, California								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
CaA—Capay clay, 0 to 2 percent slopes								
Capay	85	—	C	.24	5	28.1	29.4	42.5
RbA—Rincon clay loam, 0 to 2 percent slopes								
Rincon	85	—	C	.32	5	35.4	33.6	31.0

Appendix C

Bioretention Facility Detail

Bioretention Facilities



Bioretention facilities can rectangular, linear, or nearly any shape.
Photo by Scott Wikstrom

Bioretention detains runoff in a surface reservoir, filters it through plant roots and a biologically active soil mix, and then infiltrates it into the ground. Where native soils are less permeable, an underdrain conveys treated runoff that does not infiltrate to a storm drain or to surface drainage.

Bioretention facilities can be configured as in-ground or above-ground planter boxes, with the bottom open to allow infiltration to native soils underneath. *If infiltration cannot be allowed, use the sizing factors and criteria for the Flow-Through Planter.*

Best Uses

- Commercial areas
- Residential subdivisions
- Industrial developments
- Roadways
- Parking lots
- Fit in setbacks, medians, and other landscaped areas

Advantages

- Can be any shape
- Low maintenance
- Can be landscaped

Limitations

- Require 4%-15% of tributary impervious square footage
- Typically require 3-4 feet of head
- Irrigation may be required

► CRITERIA

For development projects subject only to runoff treatment requirements, the following criteria apply:

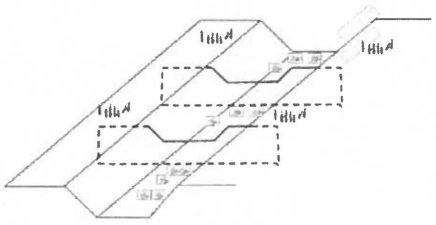
Parameter	Criterion
Soil mix depth	18 inches minimum
Soil mix requirements	See Appendix B
Soil mix surface area	0.04 times tributary impervious area (or equivalent)
Surface reservoir depth	6 inches minimum; may be sloped to 4 inches adjacent to walkways.
Underdrain	Perforated pipe (PVC SDR 35 or approved equivalent) embedded in gravel ("Class 2 permeable" recommended), connected to storm drain or other accepted discharge point. Include a cleanout.

CONTRA COSTA
CLEAN WATER
PROGRAM

Stormwater C.3 Guidebook

www.cccleanwater.org

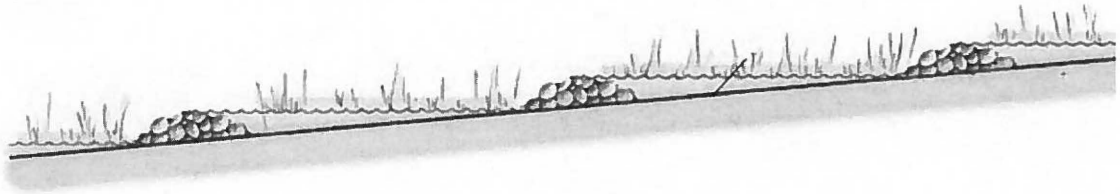
Where flow-control requirements also apply, the bioretention facility must be designed to meet the minimum surface area (A), surface volume (V_1), and subsurface volume (V_2) using the sizing factors and equations in Tables 4-8 and 4-9.



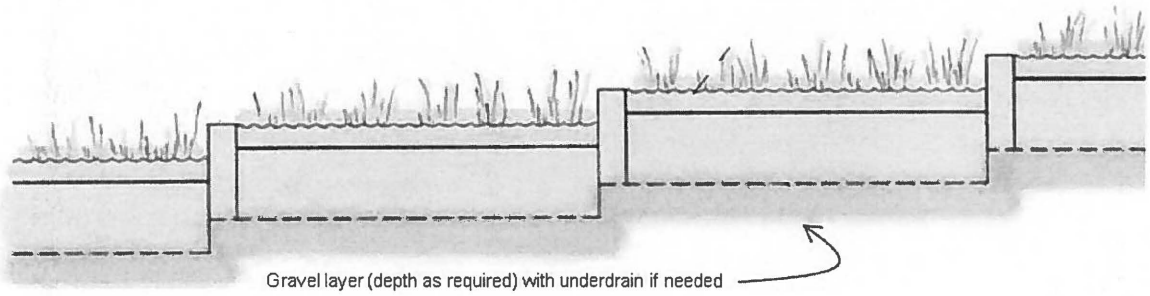
Key check dams into bottom and side slopes.

► DETAILS

Plan and Profile. On the surface, a bioretention facility should be one level, shallow basin—or a series of basins. As runoff enters each basin, it should flood and fill throughout before runoff overflows to the outlet or to the next downstream basin. This will help prevent movement of surface mulch and soil mix.



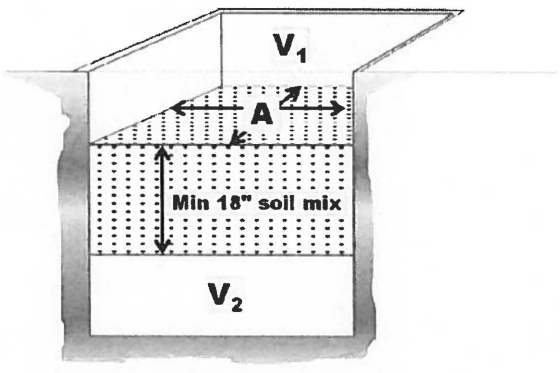
Swale with check dams. Provides limited storage; not suitable for slopes 6% and greater.



Planter on slope provides more storage. Check dams should be keyed into planter sides. (USEPA 2009b)

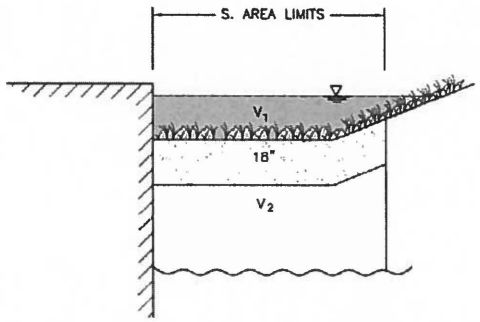
In a linear swale, check dams should be placed for every 4 to 6 inches of elevation change and so that the lip of each dam is at least as high as the toe of the next upstream dam. A similar principle applies to bioretention facilities built as terraced roadway shoulders.

Minimum Surface Volume. For a treatment-and-flow-control facility, the sizing factor V_1 is equivalent to the sizing factor A flooded to a 12" depth (10" overflow plus 2" freeboard). Surrounding the facility with a 12" vertical wall minimizes the required surface area as shown in (a). However, alternatives include:

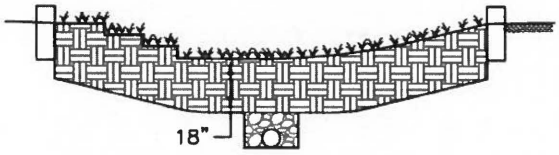


(a) A, V_1 and V_2

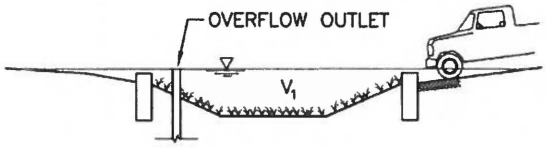
- Increasing the facility area and reducing the surface depth accordingly.
- Sloping the soil mix surface to be deeper than 12" at the middle, but less deep at the edges, so the average 12" depth is achieved (works best on larger facilities).
- Sloping or stepping back the wall as shown in (b) and (c) (requires additional area).
- Allowing shallow flooding on a portion of adjacent landscape or paving when the facility is at peak capacity as shown in (d) (rare and relatively brief events).



(b) Sloped side wall



(c) Stepped back side wall

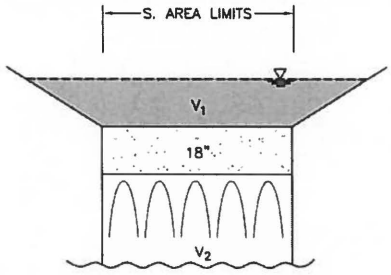


(d) allowing occasional flooding of adjacent landscaping and pavement.

Soil mix. The required soil mix is similar to a loamy sand. It must maintain a minimum percolation rate of 5" per hour throughout the life of the facility, and it must be suitable for maintaining plant life with a minimum of fertilizer use. See Appendix B and check with local staff for further guidance.

Storage and drainage layer. "Class 2 permeable," Caltrans specification 68-1.025, is preferred. Open-graded crushed rock, washed, may be used, but requires 4"-6" washed pea gravel be substituted at the top of the crushed rock layer. **Do not use filter fabric** to separate the soil mix from the gravel drainage layer or the gravel drainage layer from the native soil.

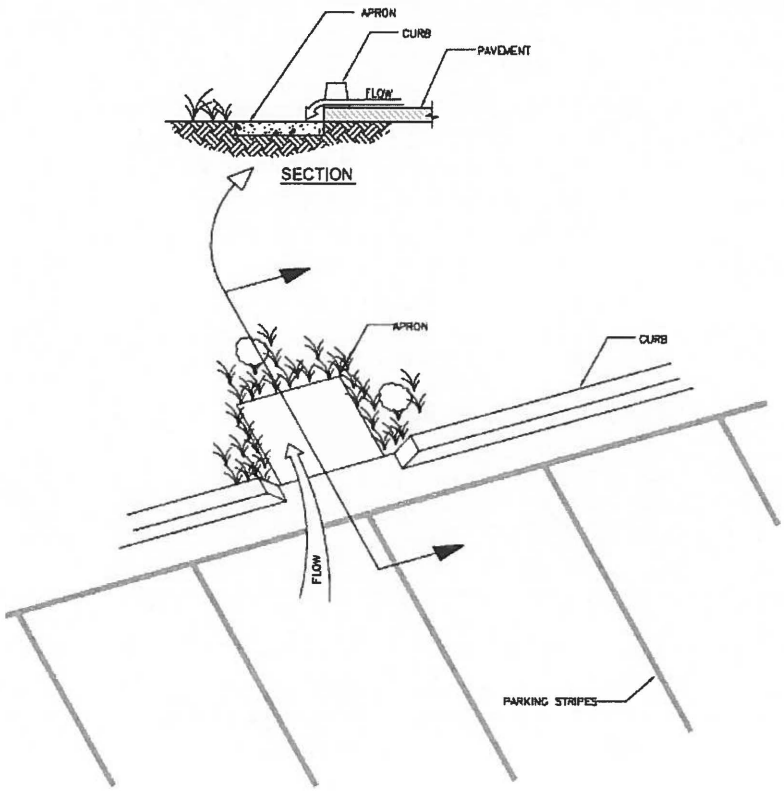
Minimum subsurface volume. No minimum sub-surface volume is required for treatment-only facilities. The gravel layer must be extensive enough and deep enough to ensure the soil mix is well-drained. For treatment-and-flow-control facilities where the native soils are Hydrologic Soil Group C or D, the minimum subsurface volume V_2 specified in Table 4-8 is equivalent to the minimum area times a 30" deep layer of gravel **of 40% porosity** (V_2 is the void space, not the entire volume of gravel.) Note that if the facility area is increased, the required depth is correspondingly decreased. If desired, voids created by buried structures such as pipes or arches may be substituted, as long as the voids are hydraulically interconnected and the minimum subsurface volume calculated by Equation 4-5 is achieved.



Buried pipes or arches may be used to achieve the required subsurface volume V_2

Inlets. Paved areas draining to the facility should be graded, and inlets should be placed, so that runoff remains as sheet flow or as dispersed as possible. Curb cuts should be wide (12" is recommended) to avoid clogging with leaves or debris. Allow for a minimum reveal of 4"-6" between the inlet and soil mix elevations to ensure turf or mulch buildup does not block the inlet. In addition, place an apron of stone or concrete, a foot square or larger, inside each inlet to prevent vegetation from growing up and blocking the inlet.

Where runoff is collected in pipes or gutters and conveyed to the facility, protect the landscaping from high-velocity flows with energy-dissipating rocks. In larger installations, provide cobble-lined channels to better distribute flows throughout the facility.



Recommended design details for bioretention facility inlets (see text).

"Bubble ups" can be used to dissipate energy when runoff is piped from roofs and upgradient paved areas.

Underdrains. Perforated pipe must be bedded **near the top of the gravel layer** and must terminate at a storm drain or other approved discharge point. Underdrains must be constructed of rigid pipe (SDR 35 or equivalent, holes facing down) and provided with a cleanout. In locations where native soils beneath the facility are Hydrologic Soil Group A or B, underdrains are optional but municipal reviewers may require them as a preventative against poor drainage.

Flow-control orifice. For treatment-and-flow-control facilities, the underdrain must be routed through a device designed to limit flows to that specified in Equation 4-10 or 4-11 (page 52). Details of combined outlet-and-underdrain facilities are shown on page 76.

Overflow outlets. In treatment-only facilities, overflow outlets must be set high enough to ensure the surface reservoir fills and the entire surface area of soil mix is flooded before the outlet elevation is reached. In swales, this can be achieved with appropriately placed check dams.

In treatment-and-flow-control facilities, the outlet elevation must be set to achieve the minimum surface storage volume calculated using Equation 4-3 and the V_1 sizing factor.

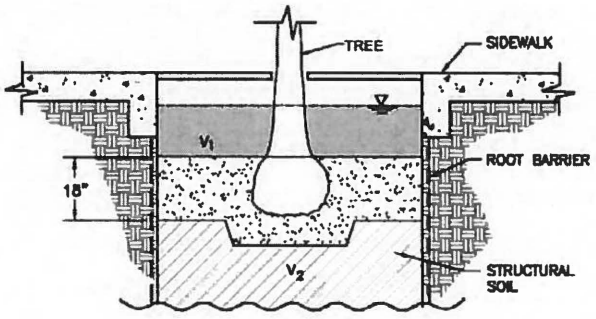
The outlet should be designed to exclude floating mulch and debris.

Vaults, utility boxes and light standards. It is best to locate utilities outside the bioretention facility—in adjacent walkways or in a separate area set aside for this purpose. If utility structures are to be placed within the facility, the locations should be anticipated and adjustments made to ensure the minimum bioretention surface area and volumes are achieved. Leaving the final locations to each individual utility can produce a haphazard, unaesthetic appearance and make the bioretention facility more difficult to maintain.

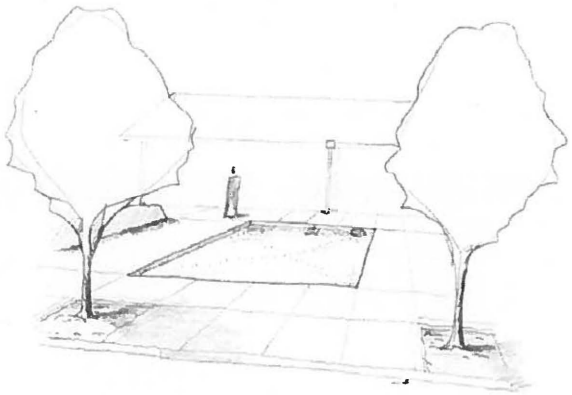
Emergency overflow. The site grading plan should anticipate extreme events and potential clogging of the overflow and route emergency overflows safely.

Trees. Bioretention areas can accommodate small or large trees within the minimum areas and volumes calculated by Equation 4-5. Tree canopies intercept rain, and extensive tree roots maintain soil permeability and help retain runoff. Normal maintenance of a bioretention facility should not affect tree lifespan.

The bioretention facility can be integrated with a tree pit of the required depth and filled with structural soil. If a root barrier is used, it can be located to allow tree roots to spread throughout the bioretention facility while protecting adjacent pavement. Locations and planting elevations should be selected to avoid blocking the facility's inlets and outlets as trees mature.



Bioretention facility configured as a tree well. The root barrier is optional.



Bioretention facility configured as a recessed decorative lawn with hardscaped edge.

► APPLICATIONS

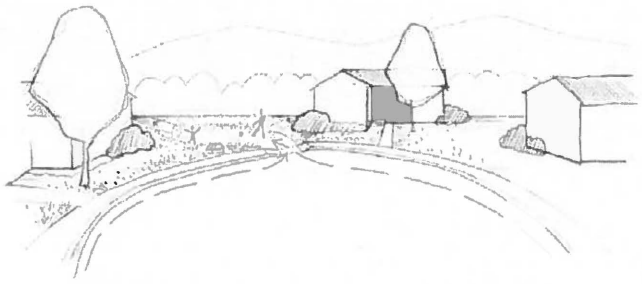
Multi-purpose landscaped areas. Bioretention facilities are easily adapted to serve multiple purposes. The loamy sand soil mix will support turf or a plant palette suitable to the location and a well-drained soil. See Appendix B for additional guidance on soil, plant selection, and irrigation.

Example landscape treatments:

- Lawn with sloped transition to adjacent landscaping.

- Swale in setback area
- Swale in parking median
- Lawn with hardscaped edge treatment
- Decorative garden with formal or informal plantings
- Traffic island with low-maintenance landscaping
- Raised planter with seating
- Bioretention on a terraced slope

Residential subdivisions. In the design of many subdivisions, it has proven easiest and most effective to drain roofs and driveways to the streets (in the conventional manner) and then drain the streets to bioretention areas, with one bioretention area for each 1 to 6 lots, depending on subdivision layout and topography.



Bioretention facility configured and planted as a lawn/ play area.

Bioretention areas can be placed on one or more separate, dedicated parcels with joint ownership.

Sloped sites. Bioretention facilities must be constructed as a basin or series of basins, with the circumference of each basin level. It may be necessary to add curbs or low retaining walls during final grading if elevations have not been determined with sufficient precision during design.

Design Checklist for Bioretention

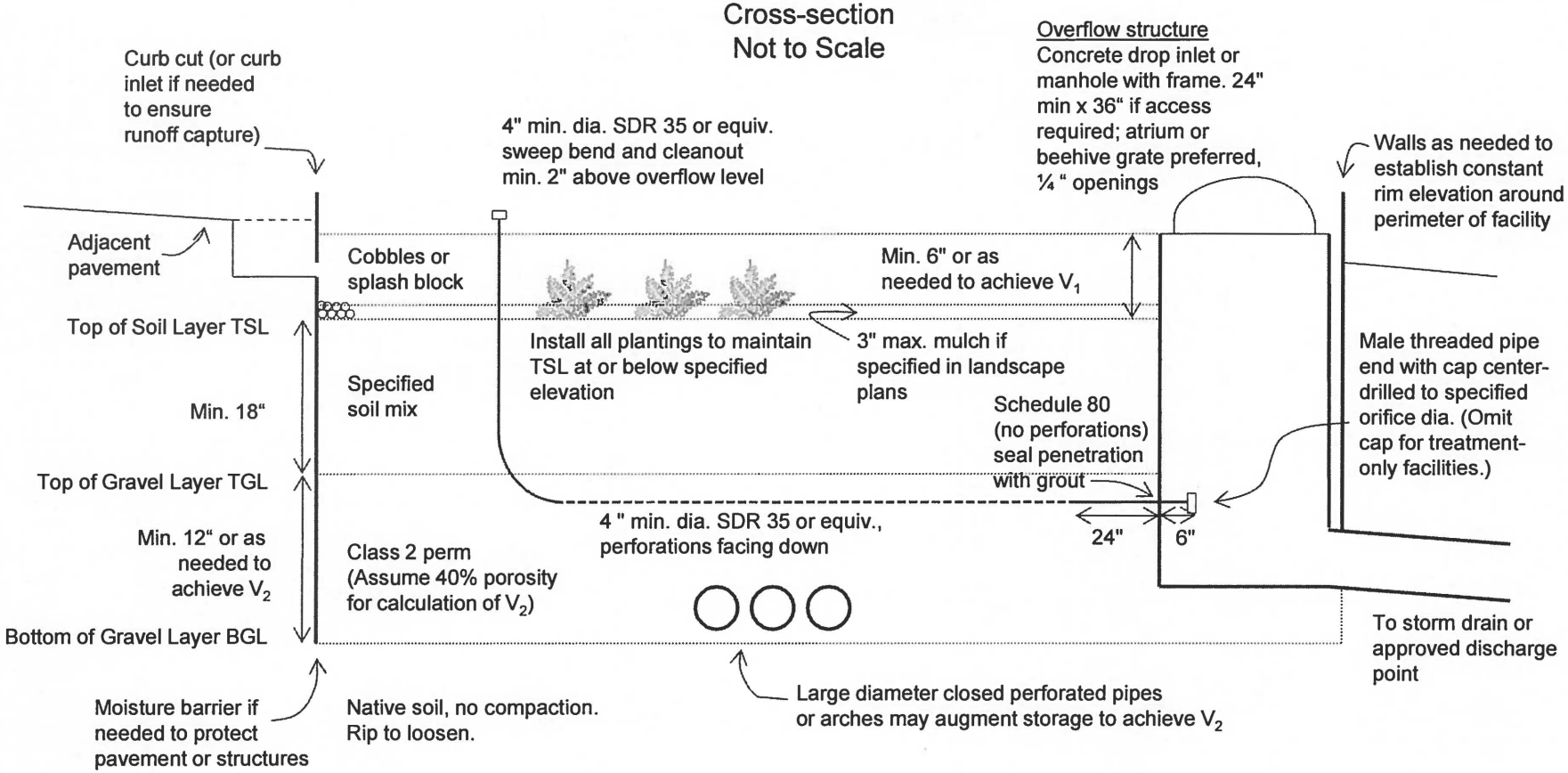
- ❒ Volume or depth of surface reservoir meets or exceeds minimum.
- ❒ 18" depth "loamy sand" soil mix with minimum long-term percolation rate of 5"/hour. See Appendix B.
- ❒ Area of soil mix meets or exceeds minimum.
- ❒ Perforated pipe (PVC SDR 35 or approved equivalent) underdrain bedded **near the top** of the "Class 2 perm" layer with holes facing downward. Connection and sufficient head to storm drain or approved discharge point (except in "A" or "B" soils).
- ❒ No filter fabric.
- ❒ Underdrain has a clean-out port consisting of a vertical, rigid, non-perforated PVC pipe, with a minimum diameter of 4 inches and a watertight cap.
- ❒ Location and footprint of facility are shown on site plan, landscaping plan, and grading plan.
- ❒ Bioretention area is designed as a basin (level edges) or a series of basins, and grading plan is consistent with these elevations. If facility is designed as a swale, check dams are set so the lip or weir of each dam is at least as high as the toe of the next upstream dam.
- ❒ Curb inlets are 12" wide, have 4"-6" reveal and an apron or other provision to prevent blockage when vegetation grows in, and energy dissipation as needed.
- ❒ Overflow connected to a downstream storm drain or approved discharge point.
- ❒ Emergency spillage will be safely conveyed overland.
- ❒ Plantings are suitable to the climate, exposure, and a well-drained soil, and occasional inundation during large storm events.
- ❒ Irrigation system with connection to water supply, on a separate zone.
- ❒ Vaults, utility boxes, and light standards are located outside the minimum soil mix surface area.
- ❒ When excavating, avoid smearing of the soils on bottom and side slopes. Minimize compaction of native soils and "rip" soils if clayey and/or compacted. Protect the area from construction site runoff.

For treatment-and-flow-control facilities only

- ❒ Volume of subsurface storage meets or exceeds minimum.
- ❒ In "C" and "D" native soils, underdrain is connected to discharge through an appropriately sized orifice or other flow-limiting device.

Bioretention Facility

Cross-section
Not to Scale

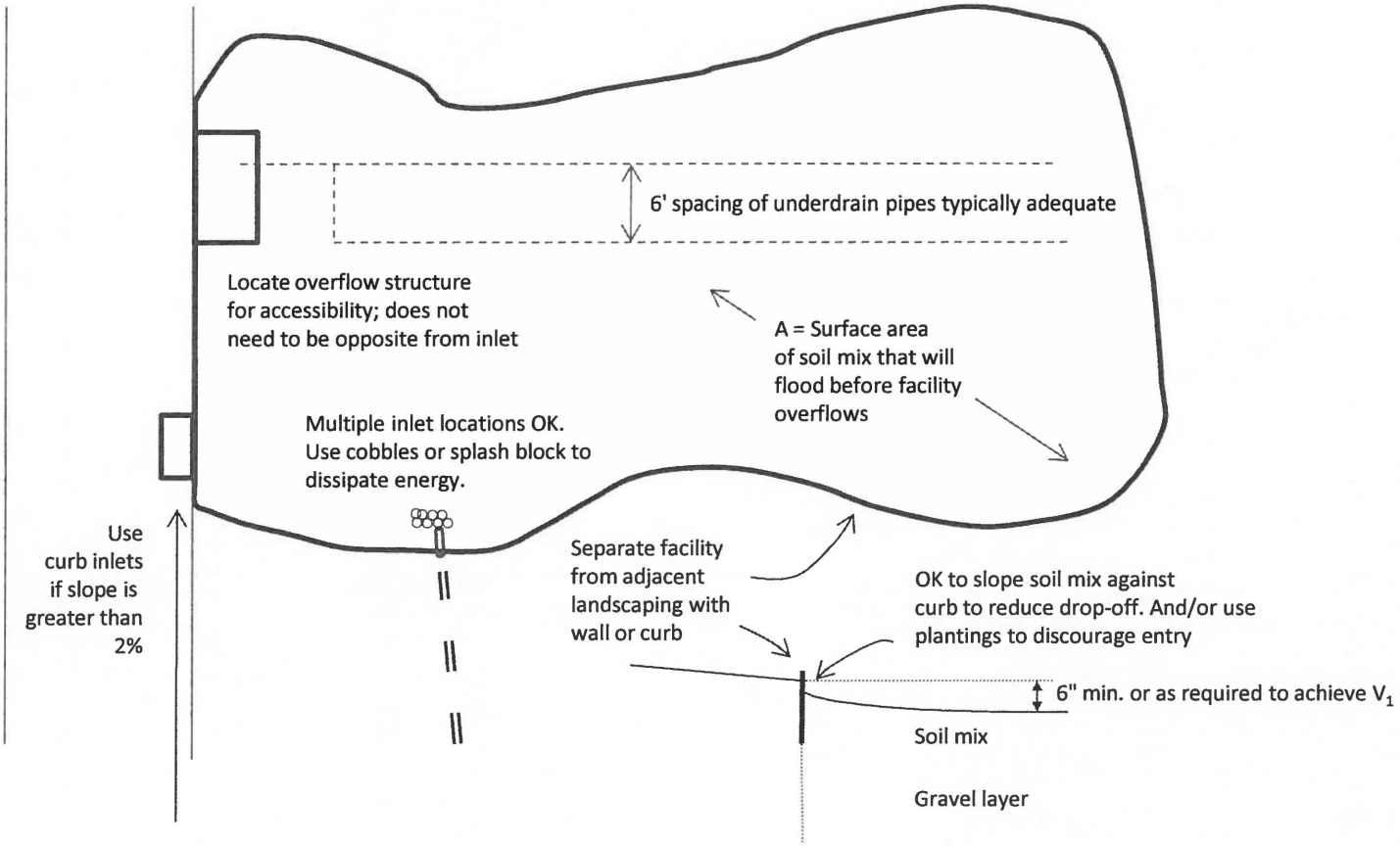


Notes:

- No liner, no filter fabric, no landscape cloth.
- Maintain BGL. TGL, TSL throughout facility area at elevations to be specified in plan.
- Class 2 perm layer may extend below and underneath drop inlet.
- Elevation of perforated pipe underdrain is near top of gravel layer, except when zero infiltration is expected.
- See Appendix B for soil mix specification, planting and irrigation guidance.
- See Chapter 4 for factors and equations used to calculate V_1, V_2, and orifice diameter.

Bioretention Facility

Plan (Not to Scale)



Note: Call out elevations of curb, pavement, inlet, top of soil layer (TSL), bottom of soil layer (BSL), and bottom of gravel layer (BGL) at all inlets and outlets and at key points along edge of facility.

Appendix D

Stormwater Control Plan Checklist

STORMWATER CONTROL PLAN CHECKLIST

The following checklist is adapted from the Stormwater C.3 Guidebook which contains a detailed description and instructions for preparing a Stormwater Control Plan. The Guidebook is available online at http://cccleanwater.org/construction/nd.php or it may be purchased from the City of Antioch. ***A Stormwater Control Plan is required for projects that are creating more than 10,000 square feet of impervious surface.***

CONTENTS OF PLAN:

Show on scaled (1"= 20', 40', 50' or 100') drawings:

- ☑ Existing natural hydrologic features (depressions, watercourses, relatively undisturbed areas) and significant natural resources.
- ☐ Soil types and depth to groundwater (if infiltration is proposed). INFILTRATION IS NOT PROPOSED.
- ☑ Existing and proposed site drainage network and connections to drainage off-site.
- ☑ Proposed design features and surface treatments used to minimize imperviousness.
- ☑ Separate drainage areas, depending on complexity of drainage network.
- ☑ Existing condition of each drainage area, including pervious and impervious areas.
- ☑ For each drainage area, types of impervious area (roof, plaza/sidewalk, and streets/parking) and area of each.
- ☑ Proposed locations and approximate sizes of infiltration, treatment, or hydrograph modification BMPs.
- ☑ Pollutant source areas, including loading docks, food service areas, refuse areas, outdoor processes and storage, vehicle cleaning, repair or maintenance, fuel dispensing, equipment washing, etc., and corresponding required source controls from Appendix E of Stormwater C.3 Guidebook.

CONTENTS OF REPORT:

A report accompanying the drawings should include:

- ☑ Narrative analysis or description of site features and conditions that constrain or provide opportunities for stormwater control.
- ☑ Narrative description of site design characteristics that protect natural resources.

Exhibits

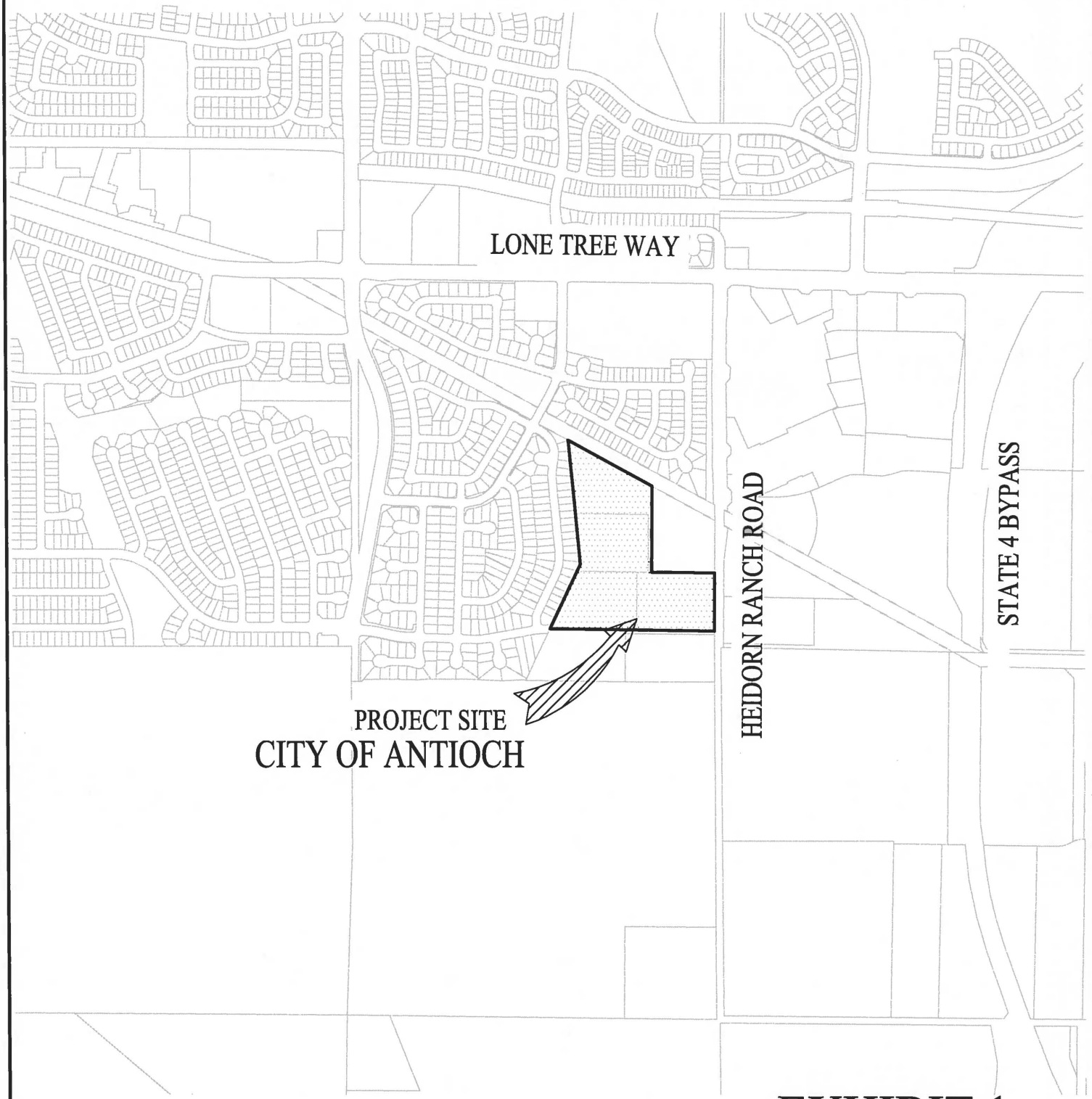


EXHIBIT 1

VICINITY MAP

Carlson, Barbee & Gibson, Inc.
CIVIL ENGINEERS • SURVEYORS • PLANNERS
2633 CAMINO RAMON, SUITE 350
SAN RAMON, CALIFORNIA 94583
(925) 866-0322
www.cbandg.com

6/24/2014 12:07 PM

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EXHIBIT 2

EXISTING CONDITION

cbg
Carlson, Barbee & Gibson, Inc.
CIVIL ENGINEERS • SURVEYORS • PLANNERS
2633 CAMINO RAMON, SUITE 350
SAN RAMON, CALIFORNIA 94583
(925) 866-0322

6/24/2014 11:53 AM

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C.3 SUMMARY TABLE

DMA 1		DMA 2	
ROAD	57,319 SF	ROAD	128,172 SF
ROOF	85,700 SF	ROOF	159,100 SF
CONCRETE	27,742 SF	CONCRETE	56,153 SF
LANDSCAPING	106,762 SF	LANDSCAPING	219,384 SF
TOTAL	277,523 SF	TOTAL	562,809 SF
PROPOSED TREATMENT MEASURE	AREA	PROPOSED TREATMENT MEASURE	AREA
BIORETENTION AREA	11,806 SF	BIORETENTION AREA	14,546 SF

MEADOW CREEK VILLAGE UNIT 5
SUBDIVISION NO. 7897
464 M 49

MEADOW CREEK VILLAGE UNIT 3
SUBDIVISION NO. 7967
435 M 48

FUTURE QUAIL COVE
SUBDIVISION NO. 7938

EAST BAY MUNICIPAL UTILITY DISTRICT

MAZANT LOOP

ALVAR LOOP

GALLIER LOOP

DALPHINE STREET

PREWETT RANCH DRIVE

COLCHICO DRIVE

HEIDORN RANCH ROAD

PARCEL A

PARCEL B

PARCEL C

PARCEL D

PARCEL E

PARCEL F

PARCEL G

PARCEL H

PARCEL I

PARCEL J

IMP 1

IMP 2

DMA 1

DMA 2

LEGEND

- PROPOSED STORM DRAIN
- IMP 1 — INTEGRATED MANAGEMENT PRACTICE - BIORETENTION AREA
- DRAINAGE MANAGEMENT AREA BOUNDARY
- DMA 1 — DRAINAGE MANAGEMENT AREA DRAINING TO BIO-RETENTION AREA OR FILTERRA BIORETENTION UNIT

STORM WATER CONTROL PLAN

HEIDORN VILLAGE

CITY OF ANTIOCH CONTRACOSTA COUNTY CALIFORNIA

0' 60' 180' 240'

SCALE: 1" = 60'

DATE: JULY 7, 2014

Carlson, Barbee & Gibson, Inc.
CIVIL ENGINEERS • SURVEYORS • PLANNERS
2633 CAMINO RAMON, SUITE 350
SAN RAMON, CALIFORNIA 94583
(925) 866-0322
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Appendix F: Noise Assessment

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HEIDORN VILLAGE RESIDENTIAL PROJECT ENVIRONMENTAL NOISE ASSESSMENT ANTIOCH, CALIFORNIA

October 5, 2014

♦ ♦ ♦

Prepared for:

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Job No.: 14-128

INTRODUCTION

This assessment evaluates the significance of noise and vibration impacts resulting from the Heidorn Village residential project proposed west of Heidorn Ranch Road in Antioch, California. The project proposes to construct 117 single-family residential units, park and open space areas, the extension of Prewett Ranch Road to Heidorn Ranch Road, and internal access roads. This report evaluates the project's potential to result in significant impacts with respect to applicable CEQA guidelines. The report is divided into two sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise, summarizes applicable regulatory criteria, and discusses the results of the ambient noise monitoring survey completed to document existing noise conditions; and 2) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents mitigation measures, where necessary, to provide a compatible project in relation to adjacent noise sources and land uses.

SETTING

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA).* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the *sound level meter*. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level* (*CNEL*) is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 p.m. - 10:00 p.m.) and a 10 dB addition to nocturnal (10:00 p.m. - 7:00 a.m.) noise levels. The *Day/Night Average Sound Level* (L_{dn} *or DNL*) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous vibration levels produce.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related groundborne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess groundborne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Studies have shown that the threshold of perception for average persons is in the range of 0.008 to 0.012 in/sec PPV. Human perception to vibration varies with the individual and

is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as minor cracking of building elements, or may threaten the integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher and there is no general consensus as to what amount of vibration may pose a threat for structural damage to the building. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 p.m. and 7:00 a.m.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 p.m.to 10:00 p.m. and after addition of 10 decibels to sound levels measured in the night between 10:00 p.m. and 7:00 a.m.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

TABLE 3 Reactions of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Virtually no risk of damage to normal buildings
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential dwellings such as plastered walls or ceilings
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to newer residential structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, September 2013.

REGULATORY BACKGROUND

The State of California, the City of Antioch, the City of Brentwood, and the US Department of Transportation Federal Transit Administration (FTA) have established plans and policies designed to limit noise exposure at noise sensitive land uses. These plans and policies are contained in the following documents: (1) the State of California Environmental Quality Act (CEQA) Guidelines, Appendix G, (2) the City of Antioch General Plan, and (3) the City of Antioch Zoning Ordinance, (4) the City of Brentwood General Plan, and (5) the construction vibration criteria established by the Federal Transit Authority (FTA). Regulations, plans, and policies presented within these documents form the basis of the significance criteria used to assess project impacts.

State CEQA Guidelines. The California Environmental Quality Act (CEQA) contains guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. Under CEQA, noise impacts would be considered significant if the project would result in:

(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 groundborne vibration or groundborne 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, if the project would expose people residing or working in the project area to excessive noise levels; or

(f) For a project within the vicinity of a private airstrip, if the project would expose people residing or working in the project area to excessive noise levels.

Of these guidelines, items (a), (b), (c), and (d) are applicable to the proposed project. Guidelines (e) and (f) are not applicable because the project is not located in the vicinity of a public or private airstrip.

Environmental Hazards Chapter of the General Plan. The Environmental Hazards Chapter of the City of Antioch General Plan sets forth noise and land use compatibility standards to guide development, and noise goals and policies to protect citizens from the harmful and annoying effects of excessive noise. Objectives and policies established in the Noise Element of the General Plan that are applicable to the proposed project include:

11.6.1 Noise Objective: Achieve and maintain exterior noise levels appropriate to planned land uses throughout Antioch as described below:

- Residential: Single-Family: 60 dBA CNEL within rear yards, Multi-Family: 60 dBA CNEL within exterior open space

11.6.2 Noise Policies:

Noise Compatible Land Use and Circulation Patterns

b. Maintain a pattern of land uses that separates noise-sensitive land uses from major noise sources to the extent possible, and guide noise-tolerant land uses into the noisier portions of the Planning Area.

Noise Analysis and Mitigation

d. When new development is proposed in areas exceeding the noise levels exceeding the noise levels identified in the General Plan Noise Objective, or where the development of proposed uses could result in a significant increase in noise, require a detailed noise attenuation study to be prepared by a qualified acoustical engineer to determine appropriate mitigation and ways to incorporate such mitigation into project design and implementation.

f. In reviewing noise impacts, utilize site design and architectural design features to the extent feasible to mitigate impacts on residential neighborhoods and other uses that are sensitive to noise.

g. Where feasible, require the use of noise barriers (walls, berms, or a combination thereof) to reduce significant noise impacts.
    - The barrier must have sufficient mass to reduce noise transmission and high enough to shield the receptor from the noise source.
    - To be effective, the barrier needs to be constructed without cracks or openings.
    - The barrier must interrupt the line-of-sight between the noise source and the receptor.
    - The effects of noise 'flanking' the noise barrier should be minimized by bending the end of the barrier back from the noise source.

h. Continue enforcement of California Noise Insulation Standards (Title 25, Section 1092, California Administration Code).

    The California Building Code (CBC) no longer includes noise insulation standards for residences. For compliance with the intent of this policy, the 2010 CBC noise insulation standards are used. The 2010 CBC established an interior noise level standard of 45 dBA CNEL/L_{dn} in any habitable room for new hotels, motels, dormitories, and apartment houses. This standard is generally also applied for single family dwellings.

Temporary Construction

i. Ensure that construction activities are regulated as to hours of operation in order to avoid or mitigate noise impacts on adjacent noise-sensitive land uses.

j. Require proposed development adjacent to occupied noise sensitive land uses to implement a construction-related noise mitigation plan. This plan would depict the location of construction equipment storage and maintenance areas, and document methods to be employed to minimize noise impacts on adjacent noise sensitive land uses.

k. Require that all construction equipment utilize noise reduction features (e.g., mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer.

m. Prior to the issuance of any grading plans, the City shall condition approval of subdivisions and non-residential development adjacent to any developed/occupied noise-sensitive land uses by requiring applicants to submit a construction-related noise mitigation plan to the City for review and approval. The plan should depict the location of construction equipment and how the noise from this equipment will be mitigated during construction of the project through the use of such methods as:
    - The construction contractor shall use temporary noise-attenuation fences, where feasible, to reduce construction noise impacts on adjacent noise sensitive land uses

- During all project site excavation and grading on-site, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.

- The construction contractor shall locate equipment staging in areas that will create the greatest distance between the construction-related noise sources and noise-sensitive receptors nearest the project site during project construction.

- The construction contractor shall limit all construction-related activities that would result in high noise levels to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday. No construction shall be allowed on Sundays and public holidays.

n. The construction-related noise mitigation plan required shall also specify that haul truck deliveries be subject to the same hours specified for construction equipment. Additionally, the plan shall denote any construction traffic haul routes where heavy trucks would exceed 100 daily trips (counting those both to and from the construction site). To the extent feasible, the plan shall denote haul routes that do not pass sensitive land uses or residential dwellings. Lastly, the construction-related noise mitigation plan shall incorporate any other restrictions imposed by the city.

City of Antioch Zoning Ordinance. The City of Antioch Zoning Ordinance specifies hours of construction operations. Construction activity is restricted to between the hours of 7:00 am and 6:00 pm on weekdays, 8:00 am and 5:00 pm on weekdays within 300 feet of occupied dwellings, and 9:00 am and 5:00 pm on weekends and holidays, irrespective of the distance from the occupied dwellings.

City of Brentwood's General Plan. The project is proposed within the City of Antioch, but the site borders the City of Brentwood. Single family residences in Brentwood border the site to the east, across Heidorn Ranch Road. The City of Brentwood's General Plan contains policies designed to support the City's two primary concerns: (1) preventing the introduction of new noise-producing uses in noise-sensitive areas; and (2) preventing the encroachment of noise-sensitive uses into existing noise-producing areas. The City has policies that protect new development from existing noise sources and to protect existing noise sensitive development from new transportation noise sources (such as roadway improvements), industrial noise sources, or increases in noise. Since the project is not proposed within Brentwood, only the policies concerning the protection of existing noise sensitive uses from increases in noise due to proposed uses would be applicable, as follows:

Policy N 1-1: Ensure the noise compatibility of existing and future development when making land use planning decisions.

Policy N 1-7: For projects that are required by the California Environmental Quality Act (CEQA) to analyze noise impacts, the following criteria shall be used to determine the significance of those impacts:

Transportation Noise Sources

- Where existing traffic noise levels are less than 60 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a +5 dB L_{dn} increase in roadway noise levels will be considered significant;
- Where existing traffic noise levels range between 60 and 65 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a +3 dB L_{dn} increase in roadway noise levels will be considered significant; and
- Where existing traffic noise levels are greater than 65 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a + 1.5 dB L_{dn} increase in roadway noise levels will be considered significant.

Since the project is in Antioch, where a CNEL criteria is used, these increases are applied as increases to the CNEL in this document.

Policy N 1-15: Require construction activities to comply with standard best practices (see Action N 1e).

Action N 1e: During the environmental review process, determine if proposed construction will constitute a significant impact on nearby residents and, if necessary, require mitigation measures in addition to the standard best practice controls. Suggested best practices for control of construction noise include:

1. Construction period shall be less than 12 months;
2. Noise-generating construction activities, including truck traffic coming to and from the construction site for any purpose, shall be limited to between the hours of 7:00 am and 6:00 pm on weekdays, and between 8:00 am and 5:00 pm on Saturdays. No construction shall occur on Sundays or City holidays;
3. All equipment driven by internal combustion engines shall be equipped with mufflers, which are in good condition and appropriate for the equipment;
4. The construction contractor shall utilize "quiet" models of air compressors and other stationary noise sources where technology exists;
5. At all times during project grading and construction, stationary noise generating equipment shall be located as far as practical from sensitive receptors and placed so that emitted noise is directed away from residences;
6. Unnecessary idling of internal combustion engines shall be prohibited;
7. Construction staging areas shall be established at locations that will create the greatest distance between the construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction activities, to the extent feasible;
8. The required construction-related noise mitigation plan shall also specify that haul truck deliveries are subject to the same hours specified for construction equipment;
9. Neighbors located adjacent to the construction site shall be notified of the construction schedule in writing; and
10. The construction contractor shall designate a "noise disturbance coordinator" who will be responsible for responding to any local complaints about construction noise. The disturbance coordinator shall be responsible for determining the cause of the noise complaint (e.g., starting too early, poor muffler, etc.) and instituting reasonable measures

as warranted to correct the problem. A telephone number for the disturbance coordinator shall be conspicuously posted at the construction site.

Construction Vibration Guidelines. The City of Antioch does not establish vibration thresholds applicable to the proposed project. The FTA establishes the following construction vibration damage criteria for various structural categories:

TABLE 4 Construction Vibration Damage Criteria

Building Category	PPV (in/sec)
I. Reinforced-concrete, steel or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Federal Transit Agency, Office of Planning and Environment, May 2006.

EXISTING NOISE ENVIRONMENT

The Heidorn Village residential project site is located in southeast Antioch, west of Heidorn Ranch Road and southeast of the existing terminus of Prewett Ranch Drive. Residential land uses, including large-lot rural residences and single-family subdivisions, surround the site in all directions. The Heritage Baptist Church and School borders the project site to the northeast.

A noise monitoring survey was conducted from March 31, 2009 to April 3, 2009 to quantify the existing noise environment at the site and in the project vicinity. An additional noise monitoring survey was conducted on September 26, 2014 to update the 2009 noise survey and to confirm that no major changes in land uses have occurred near the site since 2009 that could affect the results of the noise study.

The 2009 noise monitoring survey included one long-term noise measurement (LT-1), and two short-term measurements (ST-1, ST-2), as shown in Figure 1. For the 2014 noise measurement survey, short-term measurements were made at locations LT-1 and ST-2. The noise environment at the site results primarily from intermittent traffic along Heidorn Ranch Road.

Noise measurement location LT-1 was made approximately 40 feet from the center of Heidorn Ranch Road. Hourly average noise levels measured in 2009 at this site typically ranged from 51 to 56 dBA L_{eq} during the day, and from 41 to 50 dBA L_{eq} at night. The ten-minute average noise level measured at 1:50 pm on September 26, 2014 during was 47 dBA L_{eq}, which is in-line with the 2009 data. The calculated CNEL noise level at this location was 57 dBA. These data are summarized in Appendix 1.

Short-term noise measurement (ST-1) was made approximately 155 feet from the nearest residential land uses to the north and adjacent to the northwest corner of the Church property. The ten-minute average noise level during this time period was 47 dBA L_{eq}. An update to this measurement could not be completed during the 2014 site visit because of landscaping activities occurring north of the project site. Short-term noise measurement (ST-2) was conducted at the

end of Prewett Ranch Drive, just west of the site. The ten-minute average noise level during this time period was 46 dBA L_{eq} in 2009 and 44 dBA L_{eq} in 2014. Table 5 summarizes the results of these measurements.

TABLE 5 Summary of Short-Term Noise Measurement Data

Noise Measurement Location		**L_{max}**	**$L_{(1)}$**	**$L_{(10)}$**	**$L_{(50)}$**	**$L_{(90)}$**	**L_{eq}**	**CNEL**
LT-1: ~40 feet from center of Heidorn Ranch Drive (9/26/14, 13:50-14:00)		55	51	479	47	45	47	57
ST-1: ~155 feet from the nearest residential land uses. (3/31/2009, 13:50-14:00)		58	55	49	45	42	47	49
ST-2: End of Prewett Ranch Drive.	(4/3/2009, 13:20-13:30)	59	55	50	42	37	46	47
	(9/26/14, 13:30-13:40)	52	51	48	41	39	44	
Note: CNEL approximated by correlating data collected during the short-term monitoring interval to data collected during a corresponding period at the long-term site.								

Figure 1: Site Vicinity and Noise Measurement Locations



NOISE IMPACTS AND MITIGATION MEASURES

Significance Criteria

Paraphrasing from Appendix G of the CEQA Guidelines, a project would normally result in significant noise impacts if noise levels generated by the project conflict with adopted environmental standards or plans, if the project would generate excessive ground-borne vibration levels, or if ambient noise levels at sensitive receivers would be substantially increased over a permanent, temporary, or periodic basis. The following criteria were used to evaluate the significance of environmental noise resulting from the project:

- **Noise and Land Use Compatibility.** A significant noise impact would be identified if exterior noise levels are anticipated to exceed 60 dBA CNEL in backyards of proposed residences or if interior noise levels are anticipated to exceed 45 dBA CNEL inside residences.

- **Exposure to Excessive Groundborne Vibration.** A significant impact would be identified if the construction of the project would expose persons to excessive vibration levels. Groundborne vibration levels exceeding 0.3 in/sec PPV (peak particle velocity) would have the potential to result in cosmetic damage to normal buildings.

- **Substantial Permanent Noise Increase.** According to CEQA, a significant noise impact would result if noise levels increase substantially over a permanent basis at existing noise-sensitive land uses (e.g., residences) as a result of the project. Neither CEQA, nor the City of Antioch defines a 'significant noise increase'. However, there are adjacent noise-sensitive uses located east of the project site across Heidorn Ranch Road, which are within the City of Brentwood. The City of Brentwood does define a 'significant noise increase'. As a result, the City of Brentwood's policy is applied to this entire analysis, with as substantial increase being defined in terms of CNEL, rather than L_{dn}.

  The impact would be considered significant if traffic or commercial operating noise sources generated by the project would substantially increase noise levels at sensitive receivers in the vicinity. A substantial increase would occur if project operations would:
  - Where existing traffic noise levels are less than 60 dB CNEL at the outdoor activity areas of noise-sensitive uses, a +5 dB L_{dn} increase in roadway noise levels will be considered significant;
  - Where existing traffic noise levels range between 60 and 65 dB CNEL at the outdoor activity areas of noise-sensitive uses, a +3 dB L_{dn} increase in roadway noise levels will be considered significant; and
  - Where existing traffic noise levels are greater than 65 dB CNEL at the outdoor activity areas of noise-sensitive uses, a + 1.5 dB L_{dn} increase in roadway noise levels will be considered significant.

- **Temporary Construction Noise.** A significant temporary noise impact would be identified if construction-related noise would generate hourly average noise levels exceeding 60 dBA $L_{eq,}$ and raise the ambient by at least 5 dBA L_{eq}, for a period of more than one year at adjacent residential land uses.

Impact 1: **Noise and Land Use Compatibility.** Future noise levels at the project site would meet the City of Antioch's exterior and interior noise and land use compatibility standards. **This is a less-than-significant impact.**

The project would include 117 residential lots, park and open space areas, the extension of Prewett Ranch Road to Heidorn Ranch Road, and internal access roads. Project residences are proposed at a distance of about 175 feet from the center of Heidorn Ranch Road and about 40 feet from the center of the proposed extension of Prewett Ranch Drive. Park and open space areas are proposed adjacent to Heidorn Ranch Road and also on the interior of the site.

The future noise environment at the project site is anticipated to increase as a result of cumulative growth forecast under the current General Plan and also through the extension of Prewett Ranch Road. Long term (2030) + Project traffic volumes were used to assess the compatibility of the proposed residential project with respect to the noise environment expected at the site. Long term (2030) + Project traffic noise levels were modeled in the Federal Highway

Administration's (FHWA's) Traffic Noise Model (TNM) along both Heidorn Ranch Road and Prewett Ranch Road using traffic volumes supplied by Kimley Horn and posted travel speeds of 45 mph and 25 mph, respectively. Modeled traffic noise levels were calibrated based the noise monitoring survey.

Based on the traffic noise modeling, traffic noise levels are calculated to be about 53 dBA CNEL at the setback of homes along Heidorn Ranch Road and about 55 dBA CNEL at the setback of homes along Prewett Ranch Road. These noise levels would meet the exterior noise and land use compatibility standard presented in the City of Antioch's General Plan. In buildings of typical residential construction, interior noise levels are approximately 15 dBA lower than exterior noise levels with the windows partially open and 20 to 25 dBA lower than exterior noise levels with the windows closed. As a result, interior noise levels would be expected to meet the 45 dBA CNEL interior standard with standard construction and windows in the open or shut position.

At the park or open space area proposed adjacent to Heidorn Ranch Road, Long term (2030) + Project traffic noise levels are anticipated to exceed 60 dBA CNEL within about 60 feet of the center of the roadway. Approximately two-thirds of this open space area is located beyond 60 feet from the center of Heidorn Ranch Road and would meet the 60 dBA CNEL criteria. In addition, all project residents would have private yard areas and access to park and open space areas located within the interior of the site plan that meet the 60 dBA CNEL criteria. This is a less-than-significant impact.

Mitigation Measure 1: None required.

Impact 2: Exposure to Excessive Groundborne Vibration. Construction-related vibration would not be excessive at nearby residential land uses. **This is a less-than-significant impact.**

The construction of the project may generate perceptible vibration when heavy equipment or impact tools (e.g. jackhammers, hoe rams, etc.) are used in areas adjacent to developed properties. Construction activities would include excavation, grading, site preparation work, foundation work, and new building framing and finishing. The proposed project would not require pile driving, which can cause excessive vibration.

The FTA and California Department of Transportation use a vibration limit of 0.3 in/sec, PPV for buildings that are found to be structurally sound and designed to modern engineering standards. No sensitive historic structures or buildings that are documented to be structurally weakened adjoin the project site. Therefore, groundborne vibration levels exceeding 0.3 in/sec, PPV would have the potential to result in a significant vibration impact. Table 6 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet.

Project construction activities, such as drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.) may generate substantial vibration in the immediate vicinity of the work area. Jackhammers typically generate vibration levels of 0.035 in/sec, PPV, and drilling typically generates vibration

levels of 0.09 in/sec, PPV at a distance of 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used.

TABLE 6 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	Approximate L_v at 25 ft. (VdB)
Pile Driver (Impact)	upper range	1.158	112
	typical	0.644	104
Pile Driver (Sonic)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, May 2006.

Residential structures adjoining the site are located about 25 feet west of the site and more than 100 feet north of the site. At residences to the west, vibration levels would be expected to be 0.2 in/sec, PPV, or less when vibration generating operations are located adjacent to these residences. For the residences to the north, vibration levels would be expected to be 0.05 in/sec, PPV, or less. These levels are below the significance threshold. Vibration generated by construction activities near the common property line to the west could at times be perceptible at adjacent residences. However, vibration generating activities would only occur in these areas for short periods of time and would not be expected to result in "architectural" damage to the buildings. This is a less-than-significant impact.

Mitigation Measure 2: None required.

Impact 3: Project-Generated Traffic Noise. The proposed project would not result in a substantial permanent noise level increase at nose sensitive land uses in the vicinity. **This is a less-than-significant impact.**

The project site is currently vacant, and therefore there are no on-site uses that generate audible noise. Potential noise-sensitive receptors in the project area include medium-density residential neighborhoods to the north and west of the project site; recreational users of the Mokelumne Trail to the north; the church/school to the northeast; and two large-lot rural residential homes to the east of the project site across Heidorn Ranch Road, located in the City of Brentwood.

The development of the Project will cause an increase in vehicular traffic on the street network. Increased vehicular traffic on the streets is the only source of operational noise that would substantially affect the noise environment in the vicinity of the project. An increase is considered to be substantial if the CNEL noise exposure level at a sensitive receiver increases by 3 dBA or more where exterior noise levels would exceed 60 dBA CNEL for residential uses or by 5 dBA or more where noise levels would remain at or below 60 dBA CNEL for residential uses. The noise exposure levels were evaluated at three existing and three future intersections in the vicinity of the project to determine whether or not the increased vehicular traffic would cause a substantial increase in the noise environment. Traffic noise along a street is logarithmically proportional to the volume of traffic.

Using traffic volumes developed for this study by Kimley Horn, noise levels along the roads in and around the project area were calculated to increase above Existing levels by 1 dBA CNEL or less as a result of project generated traffic (Existing + Project Condition) on Lone Tree Way, Prewett Ranch Drive, Hillcrest Avenue, Canada Valley Road, and Heidorn Ranch Road, north of Lone Tree Way and south of the project's northern project entrance. These increases would not typically be noticeable and are below the 3 and 5 dBA CNEL permanent noise increase thresholds. Project generated traffic noise increases of 2 to 3 dBA CNEL are calculated for Heidorn Ranch Road, between Lone Tree Way and north of the northern project entrance. Based on review of the long-term noise monitoring data along Heidorn Ranch Road (LT-1), peak-hour traffic noise levels are approximately equivalent to CNEL noise levels. Existing + Project noise levels would exceed 60 dBA CNEL at a distance of about 80 feet from the center of Heidorn Ranch Road through this area, using the posted speed limit of 45 mph. There are no noise sensitive uses located east of Heidorn Ranch Road along this segment. Single and multi-family residences are 90 and 120 feet west of the center of the road, respectively. Heritage Baptist Academy is located about 175 feet west of Heidorn Ranch Road, with one basketball court located about 90 feet from the center of the road. Noise levels at these noise sensitive locations would continue to be below the 60 dBA CNEL threshold under Existing + Project conditions. As a result, increases in vehicular traffic would not cause a significant noise impact to existing residents or businesses in the area. This is a less-than-significant impact.

Mitigation Measure 3: **None required.**

Impact 4: **Temporary Construction Noise.** Existing noise-sensitive land uses would not be exposed to construction noise levels in excess of the significance thresholds for a period of more than one year provided standard construction noise controls are implemented at the site. **This is a less-than-significant impact with the incorporation of mitigation.**

The development of the project is expected to generate noise and would temporarily increase noise levels at nearby sensitive land uses. Noise impacts resulting from construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise generating activities, and the distance between construction noise sources and noise sensitive receptors and existing ambient noise levels.

Noise impacts resulting from construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise generating activities, and the distance between construction noise sources and noise sensitive receptors. Construction activities can generate considerable amounts of noise, especially during earth-moving activities when heavy equipment is used. Construction noise impacts primarily occur when construction activities occur during noise-sensitive times of the day (early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise sensitive land uses, or when construction durations last over extended periods of time. Where noise from construction activities exceeds 60 dBA L_{eq} and exceeds the ambient noise environment by at least 5 dBA L_{eq} at noise-sensitive uses in the project vicinity for a period greater than one year, the impact would be considered significant.

The project would be built in phases. The model homes (4) would be built first. Between 36 and 39 homes would be constructed in each of the following three phases, over a total construction period of about 30 months. The highest noise levels would be generated during site preparation, excavation, grading, and trenching. Noise generated during construction of residences is generally lower. Once construction moves indoors, minimal noise would be generated at off-site locations. During construction, maximum noise levels would vary depending on the equipment operating on site.

The typical range of maximum noise levels would be 80 to 90 dBA L_{max} at a distance of 50 feet. Hourly average noise levels generated by construction are about 81 dBA to 88 dBA L_{eq} measured at a distance of 50 feet from the center of a busy construction site. Hourly average construction noise levels associated with the erection of the residential units, such as hammer- and drilling-related noise, range from approximately 63 to 71 dBA at a distance of 50 feet. The noise levels associated with construction of the residential units would be substantially less than the noise levels associated with grading and pavement activities during project site preparation. Construction generated noise levels drop off at a rate of about 6 dBA per doubling of distance between the source and receptor. Shielding provided by barriers or structures can provide an additional 5 to 10 dBA noise reduction at distant receptors.

The nearest existing residential receivers to the west would be exposed to hourly average noise levels ranging from 79 to 86 dBA L_{eq} during the busiest construction periods along the western perimeter of the site. At residences to the north, located about 100 feet from the project boundary, construction noise levels would be about 69 to 78 L_{eq} during the busiest construction periods located adjacent to the northern boundary of the site. Again, construction generated noise levels drop off at a rate of about 6 dBA per doubling of distance between the source and receptor. Shielding by barriers or buildings would provide 5 to 10 decibels of attenuation at receptors. As construction moves away from noise-sensitive receptors, or indoors, noise levels generated by heavy construction will be lower.

Although the entire construction period would exceed 12 months, not all construction activities would be anticipated to generate high levels of noise. Additionally, construction would move around the site as different phases of the project are built. Reasonable regulation of the hours of construction, as well as regulation of the arrival and operation of heavy equipment and the delivery of construction material, are necessary to protect the health and safety of persons,

promote the general welfare of the community, and maintain the quality of life. Noise generated by project construction would not be expected to exceed 60 dBA L_{eq} and exceed ambient noise levels at receivers to the east or south by more than 5 dBA L_{eq} for a period greater than one year. At residences to the north and west, noise levels would achieve the criteria assuming that construction activities are conducted in accordance with the provisions of the City of Antioch and with implementation of construction best management practices as described in **Mitigation Measure 4**, stated below.

Mitigation Measure 4: The following construction best management controls, as identified in the Antioch General Plan and Municipal Code and the Brentwood General Plan, shall be implemented at the construction site:

- Per the most conservative restrictions between Section 5-17.04 of the City of Antioch's Municipal Code and the Action N 1e of the City of Brentwood's General Plan, construction activities, including haul truck deliveries, shall be limited to the hours of:
    - 8:00 AM to 5:00 PM on weekdays within 300 feet of occupied dwelling units, and the Heritage Baptist Church and Academy,
    - 7:00 AM to 6:00 PM on weekdays for construction located more than 300 feet from noise sensitive uses,
    - 9:00 AM to 5:00 PM on Saturdays, and
    - No construction shall occur on Sundays or public holidays.

- Prohibit unnecessary idling of internal combustion engines. Equip all equipment driven by internal combustion engines with mufflers which are in good mechanical condition, appropriate for the equipment, and no less effective that those originally installed by the manufacturer.

- Utilize "quiet" air compressors and other stationery noise sources where technology exists.

- Locate stationary noise-generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors and place equipment so that emitted noise is directed away from nearby sensitive receptors.

- Construct temporary noise barriers, where feasible, to screen stationary noise-generating equipment when located within 200 feet of adjoining sensitive land uses. Temporary noise barrier fences would provide a 5 dBA noise reduction if the noise barrier interrupts the line-of-sight between the noise source and receiver and if the barrier is constructed in a manner that eliminates any cracks or gaps.

- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.

- Construct units at the perimeter of the site and immediately adjacent to existing residences as early as possible so that the completed buildings will provide acoustical shielding for existing residences to the north and west. Constructing units along the

western and northern perimeters of the site would provide approximately 10 dB of noise reduction during the remainder of project construction activities.

- Designate a "disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and instituting reasonable measures as warranted to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

- Coordinate with the City of Antioch to notice to the residents immediately adjacent to the project site and the Heritage Baptist Academy regarding the project construction schedule. The notice shall include the contact information for the disturbance coordinator (discussed above).

- Prior to the issuance of any grading plans, the City of Antioch shall condition approval of the project by requiring applicants to submit a construction-related noise mitigation plan to the City for review and approval. The plan should depict the location of construction equipment, storage, and maintenance areas, and document how the noise from this equipment will be mitigated during construction of the project through the use of method described above.

Implementation of the above measures would reduce construction noise levels emanating from the site, limit construction hours, and minimize disruption and annoyance. While construction of the residential units would take place over a period greater than one year, the noise levels associated with unit construction would be localized to a single portion of the project site at a time, as phases of the project are completed and would result in substantially lower noise levels than site preparation activities. With the implementation of these measures, and recognizing that noise generated by construction activities would occur over a temporary period, the temporary increase in ambient noise levels would be less-than-significant.

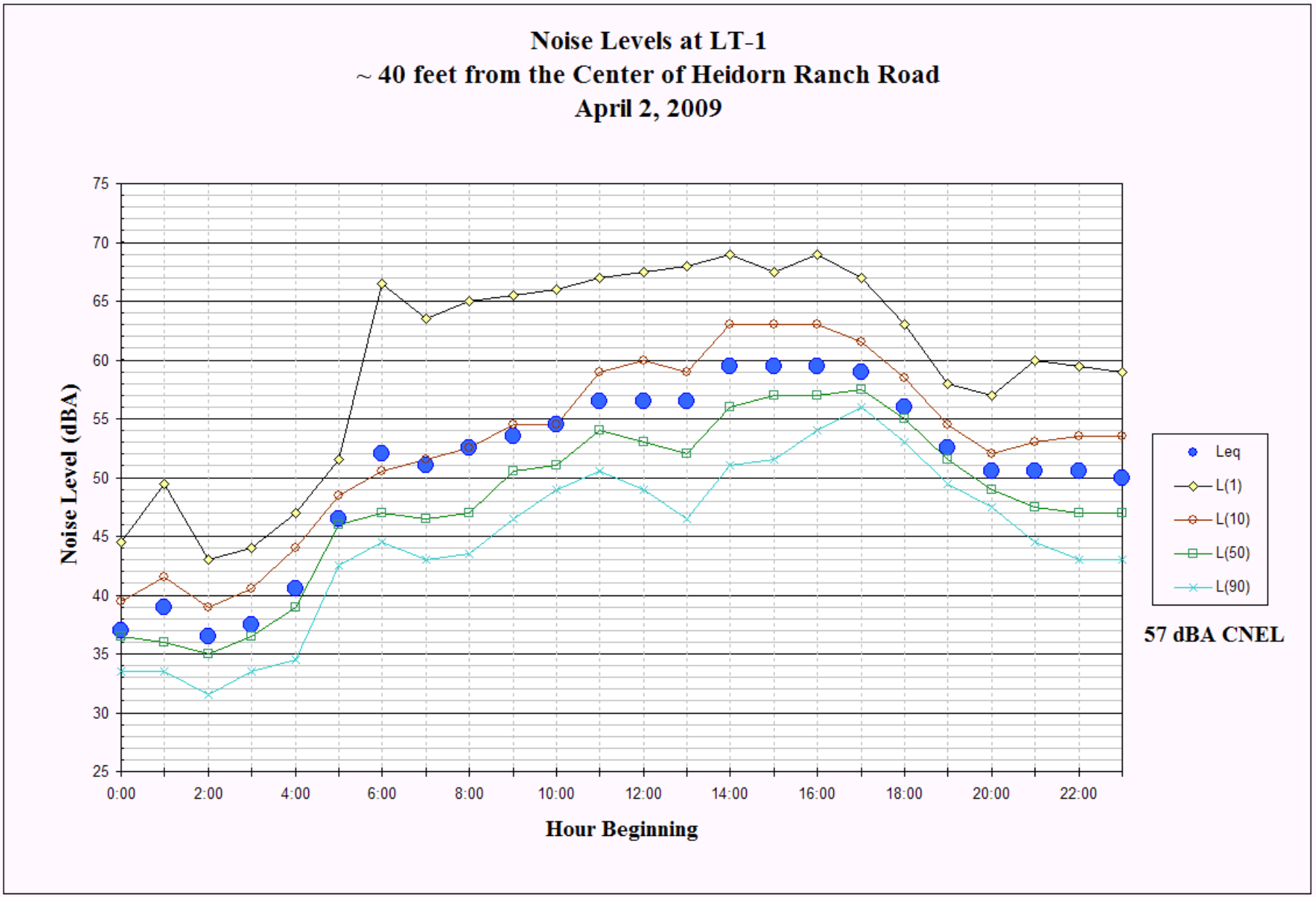
Impact 5: **Cumulative Traffic Noise.** The proposed project would not substantially contribute to cumulative noise levels anticipated with the build-out of the General Plan. **This is a less-than-significant impact.**

Traffic noise levels in the area are calculated to increase substantially along some roadways over the long-term as the area transitions from a rural land use pattern to a suburban area. Cumulative traffic noise levels increases were calculated by comparing Long-Term (2030) traffic volumes to Long-Term (2030) + Project volumes. The project's contribution to cumulative noise level increases would be less than 1 dBA CNEL along all studied roadway segments, except Heidorn Ranch Road, between Lone Tree Way and north of the northern project entrance. Traffic noise increases along this segment of roadway were described previously under Impact 3. Under Long-term (2030) + Project conditions, traffic noise levels would not substantially increase above Existing + Project levels. Long-term (2030) + Project noise levels would exceed 60 dBA at a distance of about 80 feet from the center of Heidorn Ranch Road. There are no noise sensitive

receptors located within 80 feet of the center of the roadway through this segment; therefore, noise levels at all noise sensitive locations would continue to be below the 60 dBA CNEL threshold under Long-term (2030) + Project conditions. As a result, the project would not make a cumulatively considerable contribution to increased noise levels resulting from the build-out of the area.

Mitigation Measure 5: None required.

Appendix 1: Daily Trend in Noise Levels at LT-1


Noise Levels at LT-1
~ 40 feet from the Center of Heidorn Ranch Road
April 2, 2009
Noise Level (dBA)
75
70
65
60
55
50
45
40
35
30
25
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Hour Beginning
Leq
L(1)
L(10)
L(50)
L(90)
57 dBA CNEL

Appendix G: Traffic Impact Study

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TRAFFIC IMPACT STUDY – FINAL REPORT

HEIDORN VILLAGE
ANTIOCH, CA

May 13, 2015

Prepared for:

City of Antioch, CA

Prepared by:

Kimley»Horn

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INTRODUCTION

Kimley-Horn and Associates, Inc. was retained by the City of Antioch to prepare a traffic study for the proposed Heidorn Village residential development in Antioch, CA. The project proposes 117 single family residential homes. The project is located to the west of Heidorn Ranch Road and north of the Prewett Ranch Drive extension.

Figure 1 illustrates the location of the project site in relation to the City of Antioch.

This traffic study was prepared based on discussions with, and criteria set forth by, the City of Antioch and Contra Costa Transportation Authority (CCTA). This study addresses the traffic and transportation effects of the proposed development to assist the project applicant and the City in project planning and determining conditions of approval for the project.

Study Methodology

Development Conditions

The Heidorn Village traffic study was based on the following development conditions:

- Existing (2014) conditions – Based on current traffic counts in 2014 and existing roadway geometry and traffic control.
- Existing (2014) Plus Project conditions – Based on current traffic counts and existing roadway geometry and traffic control, plus the traffic generated by the Heidorn Village residential development.
- Near-term conditions – Based on a forecast of the anticipated traffic after the project has been built out. The Near-term conditions include all approved and pending land use changes and any development that is consistent with the General Plan and expected to occur within the time frame of the project. It also includes transportation projects programmed for implementation at the time that the project is completed and any approved mitigation measures required for approved and planned projects. Additional projects submitted to the City after commencement of this traffic study have been included in the Long-term conditions.
- Near-term Plus Project conditions – Based on existing traffic volumes, traffic from all approved and pending land use changes and any development that is consistent with the General Plan, and traffic generated by the Heidorn Village residential development, as well as transportation projects programmed for implementation at the time that the project is completed and any approved mitigation measures required for approved and planned projects.
- Long-term (2030) conditions – Based on future year traffic forecasts from the CCTA 2040 travel demand forecast model. Includes road projects anticipated to

be in place under the long-term condition.

- Long-term (2030) Plus Project conditions – Based on CCTA traffic forecasts and traffic generated by the Heidorn Village residential development. Includes road projects anticipated to be in place under the long-term condition.

Operating Conditions and Criteria

Analysis of project effects at intersections is based on the concept of Level of Service (LOS). The LOS of an intersection is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. Levels of Service for this study were determined using methods defined in the *Highway Capacity Manual, 2010* (HCM) and appropriate traffic analysis software.

The HCM included procedures for analyzing side-street stop-controlled (SSSC), all-way stop-controlled (AWSC), and signalized intersections. The SSSC procedure defines LOS as a function of average control delay for each minor street approach movement. Conversely, the AWSC and signalized intersection procedures define LOS as a function of average control delay for the intersection as a whole. **Table 1** relates the operational characteristics associated with each LOS category for signalized and unsignalized intersections.

According to the CCTA requirements, there is one route of regional significance within the project study area, which includes Lone Tree Way. Routes of regional significance are governed by the CCTA Technical Procedures, which has a level of service requirement of LOS D or better. These requirements would apply to all study intersections on routes of regional significance.

For study intersections in the City of Antioch and not associated with routes of regional significance, the City has a level of service requirement of LOS “High D” or better.

Project impacts are determined by comparing conditions with the proposed project to those without the proposed project. Significant impacts for intersections are created when traffic from the proposed project causes the LOS to fall below a specific threshold. Mitigation may be required when traffic from the project causes the intersection to operate below acceptable levels of traffic operation.

Table 1 – Intersection Level of Service Definitions

Level of Service	Description	Signalized (Avg. control delay per vehicle sec/veh.)	Unsignalized (Avg. control delay per vehicle sec/veh.)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream	≤ 10	≤ 10
B	Stable traffic. Traffic flows smoothly with few delays.	> 10 – 20	> 10 – 15
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	> 20 – 35	> 15 – 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	> 35 – 55	> 25 – 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	> 55 – 80	> 35 – 50
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	> 80	> 50

Sources: Transportation Research Board, *Highway Capacity Manual 2000*, National Research Council, 2000 and Transportation Research Board, Highway Capacity Manual 2010, National Research Council, 2010

The effects of vehicle queuing were also analyzed and the 95th percentile queue is reported for all study intersections. The 95th percentile queue length represents a condition where 95 percent of the time during the peak period, traffic volumes and related queuing will be at, or less, than the queue length determined by the analysis. This is referred to as the "95th percentile queue." Average queuing is generally less. Queuing is considered a potentially significant impact since queues that exceed the turn pocket length can create potentially hazardous conditions by blocking or disrupting through traffic in adjacent travel lanes. However, these potentially hazardous queues are generally associated with left-turn movements. Locations where the right turn pocket storage is exceeded are not considered potentially hazardous because the right turn movement typically goes at the same time as the through movement and the additional vehicles that spill out over the turn pocket will not be hindering or disrupting the adjacent through traffic as would be the case in most left turn pockets. Thus, for purposes of this analysis, a queuing impact was considered to occur under conditions where project traffic causes the queue in a left turn pocket to extend beyond the turn pocket by 25 feet or more (i.e., the length of one vehicle) into adjacent traffic lanes that operate (i.e., move) separately from the left turn lane. Where the vehicle queue already

exceeds that turn pocket length under pre-project conditions, a project impact would occur if project traffic lengthens the queue by 25 feet or more.

Study Intersections Included in Analysis

The proposed project will generate new vehicular trips that will increase traffic volumes on the nearby street network. To assess changes in traffic conditions associated with the project, the following intersections, illustrated in **Figure 1**, were selected for evaluation in this traffic study:

1. Heidorn Ranch Road/Lone Tree Way
2. Canada Valley Road/Lone Tree Way
3. Hillcrest Avenue/Prewett Ranch Drive
4. South Project Driveway/Prewett Ranch Drive (future)
5. Heidorn Ranch Road/Prewett Ranch Drive (future)
6. Heidorn Ranch Road/East Project Driveway (future)

EXISTING (2014) CONDITIONS

Existing Site Uses

The Heidorn Village residential development is proposed to be built on the vacant lot to the northwest of the intersection of Prewett Ranch Drive and Heidorn Ranch Road. The project will comprise only of single family residential homes.

Existing Uses in Vicinity of Site

The proposed project site is surrounded by residential homes to the west and north, a church directly adjacent to the site to the north, Lone Tree Plaza commercial area to the northeast, and agricultural land to the east and south.

Existing Roadway Network

Below is a description of the principal roadways included in this study.

Canada Valley Road

Canada Valley Road is mostly a two-lane collector roadway with turn lanes serving residential areas north of Lone Tree Way. Canada Valley Road is a four lane roadway between Lone Tree Way and Country Hills Drive. South of Lone Tree Way the street serves the Lone Tree Plaza which includes the Home Depot store. The posted speed limit is 40 mph.

Heidorn Ranch Road

Heidorn Ranch Road is a four-lane arterial with turn lanes between Lone Tree Way and Lone Tree Plaza Drive and a two-lane arterial south of Lone Tree Plaza Drive. The posted speed limit on Heidorn Ranch Road is 45 mph. The roadway serves residential and commercial uses and is planned to be extended to the south to connect with the future Sand Creek Road extension. North of Lone Tree Way, the street is named Fairside Way. Fairside Way is a two-lane roadway and serves residential areas.

Hillcrest Avenue

Hillcrest Avenue is a four-lane divided roadway with a landscaped median and left turn bays. The roadway serves mostly residential uses and SR-4 to the north. The speed limit on Hillcrest Avenue is posted at 45 mph in the study area.

Lone Tree Way

Lone Tree Way is an arterial roadway that that connects Antioch with the City of Brentwood. Through the project study area, Lone Tree Way is a six-lane divided roadway with a landscaped median, left turn bays, wide shoulders, and restricted parking. The speed limit on Lone Tree Way is posted at 45 mph in the study area. Lone Tree Way is designated as a Route of Regional Significance. Deer Valley High School is located on Lone Tree Way, east of Deer Valley Road. Traffic from the high school represents a significant portion of traffic during the AM peak period.

Prewett Ranch Drive

Prewett Ranch Drive is a two-lane collector street with turn lanes at major intersections. The posted speed limit on Prewett Ranch Drive is 25 mph near Hillcrest Avenue. There are Class II bike lanes present east of Deer Valley Road.

Existing Site Access

There are currently no driveways for access to the existing vacant lot as shown in **Figure 2**. Access to the residential development from the east will be constructed off of Heidorn Ranch Road. Prewett Ranch Drive will be extended along the proposed project frontage and access to the residential development will be constructed on Prewett Ranch Drive.

Existing (2014) Lane Configurations and Traffic Control

Existing intersection lane configurations and traffic controls are illustrated in **Figure 3**. The two proposed project accesses will be side-street stop-controlled and will be full access intersections. It should be noted that the two proposed project driveways do not exist as current intersections and were therefore not analyzed in the existing without project condition.

Existing (2014) Peak Hour Turning Movement Volumes

Weekday intersection turning movement volumes were collected at project study area intersections in January 2014. Volumes were collected during the AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) peak periods of a typical weekday. These volumes were collected during a typical weekday when school was in session and not near any major holidays.

AM and PM peak one-hour volumes are shown in **Figure 4**. Traffic volume data sheets are shown in the **Appendix**.

Existing Transit Facilities

Tri-Delta Transit provides bus service in Antioch. Routes 380, 383, 385, and 395 operate within the study area. Currently there are no bus routes that pass directly adjacent to the proposed project site due to the existing vacant land use at the proposed project site and surrounding areas. However, routes 380, 383, and 385 run along Lone Tree Way, north of the proposed project site. Tri-Delta Transit connects passengers to the Antioch Park and Ride (Hillcrest), Kaiser Medical Center, Pittsburg/Bay Point BART Station, Tri Delta Transit Station, various local schools, Brentwood Park and Ride, the Streets of Brentwood and convenient connections to many locations in the City and connections to other local and regional transit routes.

Route 380 operates between the Pittsburg/Bay Point BART Station to the Tri Delta Transit station. This route runs along Lone Tree Way, Canada Valley Road, Laurel Road, and Hillcrest Avenue within the study area. This route operates on weekdays from 3:04 AM to 11:33 PM on a frequency of 10-minute to 120-minute headways.

Route 383 operates between the Antioch Park and Ride (Hillcrest) to Freedom High School. This route runs along Deer Valley Road and Lone Tree Way within the study area. This route operates on weekdays from 7:12 AM to 5:23 PM on a frequency of 60-minute to 125-minute headways.

Route 385 operates between the Antioch Park and Ride (Hillcrest) to the Brentwood Park and Ride. This route runs along Hillcrest Avenue, Lone Tree Way, Sand Creek Road, and the SR-4 bypass within the study area. This route operates on weekdays from 6:39 AM to 7:17 PM on a frequency of 25-minute to 145-minute headways.

Route 395 operates between the Antioch Park and Ride (Hillcrest) to the Streets of Brentwood. This route runs along the SR-4 bypass and Sand Creek Road within the study area. This route operates on weekends from 9:40 AM to 8:03 PM on a frequency of 60-minute headways.

Existing Bicycle and Pedestrian Facilities

There are multiple existing and proposed bikeway facilities in Antioch. Class I bicycle facilities are bike paths or trails, class II bicycle facilities are defined as bike lanes, and class III bicycle facilities are bike routes.

Class I bike paths located within the project study area include the Mokelumne Trail and the Canada Valley Trail. The Mokelumne Trail runs parallel to Lone Tree Way on the north side, starting west of the study area and terminates at Hillcrest Avenue. The Canada Valley Trail runs parallel to Country Hills Drive on the south side, starting at Hillcrest Avenue and terminates near SR-4. It is proposed that the Mokelumne Trail be extended from Hillcrest Avenue to Brentwood.

Class II bike lanes are located within the project study area on Canada Valley Road from Vista Grande Drive to Lone Tree Way, Hillcrest Avenue from E. 18th Street to Prewett Ranch Drive, Prewett Ranch Drive, and Heidorn Road from Lone Tree Way to south of Lone Tree Plaza Drive.

There are no Class III bike routes located within the project study area.

Sidewalks and crosswalks are mostly provided throughout the study area in Antioch to allow for pedestrians to access nearby transit stops, residential uses, and commercial uses. Sidewalks are absent near the southern portion of the City of Antioch where roadways are not built out yet or where they are adjacent to rural lands. Existing sidewalks along Heidorn Ranch Road terminate at the intersection of Heidorn Ranch Road and Lone Tree Plaza Drive and so there are no sidewalks adjacent to the proposed project site.

Existing (2014) Levels of Service at Study Intersections

Traffic operations were evaluated at the study intersections under existing traffic conditions.

Results of the analysis are presented in **Table 2**, along with the minimum jurisdictional standard for acceptable levels of service (as previously described in Operating Conditions and Criteria). Additional detail of the analysis is provided in the **Appendix**.

As shown in **Table 2**, all of the study intersections function within acceptable standards under this analysis scenario.

Table 2 – Existing (2014) Level of Service Summary

	Intersection	LOS Criteria	Control	Existing			
				AM Peak		PM Peak	
				LOS	Delay	LOS	Delay
1	Lone Tree Way and Heidorn Ranch Road	D	Signal	A	3.0	A	3.6
2	Lone Tree Way and Canada Valley Road	D	Signal	B	13.6	B	14.4
3	Prewett Ranch Drive and Hillcrest Avenue	D	Signal (AWSC)*	A	9.8	A	9.8
4	Prewett Ranch Drive and South Project Driveway Worst Approach	D	SSSC	Future Intersections			
5	Prewett Ranch Drive and Heidorn Ranch Road	D	Signal				
6	East Project Driveway and Heidorn Ranch Road Worst Approach	D	SSSC				

Note: Intersections that are operating below acceptable levels are shown in **BOLD**.

*Prewett Ranch Drive and Hillcrest Avenue is a signalized intersection, however it operates as an All Way Stop Control (AWSC) with flashing red lights.

HEIDORN VILLAGE RESIDENTIAL DEVELOPMENT PROJECT

Proposed Site Uses

As noted previously, the proposed Heidorn Village residential development will be constructed on the vacant lot to the northwest of the intersection of Prewett Ranch Drive and Heidorn Ranch Road. The proposed development will consist of 117 single family residential homes.

Project Trip Generation

Trip generation for residential development projects is typically calculated based on rates contained in the Institute of Transportation Engineer's publication, *Trip Generation 9th Edition*[1]. *Trip Generation* is a standard reference used by jurisdictions throughout the country for the estimation of trip generation potential of proposed developments.

A trip is defined in *Trip Generation* as a single or one-directional vehicle movement with either the origin or destination at the project site. In other words, a trip can be either "to" or "from" the site. In addition, a single customer visit to a site is counted as two trips (i.e., one to and one from the site).

For purposes of determining the worst-case impacts of traffic on the surrounding street network, the trips generated by a proposed development are typically estimated between the hours of 7:00-9:00 AM and 4:00-6:00 PM. This methodology is in harmony with the City's standard for the preparation of traffic impact studies.

[1] *Trip Generation, 9th Edition*, Institute of Transportation Engineers, 2012.

The proposed single family residential development is most appropriately classified as Single-Family Detached Housing (ITE Land Use 210).

Internal Capture

Internal capture reductions were considered, but since the project site will only consist of residential homes, no internal capture reductions were taken.

Project Trip Pass-By

The Heidorn Village residential development is unlikely to create any pass-by trips. Pass-by trips are typically calculated based on data published in ITE's *Trip Generation Handbook, 2nd Edition*[2] which includes weekday AM and PM information. This reference assumes no pass-by trips for this specific land use.

Trip generation was calculated based on the previous discussions and is reported in **Table 3**. Additional trip generation calculations are contained in the **Appendix**.

As noted in **Table 3**, the project will generate approximately 88 new peak AM trips and approximately 117 new peak PM trips.

Table 3 – Heidorn Village Residential Trip Generation

TIME PERIOD	LAND USE	Trip Rate			Trips		
		In	Out	Total	In	Out	Total
Daily	Single-Family Detached Housing (117 DU)	4.76	4.76	9.52	557	557	1114
AM Peak	Single-Family Detached Housing (117 DU)	0.1875	0.5625	0.75	22	66	88
PM Peak	Single-Family Detached Housing (117 DU)	0.63	0.37	1.00	74	43	117

Project Trip Distribution and Assignment

The Heidorn Village residential development project trip distribution is based on the updated CCTA travel demand model as well as existing traffic patterns and field observations. **Figure 5** shows the traffic distribution assumed in this traffic report for the

[2] *Trip Generation Handbook, 2nd Edition*, Institute of Transportation Engineers, June 2004.

Existing and Near-term plus Project scenarios. Based on the assumed trip distribution, new vehicle trips generated by the Heidorn Village residential development were assigned to the street network as shown in **Figure 6**.

Due to the future roadways being completed only in the Long-term scenario, the trip distribution is different in the Near-term than the Long-term. When compared to the Near-term, the Long-term trip distribution is higher in the southern portions of the City along Sand Creek Road, Hillcrest Avenue, and the SR-4 bypass. **Figure 7** shows the traffic distribution assumed in this traffic report for the Long-term plus Project scenario. Based on the assumed trip distribution, new vehicle trips generated by the Heidorn Village development were assigned to the street network as shown in **Figure 8**.

Project Roadway Improvements

As part of the proposed project, Prewett Ranch Drive will be extended east to Heidorn Ranch Road. The project also proposes to add sidewalk along the frontage of the project. Bicycle lanes will be added along Prewett Ranch Drive in areas without front-on housing. The project also proposes to add a full access intersection on the Prewett Ranch Drive extension, which is planned to be unsignalized. An access intersection on Heidorn Ranch Road is also planned, which will also be unsignalized, but will be right-in and right-out only. Per City standards, a continuous median will run along Heidorn Ranch Road adjacent to the project access, restricting left turns in and left turns out. It is important to note that the project driveway intersections are only analyzed under the plus Proposed Project conditions, as they do not exist without the construction of the project.

The proposed Heidorn Village project will be responsible for building the frontage improvements along Heidorn Ranch Road, per City policy. In addition, per City policy, the proposed project will widen Heidorn Ranch Road to two southbound lanes and one northbound lane adjacent to the proposed project, as well as construct a divided median. Heidorn Ranch Road should be designed in a manner consistent with the build out to a four lane arterial.

EXISTING (2014) PLUS PROJECT TRAFFIC CONDITIONS

Project traffic was added to the existing volumes at the study intersections and the volumes are shown in **Figure 9**. Traffic operations were evaluated under the Existing (2014) Plus Project Traffic Conditions. Results of the analysis are presented in **Table 4**. Additional detail is provided in the **Appendix**.

As shown in **Table 4**, all the study intersections function within acceptable standards under this analysis scenario.

Table 4 – Existing (2014) Plus Project Level of Service Summary

	Intersection	LOS Criteria	Control	Existing				Existing + Project					
				AM Peak		PM Peak		AM Peak			PM Peak		
				LOS	Delay	LOS	Delay	LOS	Delay	Var	LOS	Delay	Var
1	Lone Tree Way and Heidorn Ranch Road	D	Signal	A	3.0	A	3.6	A	4.6	1.6	A	4.8	1.2
2	Lone Tree Way and Canada Valley Road	D	Signal	B	13.6	B	14.4	B	13.4	-0.2	B	14.3	-0.1
3	Prewett Ranch Drive and Hillcrest Avenue	D	Signal (AWSC)*	A	9.8	A	9.8	A	9.8	0.0	A	9.7	-0.1
4	Prewett Ranch Drive and South Project Driveway	D	SSSC	Future Intersections				A	6.7	-	A	4.6	-
	Worst Approach							A	8.6	-	A	8.7	-
5	Prewett Ranch Drive and Heidorn Ranch Road	D	Signal					B	15.9	-	B	11.0	-
6	East Project Driveway and Heidorn Ranch Road	D	SSSC					A	2.4	-	A	1.4	-
	Worst Approach							A	8.5	-	A	8.6	-

Note: Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are highlighted.

*Prewett Ranch Drive and Hillcrest Avenue is a signalized intersection, however it operates as an All Way Stop Control (AWSC) with flashing red lights.

NEARBY ROADWAY AND DEVELOPMENT PROJECTS

Planned Roadway Projects in Vicinity of Site

There are roadway improvements planned in the study area for the Near-term as identified by the City. The following summarizes the future intersection improvements and roadway improvements that will affect the study area:

- Intersection #2 – The intersection of Lone Tree Way and Canada Valley Road will be restriped on the eastbound and southbound approaches. The eastbound approach will be restriped to have dual left turn lanes. The southbound approach will be restriped to be dual left turn lanes and a through-right lane.
- Intersection #3 – The intersection of Hillcrest Avenue and Prewett Ranch Drive currently has new traffic signal equipment constructed, but is set on flashing all red. It is anticipated that the traffic signal will be fully operational by Near-term.
- The extension of Prewett Ranch Drive will be completed as part of the proposed project and therefore will not be assumed in the Near-term without project scenario.

Figure 10 illustrates the intersection geometry and traffic control assumed in the Near-term analysis.

There is no documentation of any signal timing program in which signalized intersections are optimized every few years. The City noted that the signals are updated on an as needed basis. Therefore it was assumed that the existing signal timing was still being used for the Near-term scenario, unless there were improvements made to the intersection.

Approved & Pending Development Projects in Vicinity of Site

Kimley-Horn coordinated with the City of Antioch, City of Brentwood, and City of Oakley to determine if there were any development projects in the vicinity of the project site that are in various stages of planning, approval, or development. This includes all approved and pending land use changes and any development that are consistent with the City's General Plan. These projects were identified and included in the Near-term conditions with and without the project. Additional projects submitted to the City after commencement of this traffic study have been included in the Long-term conditions. Available trip generation and trip distribution were used to assign vehicle trips to the study area. **Figure 11** shows the pending and approved projects considered in this study for the Near-term scenario. The pending and approved project trips were assigned to the study area and are shown in **Figure 12**.

NEAR-TERM TRAFFIC CONDITIONS

Near-term conditions are a forecast of the anticipated traffic after the project has been built out. The Near-term conditions include all approved and pending land use changes and any development that is consistent with the General Plan and expected to occur within the time frame of the project. It also includes transportation projects programmed for implementation at the time that the project is completed and any approved mitigation measures required for approved or planned projects. Additional projects submitted to the City after commencement of this traffic study have been included in the Long-term conditions.

Traffic operations were evaluated under the following development conditions:

- Near-term Conditions
- Near-term plus Project Conditions

Near-term volumes were calculated by using the list of pending and approved development projects and determining trip generation, trip distribution, and trip assignment for each project. Vehicle trips were then assigned to the project study area. **Figure 13** illustrates the Near-term volumes.

Near-Term Intersection Level of Service

Near-term volumes were evaluated at the study intersections. Results are presented in **Table 5**. Analysis sheets are provided in the **Appendix**. As shown in **Table 5**, all study intersections function within acceptable standards.

Table 5 – Near-Term Intersection Level of Service Summary

	Intersection	LOS Criteria	Control	Near-Term			
				AM Peak		PM Peak	
				LOS	Delay	LOS	Delay
1	Lone Tree Way and Heidorn Ranch Road	D	Signal	A	2.5	A	3.4
2	Lone Tree Way and Canada Valley Road	D	Signal	A	9.4	B	12.7
3	Prewett Ranch Drive and Hillcrest Avenue	D	Signal	B	15.2	B	16.9
4	Prewett Ranch Drive and South Project Driveway Worst Approach	D	SSSC	Future Intersections			
5	Prewett Ranch Drive and Heidorn Ranch Road	D	Signal				
6	East Project Driveway and Heidorn Ranch Road Worst Approach	D	SSSC				

Note: Intersections that are operating below acceptable levels are shown in **BOLD**.

Near-Term Plus Project Intersection Level of Service

Near-term plus project traffic conditions were evaluated at the study intersections and are shown in **Figure 14**. As noted earlier, locations operating unacceptably that have an increase in delay are considered to be subject to a significant impact.

As shown in **Table 6**, all study intersections function within acceptable standards. Analysis sheets are provided in the **Appendix**.

Table 6 – Near-Term Plus Project Intersection Level of Service Summary

	Intersection	LOS Criteria	Control	Near-Term				Near-Term + Project					
				AM Peak		PM Peak		AM Peak			PM Peak		
				LOS	Delay	LOS	Delay	LOS	Delay	Var	LOS	Delay	Var
1	Lone Tree Way and Heidorn Ranch Road	D	Signal	A	2.5	A	3.4	A	3.8	1.3	A	4.3	0.9
2	Lone Tree Way and Canada Valley Road	D	Signal	A	9.4	B	12.7	A	9.5	0.1	B	12.7	0.0
3	Prewett Ranch Drive and Hillcrest Avenue	D	Signal	B	15.2	B	16.9	B	15.3	0.1	B	16.9	0.0
4	Prewett Ranch Drive and South Project Driveway	D	SSSC	Future Intersections				A	6.7	-	A	4.6	-
	Worst Approach							A	8.6	-	A	8.7	-
5	Prewett Ranch Drive and Heidorn Ranch Road	D	Signal					B	15.9	-	B	11.0	-
6	East Project Driveway and Heidorn Ranch Road	D	SSSC					A	2.4	-	A	1.4	-
	Worst Approach							A	8.5	-	A	8.6	-

Note: Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are highlighted.

LONG-TERM (2030) CONDITIONS

Long-Term Lane Configurations and Traffic Control

There are roadway improvements planned in the study area for the Long-term (2030) as identified by the City. In the Long-term (2030) scenario, Sand Creek Road is planned to be extended from the Dozier Libbey Medical High School to the SR-4 bypass. It is assumed that there will be other developments that occur to warrant the construction of the Sand Creek Road extension. Hillcrest Avenue will be extended to Balfour Road.

Heidorn Ranch Road is currently a two-lane, undivided roadway south of Lone Tree Plaza Drive. The City of Brentwood recently updated its General Plan, which includes a number of special planning areas. The allowed land uses in these special planning areas will most likely alter the projected volumes in the CCTA model resulting in a need for the widening of Heidorn Ranch Road. The Brentwood General Plan calls for Heidorn Ranch Road to be a 4 to 6 lane arterial; the Antioch general Plan also shows Heidorn Ranch Road as an arterial, but does not specify the number of lanes. The proposed Heidorn Village project will be responsible for building the frontage improvements along Heidorn Ranch Road, per City policy. In addition, per City policy, the proposed project will widen Heidorn Ranch Road to two southbound lanes and one northbound lane adjacent to the proposed project, as well as construct a divided median. Heidorn Ranch Road should be designed in a manner consistent with the build out to a 4 lane arterial.

Figure 15 illustrates the intersection geometry and traffic control assumed in the Long-term (2030) analysis.

There is no documentation of any signal timing program in which signalized intersections are optimized every few years. The City noted that the signals are updated on an as needed basis. Therefore it was assumed that the existing signal timing was still being used for the Long-term scenario.

Year 2030 Forecast Model Volumes

Year 2030 roadway link volumes from the CCTA Travel Demand Forecast model were obtained from the County. The model was used to plot bi-directional AM and PM peak-hour traffic volumes on each segment along roadways within the study area. Model outputs were used to compare 2010 base year volumes and year 2040 future model forecasts to determine the annual incremental growth in traffic volumes at study intersections. Year 2030 turning movement volumes were calculated by adding the growth increment to the current year (2014) traffic count to calculate the final adjusted roadway link forecast volume. Final adjusted forecast volumes were then converted to Long-term (2030) intersection turning movement volumes using a traffic modeling

standard process commonly referred to as the Furness method. The Furness method uses an iterative process to derive future turning movement volumes based on future year roadway link volumes and an initial estimate of turning percentages (obtained from the 2014 intersection turning movement counts).

LONG-TERM TRAFFIC CONDITIONS

Traffic operations were evaluated under the following long-term conditions:

- Long-term (2030) Conditions
- Long-term (2030) plus Project Conditions

Long-Term Intersection Level of Service

Long-term (2030) traffic volumes were evaluated at study intersections and are presented in **Figure 16**. As shown in **Table 7**, all study intersections function within acceptable standards. Analysis sheets are provided in the **Appendix**.

Table 7 – Long-Term (2030) Intersection Level of Service Summary

	Intersection	LOS Criteria	Control	Long-Term (2030)			
				AM Peak		PM Peak	
				LOS	Delay	LOS	Delay
1	Lone Tree Way and Heidorn Ranch Road	D	Signal	A	2.3	A	3.7
2	Lone Tree Way and Canada Valley Road	D	Signal	A	9.6	B	12.6
3	Prewett Ranch Drive and Hillcrest Avenue	D	Signal	B	17.5	B	17.1
4	Prewett Ranch Drive and South Project Driveway Worst Approach	D	SSSC	Future Intersection			
5	Prewett Ranch Drive and Heidorn Ranch Road	D	Signal	A	6.8	A	9.4
6	East Project Driveway and Heidorn Ranch Road Worst Approach	D	SSSC	Future Intersection			

Note: Intersections that are operating below acceptable levels are shown in **BOLD**.

Long-Term (2030) Plus Project Intersection Level of Service

Long-term (2030) plus project traffic conditions were evaluated at the study intersections and are shown in **Figure 17**. As shown in **Table 8**, all study intersections function within acceptable standards. Analysis sheets are provided in the **Appendix**.

Table 8 – Long-Term (2030) Plus Project Intersection Level of Service Summary

	Intersection	LOS Criteria	Control	Long-Term (2030)				Long-Term (2030) + Project					
				AM Peak		PM Peak		AM Peak			PM Peak		
				LOS	Delay	LOS	Delay	LOS	Delay	Var	LOS	Delay	Var
1	Lone Tree Way and Heidorn Ranch Road	D	Signal	A	2.3	A	3.7	A	3.1	0.8	A	4.3	0.6
2	Lone Tree Way and Canada Valley Road	D	Signal	A	9.6	B	12.6	A	9.5	-0.1	B	12.6	0.0
3	Prewett Ranch Drive and Hillcrest Avenue	D	Signal	B	17.5	B	17.1	B	19.0	1.5	B	17.2	0.1
4	Prewett Ranch Drive and South Project Driveway	D	SSSC	Future Intersection				A	1.0	-	A	1.2	-
	Worst Approach							B	11.9	-	B	10.3	-
5	Prewett Ranch Drive and Heidorn Ranch Road	D	Signal	B	11.6	A	9.6	B	11.2	-0.4	A	9.6	0.0
6	East Project Driveway and Heidorn Ranch Road	D	SSSC	Future Intersection				A	1.2	-	A	1.1	-
	Worst Approach							A	8.6	-	A	9.5	-

Note: Intersections that are operating below acceptable levels are shown in **BOLD** and significant impacts are highlighted.

VEHICLE QUEUING FOR ALL SCENARIOS

As congestion increases it is common for traffic at signals and stop signs to form lines of stopped (or queued) vehicles. Queue lengths were determined for each lane and measure the distance that vehicles will back up in each direction approaching an intersection. Synchro software calculates the queues based on HCM 2000 methodology. The 95th percentile queue is calculated by using 95th percentile traffic to account for fluctuations in traffic and represents a condition where 95 percent of the time during the peak period, traffic volumes and related queuing will be at, or less, than determined by the analysis and is used as the benchmark for impacts as a standard transportation engineering practice. Average queuing is generally less. Ninety-fifth percentile queuing was estimated under the various development conditions and in consideration of the planned intersection and signal timing improvements.[3] A typical vehicle length of 25 feet is used in the queuing analysis. As stated in the Operating Conditions and Criteria, a significant impact was assumed to occur if the queue increases by one or more vehicles and the vehicle queue exceeds the turn pocket length. A summary of the queuing results is included in the **Appendix**. The results indicated instances where queuing in the dedicated turn lanes may exceed the storage limits of the turn pockets.

The analysis showed that several existing turn bays lengths are exceeded under future traffic volumes. In all cases the inadequate queue lengths are not associated with the project, but are a result of pre-existing deficiencies. For example, the southbound left turn queue at the intersection of Canada Valley Road and Lone Tree Way is 359 feet during the AM peak during Existing conditions and the queue length is also 359 feet during the AM peak in the Existing Plus Project conditions. Although the turn pocket length is 160 feet long and the queue spills out of the turn pocket, the result is a pre-existing deficiency not associated with the project and is therefore not an impact since the project did not increase the queue by at least one vehicle length. At locations affected by project traffic, the increase in vehicle queuing is less than one vehicle.

POTENTIAL EFFECTS ON TRANSIT, BICYCLE, AND PEDESTRIAN MOBILITY

The project was evaluated to determine if it would likely conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks) or generate pedestrian, bicycle, or transit travel demand that would not be accommodated by transit, bicycle, or pedestrian facilities and plans.

[3] Existing queuing was calibrated in the Synchro model based on existing signal timing parameters and field observations.

Residents to the Heidorn Village residential development have the option of driving, taking transit, walking or bicycling. For those taking transit, they can reach the site via future bus routes of the Tri-Delta Transit system.

According to the 2008-2012 U.S. Census[4], five percent of Antioch residents use transit to travel to work. This typically represents the highest level of transit ridership during the day. If it is conservatively assumed that five percent of the residents associated with the Heidorn Village residential development will use transit during the peak hours of the day, it represents approximately 5 passengers in the weekday AM and 6 passengers in the weekday PM peak periods.

Data was not readily available for peak hour ridership levels on the Tri-Delta Transit system but during the weekday periods, the routes operate as often as every 10 minutes and observations indicate that sufficient capacity exists on the buses to accommodate the potential additional transit demand. Furthermore, dispersion of the project-generated riders to the bus routes would result in a minimal effect on transit capacity. Thus the project impact on transit service is determined to be less than significant.

There will be adequate pedestrian walkways from the project site to the existing sidewalks on Prewett Ranch Drive. The project proposes to extend Prewett Ranch Drive to Heidorn Ranch Road, adjacent to the proposed project, and construct sidewalk along the north side. Although, the project proposes to construct sidewalk along Heidorn Ranch Road fronting the eastern edge of the project, there is still no sidewalk along Heidorn Ranch Road south of Lone Tree Plaza Drive.

Cyclists will be able to access the residential development using the bike lane along Prewett Ranch Drive and along Heidorn Ranch Road. The extensive bicycle network allows residents and visitors living within biking distance to travel to and from the project.

There are adequate transit facilities adjacent to the project site with continuous sidewalks and ramps to the transit stop locations. Therefore, the Heidorn Village residential development's impact on transit, pedestrian, or bicycle facilities is determined to be less than significant.

SITE ACCESS AND CIRCULATION

On-site circulation was evaluated at the project's two driveways and within the project site. **Figure 2** shows the project site plan.

[4] *American Factfinder*, U.S. Census Bureau, 2013.

The two access points to the project are along the Heidorn Ranch Road extension and the Prewett Ranch Drive extension. Each of these intersections will be unsignalized intersections, with the Prewett Ranch Drive entrance being full access, and the Heidorn Ranch Road entrance being restricted to right-in/right-out.

The site plan does not indicate proposed project throat depths for each of the site driveways. However, the queuing analysis at the project driveways indicated that the 95th percentile queues would be no greater one vehicle.

SUMMARY OF IMPACTS AND RECOMMENDED MITIGATION

Based on the results of the traffic analysis and evaluation of the proposed site plan there are no significant impacts that need to be mitigated.

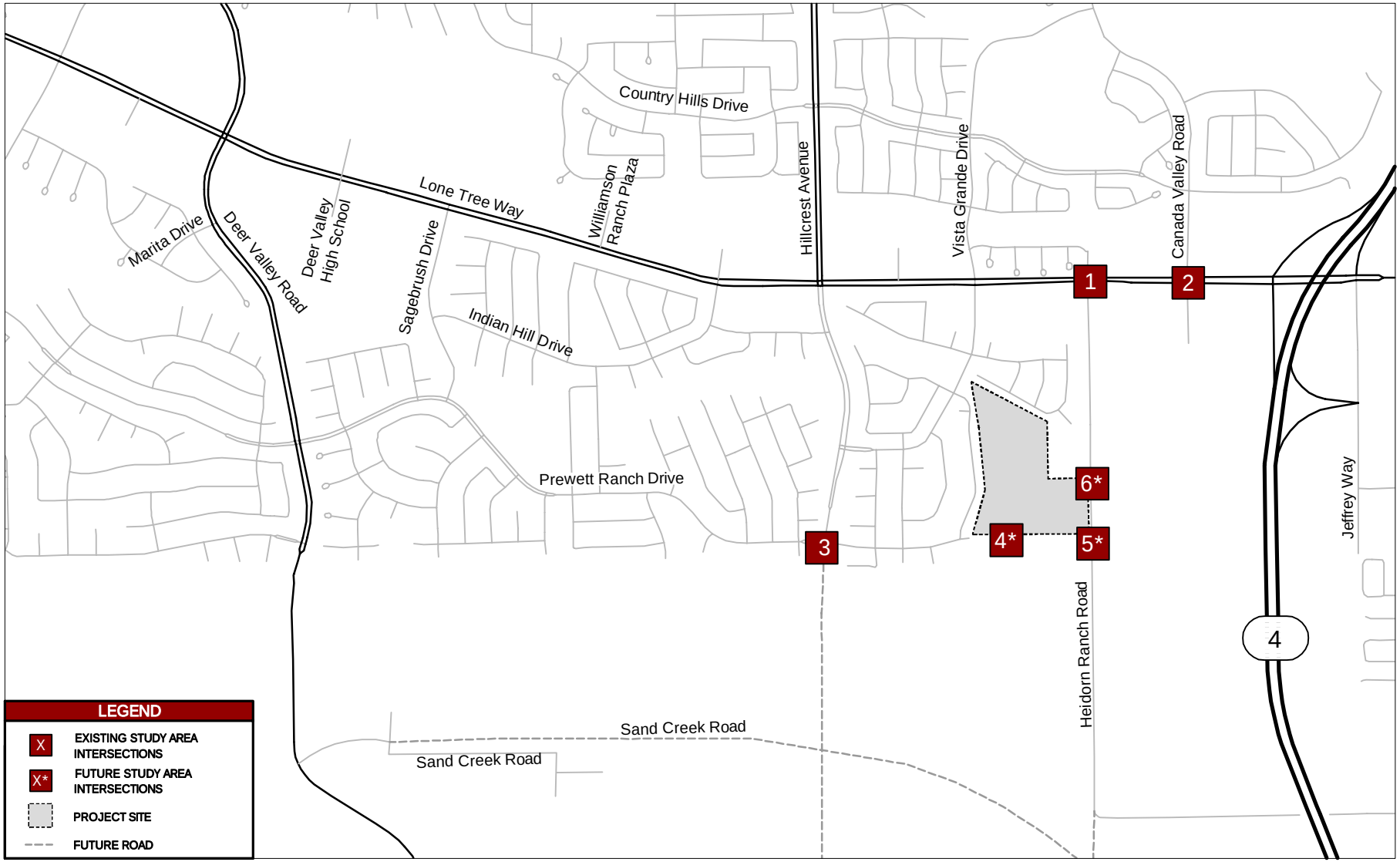

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FIGURE 1
PROJECT LOCATION AND STUDY INTERSECTIONS



Source: Carlson, Barbee & Gibson, Inc.

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Kimley»Horn

FIGURE 2
SITE PLAN

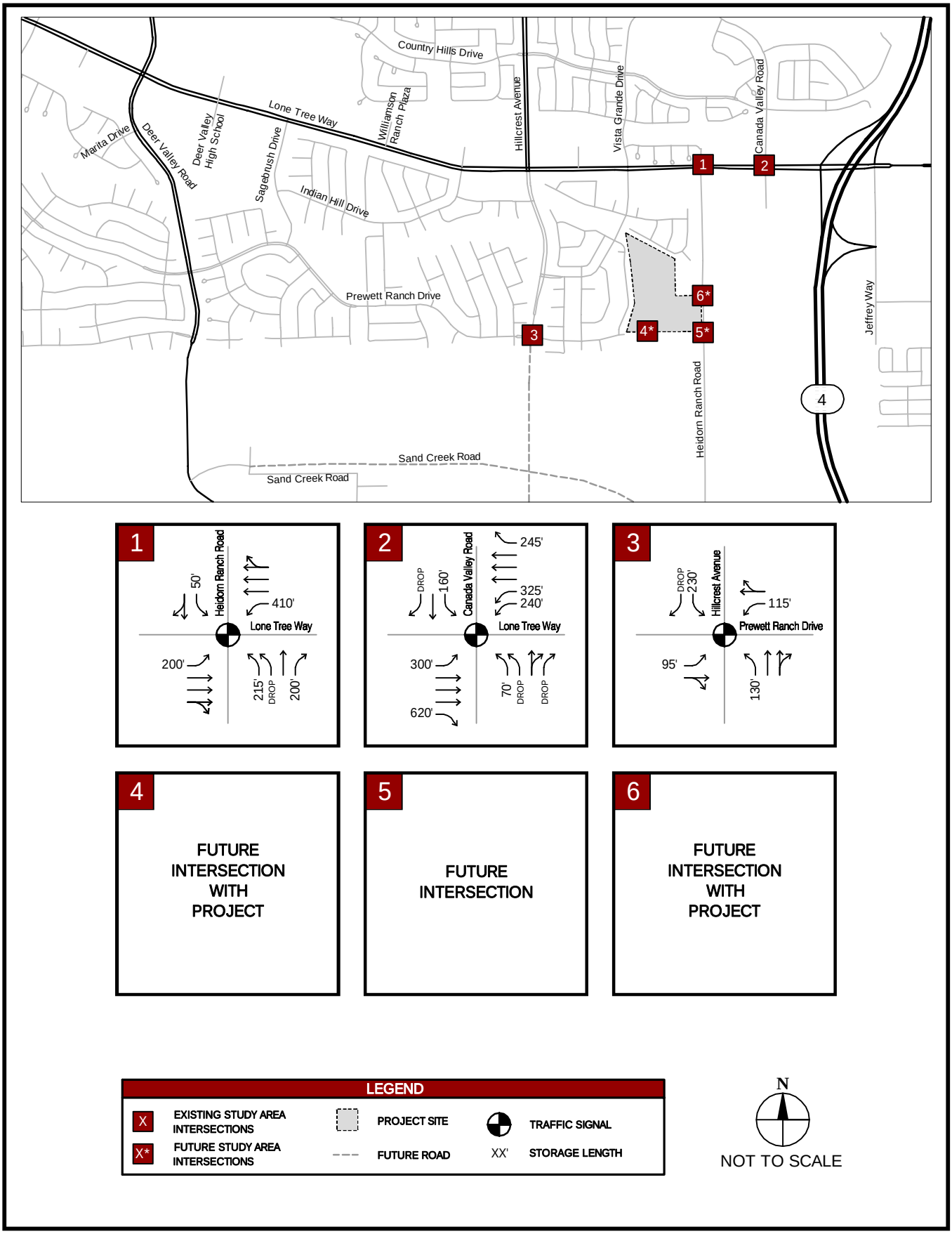

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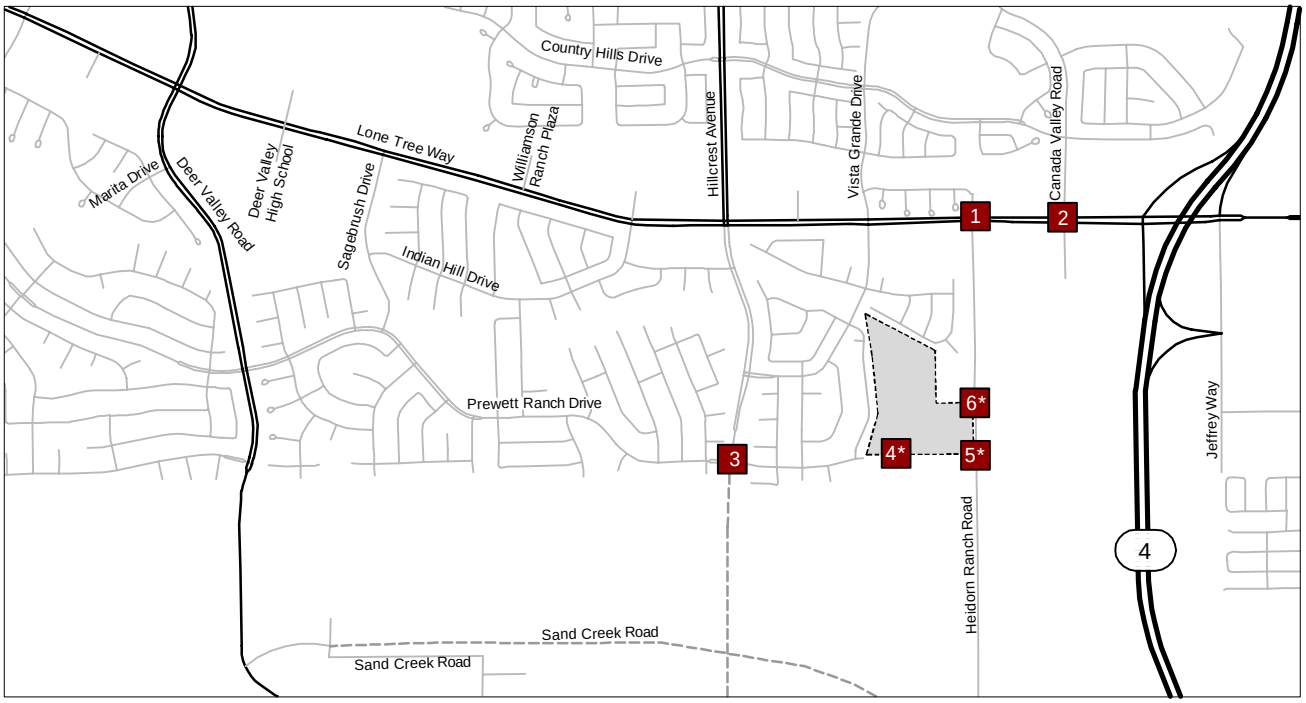
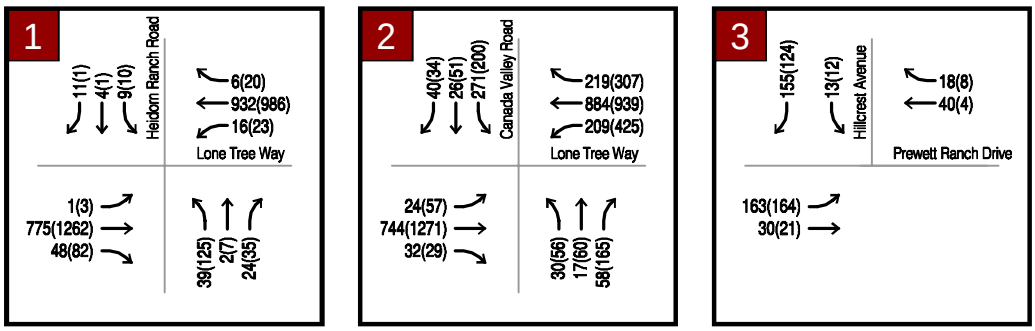
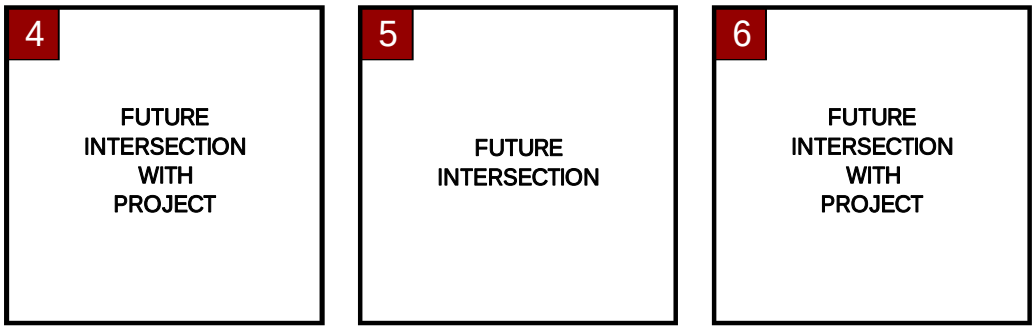
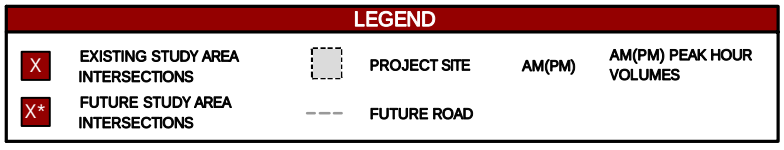
FIGURE 3
EXISTING (2014) CONDITION
LANE GEOMETRY AND TRAFFIC CONTROL











NOT TO SCALE

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FIGURE 4
EXISTING (2014) CONDITION PEAK HOUR TURNING MOVEMENT VOLUMES

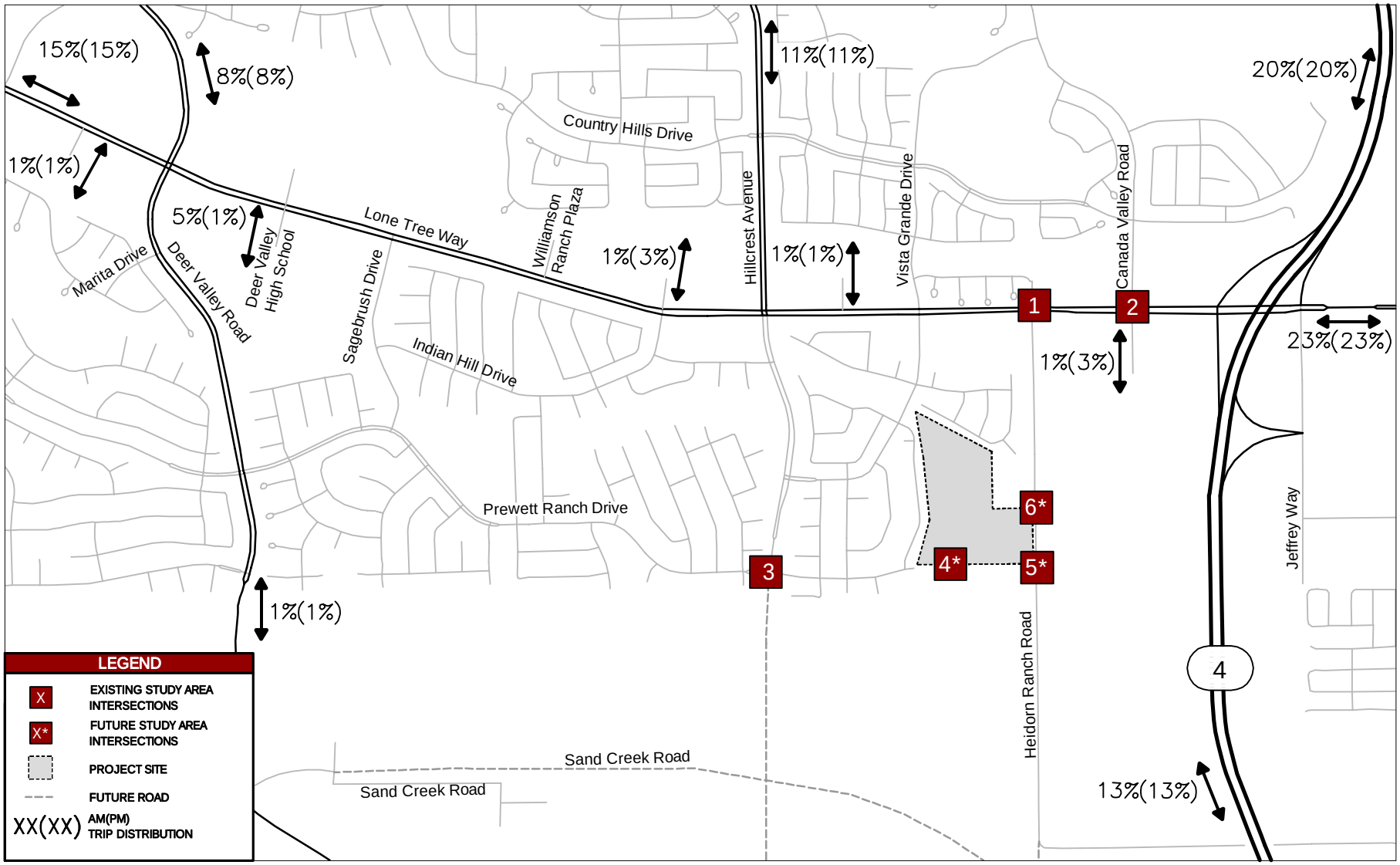

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FIGURE 5
NEAR-TERM TRIP DISTRIBUTION

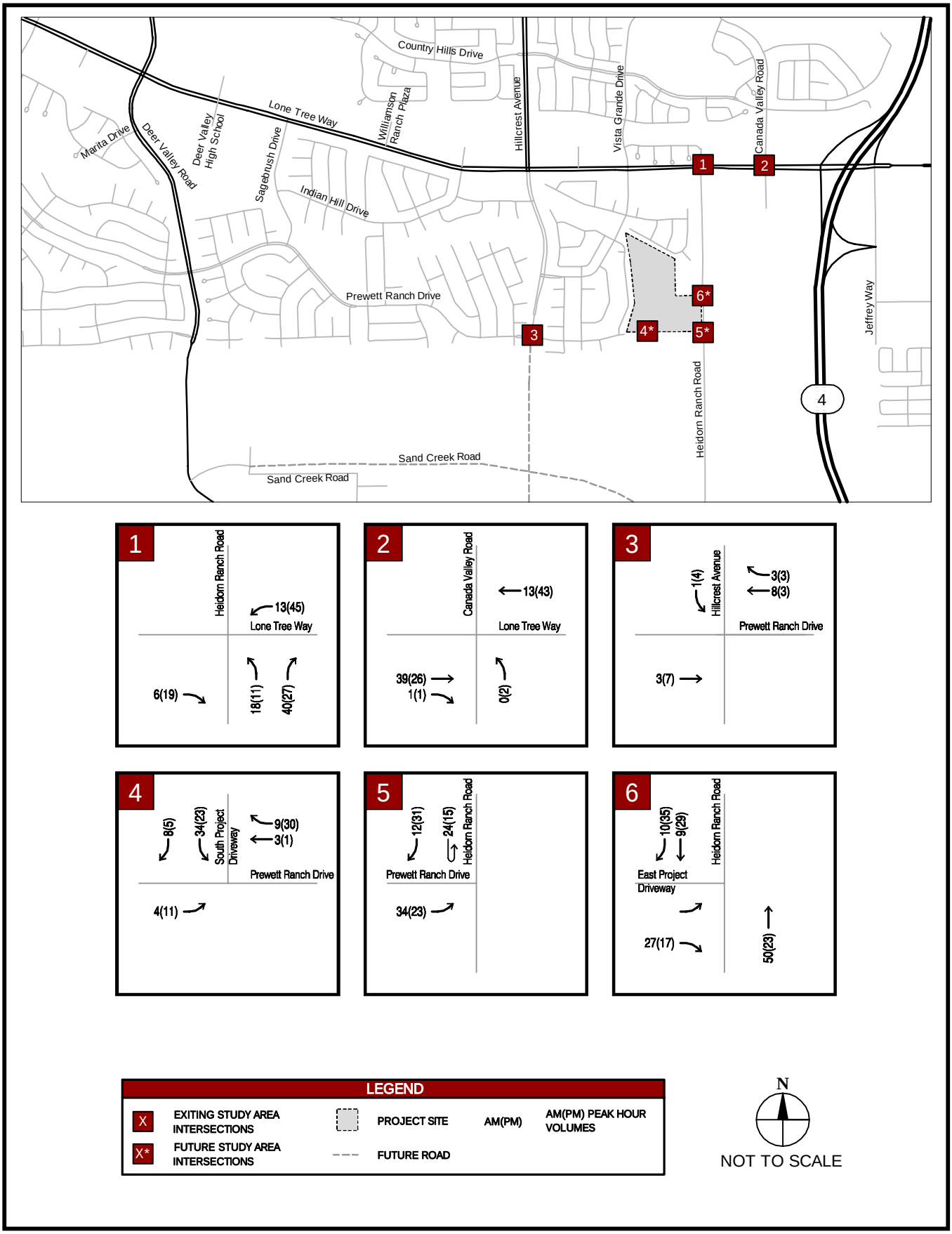
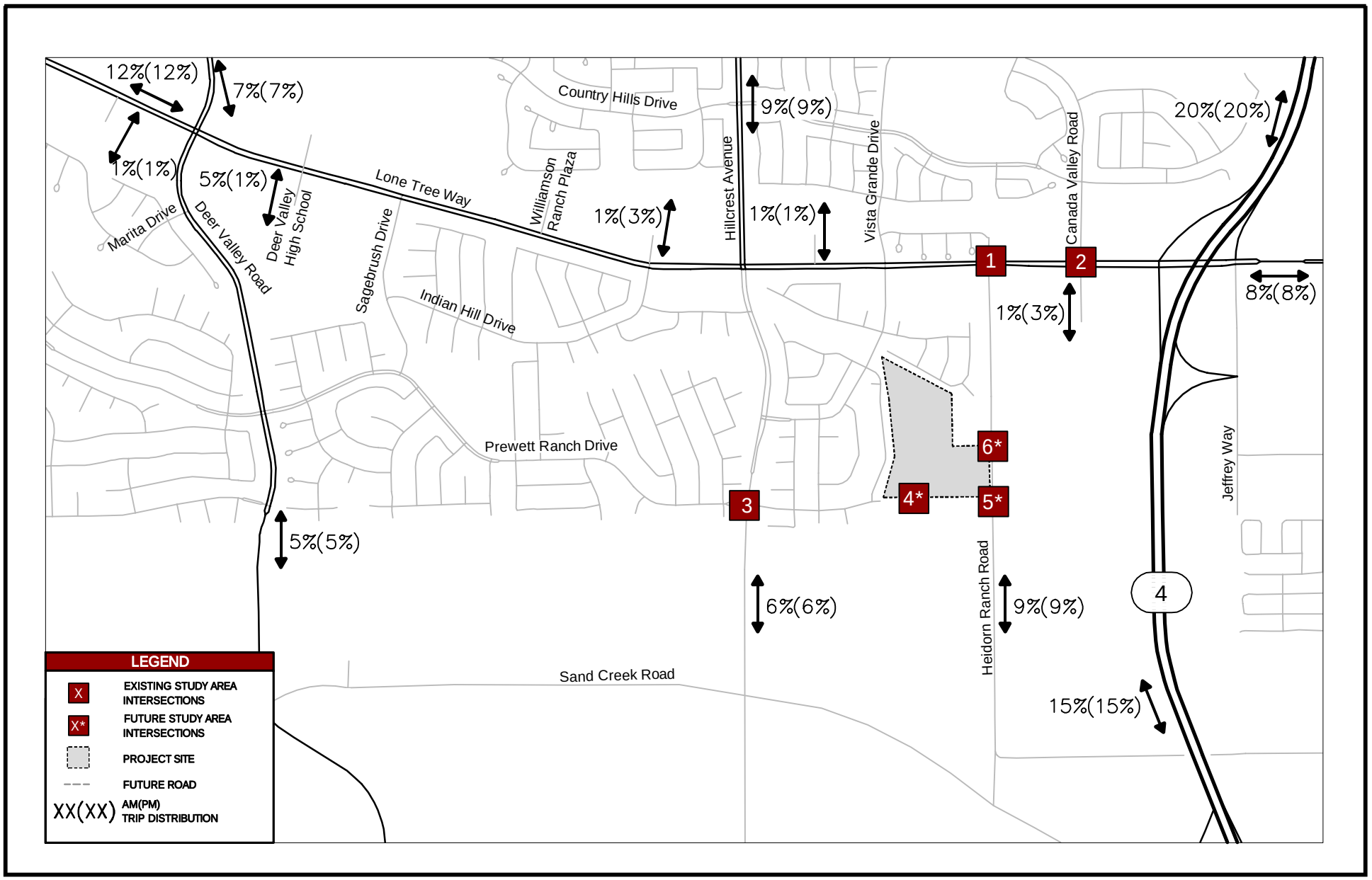


FIGURE 6

PROJECT GENERATED PEAK HOUR TURNING MOVEMENT VOLUMES IN NEAR-TERM



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NOT TO SCALE

FIGURE 7
LONG-TERM TRIP DISTRIBUTION

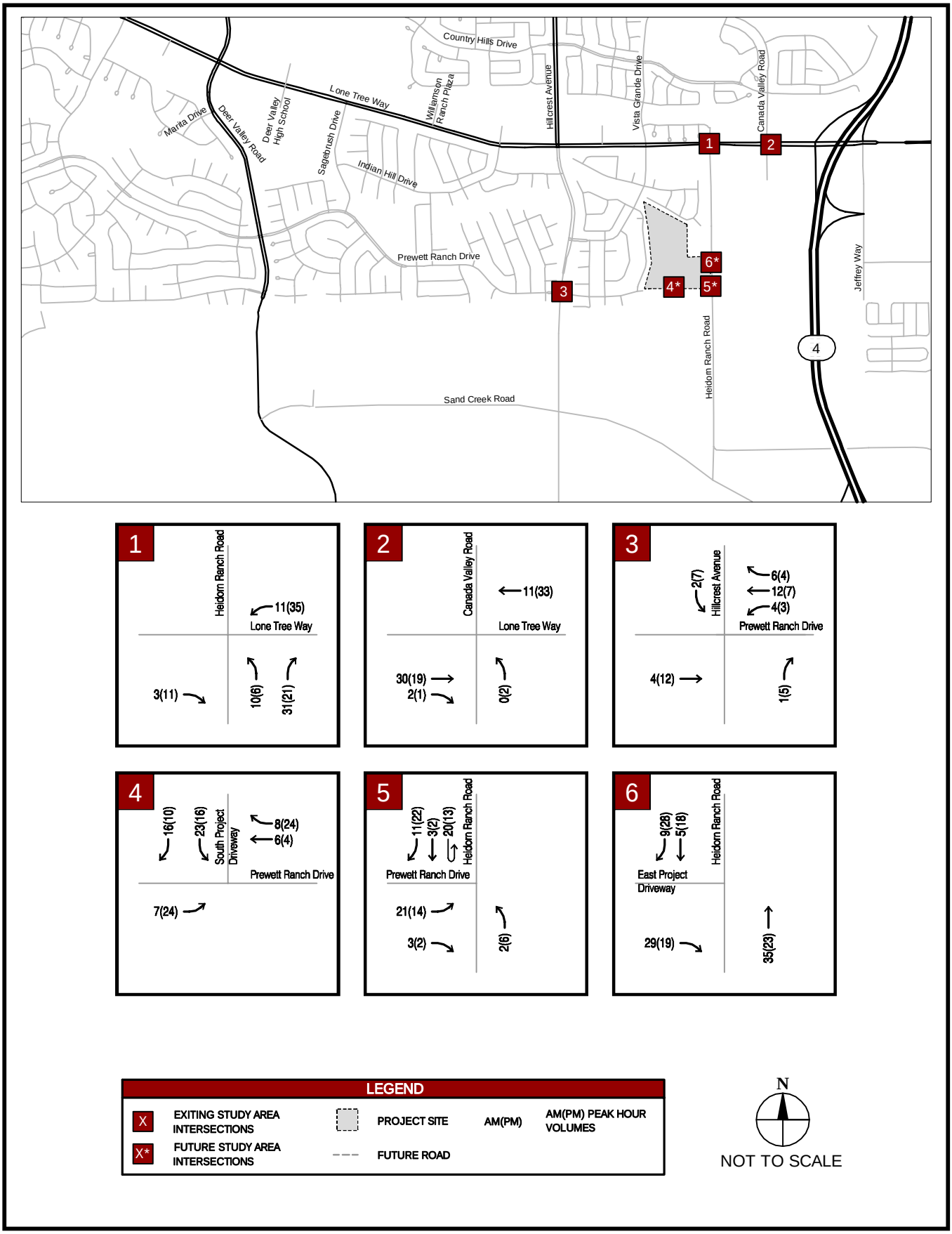

FIGURE 8

PROJECT GENERATED PEAK HOUR TURNING MOVEMENT VOLUMES IN LONG-TERM

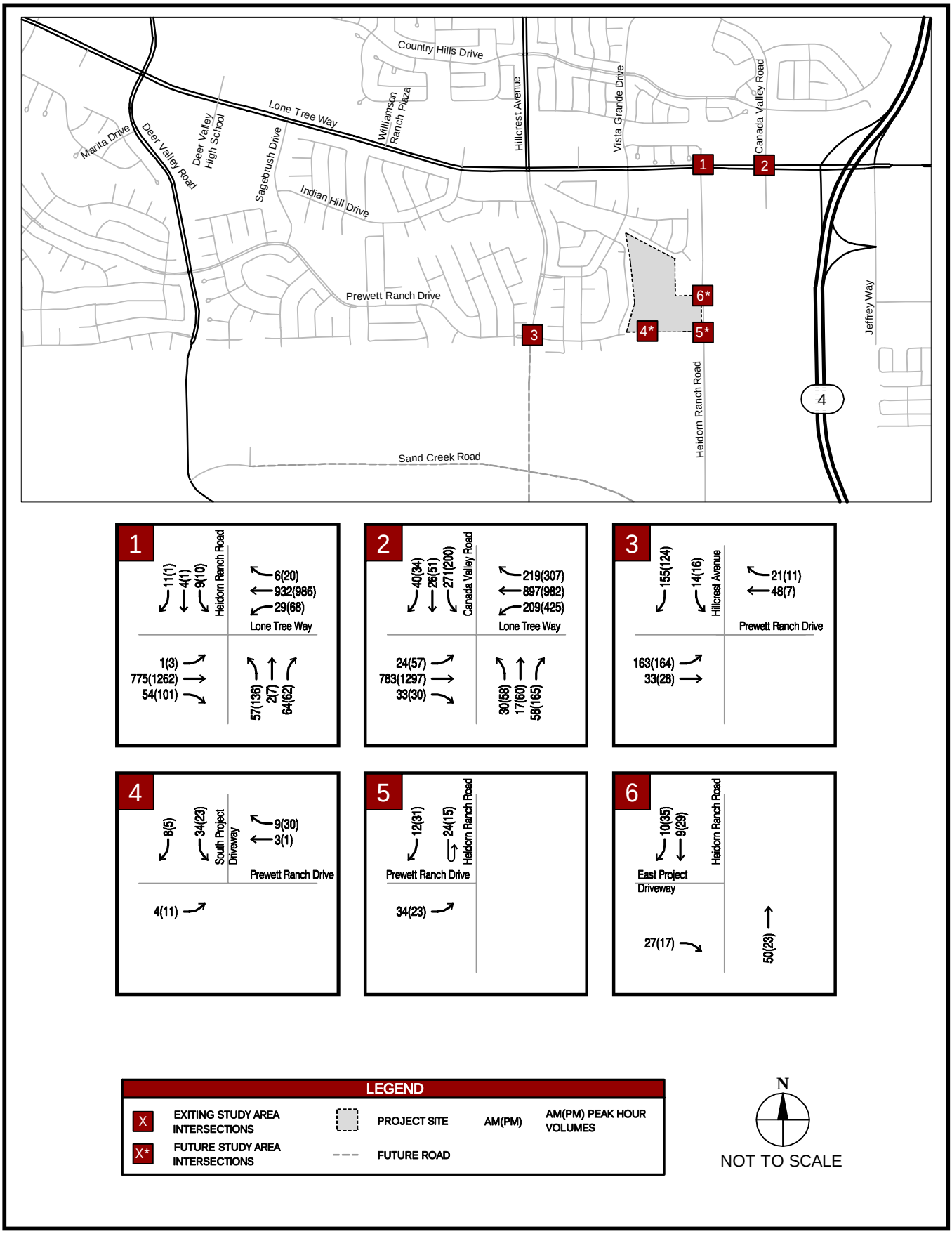

FIGURE 9

EXISTING (2014) PLUS PROJECT CONDITION
PEAK HOUR TURNING MOVEMENT VOLUMES

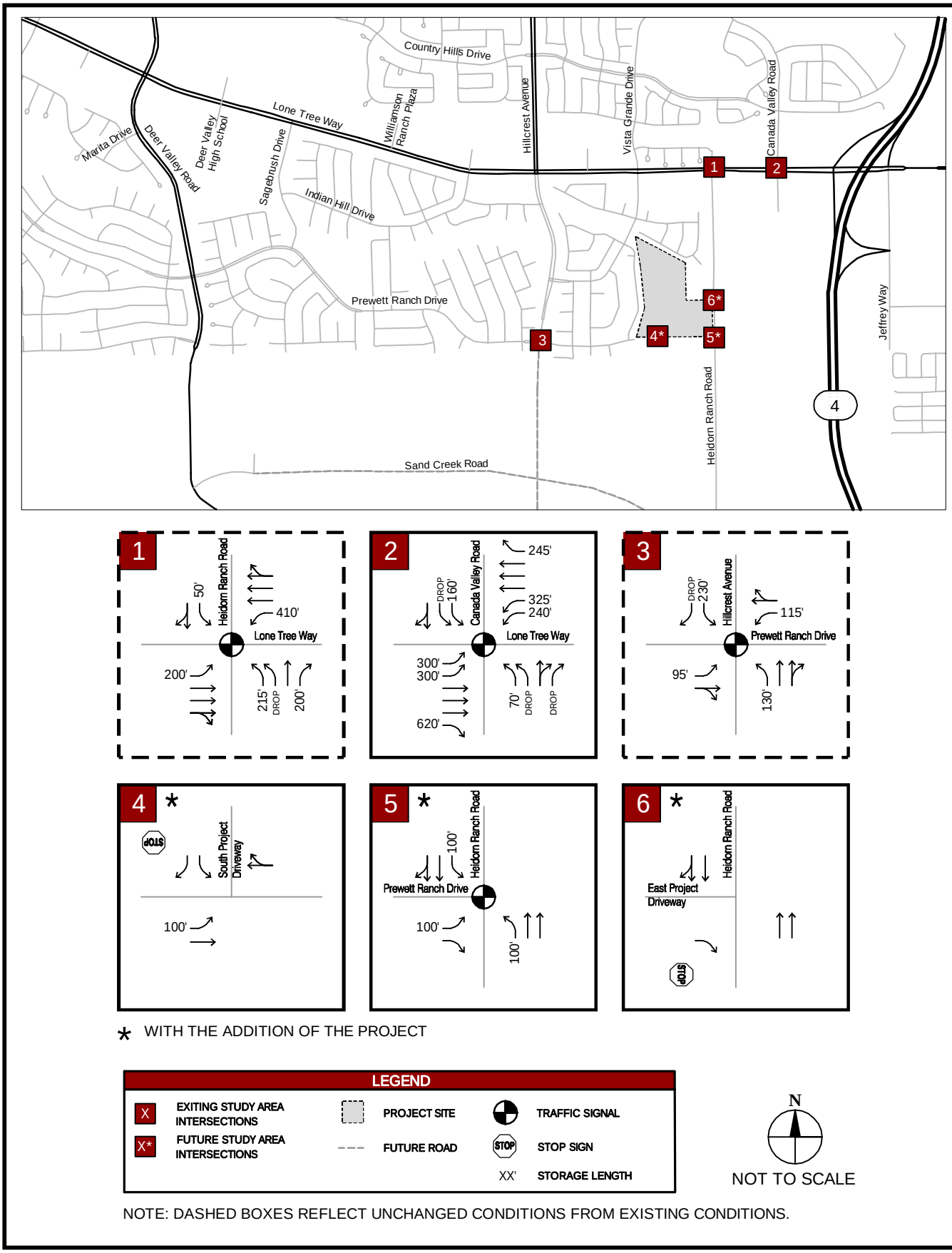

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FIGURE 10
NEAR-TERM CONDITION
LANE GEOMETRY AND TRAFFIC CONTROL

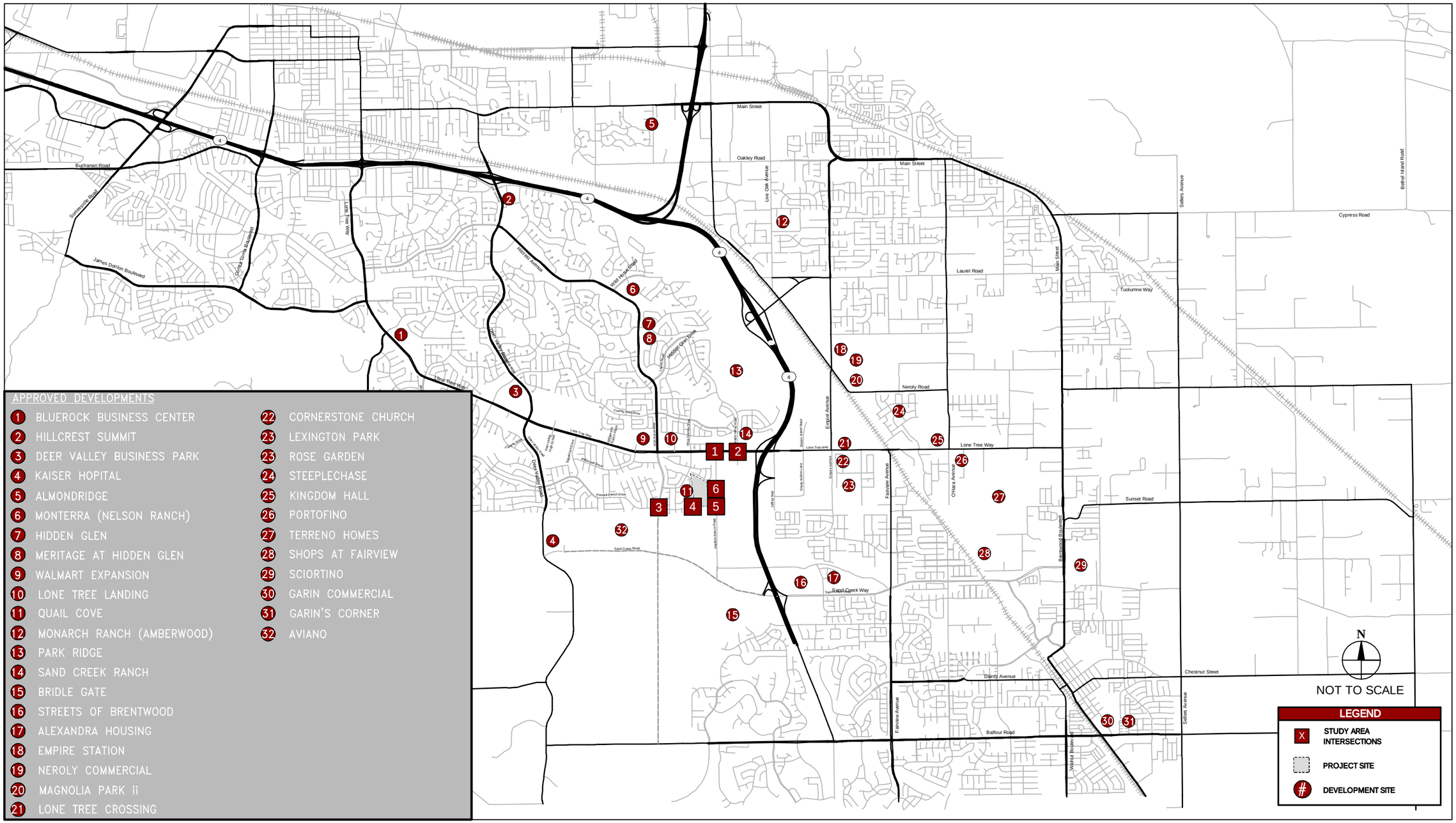

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FIGURE 11
APPROVED PROJECT LOCATIONS
ANTIOCH HEIDORN VILLAGE TIA

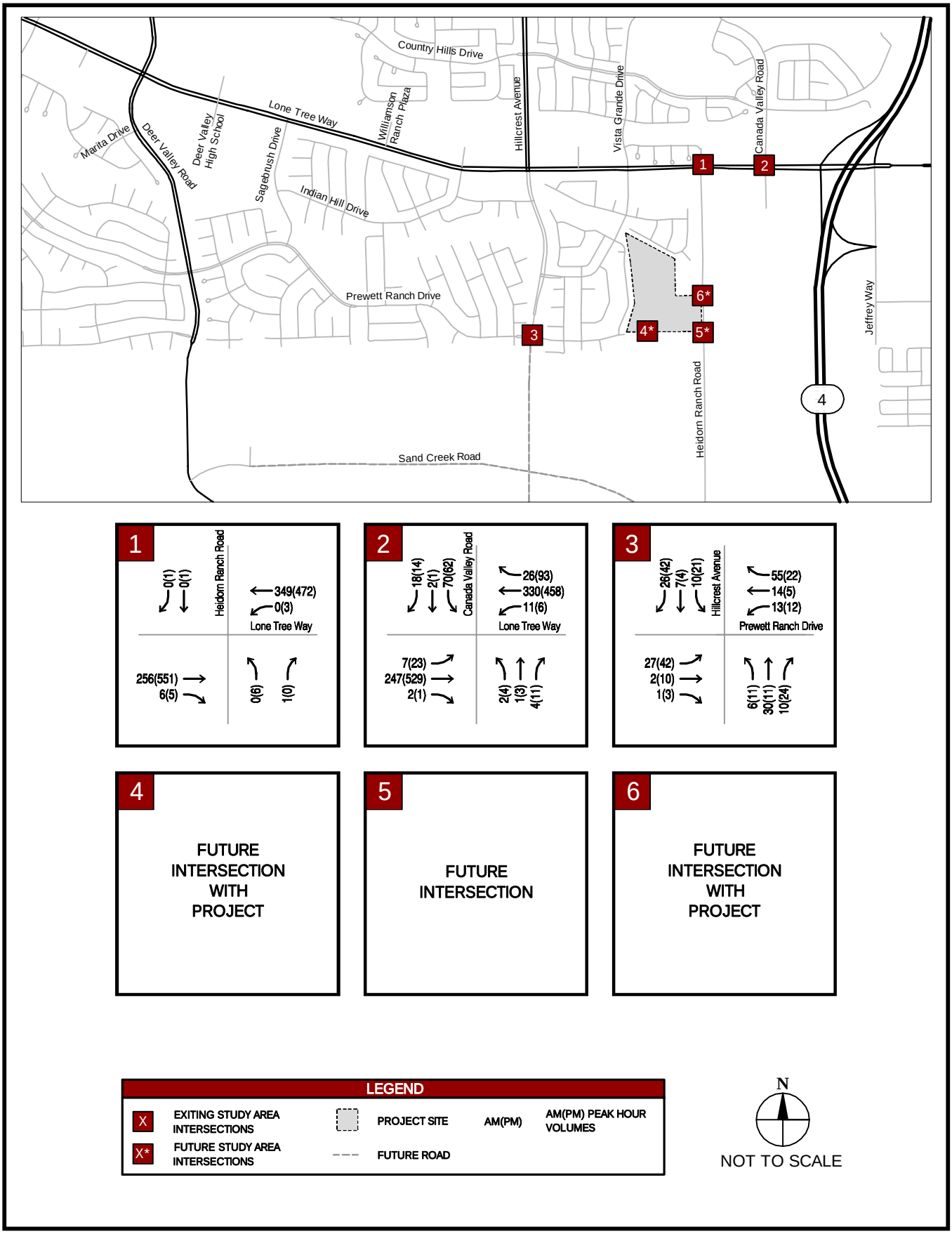

FIGURE 12

APPROVED AND PENDING DEVELOPMENT GENERATED PEAK HOUR VOLUMES

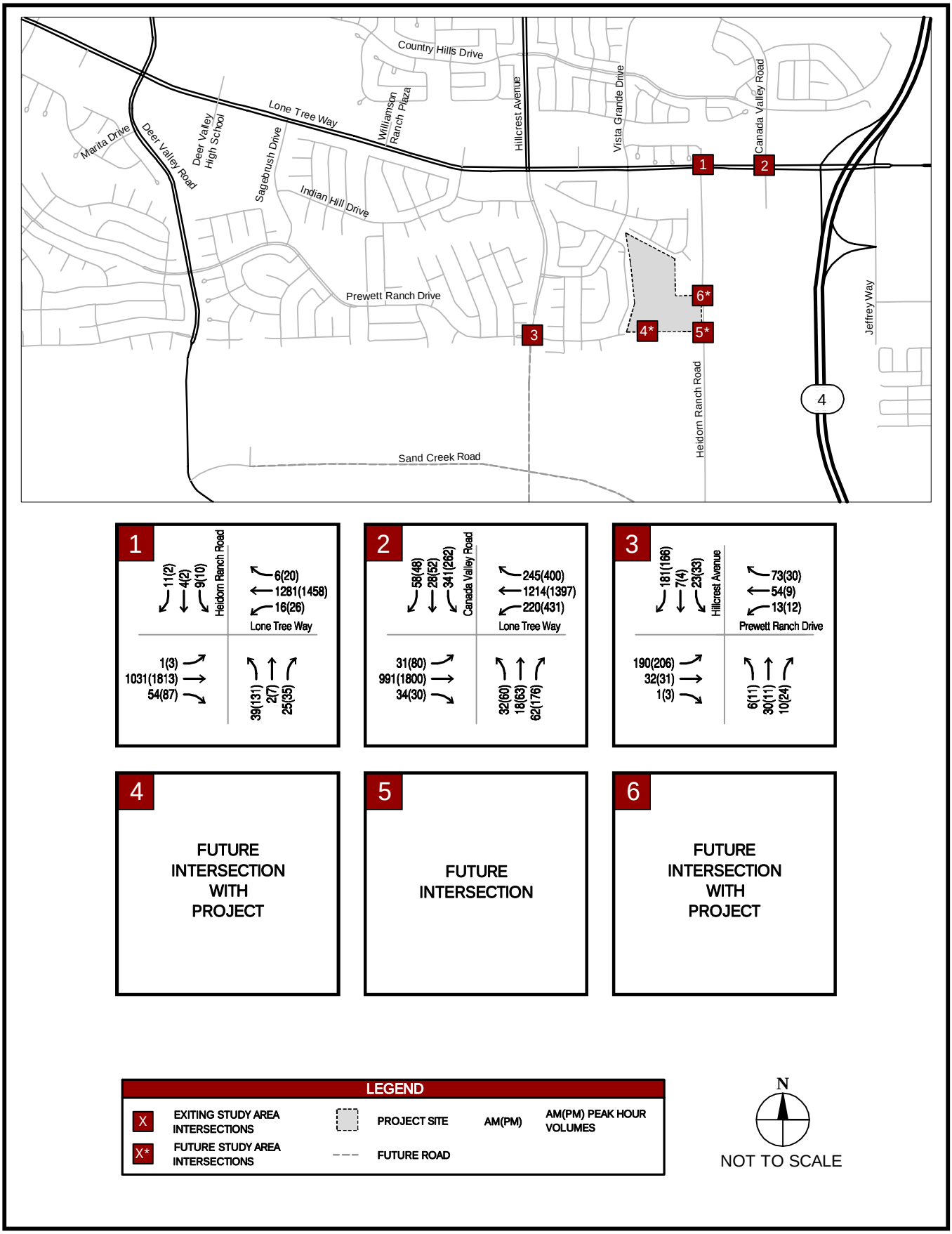

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FIGURE 13
NEAR-TERM CONDITION
PEAK HOUR TURNING MOVEMENT VOLUMES

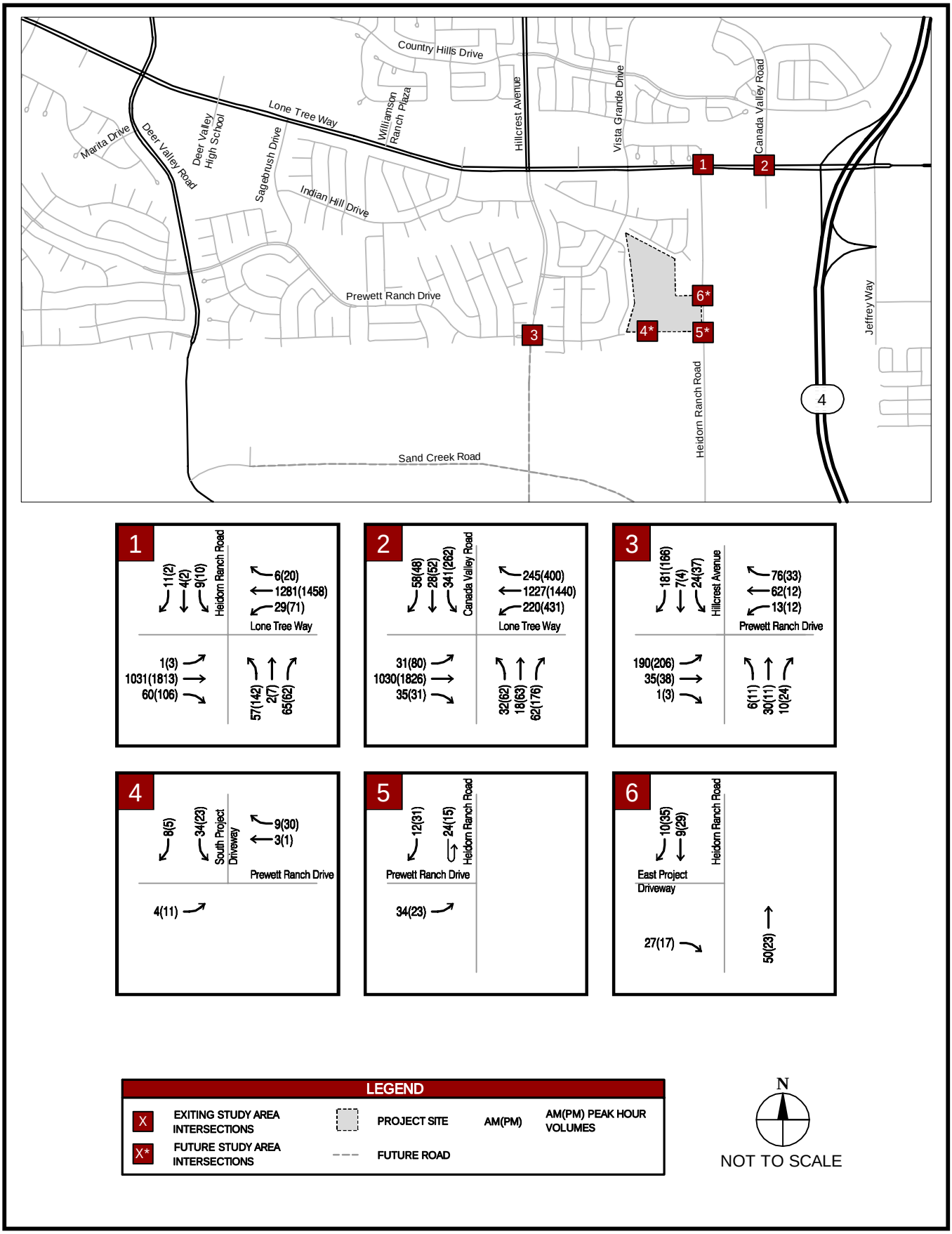
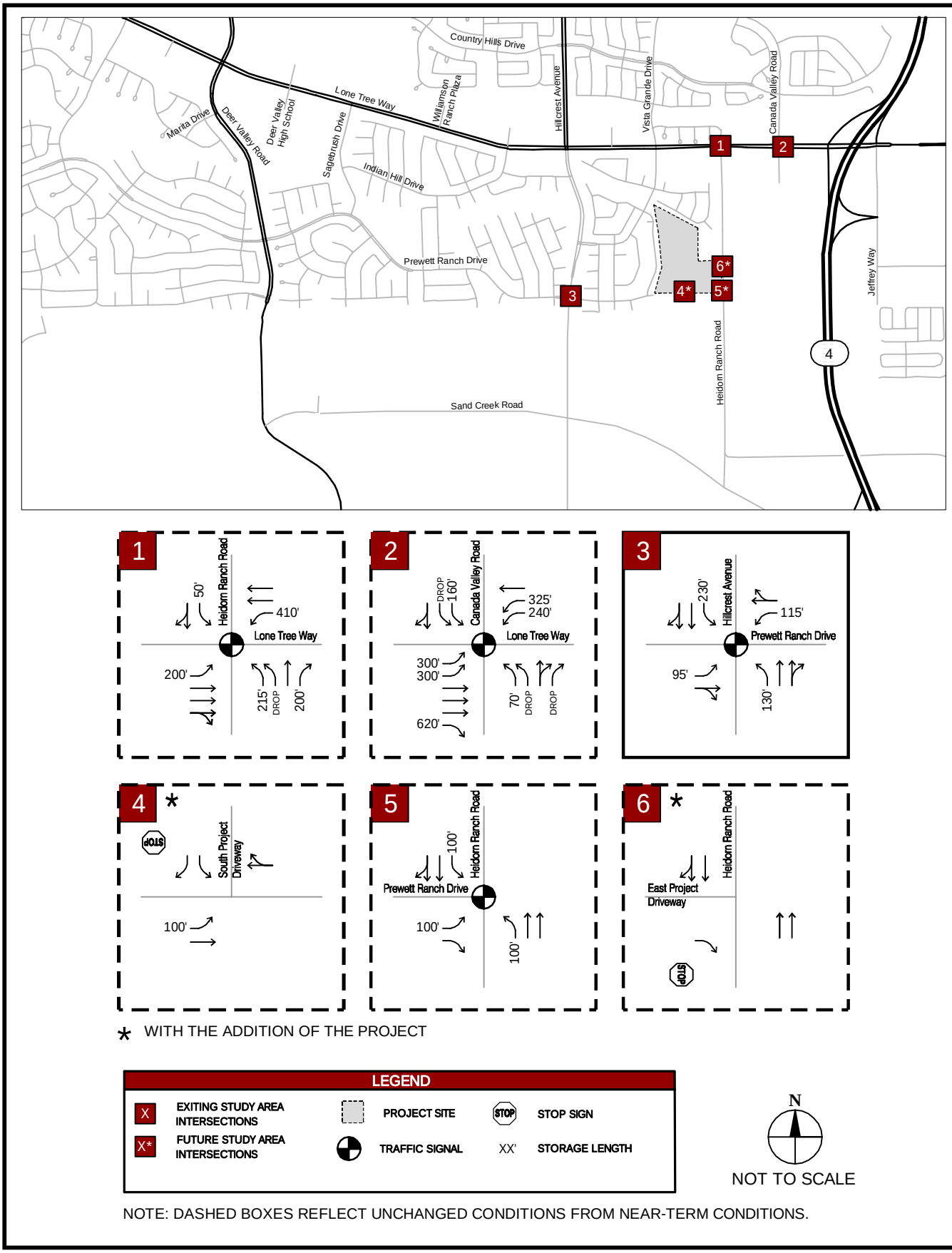


FIGURE 14

NEAR-TERM PLUS PROJECT CONDITION
PEAK HOUR TURNING MOVEMENT VOLUMES



* WITH THE ADDITION OF THE PROJECT

LEGEND			
X — EXITING STUDY AREA INTERSECTIONS	PROJECT SITE	STOP — STOP SIGN	
X* — FUTURE STUDY AREA INTERSECTIONS	TRAFFIC SIGNAL	XX' — STORAGE LENGTH	

N

NOT TO SCALE

NOTE: DASHED BOXES REFLECT UNCHANGED CONDITIONS FROM NEAR-TERM CONDITIONS.

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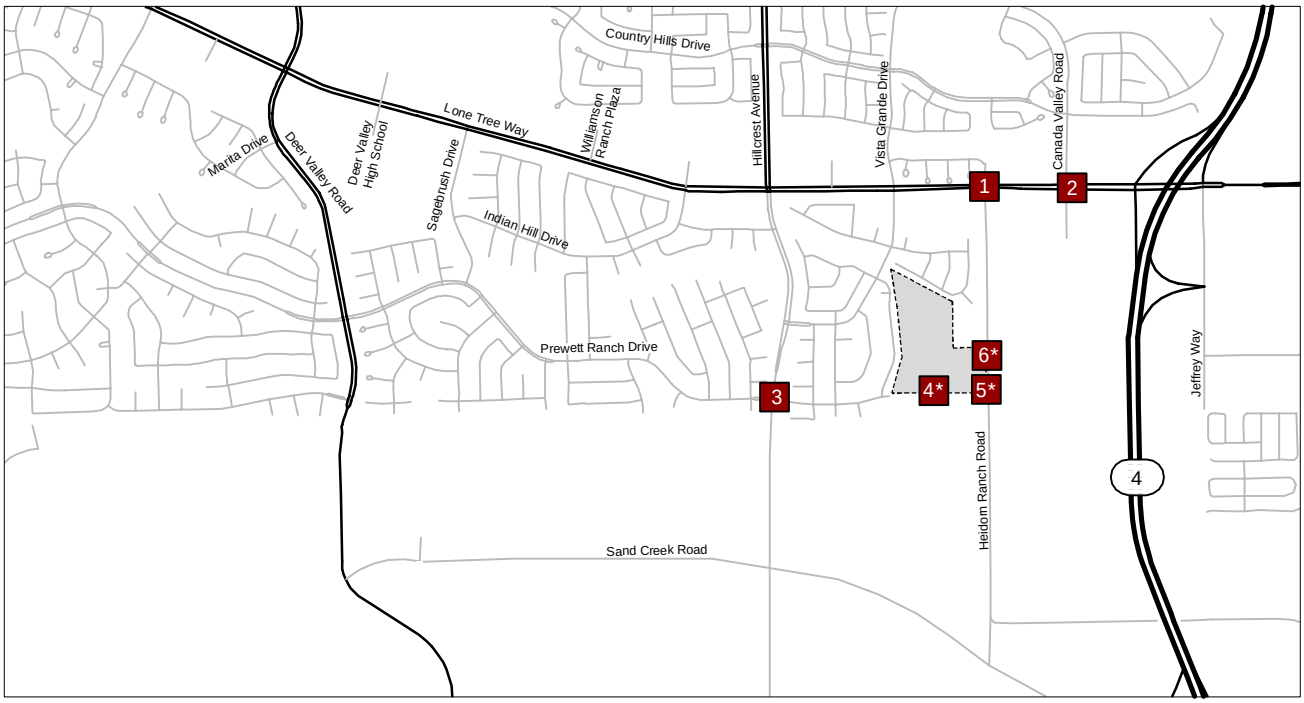
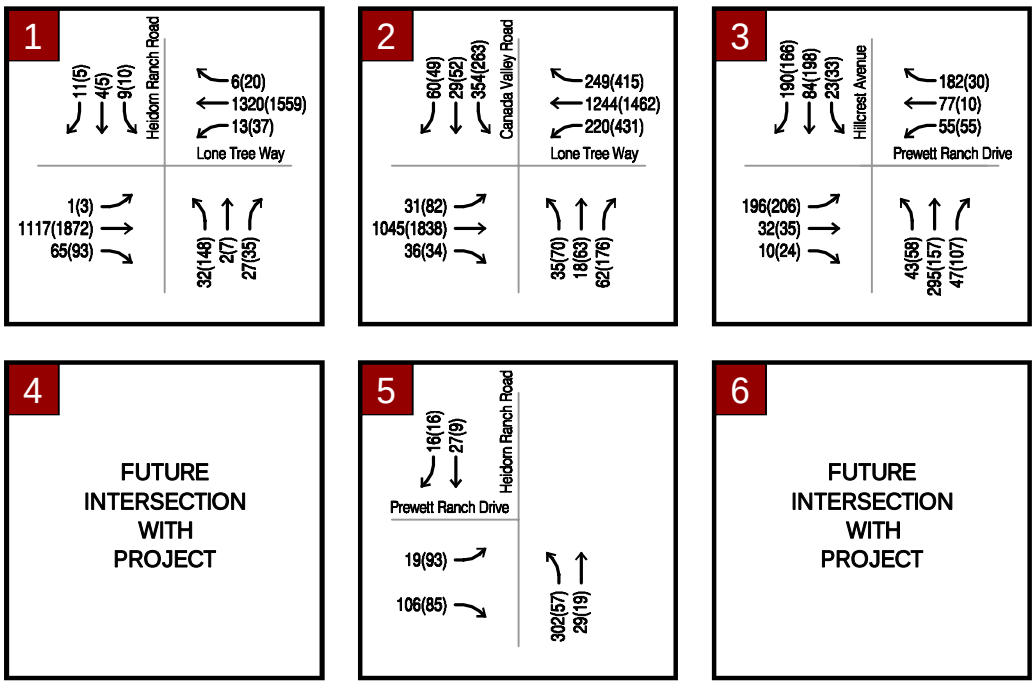
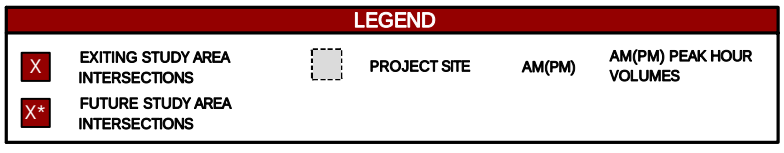
FIGURE 15
LONG-TERM (2030) CONDITION LANE GEOMETRY AND TRAFFIC CONTROL









NOT TO SCALE

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FIGURE 16

LONG-TERM (2030) CONDITION
PEAK HOUR TURNING MOVEMENT VOLUMES

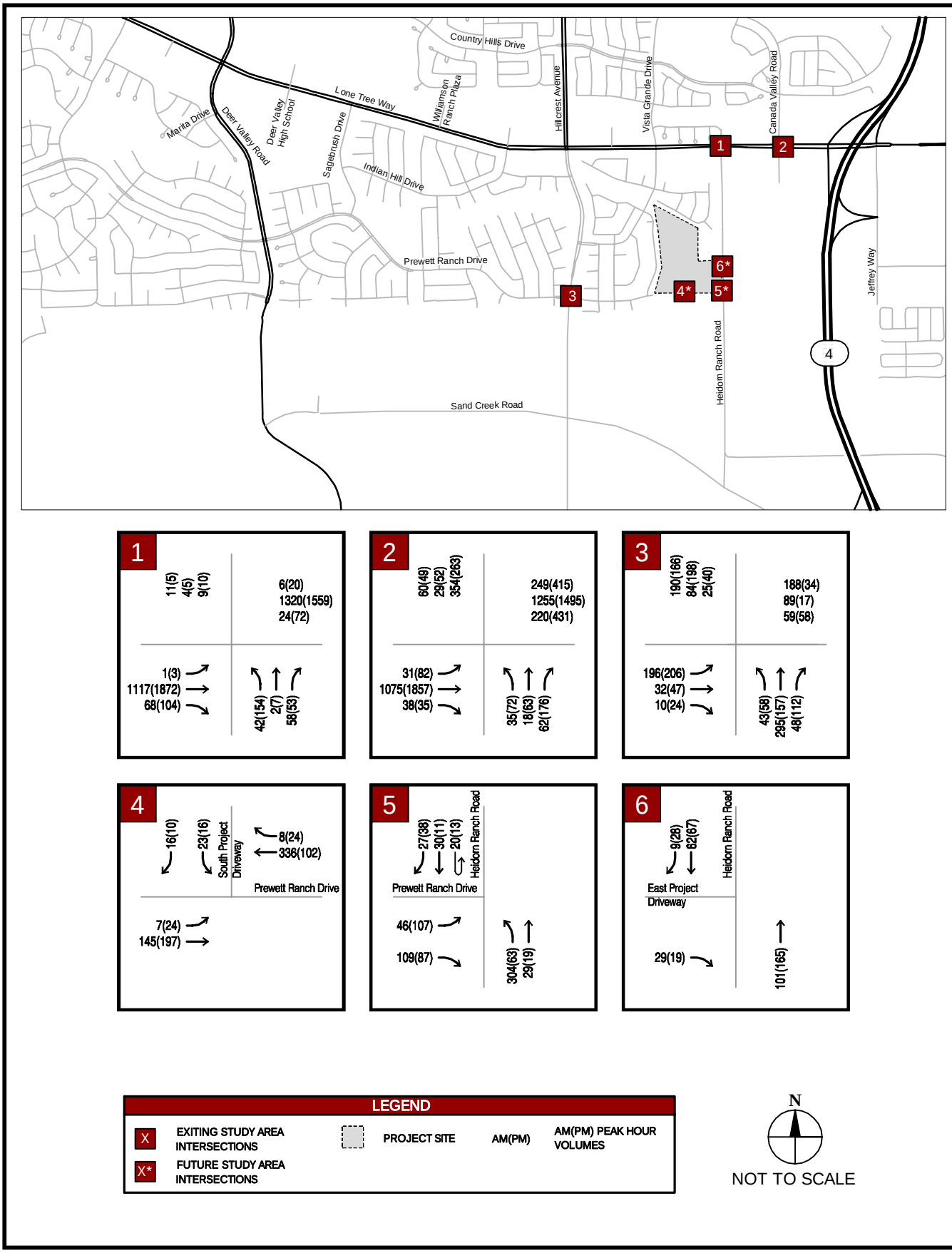


FIGURE 17

LONG-TERM (2030) PLUS PROJECT CONDITION
PEAK HOUR TURNING MOVEMENT VOLUMES

APPENDIX

APPENDIX

TURNING MOVEMENT VOLUMES

EXISTING (2014) TRAFFIC CONDITIONS

TRIP GENERATION

EXISTING (2014) PLUS PROJECT TRAFFIC CONDITIONS

NEAR-TERM TRAFFIC CONDITIONS

NEAR-TERM PLUS PROJECT TRAFFIC CONDITIONS

LONG-TERM (2030) TRAFFIC CONDITIONS

LONG-TERM (2030) PLUS PROJECT TRAFFIC CONDITIONS

QUEUING SUMMARY

TURNING MOVEMENT VOLUMES

ALL TRAFFIC DATA

City of Antioch
All Vehicles on Unshifted
Peds & Bikes on Bank 1
Nothing on Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 14-7011-018 Hillcrest Avenue-Prewett Ranch Drive.ppd
Date : 1/8/2014

Bank 1 Count = Peds & Bikes

	Hillcrest Avenue Southbound					Prewett Ranch Drive Westbound					Hillcrest Avenue Northbound					Prewett Ranch Drive Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Ped Total
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0
07:45	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	2
08:00	0	0	0	3	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	1	4
08:15	0	0	1	2	1	0	0	0	0	0	0	0	0	3	0	0	1	0	0	1	2	5
08:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	6	1	0	1	0	0	1	0	0	0	4	0	0	1	0	0	1	3	10
16:00	0	0	0	1	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	7
16:15	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	0	0	0	4	0	0	0	0	0	0	0	0	0	7	0	1	0	0	0	1	1	11
17:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
Grand Total	0	0	1	13	1	0	1	0	0	1	0	0	0	12	0	1	2	0	0	3	5	25
Apprch %	0.0%	0.0%	100.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			33.3%	66.7%	0.0%				
Total %	0.0%	0.0%	20.0%		20.0%	0.0%	20.0%	0.0%		20.0%	0.0%	0.0%	0.0%		0.0%	20.0%	40.0%	0.0%		60.0%	100.0%	

AM PEAK HOUR	Hillcrest Avenue Southbound					Prewett Ranch Drive Westbound					Hillcrest Avenue Northbound					Prewett Ranch Drive Eastbound					
START TIME	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	Total
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
07:45	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1
08:15	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2
Total Volume	0	0	1	2	1	0	1	0	1	1	0	0	0	0	0	0	2	0	1	2	4
% App Total	0.0%	0.0%	100.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.000	.250		.250	.000	.250	.000		.250	.000	.000	.000		.000	.000	.500	.000		.500	.500

PM PEAK HOUR	Hillcrest Avenue Southbound					Prewett Ranch Drive Westbound					Hillcrest Avenue Northbound					Prewett Ranch Drive Eastbound					
START TIME	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	Total
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
% App Total	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000

ALL TRAFFIC DATA

City of Antioch
All Vehicles on Unshifted
Peds & Bikes on Bank 1
Nothing on Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 14-7011-024 Canada Valley Road-Lone Tree Way.ppd
Date : 1/8/2014

Bank 1 Count = Peds & Bikes

	Canada Valley Road Southbound					Lone Tree Way Westbound					Canada Valley Road Northbound					Lone Tree Way Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Ped Total
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0
07:30	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
07:45	0	0	0	2	0	0	0	1	2	1	0	0	0	0	0	0	1	0	0	1	2	4
Total	1	0	0	2	1	0	0	1	2	1	0	0	0	0	0	0	3	0	1	3	5	5
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	1	1	1	3
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	1	1	1	3
16:00	0	0	0	2	0	0	0	0	4	0	0	0	0	2	0	0	1	0	1	1	1	9
16:15	0	0	0	1	0	0	1	1	0	2	0	0	0	0	0	0	2	0	2	2	4	3
16:30	0	0	0	3	0	0	0	1	3	1	0	0	0	0	0	0	0	0	1	0	1	7
16:45	0	0	0	4	0	0	0	0	0	0	0	0	0	4	0	0	3	0	0	3	3	8
Total	0	0	0	10	0	0	1	2	7	3	0	0	0	6	0	0	6	0	4	6	9	27
17:00	0	0	0	0	0	0	1	0	3	1	0	0	0	0	0	0	0	0	0	0	1	3
17:15	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	2	0	1	3
17:30	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	4
17:45	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	4
Total	0	0	0	2	0	0	2	0	6	2	0	0	0	1	0	0	0	0	5	0	2	14
Grand Total	1	0	0	14	1	0	3	3	15	6	0	0	0	9	0	0	10	0	11	10	17	49
Apprch %	100.0%	0.0%	0.0%			0.0%	50.0%	50.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%				
Total %	5.9%	0.0%	0.0%		5.9%	0.0%	17.6%	17.6%		35.3%	0.0%	0.0%	0.0%		0.0%	0.0%	58.8%	0.0%		58.8%	100.0%	

AM PEAK HOUR	Canada Valley Road Southbound					Lone Tree Way Westbound					Canada Valley Road Northbound					Lone Tree Way Eastbound					
START TIME	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	Total
Peak Hour Analysis From 07:45 to 08:45																					
Peak Hour For Entire Intersection Begins at 07:45																					
07:45	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0	0	1	0	1	1	2
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0	0	2	0	1	2	3
% App Total	0.0%	0.0%	0.0%			0.0%	0.0%	100.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.000	.250		.250	.000	.000	.000		.000	.000	.500	.000		.500	.375

PM PEAK HOUR	Canada Valley Road Southbound					Lone Tree Way Westbound					Canada Valley Road Northbound					Lone Tree Way Eastbound					
START TIME	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	3	3
17:00	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	2	0	1
17:15	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	0	0	0	2	0	1
17:30	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0
Total Volume	0	0	0	2	0	0	2	0	6	2	0	0	0	1	0	0	3	0	5	3	5
% App Total	0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.500	.000		.500	.000	.000	.000		.000	.000	.250	.000		.250	.417

ALL TRAFFIC DATA

City of Antioch
All Vehicles on Unshifted
Peds & Bikes on Bank 1
Nothing on Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 14-7011-023 Heidorn Ranch Road-Lone Tree Way.ppd
Date : 1/8/2014

Bank 1 Count = Peds & Bikes

	Fairside Way Southbound					Lone Tree Way Westbound					Heidorn Ranch Road Northbound					Lone Tree Way Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Ped Total
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	0	0	2	3	1
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	1
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	2	2	1
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
16:15	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0	0	2	0	0	2	2	4
16:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
16:45	0	0	0	2	0	0	0	0	3	0	0	0	0	3	0	0	2	0	0	2	2	8
Total	0	0	0	3	0	0	0	0	4	0	0	0	0	8	0	0	4	0	0	4	4	15
17:00	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
17:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
17:30	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	1	1
17:45	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1
Total	0	1	0	1	1	0	1	1	1	2	0	0	0	2	0	0	0	0	0	0	3	4
Grand Total	1	1	0	4	2	0	1	1	6	2	0	0	0	11	0	0	8	0	0	8	12	21
Apprch %	50.0%	50.0%	0.0%			0.0%	50.0%	50.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%				
Total %	8.3%	8.3%	0.0%		16.7%	0.0%	8.3%	8.3%		16.7%	0.0%	0.0%	0.0%		0.0%	0.0%	66.7%	0.0%		66.7%	100.0%	

AM PEAK HOUR	Fairside Way Southbound					Lone Tree Way Westbound					Heidorn Ranch Road Northbound					Lone Tree Way Eastbound					
START TIME	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	Total
Peak Hour Analysis From 07:45 to 08:45																					
Peak Hour For Entire Intersection Begins at 07:45																					
07:45	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	1	2
% App Total	100.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.250	.000	.000		.250	.000	.000	.000		.000	.000	.000	.000		.000	.000	.250	.000		.250	.500

PM PEAK HOUR	Fairside Way Southbound					Lone Tree Way Westbound					Heidorn Ranch Road Northbound					Lone Tree Way Eastbound					
START TIME	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	LEFT	THRU	RIGHT	Ped	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	0	0	0	2	0	0	0	0	3	0	0	0	0	3	0	0	2	0	0	2	2
17:00	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1
17:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	1
Total Volume	0	0	0	3	0	0	1	1	4	2	0	0	0	4	0	0	2	0	0	2	4
% App Total	0.0%	0.0%	0.0%			0.0%	50.0%	50.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.250	.250		.500	.000	.000	.000		.000	.000	.250	.000		.250	.500

EXISTING (2014) TRAFFIC CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	775	48	16	932	6	39	2	24	9	4	11
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		0.98	1.00		0.99	1.00		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Cap, veh/h	34	3483	214	61	3797	25	198	167	141	107	42	110
Arrive On Green	0.04	1.00	1.00	0.07	1.00	1.00	0.06	0.09	0.09	0.06	0.09	0.09
Sat Flow, veh/h	1774	5203	320	1774	5545	36	3442	1863	1573	1774	457	1187
Grp Volume(v), veh/h	1	637	309	18	720	358	72	4	44	10	0	18
Grp Sat Flow(s),veh/h/ln	1774	1863	1798	1774	1863	1855	1721	1863	1573	1774	0	1643
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	1.7	0.2	1.8	0.4	0.0	0.8
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.8	0.0	0.0	1.7	0.2	1.8	0.4	0.0	0.8
Prop In Lane	1.00		0.18	1.00		0.02	1.00		1.00	1.00		0.72
Lane Grp Cap(c), veh/h	34	2494	1204	61	2551	1271	198	167	141	107	0	152
V/C Ratio(X)	0.03	0.26	0.26	0.29	0.28	0.28	0.36	0.02	0.31	0.09	0.00	0.12
Avail Cap(c_a), veh/h	302	2494	1204	302	2551	1271	586	794	670	302	0	700
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)	0.98	0.98	0.98	0.94	0.94	0.94	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.7	0.0	0.0	37.3	0.0	0.0	37.3	34.1	23.6	36.5	0.0	34.4
Incr Delay (d2), s/veh	0.5	0.2	0.5	3.5	0.3	0.5	1.6	0.1	1.8	0.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.0	0.1	0.2	0.4	0.1	0.2	0.7	0.1	0.9	0.2	0.0	0.3
Lane Grp Delay (d), s/veh	39.2	0.2	0.5	40.7	0.3	0.5	38.9	34.2	25.3	37.0	0.0	34.5
Lane Grp LOS	D	A	A	D	A	A	D	C	C	D		C
Approach Vol, veh/h		947			1096			120			28	
Approach Delay, s/veh		0.4			1.0			33.7			35.4	
Approach LOS		A			A			C			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	4.6	58.0		5.8	59.3		7.7	10.4		7.9	10.6	
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5		4.5	5.3		4.5	4.5	
Max Green Setting (Gmax), s	12.5	52.5		12.5	52.5		12.5	32.7		12.5	33.5	
Max Q Clear Time (g_c+I1), s	2.0	2.0		2.8	2.0		3.7	3.8		2.4	2.8	
Green Ext Time (p_c), s	0.0	46.3		0.0	46.3		0.2	0.2		0.0	0.1	

Intersection Summary	
HCM 2010 Ctrl Delay	3.0
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	24	744	32	209	884	219	30	17	58	271	26	40
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		0.98	1.00		0.98	1.00		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	3	1	2	3	1	2	1	1	1	1	1
Cap, veh/h	87	2431	678	351	2587	715	106	143	119	451	560	470
Arrive On Green	0.10	0.87	0.87	0.20	0.93	0.93	0.03	0.08	0.08	0.25	0.30	0.30
Sat Flow, veh/h	1774	5588	1559	3442	5588	1545	3548	1863	1554	1774	1863	1562
Grp Volume(v), veh/h	27	836	36	240	1016	252	35	56	44	399	38	59
Grp Sat Flow(s),veh/h/ln	1774	1863	1559	1721	1863	1545	1774	1863	1554	1774	1863	1562
Q Serve(g_s), s	1.3	2.5	0.3	5.9	1.9	0.4	0.9	2.6	2.4	19.6	1.3	1.9
Cycle Q Clear(g_c), s	1.3	2.5	0.3	5.9	1.9	0.4	0.9	2.6	2.4	19.6	1.3	1.9
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	87	2431	678	351	2587	715	106	143	119	451	560	470
V/C Ratio(X)	0.31	0.34	0.05	0.68	0.39	0.35	0.33	0.39	0.37	0.89	0.07	0.13
Avail Cap(c_a), veh/h	235	2431	678	759	2587	715	469	760	634	528	1068	895
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)	0.98	0.98	0.98	0.87	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.5	3.5	3.3	34.7	1.9	0.1	43.1	39.9	39.8	32.6	22.6	13.4
Incr Delay (d2), s/veh	0.7	0.4	0.1	0.8	0.4	1.2	0.7	0.7	0.7	13.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.6	0.9	0.1	2.3	0.6	0.6	0.4	1.2	1.0	10.1	0.6	0.9
Lane Grp Delay (d), s/veh	40.3	3.9	3.5	35.5	2.3	1.3	43.8	40.5	40.5	46.0	22.7	13.4
Lane Grp LOS	D	A	A	D	A	A	D	D	D	D	C	B
Approach Vol, veh/h		899			1508			135			496	
Approach Delay, s/veh		5.0			7.4			41.4			40.4	
Approach LOS		A			A			D			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.7	42.5		12.3	45.0		5.7	9.9		26.0	30.3	
Change Period (Y+Rc), s	6.3	6.3		4.0	6.3		4.0	4.2		4.0	4.2	
Max Green Setting (Gmax), s	11.0	30.7		19.0	38.7		11.0	35.8		26.0	50.8	
Max Q Clear Time (g_c+I1), s	3.3	4.5		7.9	3.9		2.9	4.6		21.6	3.9	
Green Ext Time (p_c), s	0.1	11.3		0.4	19.5		0.0	0.4		0.4	0.4	

Intersection Summary	
HCM 2010 Ctrl Delay	13.6
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	163	30	0	0	40	18	0	0	0	13	0	155
Peak Hour Factor	0.85	0.85	0.85	0.63	0.63	0.63	1.00	1.00	1.00	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	192	35	0	0	63	29	0	0	0	15	0	180
Number of Lanes	1	1	0	1	1	0	1	2	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	10.7	9	0	9.1
HCM LOS	B	A	-	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%	0%	0%	100%	0%
Vol Thru, %	100%	100%	100%	0%	100%	100%	69%	0%	0%
Vol Right, %	0%	0%	0%	0%	0%	0%	31%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	0	0	163	30	0	58	13	155
LT Vol	0	0	0	0	30	0	40	0	0
Through Vol	0	0	0	0	0	0	18	0	155
RT Vol	0	0	0	163	0	0	0	13	0
Lane Flow Rate	0	0	0	192	35	0	92	15	180
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0	0	0	0.307	0.052	0	0.137	0.025	0.24
Departure Headway (Hd)	5.888	5.888	4.137	5.755	5.253	5.576	5.357	6	4.794
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	0	0	623	679	0	666	596	746
Service Time	3.667	3.667	1.914	3.512	3.009	3.341	3.122	3.747	2.54
HCM Lane V/C Ratio	0	0	0	0.308	0.052	0	0.138	0.025	0.241
HCM Control Delay	8.7	8.7	6.9	11.1	8.3	8.3	9	8.9	9.1
HCM Lane LOS	N	N	N	B	A	N	A	A	A
HCM 95th-tile Q	0	0	0	1.3	0.2	0	0.5	0.1	0.9

Notes

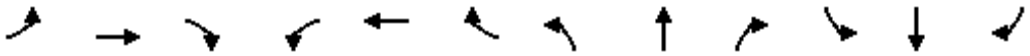
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	946	18	1078	72	4	44	10	18
v/c Ratio	0.01	0.24	0.14	0.26	0.26	0.02	0.15	0.08	0.11
Control Delay	75.0	6.1	80.2	0.8	57.8	41.5	1.1	57.8	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.0	6.1	80.2	0.8	57.8	41.5	1.1	57.8	27.0
Queue Length 50th (ft)	1	28	16	1	29	3	0	8	4
Queue Length 95th (ft)	m4	117	m43	21	31	7	0	26	22
Internal Link Dist (ft)		1050		900		972			316
Turn Bay Length (ft)	200		410		215		200	50	
Base Capacity (vph)	190	3949	190	4108	369	501	490	190	456
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.24	0.09	0.26	0.20	0.01	0.09	0.05	0.04

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)	27	836	36	240	1016	252	35	46	42	399	38	59
v/c Ratio	0.17	0.33	0.04	0.63	0.38	0.27	0.19	0.26	0.14	1.09	0.08	0.11
Control Delay	44.1	14.0	0.8	61.6	14.0	2.1	61.0	28.7	0.9	120.3	33.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.1	14.0	0.8	61.6	14.0	2.1	61.0	28.7	0.9	120.3	33.0	0.4
Queue Length 50th (ft)	22	115	0	83	98	0	14	16	0	~377	26	0
Queue Length 95th (ft)	52	273	8	m146	258	m77	30	42	0	#359	31	0
Internal Link Dist (ft)		900			775			542			1064	
Turn Bay Length (ft)	300		620	285		245	70			160		
Base Capacity (vph)	163	2565	840	528	2659	925	316	475	551	367	754	720
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.33	0.04	0.45	0.38	0.27	0.11	0.10	0.08	1.09	0.05	0.08

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)	3	1262	82	23	986	20	125	7	35	10	1	1
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.97
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	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Cap, veh/h	40	3166	206	72	3429	70	306	203	168	156	91	91
Arrive On Green	0.04	1.00	1.00	0.08	1.00	1.00	0.09	0.11	0.11	0.09	0.11	0.10
Sat Flow, veh/h	1774	5189	338	1774	5458	111	3442	1863	1544	1774	843	843
Grp Volume(v), veh/h	3	925	447	25	740	366	147	8	41	23	0	4
Grp Sat Flow(s),veh/h/ln	1774	1863	1802	1774	1863	1843	1721	1863	1544	1774	0	1686
Q Serve(g_s), s	0.1	0.0	0.0	1.0	0.0	0.0	3.2	0.3	1.5	0.9	0.0	0.2
Cycle Q Clear(g_c), s	0.1	0.0	0.0	1.0	0.0	0.0	3.2	0.3	1.5	0.9	0.0	0.2
Prop In Lane	1.00		0.19	1.00		0.06	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	40	2273	1099	72	2341	1158	306	203	168	156	0	182
V/C Ratio(X)	0.08	0.41	0.41	0.35	0.32	0.32	0.48	0.04	0.24	0.15	0.00	0.02
Avail Cap(c_a), veh/h	383	2273	1099	383	2341	1158	744	852	707	383	0	771
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)	0.93	0.93	0.93	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.8	0.0	0.0	35.2	0.0	0.0	34.1	31.4	20.7	33.1	0.0	31.5
Incr Delay (d2), s/veh	1.1	0.5	1.0	3.9	0.3	0.7	1.7	0.1	1.1	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.1	0.2	0.3	0.5	0.1	0.2	1.4	0.1	0.7	0.4	0.0	0.1
Lane Grp Delay (d), s/veh	37.9	0.5	1.0	39.0	0.3	0.7	35.8	31.5	21.8	33.7	0.0	31.5
Lane Grp LOS	D	A	A	D	A	A	D	C	C	C		C
Approach Vol, veh/h		1375			1131			196			27	
Approach Delay, s/veh		0.8			1.3			32.7			33.4	
Approach LOS		A			A			C			C	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	4.8	51.0		6.2	52.4		10.0	11.6		9.9	11.5	
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5		4.5	5.3		4.5	4.5	
Max Green Setting (Gmax), s	15.5	45.5		15.5	45.5		15.5	33.7		15.5	34.5	
Max Q Clear Time (g_c+I1), s	2.1	2.0		3.0	2.0		5.2	3.5		2.9	2.2	
Green Ext Time (p_c), s	0.0	42.4		0.0	42.4		0.5	0.2		0.0	0.1	

Intersection Summary	
HCM 2010 Ctrl Delay	3.6
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	57	1271	29	425	939	307	56	60	165	200	51	34
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.98
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	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	3	1	2	3	1	2	1	1	1	1	1
Cap, veh/h	81	2189	619	546	2684	759	152	298	246	287	519	432
Arrive On Green	0.09	0.78	0.78	0.32	0.96	0.96	0.04	0.16	0.16	0.16	0.28	0.28
Sat Flow, veh/h	1774	5588	1581	3442	5588	1580	3548	1863	1543	1774	1863	1551
Grp Volume(v), veh/h	61	1352	31	443	978	320	64	158	128	233	59	40
Grp Sat Flow(s),veh/h/ln	1774	1863	1581	1721	1863	1580	1774	1863	1543	1774	1863	1551
Q Serve(g_s), s	3.1	9.5	0.4	11.1	1.0	0.5	1.6	7.3	7.1	11.9	2.2	1.4
Cycle Q Clear(g_c), s	3.1	9.5	0.4	11.1	1.0	0.5	1.6	7.3	7.1	11.9	2.2	1.4
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	81	2189	619	546	2684	759	152	298	246	287	519	432
V/C Ratio(X)	0.75	0.62	0.05	0.81	0.36	0.42	0.42	0.53	0.52	0.81	0.11	0.09
Avail Cap(c_a), veh/h	227	2189	619	808	2684	759	530	736	609	454	934	778
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)	0.94	0.94	0.94	0.87	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	7.2	6.2	30.7	1.0	0.2	43.7	36.1	36.1	37.9	25.2	15.2
Incr Delay (d2), s/veh	4.9	1.2	0.1	2.0	0.3	1.5	0.7	0.5	0.6	2.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	1.4	2.6	0.2	4.0	0.4	0.6	0.7	3.4	2.7	5.4	1.0	0.7
Lane Grp Delay (d), s/veh	47.0	8.4	6.4	32.7	1.3	1.7	44.4	36.7	36.7	40.6	25.2	15.2
Lane Grp LOS	D	A	A	C	A	A	D	D	D	D	C	B
Approach Vol, veh/h		1444			1741			350			332	
Approach Delay, s/veh		10.0			9.4			38.1			34.8	
Approach LOS		B			A			D			C	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.6	39.7		17.9	48.0		7.0	18.0		18.2	29.1	
Change Period (Y+Rc), s	6.3	6.3		4.0	6.3		4.0	4.2		4.0	4.2	
Max Green Setting (Gmax), s	11.0	31.7		21.0	41.7		13.0	35.8		23.0	45.8	
Max Q Clear Time (g_c+I1), s	5.1	11.5		13.1	3.0		3.6	9.3		13.9	4.2	
Green Ext Time (p_c), s	0.2	14.8		0.8	21.2		0.1	0.8		0.3	0.8	

Intersection Summary	
HCM 2010 Ctrl Delay	14.4
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	164	21	0	0	4	8	0	0	0	12	0	124
Peak Hour Factor	0.73	0.73	0.73	1.00	1.00	1.00	1.00	1.00	1.00	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	225	29	0	0	4	8	0	0	0	14	0	149
Number of Lanes	1	1	0	1	1	0	1	2	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	10.7	7.9	0	8.5
HCM LOS	B	A	-	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%	0%	0%	100%	0%
Vol Thru, %	100%	100%	100%	0%	100%	100%	33%	0%	0%
Vol Right, %	0%	0%	0%	0%	0%	0%	67%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	0	0	164	21	0	12	12	124
LT Vol	0	0	0	0	21	0	4	0	0
Through Vol	0	0	0	0	0	0	8	0	124
RT Vol	0	0	0	164	0	0	0	12	0
Lane Flow Rate	0	0	0	225	29	0	12	14	149
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0	0	0	0.343	0.04	0	0.017	0.023	0.193
Departure Headway (Hd)	5.664	5.664	3.915	5.49	4.988	5.531	5.061	5.846	4.641
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	0	0	656	718	0	705	614	774
Service Time	3.405	3.405	1.657	3.221	2.719	3.274	2.804	3.566	2.361
HCM Lane V/C Ratio	0	0	0	0.343	0.04	0	0.017	0.023	0.193
HCM Control Delay	8.4	8.4	6.7	11.1	7.9	8.3	7.9	8.7	8.5
HCM Lane LOS	N	N	N	B	A	N	A	A	A
HCM 95th-tile Q	0	0	0	1.5	0.1	0	0.1	0.1	0.7

Notes

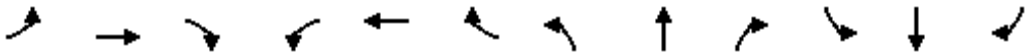
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	1372	25	1106	147	8	41	23	4
v/c Ratio	0.03	0.38	0.19	0.29	0.33	0.04	0.16	0.17	0.03
Control Delay	84.7	5.4	89.4	2.2	52.8	46.0	1.3	58.7	38.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.7	5.4	89.4	2.2	52.8	46.0	1.3	58.7	38.0
Queue Length 50th (ft)	3	57	22	26	56	6	0	19	2
Queue Length 95th (ft)	m7	86	55	38	88	17	0	22	5
Internal Link Dist (ft)		1050		900		972			316
Turn Bay Length (ft)	200		410		215		200	50	
Base Capacity (vph)	231	3583	231	3837	507	515	500	231	475
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.38	0.11	0.29	0.29	0.02	0.08	0.10	0.01

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)	61	1352	31	443	978	320	64	134	122	233	59	40
v/c Ratio	0.41	0.59	0.04	0.80	0.35	0.32	0.31	0.55	0.35	0.81	0.13	0.08
Control Delay	49.4	19.3	0.1	60.3	8.6	0.9	61.9	44.0	3.7	74.4	35.9	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	19.3	0.1	60.3	8.6	0.9	61.9	44.0	3.7	74.4	35.9	0.3
Queue Length 50th (ft)	50	252	0	140	74	0	27	83	0	189	41	0
Queue Length 95th (ft)	80	#512	0	201	178	1	49	122	7	265	59	0
Internal Link Dist (ft)		900			775			542			1064	
Turn Bay Length (ft)	300		620	285		245	70			160		
Base Capacity (vph)	163	2311	770	596	2785	990	369	488	549	326	682	662
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.59	0.04	0.74	0.35	0.32	0.17	0.27	0.22	0.71	0.09	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

TRIP GENERATION

Trip Generation Planner (ITE 9th Edition)

Kimley»Horn

Weekday Trip Generation
Trips Based on Average Rates/Equations

Project Name **Heidorn Village**
Project Number **097037026**

ITE Code	Land Use Description	Independent Variable	No. of Units	Avg Rate or Eq	Trip Rates: Daily Rate	Trip Rates: AM Rate	Trip Rates: PM Rate	Total Trips: Daily Trips	Total Trips: AM Trips	Total Trips: PM Trips	Total Trips: AM Trips In	Total Trips: AM Trips Out	Total Trips: PM Trips In	Total Trips: PM Trips Out	Net Trips after Pass-By Reduction: Daily Trips	Net Trips after Pass-By Reduction: AM Trips	Net Trips after Pass-By Reduction: PM Trips	Net Trips after Pass-By Reduction: AM Trips In	Net Trips after Pass-By Reduction: AM Trips Out	Net Trips after Pass-By Reduction: PM Trips In	Net Trips after Pass-By Reduction: PM Trips Out
210	Single-Family Detached Housing	Dwelling Unit(s)	117	Avg	9.52	0.75	1.00	1114	88	117	22	66	74	43	1114	88	117	22	66	74	43
							Totals	**1114**	**88**	**117**	**22**	**66**	**74**	**43**	**1114**	**88**	**117**	**22**	**66**	**74**	**43**

Notes:
(1) AM and/or PM rates correspond to peak hour of generator

A Trip generation data from ITE *Trip Generation, 8th Edition*
B AM/PM rates correspond to peak of adjacent street traffic (if data available)
C Includes weekday rates only
D Total trips include pass-by trips w/ no internal capture
E Pass-by rates from ITE *Trip Generation Handbook, 2nd Edition*
F Internal capture rates from ITE *Trip Generation Handbook, 2nd Edition*
G Worksheet is intended as a planning tool. Verify results w/ ITE *Trip Generation, 9th Edition*
H Enter data only in green shaded cells

EXISTING (2014) PLUS PROJECT TRAFFIC CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	775	54	29	932	6	57	2	64	9	4	11
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		0.99	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Cap, veh/h	33	3339	232	76	3722	24	239	240	203	72	45	118
Arrive On Green	0.04	1.00	1.00	0.09	1.00	1.00	0.07	0.13	0.13	0.04	0.10	0.09
Sat Flow, veh/h	1774	5161	358	1774	5545	36	3442	1863	1576	1774	457	1187
Grp Volume(v), veh/h	1	642	311	33	720	358	106	4	119	10	0	18
Grp Sat Flow(s),veh/h/ln	1774	1863	1794	1774	1863	1855	1721	1863	1576	1774	0	1644
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	2.5	0.2	4.9	0.5	0.0	0.9
Cycle Q Clear(g_c), s	0.0	0.0	0.0	1.5	0.0	0.0	2.5	0.2	4.9	0.5	0.0	0.9
Prop In Lane	1.00		0.20	1.00		0.02	1.00		1.00	1.00		0.72
Lane Grp Cap(c), veh/h	33	2410	1160	76	2501	1245	239	240	203	72	0	164
V/C Ratio(X)	0.03	0.27	0.27	0.43	0.29	0.29	0.44	0.02	0.59	0.14	0.00	0.11
Avail Cap(c_a), veh/h	292	2410	1160	292	2501	1245	567	767	649	292	0	677
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)	0.98	0.98	0.98	0.94	0.94	0.94	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.2	0.0	0.0	37.9	0.0	0.0	38.0	32.4	22.8	39.4	0.0	35.0
Incr Delay (d2), s/veh	0.5	0.3	0.6	5.1	0.3	0.5	1.8	0.0	3.8	1.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.0	0.1	0.2	0.8	0.1	0.2	1.1	0.1	2.0	0.2	0.0	0.4
Lane Grp Delay (d), s/veh	40.7	0.3	0.6	42.9	0.3	0.5	39.8	32.4	26.6	40.6	0.0	35.1
Lane Grp LOS	D	A	A	D	A	A	D	C	C	D		D
Approach Vol, veh/h		954			1111			229			28	
Approach Delay, s/veh		0.4			1.6			32.8			37.1	
Approach LOS		A			A			C			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	4.6	58.0		6.7	60.1		8.9	13.9		6.4	11.5	
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5		4.5	5.3		4.5	4.5	
Max Green Setting (Gmax), s	12.5	52.5		12.5	52.5		12.5	32.7		12.5	33.5	
Max Q Clear Time (g_c+I1), s	2.0	2.0		3.5	2.0		4.5	6.9		2.5	2.9	
Green Ext Time (p_c), s	0.0	46.3		0.0	46.3		0.3	0.7		0.0	0.1	

Intersection Summary		
HCM 2010 Ctrl Delay	4.6	
HCM 2010 LOS	A	

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	24	783	33	209	897	219	30	17	58	271	26	40
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		0.98	1.00		0.98	1.00		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	3	1	2	3	1	2	1	1	1	1	1
Cap, veh/h	87	2431	678	351	2587	715	106	143	119	451	560	470
Arrive On Green	0.10	0.87	0.87	0.20	0.93	0.93	0.03	0.08	0.08	0.25	0.30	0.30
Sat Flow, veh/h	1774	5588	1559	3442	5588	1545	3548	1863	1554	1774	1863	1562
Grp Volume(v), veh/h	27	880	37	240	1031	252	35	56	44	399	38	59
Grp Sat Flow(s),veh/h/ln	1774	1863	1559	1721	1863	1545	1774	1863	1554	1774	1863	1562
Q Serve(g_s), s	1.3	2.7	0.3	5.9	2.0	0.4	0.9	2.6	2.4	19.6	1.3	1.9
Cycle Q Clear(g_c), s	1.3	2.7	0.3	5.9	2.0	0.4	0.9	2.6	2.4	19.6	1.3	1.9
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	87	2431	678	351	2587	715	106	143	119	451	560	470
V/C Ratio(X)	0.31	0.36	0.05	0.68	0.40	0.35	0.33	0.39	0.37	0.89	0.07	0.13
Avail Cap(c_a), veh/h	235	2431	678	759	2587	715	469	760	634	528	1068	895
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)	0.97	0.97	0.97	0.87	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.5	3.5	3.3	34.7	1.9	0.1	43.1	39.9	39.8	32.6	22.6	13.4
Incr Delay (d2), s/veh	0.7	0.4	0.1	0.8	0.4	1.2	0.7	0.7	0.7	13.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.6	0.9	0.1	2.3	0.6	0.6	0.4	1.2	1.0	10.1	0.6	0.9
Lane Grp Delay (d), s/veh	40.3	3.9	3.5	35.5	2.3	1.3	43.8	40.5	40.5	46.0	22.7	13.4
Lane Grp LOS	D	A	A	D	A	A	D	D	D	D	C	B
Approach Vol, veh/h		944			1523			135			496	
Approach Delay, s/veh		4.9			7.4			41.4			40.4	
Approach LOS		A			A			D			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.7	42.5		12.3	45.0		5.7	9.9		26.0	30.3	
Change Period (Y+Rc), s	6.3	6.3		4.0	6.3		4.0	4.2		4.0	4.2	
Max Green Setting (Gmax), s	11.0	30.7		19.0	38.7		11.0	35.8		26.0	50.8	
Max Q Clear Time (g_c+I1), s	3.3	4.7		7.9	4.0		2.9	4.6		21.6	3.9	
Green Ext Time (p_c), s	0.1	11.9		0.4	19.7		0.0	0.4		0.4	0.4	

Intersection Summary		
HCM 2010 Ctrl Delay	13.4	
HCM 2010 LOS	B	

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	163	33	0	0	48	21	0	0	0	14	0	155
Peak Hour Factor	0.85	0.85	0.85	0.63	0.63	0.63	1.00	1.00	1.00	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	192	39	0	0	76	33	0	0	0	16	0	180
Number of Lanes	1	1	0	1	1	0	1	2	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	10.7	9.2	0	9.2
HCM LOS	B	A	-	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%	0%	0%	100%	0%
Vol Thru, %	100%	100%	100%	0%	100%	100%	70%	0%	0%
Vol Right, %	0%	0%	0%	0%	0%	0%	30%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	0	0	163	33	0	69	14	155
LT Vol	0	0	0	0	33	0	48	0	0
Through Vol	0	0	0	0	0	0	21	0	155
RT Vol	0	0	0	163	0	0	0	14	0
Lane Flow Rate	0	0	0	192	39	0	110	16	180
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0	0	0	0.309	0.057	0	0.164	0.027	0.243
Departure Headway (Hd)	5.955	5.955	4.202	5.801	5.298	5.594	5.379	6.06	4.852
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	0	0	617	672	0	663	589	737
Service Time	3.741	3.741	1.987	3.564	3.061	3.361	3.146	3.812	2.604
HCM Lane V/C Ratio	0	0	0	0.311	0.058	0	0.166	0.027	0.244
HCM Control Delay	8.7	8.7	7	11.2	8.4	8.4	9.2	9	9.2
HCM Lane LOS	N	N	N	B	A	N	A	A	A
HCM 95th-tile Q	0	0	0	1.3	0.2	0	0.6	0.1	1

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection	
Intersection Delay, s/veh	6.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	4	0	3	9	34	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	3	10	38	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	13	0	-	0	17	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	9	-
Follow-up Headway	2.218	-	-	-	3.518	3.318
Pot Capacity-1 Maneuver	1606	-	-	-	1001	1074
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	1014	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1606	-	-	-	999	1074
Mov Capacity-2 Maneuver	-	-	-	-	999	-
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	1011	-

Approach	EB	WB	SB
HCM Control Delay, s	7.2	0	8.6
HCM LOS			A

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1606	-	-	-	999	1074
HCM Lane V/C Ratio	0.003	-	-	-	0.038	0.008
HCM Control Delay (s)	7.248	-	-	-	8.7	8.4
HCM Lane LOS	A				A	A
HCM 95th %tile Q(veh)	0.008	-	-	-	0.118	0.025

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (veh/h)	34	0	0	0	24	0	12
Number	7	14	5	2		6	16
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3		186.3	190.0
Lanes	1	1	1	2		2	0
Cap, veh/h	65	58	7	2484		1242	1056
Arrive On Green	0.04	0.00	0.00	0.00		0.00	0.67
Sat Flow, veh/h	1774	1583	1774	3725		1863	1583
Grp Volume(v), veh/h	38	0	0	0		0	13
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1863		1863	1583
Q Serve(g_s), s	0.6	0.0	0.0	0.0		0.0	0.1
Cycle Q Clear(g_c), s	0.6	0.0	0.0	0.0		0.0	0.1
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	65	58	7	2484		1242	1056
V/C Ratio(X)	0.58	0.00	0.00	0.00		0.00	0.01
Avail Cap(c_a), veh/h	1117	997	526	2484		1242	1056
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00		0.00	1.00
Uniform Delay (d), s/veh	12.8	0.0	0.0	0.0		0.0	1.5
Incr Delay (d2), s/veh	8.0	0.0	0.0	0.0		0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile Back of Q (50%), veh/ln	0.3	0.0	0.0	0.0		0.0	0.0
Lane Grp Delay (d), s/veh	20.8	0.0	0.0	0.0		0.0	1.5
Lane Grp LOS	C						A
Approach Vol, veh/h	38			0		13	
Approach Delay, s/veh	20.8			0.0		1.5	
Approach LOS	C					A	

Timer							
Assigned Phs			5	2		6	
Phs Duration (G+Y+Rc), s			0.0	22.0		22.0	
Change Period (Y+Rc), s			4.0	4.0		4.0	
Max Green Setting (Gmax), s			8.0	17.0		18.0	
Max Q Clear Time (g_c+I1), s			0.0	0.0		2.1	
Green Ext Time (p_c), s			0.0	0.0		0.0	

Intersection Summary	
HCM 2010 Ctrl Delay	15.9
HCM 2010 LOS	B

Notes

Intersection	
Intersection Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	27	1	50	9	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	30	1	56	10	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	46	11	21	0	-	0
Stage 1	16	-	-	-	-	-
Stage 2	30	-	-	-	-	-
Follow-up Headway	3.52	3.32	2.22	-	-	-
Pot Capacity-1 Maneuver	958	1067	1593	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	989	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	957	1067	1593	-	-	-
Mov Capacity-2 Maneuver	957	-	-	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	988	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	0.1	0
HCM LOS	A		

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1593	-	1067	-	-
HCM Lane V/C Ratio	0.001	-	0.028	-	-
HCM Control Delay (s)	7.261	0	8.5	-	-
HCM Lane LOS	A	A	A		
HCM 95th %tile Q(veh)	0.002	-	0.087	-	-

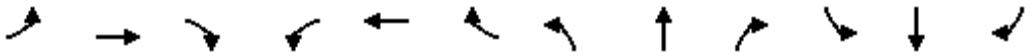
Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	953	33	1078	106	4	119	10	18
v/c Ratio	0.01	0.26	0.23	0.27	0.34	0.02	0.38	0.08	0.11
Control Delay	74.0	7.5	81.0	0.9	58.1	41.0	10.4	57.8	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.0	7.5	81.0	0.9	58.1	41.0	10.4	57.8	27.4
Queue Length 50th (ft)	1	63	29	1	43	3	0	8	4
Queue Length 95th (ft)	m4	119	65	21	42	7	0	26	23
Internal Link Dist (ft)		1050		900		972			316
Turn Bay Length (ft)	200		410		215		200	50	
Base Capacity (vph)	190	3673	190	3959	369	501	506	190	456
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.26	0.17	0.27	0.29	0.01	0.24	0.05	0.04

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)	27	880	37	240	1031	252	35	46	42	399	38	59
v/c Ratio	0.17	0.34	0.04	0.63	0.39	0.27	0.19	0.26	0.14	1.09	0.08	0.11
Control Delay	44.8	14.2	0.6	61.6	14.1	2.1	61.0	28.7	0.9	120.3	33.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	14.2	0.6	61.6	14.1	2.1	61.0	28.7	0.9	120.3	33.0	0.4
Queue Length 50th (ft)	21	121	0	83	100	0	14	16	0	~377	26	0
Queue Length 95th (ft)	53	291	5	m146	262	m77	30	42	0	#359	31	0
Internal Link Dist (ft)		900			775			542			1064	
Turn Bay Length (ft)	300		620	285		245	70			160		
Base Capacity (vph)	163	2565	840	528	2659	925	316	475	551	367	754	720
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.34	0.04	0.45	0.39	0.27	0.11	0.10	0.08	1.09	0.05	0.08

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.

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	163	33	0	0	48	21	0	0	0	14	0	155
Peak Hour Factor	0.85	0.85	0.85	0.63	0.63	0.63	1.00	1.00	1.00	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	192	39	0	0	76	33	0	0	0	16	0	180
Number of Lanes	1	1	0	1	1	0	1	2	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	10.7	9.2	0	9.2
HCM LOS	B	A	-	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%	0%	0%	100%	0%
Vol Thru, %	100%	100%	100%	0%	100%	100%	70%	0%	0%
Vol Right, %	0%	0%	0%	0%	0%	0%	30%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	0	0	163	33	0	69	14	155
LT Vol	0	0	0	0	33	0	48	0	0
Through Vol	0	0	0	0	0	0	21	0	155
RT Vol	0	0	0	163	0	0	0	14	0
Lane Flow Rate	0	0	0	192	39	0	110	16	180
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0	0	0	0.309	0.057	0	0.164	0.027	0.243
Departure Headway (Hd)	5.955	5.955	4.202	5.801	5.298	5.594	5.379	6.06	4.852
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	0	0	617	672	0	663	589	737
Service Time	3.741	3.741	1.987	3.564	3.061	3.361	3.146	3.812	2.604
HCM Lane V/C Ratio	0	0	0	0.311	0.058	0	0.166	0.027	0.244
HCM Control Delay	8.7	8.7	7	11.2	8.4	8.4	9.2	9	9.2
HCM Lane LOS	N	N	N	B	A	N	A	A	A
HCM 95th-tile Q	0	0	0	1.3	0.2	0	0.6	0.1	1

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection	
Intersection Delay, s/veh	6.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	4	0	3	9	34	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	3	10	38	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	13	0	-	0	17	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	9	-
Follow-up Headway	2.218	-	-	-	3.518	3.318
Pot Capacity-1 Maneuver	1606	-	-	-	1001	1074
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	1014	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1606	-	-	-	999	1074
Mov Capacity-2 Maneuver	-	-	-	-	999	-
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	1011	-

Approach	EB	WB	SB
HCM Control Delay, s	7.2	0	8.6
HCM LOS			A

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1606	-	-	-	999	1074
HCM Lane V/C Ratio	0.003	-	-	-	0.038	0.008
HCM Control Delay (s)	7.248	-	-	-	8.7	8.4
HCM Lane LOS	A				A	A
HCM 95th %tile Q(veh)	0.008	-	-	-	0.118	0.025

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Lane Group	EBL	SBU	SBT
Lane Group Flow (vph)	38	27	13
v/c Ratio	0.13	0.10	0.00
Control Delay	15.3	15.4	0.0
Queue Delay	0.0	0.0	0.0
Total Delay	15.3	15.4	0.0
Queue Length 50th (ft)	7	5	0
Queue Length 95th (ft)	26	21	0
Internal Link Dist (ft)	580		322
Turn Bay Length (ft)	100	100	
Base Capacity (vph)	786	416	2870
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.05	0.06	0.00

Intersection Summary

Intersection	
Intersection Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	27	1	50	9	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	30	1	56	10	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	46	11	21	0	-	0
Stage 1	16	-	-	-	-	-
Stage 2	30	-	-	-	-	-
Follow-up Headway	3.52	3.32	2.22	-	-	-
Pot Capacity-1 Maneuver	958	1067	1593	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	989	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	957	1067	1593	-	-	-
Mov Capacity-2 Maneuver	957	-	-	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	988	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	0.1	0
HCM LOS	A		

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1593	-	1067	-	-
HCM Lane V/C Ratio	0.001	-	0.028	-	-
HCM Control Delay (s)	7.261	0	8.5	-	-
HCM Lane LOS	A	A	A		
HCM 95th %tile Q(veh)	0.002	-	0.087	-	-

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	1262	101	68	986	20	136	7	62	10	1	1
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.97
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	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Cap, veh/h	38	2963	237	128	3444	70	315	221	183	149	94	94
Arrive On Green	0.04	1.00	1.00	0.14	1.00	1.00	0.09	0.12	0.12	0.08	0.11	0.11
Sat Flow, veh/h	1774	5107	408	1774	5458	111	3442	1863	1546	1774	843	843
Grp Volume(v), veh/h	3	940	451	75	740	366	160	8	73	23	0	4
Grp Sat Flow(s),veh/h/ln	1774	1863	1790	1774	1863	1843	1721	1863	1546	1774	0	1686
Q Serve(g_s), s	0.1	0.0	0.0	3.3	0.0	0.0	3.7	0.3	2.8	1.0	0.0	0.2
Cycle Q Clear(g_c), s	0.1	0.0	0.0	3.3	0.0	0.0	3.7	0.3	2.8	1.0	0.0	0.2
Prop In Lane	1.00		0.23	1.00		0.06	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	38	2161	1038	128	2351	1163	315	221	183	149	0	187
V/C Ratio(X)	0.08	0.43	0.43	0.59	0.31	0.31	0.51	0.04	0.40	0.15	0.00	0.02
Avail Cap(c_a), veh/h	365	2161	1038	365	2351	1163	707	811	673	365	0	734
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)	0.93	0.93	0.93	0.94	0.94	0.94	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.8	0.0	0.0	34.2	0.0	0.0	35.8	32.3	20.1	35.2	0.0	32.9
Incr Delay (d2), s/veh	1.2	0.6	1.2	5.6	0.3	0.7	1.8	0.1	2.0	0.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.1	0.2	0.4	1.5	0.1	0.2	1.6	0.1	1.4	0.5	0.0	0.1
Lane Grp Delay (d), s/veh	40.0	0.6	1.2	39.8	0.3	0.7	37.6	32.4	22.1	35.8	0.0	32.9
Lane Grp LOS	D	A	A	D	A	A	D	C	C	D		C
Approach Vol, veh/h		1394			1181			241			27	
Approach Delay, s/veh		0.9			2.9			32.8			35.4	
Approach LOS		A			A			C			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	4.8	51.0		9.0	55.2		10.6	12.8		10.0	12.2	
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5		4.5	5.3		4.5	4.5	
Max Green Setting (Gmax), s	15.5	45.5		15.5	45.5		15.5	33.7		15.5	34.5	
Max Q Clear Time (g_c+I1), s	2.1	2.0		5.3	2.0		5.7	4.8		3.0	2.2	
Green Ext Time (p_c), s	0.0	42.4		0.2	42.4		0.6	0.4		0.0	0.1	

Intersection Summary		
HCM 2010 Ctrl Delay		4.8
HCM 2010 LOS		A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	57	1297	30	425	982	307	58	60	165	200	51	34
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.98
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	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	3	1	2	3	1	2	1	1	1	1	1
Cap, veh/h	81	2189	619	546	2684	759	155	298	246	287	518	431
Arrive On Green	0.09	0.78	0.78	0.32	0.96	0.96	0.04	0.16	0.16	0.16	0.28	0.28
Sat Flow, veh/h	1774	5588	1581	3442	5588	1580	3548	1863	1543	1774	1863	1551
Grp Volume(v), veh/h	61	1380	32	443	1023	320	66	158	128	233	59	40
Grp Sat Flow(s),veh/h/ln	1774	1863	1581	1721	1863	1580	1774	1863	1543	1774	1863	1551
Q Serve(g_s), s	3.1	9.9	0.4	11.1	1.1	0.5	1.7	7.3	7.1	11.9	2.2	1.4
Cycle Q Clear(g_c), s	3.1	9.9	0.4	11.1	1.1	0.5	1.7	7.3	7.1	11.9	2.2	1.4
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	81	2189	619	546	2684	759	155	298	246	287	518	431
V/C Ratio(X)	0.76	0.63	0.05	0.81	0.38	0.42	0.43	0.53	0.52	0.81	0.11	0.09
Avail Cap(c_a), veh/h	227	2189	619	808	2684	759	530	736	609	454	935	778
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)	0.92	0.92	0.92	0.87	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	7.2	6.2	30.7	1.0	0.2	43.7	36.1	36.1	37.9	25.2	15.2
Incr Delay (d2), s/veh	4.9	1.3	0.1	2.0	0.4	1.5	0.7	0.5	0.6	2.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	1.4	2.6	0.2	4.0	0.4	0.6	0.8	3.4	2.7	5.4	1.0	0.7
Lane Grp Delay (d), s/veh	47.0	8.5	6.4	32.7	1.3	1.7	44.3	36.7	36.7	40.6	25.3	15.2
Lane Grp LOS	D	A	A	C	A	A	D	D	D	D	C	B
Approach Vol, veh/h		1473			1786			352			332	
Approach Delay, s/veh		10.1			9.2			38.1			34.8	
Approach LOS		B			A			D			C	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.6	39.7		17.9	48.0		7.1	18.0		18.2	29.0	
Change Period (Y+Rc), s	6.3	6.3		4.0	6.3		4.0	4.2		4.0	4.2	
Max Green Setting (Gmax), s	11.0	31.7		21.0	41.7		13.0	35.8		23.0	45.8	
Max Q Clear Time (g_c+I1), s	5.1	11.9		13.1	3.1		3.7	9.3		13.9	4.2	
Green Ext Time (p_c), s	0.2	14.8		0.8	22.0		0.1	0.8		0.3	0.8	

Intersection Summary	
HCM 2010 Ctrl Delay	14.3
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	164	28	0	0	7	11	0	0	0	16	0	124
Peak Hour Factor	0.73	0.73	0.73	1.00	1.00	1.00	1.00	1.00	1.00	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	225	38	0	0	7	11	0	0	0	19	0	149
Number of Lanes	1	1	0	1	1	0	1	2	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	10.6	8	0	8.5
HCM LOS	B	A	-	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%	0%	0%	100%	0%
Vol Thru, %	100%	100%	100%	0%	100%	100%	39%	0%	0%
Vol Right, %	0%	0%	0%	0%	0%	0%	61%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	0	0	164	28	0	18	16	124
LT Vol	0	0	0	0	28	0	7	0	0
Through Vol	0	0	0	0	0	0	11	0	124
RT Vol	0	0	0	164	0	0	0	16	0
Lane Flow Rate	0	0	0	225	38	0	18	19	149
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0	0	0	0.344	0.053	0	0.026	0.032	0.194
Departure Headway (Hd)	5.716	5.716	3.967	5.52	5.018	5.566	5.136	5.885	4.68
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	0	0	652	713	0	695	610	768
Service Time	3.461	3.461	1.712	3.254	2.752	3.312	2.881	3.607	2.401
HCM Lane V/C Ratio	0	0	0	0.345	0.053	0	0.026	0.031	0.194
HCM Control Delay	8.5	8.5	6.7	11.1	8	8.3	8	8.8	8.5
HCM Lane LOS	N	N	N	B	A	N	A	A	A
HCM 95th-tile Q	0	0	0	1.5	0.2	0	0.1	0.1	0.7

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection	
Intersection Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	11	0	1	30	23	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	0	1	33	26	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	34	0	-	0	42	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	24	-
Follow-up Headway	2.218	-	-	-	3.518	3.318
Pot Capacity-1 Maneuver	1578	-	-	-	969	1061
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	999	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1578	-	-	-	962	1061
Mov Capacity-2 Maneuver	-	-	-	-	962	-
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	991	-

Approach	EB	WB	SB
HCM Control Delay, s	7.3	0	8.7
HCM LOS			A

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1578	-	-	-	962	1061
HCM Lane V/C Ratio	0.008	-	-	-	0.027	0.005
HCM Control Delay (s)	7.299	-	-	-	8.8	8.4
HCM Lane LOS	A				A	A
HCM 95th %tile Q(veh)	0.023	-	-	-	0.082	0.016

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (veh/h)	23	0	0	0	15	0	31
Number	7	14	5	2		6	16
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3		186.3	190.0
Lanes	1	1	1	2		2	0
Cap, veh/h	46	41	6	2553		1277	1085
Arrive On Green	0.03	0.00	0.00	0.00		0.00	0.69
Sat Flow, veh/h	1774	1583	1774	3725		1863	1583
Grp Volume(v), veh/h	26	0	0	0		0	34
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1863		1863	1583
Q Serve(g_s), s	0.4	0.0	0.0	0.0		0.0	0.2
Cycle Q Clear(g_c), s	0.4	0.0	0.0	0.0		0.0	0.2
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	46	41	6	2553		1277	1085
V/C Ratio(X)	0.56	0.00	0.00	0.00		0.00	0.03
Avail Cap(c_a), veh/h	1024	914	512	2553		1277	1085
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00		0.00	1.00
Uniform Delay (d), s/veh	13.3	0.0	0.0	0.0		0.0	1.4
Incr Delay (d2), s/veh	10.1	0.0	0.0	0.0		0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile Back of Q (50%), veh/ln	0.3	0.0	0.0	0.0		0.0	0.0
Lane Grp Delay (d), s/veh	23.5	0.0	0.0	0.0		0.0	1.5
Lane Grp LOS	C						A
Approach Vol, veh/h	26			0		34	
Approach Delay, s/veh	23.5			0.0		1.5	
Approach LOS	C					A	

Timer							
Assigned Phs			5	2		6	
Phs Duration (G+Y+Rc), s			0.0	23.0		23.0	
Change Period (Y+Rc), s			4.0	4.0		4.0	
Max Green Setting (Gmax), s			8.0	18.0		19.0	
Max Q Clear Time (g_c+I1), s			0.0	0.0		2.2	
Green Ext Time (p_c), s			0.0	0.0		0.1	

Intersection Summary							
HCM 2010 Ctrl Delay			11.0				
HCM 2010 LOS			B				

Notes

Intersection	
Intersection Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	17	0	23	29	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	19	0	26	32	39

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	65	36	71	0	-	0
Stage 1	52	-	-	-	-	-
Stage 2	13	-	-	-	-	-
Follow-up Headway	3.52	3.32	2.22	-	-	-
Pot Capacity-1 Maneuver	933	1029	1527	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	1008	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	933	1029	1527	-	-	-
Mov Capacity-2 Maneuver	933	-	-	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	1008	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1527	-	1029	-	-
HCM Lane V/C Ratio	-	-	0.018	-	-
HCM Control Delay (s)	0	-	8.6	-	-
HCM Lane LOS	A		A		
HCM 95th %tile Q(veh)	0	-	0.056	-	-

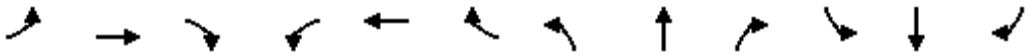
Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	1391	75	1106	160	8	73	23	4
v/c Ratio	0.03	0.41	0.41	0.29	0.36	0.04	0.27	0.17	0.03
Control Delay	84.7	7.0	92.4	2.1	53.0	46.0	6.0	58.7	38.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.7	7.0	92.4	2.1	53.0	46.0	6.0	58.7	38.5
Queue Length 50th (ft)	3	59	67	25	61	6	0	19	2
Queue Length 95th (ft)	m7	399	122	38	94	17	18	22	5
Internal Link Dist (ft)		1050		900		972			316
Turn Bay Length (ft)	200		410		215		200	50	
Base Capacity (vph)	231	3358	232	3831	507	515	500	231	475
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.41	0.32	0.29	0.32	0.02	0.15	0.10	0.01

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)	61	1380	32	443	1023	320	66	134	122	233	59	40
v/c Ratio	0.41	0.60	0.04	0.80	0.37	0.32	0.32	0.55	0.35	0.81	0.13	0.08
Control Delay	52.6	21.0	0.3	60.3	8.8	0.9	62.0	44.0	3.7	74.4	36.0	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	21.0	0.3	60.3	8.8	0.9	62.0	44.0	3.7	74.4	36.0	0.3
Queue Length 50th (ft)	49	299	0	140	78	0	27	83	0	189	41	0
Queue Length 95th (ft)	79	#519	0	201	194	1	51	122	7	265	59	0
Internal Link Dist (ft)		900			775			542			1064	
Turn Bay Length (ft)	300		620	285		245	70			160		
Base Capacity (vph)	163	2311	770	596	2785	990	369	488	549	326	682	662
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.60	0.04	0.74	0.37	0.32	0.18	0.27	0.22	0.71	0.09	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	164	28	0	0	7	11	0	0	0	16	0	124
Peak Hour Factor	0.73	0.73	0.73	1.00	1.00	1.00	1.00	1.00	1.00	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	225	38	0	0	7	11	0	0	0	19	0	149
Number of Lanes	1	1	0	1	1	0	1	2	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	10.6	8	0	8.5
HCM LOS	B	A	-	A

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%	0%	0%	100%	0%
Vol Thru, %	100%	100%	100%	0%	100%	100%	39%	0%	0%
Vol Right, %	0%	0%	0%	0%	0%	0%	61%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	0	0	164	28	0	18	16	124
LT Vol	0	0	0	0	28	0	7	0	0
Through Vol	0	0	0	0	0	0	11	0	124
RT Vol	0	0	0	164	0	0	0	16	0
Lane Flow Rate	0	0	0	225	38	0	18	19	149
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0	0	0	0.344	0.053	0	0.026	0.032	0.194
Departure Headway (Hd)	5.716	5.716	3.967	5.52	5.018	5.566	5.136	5.885	4.68
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	0	0	652	713	0	695	610	768
Service Time	3.461	3.461	1.712	3.254	2.752	3.312	2.881	3.607	2.401
HCM Lane V/C Ratio	0	0	0	0.345	0.053	0	0.026	0.031	0.194
HCM Control Delay	8.5	8.5	6.7	11.1	8	8.3	8	8.8	8.5
HCM Lane LOS	N	N	N	B	A	N	A	A	A
HCM 95th-tile Q	0	0	0	1.5	0.2	0	0.1	0.1	0.7

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection	
Intersection Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	11	0	1	30	23	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	0	1	33	26	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	34	0	-	0	42	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	24	-
Follow-up Headway	2.218	-	-	-	3.518	3.318
Pot Capacity-1 Maneuver	1578	-	-	-	969	1061
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	999	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1578	-	-	-	962	1061
Mov Capacity-2 Maneuver	-	-	-	-	962	-
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	991	-

Approach	EB	WB	SB
HCM Control Delay, s	7.3	0	8.7
HCM LOS			A

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1578	-	-	-	962	1061
HCM Lane V/C Ratio	0.008	-	-	-	0.027	0.005
HCM Control Delay (s)	7.299	-	-	-	8.8	8.4
HCM Lane LOS	A				A	A
HCM 95th %tile Q(veh)	0.023	-	-	-	0.082	0.016

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Lane Group	EBL	SBU	SBT
Lane Group Flow (vph)	26	17	34
v/c Ratio	0.09	0.06	0.01
Control Delay	16.1	16.1	0.0
Queue Delay	0.0	0.0	0.0
Total Delay	16.1	16.1	0.0
Queue Length 50th (ft)	5	3	0
Queue Length 95th (ft)	22	17	0
Internal Link Dist (ft)	580		322
Turn Bay Length (ft)	100	100	
Base Capacity (vph)	718	404	2881
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.04	0.04	0.01

Intersection Summary

Intersection	
Intersection Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	17	0	23	29	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	19	0	26	32	39

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	65	36	71	0	-	0
Stage 1	52	-	-	-	-	-
Stage 2	13	-	-	-	-	-
Follow-up Headway	3.52	3.32	2.22	-	-	-
Pot Capacity-1 Maneuver	933	1029	1527	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	1008	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	933	1029	1527	-	-	-
Mov Capacity-2 Maneuver	933	-	-	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	1008	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1527	-	1029	-	-
HCM Lane V/C Ratio	-	-	0.018	-	-
HCM Control Delay (s)	0	-	8.6	-	-
HCM Lane LOS	A		A		
HCM 95th %tile Q(veh)	0	-	0.056	-	-

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

NEAR-TERM TRAFFIC CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1031	54	16	1281	6	39	2	25	9	4	11
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		0.98	1.00		0.99	1.00		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Cap, veh/h	34	3518	184	61	3803	18	198	168	142	106	42	110
Arrive On Green	0.04	1.00	1.00	0.07	1.00	1.00	0.06	0.09	0.09	0.06	0.09	0.09
Sat Flow, veh/h	1774	5258	275	1774	5556	26	3442	1863	1573	1774	457	1187
Grp Volume(v), veh/h	1	840	407	18	987	492	72	4	46	10	0	18
Grp Sat Flow(s),veh/h/ln	1774	1863	1807	1774	1863	1857	1721	1863	1573	1774	0	1644
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	1.7	0.2	1.8	0.4	0.0	0.8
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.8	0.0	0.0	1.7	0.2	1.8	0.4	0.0	0.8
Prop In Lane	1.00		0.15	1.00		0.01	1.00		1.00	1.00		0.72
Lane Grp Cap(c), veh/h	34	2493	1209	61	2550	1271	198	168	142	106	0	153
V/C Ratio(X)	0.03	0.34	0.34	0.29	0.39	0.39	0.36	0.02	0.32	0.09	0.00	0.12
Avail Cap(c_a), veh/h	302	2493	1209	302	2550	1271	586	793	670	302	0	700
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)	0.98	0.98	0.98	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.8	0.0	0.0	37.3	0.0	0.0	37.3	34.1	23.6	36.5	0.0	34.4
Incr Delay (d2), s/veh	0.5	0.4	0.7	3.2	0.4	0.8	1.6	0.1	1.9	0.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.0	0.1	0.2	0.4	0.1	0.3	0.7	0.1	0.9	0.2	0.0	0.3
Lane Grp Delay (d), s/veh	39.2	0.4	0.7	40.5	0.4	0.8	38.9	34.2	25.4	37.1	0.0	34.5
Lane Grp LOS	D	A	A	D	A	A	D	C	C	D		C
Approach Vol, veh/h		1248			1497			122			28	
Approach Delay, s/veh		0.5			1.0			33.6			35.4	
Approach LOS		A			A			C			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	4.6	58.0		5.8	59.3		7.7	10.4		7.9	10.6	
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5		4.5	5.3		4.5	4.5	
Max Green Setting (Gmax), s	12.5	52.5		12.5	52.5		12.5	32.7		12.5	33.5	
Max Q Clear Time (g_c+I1), s	2.0	2.0		2.8	2.0		3.7	3.8		2.4	2.8	
Green Ext Time (p_c), s	0.0	49.7		0.0	49.7		0.2	0.2		0.0	0.1	

Intersection Summary	
HCM 2010 Ctrl Delay	2.5
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	991	34	220	1214	245	32	18	62	341	28	58
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		0.99	1.00		0.99	1.00		0.98	1.00		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	2	3	1	2	3	1	2	1	1	2	1	0
Cap, veh/h	166	2684	749	376	2869	801	116	139	116	650	124	257
Arrive On Green	0.10	0.96	0.96	0.22	1.00	1.00	0.03	0.07	0.07	0.19	0.23	0.23
Sat Flow, veh/h	3442	5588	1560	3442	5588	1561	3548	1863	1553	3442	536	1112
Grp Volume(v), veh/h	35	1113	38	253	1395	282	38	60	47	501	0	126
Grp Sat Flow(s),veh/h/ln	1721	1863	1560	1721	1863	1561	1774	1863	1553	1721	0	1648
Q Serve(g_s), s	0.8	1.1	0.1	5.5	0.0	0.0	0.9	2.5	2.4	11.3	0.0	5.2
Cycle Q Clear(g_c), s	0.8	1.1	0.1	5.5	0.0	0.0	0.9	2.5	2.4	11.3	0.0	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	166	2684	749	376	2869	801	116	139	116	650	0	381
V/C Ratio(X)	0.21	0.41	0.05	0.67	0.49	0.35	0.33	0.43	0.40	0.77	0.00	0.33
Avail Cap(c_a), veh/h	505	2684	749	841	2869	801	520	842	703	1136	0	1047
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)	0.96	0.96	0.96	0.87	0.87	0.87	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.5	0.9	0.8	30.6	0.0	0.0	38.7	36.2	36.1	31.5	0.0	26.2
Incr Delay (d2), s/veh	0.2	0.5	0.1	0.7	0.5	1.1	0.6	0.8	0.8	0.7	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.3	0.4	0.1	2.1	0.1	0.2	0.4	1.2	0.9	4.7	0.0	2.0
Lane Grp Delay (d), s/veh	35.8	1.3	1.0	31.3	0.5	1.1	39.3	37.0	36.9	32.2	0.0	26.4
Lane Grp LOS	D	A	A	C	A	A	D	D	D	C		C
Approach Vol, veh/h		1186			1930			145			627	
Approach Delay, s/veh		2.3			4.6			37.6			31.1	
Approach LOS		A			A			D			C	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.2	42.3		11.9	45.0		5.7	9.1		18.5	21.9	
Change Period (Y+Rc), s	6.3	6.3		4.0	6.3		4.0	4.2		4.0	4.2	
Max Green Setting (Gmax), s	11.0	30.7		19.0	38.7		11.0	35.8		26.0	50.8	
Max Q Clear Time (g_c+I1), s	2.8	3.1		7.5	2.0		2.9	4.5		13.3	7.2	
Green Ext Time (p_c), s	0.2	15.6		0.5	26.7		0.0	0.5		1.1	0.5	

Intersection Summary	
HCM 2010 Ctrl Delay	9.4
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	190	32	1	13	54	73	6	30	10	23	7	181
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Cap, veh/h	457	465	12	457	186	250	9	676	214	35	491	417
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.00	0.25	0.25	0.02	0.26	0.26
Sat Flow, veh/h	1774	1807	48	1774	720	971	1774	2715	859	1774	1863	1583
Grp Volume(v), veh/h	224	0	39	21	0	202	6	20	20	27	8	210
Grp Sat Flow(s),veh/h/ln	1774	0	1854	1774	0	1691	1774	1863	1711	1774	1863	1583
Q Serve(g_s), s	3.9	0.0	0.6	0.3	0.0	3.7	0.1	0.3	0.3	0.6	0.1	4.1
Cycle Q Clear(g_c), s	3.9	0.0	0.6	0.3	0.0	3.7	0.1	0.3	0.3	0.6	0.1	4.1
Prop In Lane	1.00		0.03	1.00		0.57	1.00		0.50	1.00		1.00
Lane Grp Cap(c), veh/h	457	0	478	457	0	436	9	463	426	35	491	417
V/C Ratio(X)	0.49	0.00	0.08	0.05	0.00	0.46	0.70	0.04	0.05	0.77	0.02	0.50
Avail Cap(c_a), veh/h	1628	0	1702	1628	0	1552	1142	2332	2142	1142	2332	1982
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.5	0.0	10.3	10.2	0.0	11.4	18.1	10.4	10.4	17.8	9.9	11.4
Incr Delay (d2), s/veh	1.2	0.0	0.1	0.1	0.0	1.1	89.5	0.1	0.2	39.1	0.0	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	1.6	0.0	0.2	0.1	0.0	1.4	0.3	0.1	0.1	0.6	0.0	1.6
Lane Grp Delay (d), s/veh	12.7	0.0	10.4	10.2	0.0	12.5	107.6	10.6	10.6	56.9	10.0	14.8
Lane Grp LOS	B		B	B		B	F	B	B	E	A	B
Approach Vol, veh/h		263			223			46			245	
Approach Delay, s/veh		12.3			12.3			23.2			19.3	
Approach LOS		B			B			C			B	
Timer												
Assigned Phs		4			8		5	2		1	6	
Phs Duration (G+Y+Rc), s		14.9			14.9		5.7	15.4		6.2	15.9	
Change Period (Y+Rc), s		5.5			5.5		5.5	6.3		5.5	6.3	
Max Green Setting (Gmax), s		33.5			33.5		23.5	45.7		23.5	45.7	
Max Q Clear Time (g_c+I1), s		5.9			5.7		2.1	2.3		2.6	6.1	
Green Ext Time (p_c), s		3.6			3.6		0.0	4.2		0.1	4.1	
Intersection Summary												
HCM 2010 Ctrl Delay			15.2									
HCM 2010 LOS			B									
Notes												



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	1247	18	1479	72	4	46	10	18
v/c Ratio	0.01	0.32	0.14	0.36	0.26	0.02	0.16	0.08	0.11
Control Delay	74.0	7.2	77.0	0.9	57.8	41.5	1.2	57.8	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.0	7.2	77.0	0.9	57.8	41.5	1.2	57.8	27.0
Queue Length 50th (ft)	1	41	0	1	29	3	0	8	4
Queue Length 95th (ft)	m4	291	m33	32	31	7	0	26	22
Internal Link Dist (ft)		1050		900		972			316
Turn Bay Length (ft)	200		410		215		200	50	
Base Capacity (vph)	190	3958	190	4109	369	501	490	190	456
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.32	0.09	0.36	0.20	0.01	0.09	0.05	0.04

Intersection Summary

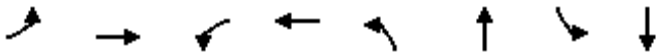
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	35	1113	38	253	1395	282	38	49	45	501	126
v/c Ratio	0.11	0.42	0.04	0.64	0.50	0.29	0.21	0.27	0.15	0.80	0.29
Control Delay	41.4	14.0	0.6	66.4	16.1	3.0	61.2	28.3	1.0	61.2	14.3
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	41.4	14.0	0.6	66.4	16.1	3.0	61.2	28.3	1.0	61.2	14.3
Queue Length 50th (ft)	13	159	0	96	151	6	15	17	0	209	29
Queue Length 95th (ft)	32	375	6	m152	378	m91	32	44	0	190	34
Internal Link Dist (ft)		900			775			542			1064
Turn Bay Length (ft)	300		620	285		245	70			160	
Base Capacity (vph)	316	2674	871	528	2789	964	316	476	551	713	722
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	0.11	0.42	0.04	0.48	0.50	0.29	0.12	0.10	0.08	0.70	0.17

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	224	39	21	202	6	40	27	218
v/c Ratio	0.50	0.08	0.05	0.49	0.03	0.07	0.12	0.28
Control Delay	26.7	21.4	24.0	23.9	33.5	24.7	32.2	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	21.4	24.0	23.9	33.5	24.7	32.2	6.4
Queue Length 50th (ft)	61	9	5	45	2	4	8	1
Queue Length 95th (ft)	160	37	19	88	15	23	37	28
Internal Link Dist (ft)		1118		1529		1312		2575
Turn Bay Length (ft)	95		115		130		230	
Base Capacity (vph)	1016	1065	1016	994	713	2646	713	2399
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.04	0.02	0.20	0.01	0.02	0.04	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	1813	87	26	1458	20	131	7	35	10	2	2
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.97
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	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Cap, veh/h	39	3202	154	76	3443	47	314	202	167	163	92	92
Arrive On Green	0.04	1.00	1.00	0.09	1.00	1.00	0.09	0.11	0.11	0.09	0.11	0.10
Sat Flow, veh/h	1774	5288	254	1774	5499	76	3442	1863	1544	1774	843	843
Grp Volume(v), veh/h	3	1302	637	29	1085	539	154	8	41	23	0	10
Grp Sat Flow(s),veh/h/ln	1774	1863	1817	1774	1863	1849	1721	1863	1544	1774	0	1686
Q Serve(g_s), s	0.1	0.0	0.0	1.2	0.0	0.0	3.4	0.3	1.5	0.9	0.0	0.4
Cycle Q Clear(g_c), s	0.1	0.0	0.0	1.2	0.0	0.0	3.4	0.3	1.5	0.9	0.0	0.4
Prop In Lane	1.00		0.14	1.00		0.04	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	39	2256	1100	76	2333	1158	314	202	167	163	0	184
V/C Ratio(X)	0.08	0.58	0.58	0.38	0.47	0.47	0.49	0.04	0.25	0.14	0.00	0.05
Avail Cap(c_a), veh/h	380	2256	1100	380	2333	1158	738	846	701	380	0	766
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)	0.93	0.93	0.93	0.85	0.85	0.85	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.1	0.0	0.0	35.3	0.0	0.0	34.3	31.6	20.8	33.1	0.0	31.7
Incr Delay (d2), s/veh	1.1	1.0	2.1	3.8	0.6	1.1	1.7	0.1	1.1	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.1	0.3	0.6	0.6	0.2	0.4	1.5	0.1	0.8	0.4	0.0	0.2
Lane Grp Delay (d), s/veh	38.2	1.0	2.1	39.1	0.6	1.1	36.0	31.8	21.9	33.7	0.0	31.8
Lane Grp LOS	D	A	A	D	A	A	D	C	C	C		C
Approach Vol, veh/h		1942			1653			203			33	
Approach Delay, s/veh		1.4			1.4			33.0			33.1	
Approach LOS		A			A			C			C	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	4.8	51.0		6.4	52.6		10.2	11.6		10.3	11.7	
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5		4.5	5.3		4.5	4.5	
Max Green Setting (Gmax), s	15.5	45.5		15.5	45.5		15.5	33.7		15.5	34.5	
Max Q Clear Time (g_c+I1), s	2.1	2.0		3.2	2.0		5.4	3.5		2.9	2.4	
Green Ext Time (p_c), s	0.0	43.4		0.0	43.4		0.5	0.2		0.1	0.1	

Intersection Summary	
HCM 2010 Ctrl Delay	3.4
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	1800	30	431	1397	400	60	63	176	262	52	48
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.98
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	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	2	3	1	2	3	1	2	1	1	2	1	0
Cap, veh/h	157	2299	651	557	2806	794	160	311	258	432	217	203
Arrive On Green	0.09	0.82	0.82	0.32	1.00	1.00	0.05	0.17	0.17	0.13	0.25	0.25
Sat Flow, veh/h	3442	5588	1581	3442	5588	1581	3548	1863	1543	3442	878	819
Grp Volume(v), veh/h	85	1915	32	449	1455	417	68	168	136	305	0	116
Grp Sat Flow(s),veh/h/ln	1721	1863	1581	1721	1863	1581	1774	1863	1543	1721	0	1697
Q Serve(g_s), s	2.1	17.3	0.3	10.7	0.0	0.0	1.7	7.4	7.2	7.6	0.0	4.9
Cycle Q Clear(g_c), s	2.1	17.3	0.3	10.7	0.0	0.0	1.7	7.4	7.2	7.6	0.0	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.48
Lane Grp Cap(c), veh/h	157	2299	651	557	2806	794	160	311	258	432	0	420
V/C Ratio(X)	0.54	0.83	0.05	0.81	0.52	0.53	0.42	0.54	0.53	0.71	0.00	0.28
Avail Cap(c_a), veh/h	461	2299	651	845	2806	794	554	769	637	922	0	890
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)	0.83	0.83	0.83	0.87	0.87	0.87	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.8	6.2	4.7	29.0	0.0	0.0	41.7	34.2	34.1	37.6	0.0	27.2
Incr Delay (d2), s/veh	0.9	3.1	0.1	1.6	0.6	2.2	0.7	0.5	0.6	0.8	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.9	3.3	0.1	3.8	0.2	0.5	0.8	3.4	2.8	3.3	0.0	2.0
Lane Grp Delay (d), s/veh	40.7	9.3	4.8	30.6	0.6	2.2	42.3	34.7	34.7	38.4	0.0	27.4
Lane Grp LOS	D	A	A	C	A	A	D	C	C	D		C
Approach Vol, veh/h		2032			2321			372			421	
Approach Delay, s/veh		10.6			6.7			36.1			35.3	
Approach LOS		B			A			D			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.4	39.9		17.5	48.0		7.1	18.0		14.3	25.2	
Change Period (Y+Rc), s	6.3	6.3		4.0	6.3		4.0	4.2		4.0	4.2	
Max Green Setting (Gmax), s	11.0	31.7		21.0	41.7		13.0	35.8		23.0	45.8	
Max Q Clear Time (g_c+I1), s	4.1	19.3		12.7	2.0		3.7	9.4		9.6	6.9	
Green Ext Time (p_c), s	0.3	11.5		0.8	31.1		0.1	0.9		0.6	0.9	

Intersection Summary	
HCM 2010 Ctrl Delay	12.7
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	206	31	3	12	9	30	11	11	24	33	4	166
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Cap, veh/h	457	432	41	457	97	325	15	436	370	49	471	400
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.01	0.23	0.23	0.03	0.25	0.25
Sat Flow, veh/h	1774	1675	160	1774	378	1260	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	282	0	46	12	0	39	11	11	24	40	5	200
Grp Sat Flow(s),veh/h/ln	1774	0	1834	1774	0	1639	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	5.0	0.0	0.7	0.2	0.0	0.7	0.2	0.2	0.4	0.8	0.1	3.9
Cycle Q Clear(g_c), s	5.0	0.0	0.7	0.2	0.0	0.7	0.2	0.2	0.4	0.8	0.1	3.9
Prop In Lane	1.00		0.09	1.00		0.77	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	457	0	473	457	0	422	15	436	370	49	471	400
V/C Ratio(X)	0.62	0.00	0.10	0.03	0.00	0.09	0.71	0.03	0.06	0.82	0.01	0.50
Avail Cap(c_a), veh/h	1652	0	1708	1652	0	1526	1159	2366	2011	1159	2366	2011
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.8	0.0	10.2	10.0	0.0	10.2	17.8	10.6	10.7	17.4	10.1	11.5
Incr Delay (d2), s/veh	1.9	0.0	0.1	0.0	0.0	0.1	61.0	0.1	0.3	36.0	0.0	3.5
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 Back of Q (50%), veh/ln	2.0	0.0	0.3	0.1	0.0	0.2	0.3	0.1	0.2	0.8	0.0	1.5
Lane Grp Delay (d), s/veh	13.7	0.0	10.3	10.0	0.0	10.3	78.8	10.7	11.0	53.4	10.1	15.0
Lane Grp LOS	B		B	B		B	E	B	B	D	B	B
Approach Vol, veh/h		328			51			46			245	
Approach Delay, s/veh		13.2			10.2			27.1			21.1	
Approach LOS		B			B			C			C	
Timer												
Assigned Phs		4			8		5	2		1	6	
Phs Duration (G+Y+Rc), s		14.8			14.8		5.8	14.7		6.5	15.4	
Change Period (Y+Rc), s		5.5			5.5		5.5	6.3		5.5	6.3	
Max Green Setting (Gmax), s		33.5			33.5		23.5	45.7		23.5	45.7	
Max Q Clear Time (g_c+I1), s		7.0			2.7		2.2	2.4		2.8	5.9	
Green Ext Time (p_c), s		2.3			2.3		0.0	3.9		0.1	3.8	
Intersection Summary												
HCM 2010 Ctrl Delay			16.9									
HCM 2010 LOS			B									
Notes												



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	1939	29	1624	154	8	41	23	10
v/c Ratio	0.03	0.54	0.21	0.42	0.34	0.04	0.15	0.17	0.06
Control Delay	76.3	8.9	88.8	2.0	52.9	46.0	1.2	58.7	36.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.3	8.9	88.8	2.0	52.9	46.0	1.2	58.7	36.0
Queue Length 50th (ft)	3	120	25	38	58	6	0	19	4
Queue Length 95th (ft)	m9	586	m51	54	91	17	0	22	7
Internal Link Dist (ft)		1050		900		972			316
Turn Bay Length (ft)	200		410		215		200	50	
Base Capacity (vph)	231	3578	231	3838	507	515	500	231	477
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.54	0.13	0.42	0.30	0.02	0.08	0.10	0.02

Intersection Summary

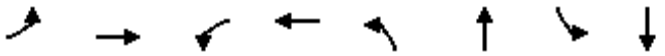
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	85	1915	32	449	1455	417	68	142	130	305	116
v/c Ratio	0.27	0.79	0.04	0.78	0.52	0.41	0.32	0.57	0.37	0.68	0.29
Control Delay	49.1	26.1	0.7	63.4	11.9	1.4	62.0	45.3	4.3	61.8	27.3
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	49.1	26.1	0.7	63.4	11.9	1.4	62.0	45.3	4.3	61.8	27.3
Queue Length 50th (ft)	35	474	0	167	135	2	28	89	0	128	56
Queue Length 95th (ft)	54	#869	m2	199	417	5	51	129	13	162	81
Internal Link Dist (ft)		900			775			542			1064
Turn Bay Length (ft)	300		620	285		245	70			160	
Base Capacity (vph)	316	2424	802	613	2810	1021	369	488	549	633	645
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	0.27	0.79	0.04	0.73	0.52	0.41	0.18	0.29	0.24	0.48	0.18

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	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	282	46	12	39	11	35	40	205
v/c Ratio	0.51	0.08	0.04	0.14	0.04	0.06	0.14	0.21
Control Delay	22.3	17.1	28.8	16.2	29.3	16.2	27.9	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	17.1	28.8	16.2	29.3	16.2	27.9	5.3
Queue Length 50th (ft)	95	12	4	3	4	2	14	0
Queue Length 95th (ft)	136	29	20	30	19	15	40	22
Internal Link Dist (ft)		1118		1529		1312		2575
Turn Bay Length (ft)	95		115		130		230	
Base Capacity (vph)	1226	1273	1226	1139	900	2544	900	2456
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.04	0.01	0.03	0.01	0.01	0.04	0.08

Intersection Summary

NEAR-TERM PLUS PROJECT TRAFFIC CONDITIONS



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	1254	33	1479	106	4	120	10	18
v/c Ratio	0.01	0.34	0.23	0.37	0.34	0.02	0.38	0.08	0.11
Control Delay	74.0	8.6	78.5	0.9	58.1	41.0	10.4	57.8	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.0	8.6	78.5	0.9	58.1	41.0	10.4	57.8	27.4
Queue Length 50th (ft)	1	96	29	1	43	3	0	8	4
Queue Length 95th (ft)	m4	313	m60	32	42	7	0	26	23
Internal Link Dist (ft)		1050		900		972			316
Turn Bay Length (ft)	200		410		215		200	50	
Base Capacity (vph)	190	3681	190	3960	369	501	507	190	456
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.34	0.17	0.37	0.29	0.01	0.24	0.05	0.04

Intersection Summary

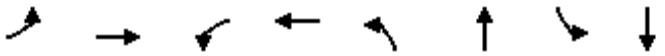
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	35	1157	39	253	1410	282	38	49	45	501	126
v/c Ratio	0.11	0.43	0.04	0.64	0.51	0.29	0.21	0.27	0.15	0.80	0.29
Control Delay	41.8	14.0	0.5	66.3	16.2	3.1	61.2	28.3	1.0	61.2	14.3
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	41.8	14.0	0.5	66.3	16.2	3.1	61.2	28.3	1.0	61.2	14.3
Queue Length 50th (ft)	13	168	1	96	153	7	15	17	0	209	29
Queue Length 95th (ft)	31	393	4	m151	385	m92	32	44	0	190	34
Internal Link Dist (ft)		900			775			542			1064
Turn Bay Length (ft)	300		620	285		245	70			160	
Base Capacity (vph)	316	2674	871	528	2789	963	316	476	551	713	722
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	0.11	0.43	0.04	0.48	0.51	0.29	0.12	0.10	0.08	0.70	0.17

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	224	42	21	219	6	40	28	218
v/c Ratio	0.50	0.09	0.05	0.52	0.03	0.08	0.12	0.29
Control Delay	27.3	21.9	23.8	24.9	34.7	25.3	33.1	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	21.9	23.8	24.9	34.7	25.3	33.1	6.6
Queue Length 50th (ft)	63	10	5	52	2	4	9	1
Queue Length 95th (ft)	163	40	19	98	15	23	38	29
Internal Link Dist (ft)		1118		1894		1312		2575
Turn Bay Length (ft)	95		115		130		230	
Base Capacity (vph)	995	1044	995	976	698	2601	698	2362
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.04	0.02	0.22	0.01	0.02	0.04	0.09

Intersection Summary

Intersection	
Intersection Delay, s/veh	6.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	4	0	3	9	34	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	3	10	38	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	13	0	-	0	17	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	9	-
Follow-up Headway	2.218	-	-	-	3.518	3.318
Pot Capacity-1 Maneuver	1606	-	-	-	1001	1074
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	1014	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1606	-	-	-	999	1074
Mov Capacity-2 Maneuver	-	-	-	-	999	-
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	1011	-

Approach	EB	WB	SB
HCM Control Delay, s	7.2	0	8.6
HCM LOS			A

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1606	-	-	-	999	1074
HCM Lane V/C Ratio	0.003	-	-	-	0.038	0.008
HCM Control Delay (s)	7.248	-	-	-	8.7	8.4
HCM Lane LOS	A				A	A
HCM 95th %tile Q(veh)	0.008	-	-	-	0.118	0.025

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Lane Group	EBL	SBU	SBT
Lane Group Flow (vph)	38	27	13
v/c Ratio	0.13	0.10	0.00
Control Delay	15.3	15.4	0.0
Queue Delay	0.0	0.0	0.0
Total Delay	15.3	15.4	0.0
Queue Length 50th (ft)	7	5	0
Queue Length 95th (ft)	26	21	0
Internal Link Dist (ft)	580		322
Turn Bay Length (ft)	100	100	
Base Capacity (vph)	786	416	2870
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.05	0.06	0.00

Intersection Summary

Intersection	
Intersection Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	27	0	50	9	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	30	0	56	10	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	44	11	21	0	-	0
Stage 1	16	-	-	-	-	-
Stage 2	28	-	-	-	-	-
Follow-up Headway	3.52	3.32	2.22	-	-	-
Pot Capacity-1 Maneuver	961	1067	1593	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	991	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	961	1067	1593	-	-	-
Mov Capacity-2 Maneuver	961	-	-	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	991	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	0	0
HCM LOS	A		

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1593	-	1067	-	-
HCM Lane V/C Ratio	-	-	0.028	-	-
HCM Control Delay (s)	0	-	8.5	-	-
HCM Lane LOS	A		A		
HCM 95th %tile Q(veh)	0	-	0.087	-	-

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1031	60	29	1281	6	57	2	65	9	4	11
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		0.99	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Cap, veh/h	33	3380	197	76	3729	18	239	241	204	71	46	118
Arrive On Green	0.04	1.00	1.00	0.09	1.00	1.00	0.07	0.13	0.13	0.04	0.10	0.09
Sat Flow, veh/h	1774	5226	304	1774	5556	26	3442	1863	1576	1774	457	1187
Grp Volume(v), veh/h	1	845	409	33	987	492	106	4	120	10	0	18
Grp Sat Flow(s),veh/h/ln	1774	1863	1804	1774	1863	1857	1721	1863	1576	1774	0	1644
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	2.5	0.2	4.9	0.5	0.0	0.9
Cycle Q Clear(g_c), s	0.0	0.0	0.0	1.5	0.0	0.0	2.5	0.2	4.9	0.5	0.0	0.9
Prop In Lane	1.00		0.17	1.00		0.01	1.00		1.00	1.00		0.72
Lane Grp Cap(c), veh/h	33	2410	1167	76	2500	1247	239	241	204	71	0	164
V/C Ratio(X)	0.03	0.35	0.35	0.43	0.39	0.39	0.44	0.02	0.59	0.14	0.00	0.11
Avail Cap(c_a), veh/h	292	2410	1167	292	2500	1247	567	767	649	292	0	677
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)	0.98	0.98	0.98	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.2	0.0	0.0	37.9	0.0	0.0	38.0	32.3	22.8	39.4	0.0	35.0
Incr Delay (d2), s/veh	0.5	0.4	0.8	4.6	0.4	0.8	1.8	0.0	3.8	1.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.0	0.1	0.3	0.7	0.1	0.3	1.1	0.1	2.0	0.2	0.0	0.4
Lane Grp Delay (d), s/veh	40.7	0.4	0.8	42.5	0.4	0.8	39.8	32.4	26.6	40.7	0.0	35.1
Lane Grp LOS	D	A	A	D	A	A	D	C	C	D		D
Approach Vol, veh/h		1255			1512			230			28	
Approach Delay, s/veh		0.6			1.5			32.8			37.1	
Approach LOS		A			A			C			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	4.6	58.0		6.7	60.1		8.9	14.0		6.4	11.5	
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5		4.5	5.3		4.5	4.5	
Max Green Setting (Gmax), s	12.5	52.5		12.5	52.5		12.5	32.7		12.5	33.5	
Max Q Clear Time (g_c+I1), s	2.0	2.0		3.5	2.0		4.5	6.9		2.5	2.9	
Green Ext Time (p_c), s	0.0	49.7		0.0	49.7		0.3	0.7		0.0	0.1	

Intersection Summary		
HCM 2010 Ctrl Delay	3.8	
HCM 2010 LOS	A	

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	1030	35	220	1227	245	32	18	62	341	28	58
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		0.99	1.00		0.99	1.00		0.98	1.00		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	2	3	1	2	3	1	2	1	1	2	1	0
Cap, veh/h	164	2650	740	375	2837	792	115	155	130	648	128	266
Arrive On Green	0.10	0.95	0.95	0.22	1.00	1.00	0.03	0.08	0.08	0.19	0.24	0.24
Sat Flow, veh/h	3442	5588	1560	3442	5588	1561	3548	1863	1555	3442	536	1112
Grp Volume(v), veh/h	35	1157	39	253	1410	282	38	60	47	501	0	126
Grp Sat Flow(s),veh/h/ln	1721	1863	1560	1721	1863	1561	1774	1863	1555	1721	0	1648
Q Serve(g_s), s	0.8	1.5	0.1	5.6	0.0	0.0	0.9	2.5	2.4	11.4	0.0	5.2
Cycle Q Clear(g_c), s	0.8	1.5	0.1	5.6	0.0	0.0	0.9	2.5	2.4	11.4	0.0	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	164	2650	740	375	2837	792	115	155	130	648	0	394
V/C Ratio(X)	0.21	0.44	0.05	0.67	0.50	0.36	0.33	0.39	0.36	0.77	0.00	0.32
Avail Cap(c_a), veh/h	499	2650	740	832	2837	792	515	833	695	1123	0	1036
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)	0.95	0.95	0.95	0.87	0.87	0.87	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.0	1.2	1.1	31.0	0.0	0.0	39.1	35.9	35.8	31.9	0.0	25.9
Incr Delay (d2), s/veh	0.2	0.5	0.1	0.7	0.5	1.1	0.6	0.6	0.6	0.8	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.3	0.5	0.1	2.2	0.1	0.2	0.4	1.2	0.9	4.9	0.0	2.0
Lane Grp Delay (d), s/veh	36.2	1.7	1.3	31.7	0.5	1.1	39.8	36.5	36.5	32.6	0.0	26.1
Lane Grp LOS	D	A	A	C	A	A	D	D	D	C		C
Approach Vol, veh/h		1231			1945			145			627	
Approach Delay, s/veh		2.6			4.7			37.3			31.3	
Approach LOS		A			A			D			C	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.2	42.2		12.0	45.0		5.7	9.9		18.6	22.8	
Change Period (Y+Rc), s	6.3	6.3		4.0	6.3		4.0	4.2		4.0	4.2	
Max Green Setting (Gmax), s	11.0	30.7		19.0	38.7		11.0	35.8		26.0	50.8	
Max Q Clear Time (g_c+I1), s	2.8	3.5		7.6	2.0		2.9	4.5		13.4	7.2	
Green Ext Time (p_c), s	0.2	16.1		0.5	26.9		0.0	0.5		1.1	0.5	

Intersection Summary	
HCM 2010 Ctrl Delay	9.5
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	190	35	1	13	62	76	6	30	10	24	7	181
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Cap, veh/h	464	474	12	464	199	245	9	700	221	36	509	432
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.00	0.26	0.26	0.02	0.27	0.27
Sat Flow, veh/h	1774	1811	44	1774	760	938	1774	2715	859	1774	1863	1583
Grp Volume(v), veh/h	224	0	42	21	0	219	6	20	20	28	8	210
Grp Sat Flow(s),veh/h/ln	1774	0	1855	1774	0	1697	1774	1863	1711	1774	1863	1583
Q Serve(g_s), s	4.0	0.0	0.6	0.3	0.0	4.1	0.1	0.3	0.3	0.6	0.1	4.2
Cycle Q Clear(g_c), s	4.0	0.0	0.6	0.3	0.0	4.1	0.1	0.3	0.3	0.6	0.1	4.2
Prop In Lane	1.00		0.02	1.00		0.55	1.00		0.50	1.00		1.00
Lane Grp Cap(c), veh/h	464	0	485	464	0	444	9	480	441	36	509	432
V/C Ratio(X)	0.48	0.00	0.09	0.05	0.00	0.49	0.70	0.04	0.05	0.78	0.02	0.49
Avail Cap(c_a), veh/h	1582	0	1655	1582	0	1514	1110	2267	2082	1110	2267	1927
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.7	0.0	10.5	10.4	0.0	11.8	18.7	10.5	10.5	18.3	10.0	11.4
Incr Delay (d2), s/veh	1.1	0.0	0.1	0.1	0.0	1.2	89.7	0.1	0.2	39.2	0.0	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	1.6	0.0	0.3	0.1	0.0	1.6	0.3	0.1	0.1	0.6	0.0	1.6
Lane Grp Delay (d), s/veh	12.8	0.0	10.6	10.4	0.0	13.0	108.4	10.6	10.6	57.5	10.0	14.5
Lane Grp LOS	B		B	B		B	F	B	B	E	B	B
Approach Vol, veh/h		266			240			46			246	
Approach Delay, s/veh		12.5			12.7			23.4			19.2	
Approach LOS		B			B			C			B	

Timer												
Assigned Phs		4			8		5	2		1	6	
Phs Duration (G+Y+Rc), s		15.3			15.3		5.7	16.0		6.3	16.6	
Change Period (Y+Rc), s		5.5			5.5		5.5	6.3		5.5	6.3	
Max Green Setting (Gmax), s		33.5			33.5		23.5	45.7		23.5	45.7	
Max Q Clear Time (g_c+I1), s		6.0			6.1		2.1	2.3		2.6	6.2	
Green Ext Time (p_c), s		3.8			3.8		0.0	4.2		0.1	4.1	

Intersection Summary		
HCM 2010 Ctrl Delay	15.3	
HCM 2010 LOS	B	

Notes

Intersection	
Intersection Delay, s/veh	6.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	4	0	3	9	34	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	3	10	38	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	13	0	-	0	17	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	9	-
Follow-up Headway	2.218	-	-	-	3.518	3.318
Pot Capacity-1 Maneuver	1606	-	-	-	1001	1074
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	1014	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1606	-	-	-	999	1074
Mov Capacity-2 Maneuver	-	-	-	-	999	-
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	1011	-

Approach	EB	WB	SB
HCM Control Delay, s	7.2	0	8.6
HCM LOS			A

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1606	-	-	-	999	1074
HCM Lane V/C Ratio	0.003	-	-	-	0.038	0.008
HCM Control Delay (s)	7.248	-	-	-	8.7	8.4
HCM Lane LOS	A				A	A
HCM 95th %tile Q(veh)	0.008	-	-	-	0.118	0.025

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (veh/h)	34	0	0	0	24	0	12
Number	7	14	5	2		6	16
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3		186.3	190.0
Lanes	1	1	1	2		2	0
Cap, veh/h	65	58	7	2484		1242	1056
Arrive On Green	0.04	0.00	0.00	0.00		0.00	0.67
Sat Flow, veh/h	1774	1583	1774	3725		1863	1583
Grp Volume(v), veh/h	38	0	0	0		0	13
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1863		1863	1583
Q Serve(g_s), s	0.6	0.0	0.0	0.0		0.0	0.1
Cycle Q Clear(g_c), s	0.6	0.0	0.0	0.0		0.0	0.1
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	65	58	7	2484		1242	1056
V/C Ratio(X)	0.58	0.00	0.00	0.00		0.00	0.01
Avail Cap(c_a), veh/h	1117	997	526	2484		1242	1056
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00		0.00	1.00
Uniform Delay (d), s/veh	12.8	0.0	0.0	0.0		0.0	1.5
Incr Delay (d2), s/veh	8.0	0.0	0.0	0.0		0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile Back of Q (50%), veh/ln	0.3	0.0	0.0	0.0		0.0	0.0
Lane Grp Delay (d), s/veh	20.8	0.0	0.0	0.0		0.0	1.5
Lane Grp LOS	C						A
Approach Vol, veh/h	38			0		13	
Approach Delay, s/veh	20.8			0.0		1.5	
Approach LOS	C					A	

Timer							
Assigned Phs			5	2		6	
Phs Duration (G+Y+Rc), s			0.0	22.0		22.0	
Change Period (Y+Rc), s			4.0	4.0		4.0	
Max Green Setting (Gmax), s			8.0	17.0		18.0	
Max Q Clear Time (g_c+I1), s			0.0	0.0		2.1	
Green Ext Time (p_c), s			0.0	0.0		0.0	

Intersection Summary	
HCM 2010 Ctrl Delay	15.9
HCM 2010 LOS	B

Notes

Intersection	
Intersection Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	27	0	50	9	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	30	0	56	10	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	44	11	21	0	-	0
Stage 1	16	-	-	-	-	-
Stage 2	28	-	-	-	-	-
Follow-up Headway	3.52	3.32	2.22	-	-	-
Pot Capacity-1 Maneuver	961	1067	1593	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	991	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	961	1067	1593	-	-	-
Mov Capacity-2 Maneuver	961	-	-	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	991	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	0	0
HCM LOS	A		

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1593	-	1067	-	-
HCM Lane V/C Ratio	-	-	0.028	-	-
HCM Control Delay (s)	0	-	8.5	-	-
HCM Lane LOS	A		A		
HCM 95th %tile Q(veh)	0	-	0.087	-	-

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	1958	78	1624	167	8	73	23	10
v/c Ratio	0.03	0.58	0.43	0.42	0.37	0.04	0.27	0.17	0.06
Control Delay	78.3	11.8	91.2	2.0	53.2	46.0	5.9	58.7	36.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.3	11.8	91.2	2.0	53.2	46.0	5.9	58.7	36.0
Queue Length 50th (ft)	3	327	69	37	64	6	0	19	4
Queue Length 95th (ft)	m9	638	123	53	97	17	18	22	7
Internal Link Dist (ft)		1050		900		972			316
Turn Bay Length (ft)	200		410		215		200	50	
Base Capacity (vph)	231	3356	233	3831	507	515	500	231	477
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.58	0.33	0.42	0.33	0.02	0.15	0.10	0.02

Intersection Summary

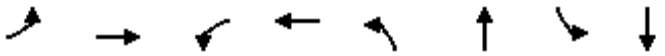
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	85	1943	33	449	1500	417	70	142	130	305	116
v/c Ratio	0.27	0.80	0.04	0.78	0.53	0.41	0.33	0.57	0.37	0.68	0.29
Control Delay	49.6	25.9	1.1	63.4	12.3	1.5	62.0	45.3	4.3	61.8	27.4
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	49.6	25.9	1.1	63.4	12.3	1.5	62.0	45.3	4.3	61.8	27.4
Queue Length 50th (ft)	35	357	0	168	142	3	29	89	0	128	56
Queue Length 95th (ft)	m52	#886	m3	200	455	7	53	129	13	162	82
Internal Link Dist (ft)		900			775			542			1064
Turn Bay Length (ft)	300		620	285		245	70			160	
Base Capacity (vph)	316	2424	802	613	2810	1016	369	488	549	633	645
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	0.27	0.80	0.04	0.73	0.53	0.41	0.19	0.29	0.24	0.48	0.18

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	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	282	56	12	45	11	35	45	205
v/c Ratio	0.51	0.10	0.04	0.16	0.04	0.06	0.15	0.21
Control Delay	22.4	17.6	28.8	16.4	29.6	16.4	28.1	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	17.6	28.8	16.4	29.6	16.4	28.1	5.3
Queue Length 50th (ft)	95	16	4	4	4	2	16	0
Queue Length 95th (ft)	138	34	20	34	19	15	44	23
Internal Link Dist (ft)		1118		1894		1312		2575
Turn Bay Length (ft)	95		115		130		230	
Base Capacity (vph)	1222	1271	1222	1143	896	2533	896	2447
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.04	0.01	0.04	0.01	0.01	0.05	0.08

Intersection Summary

Intersection	
Intersection Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	11	0	1	30	23	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	0	1	33	26	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	34	0	-	0	42	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	24	-
Follow-up Headway	2.218	-	-	-	3.518	3.318
Pot Capacity-1 Maneuver	1578	-	-	-	969	1061
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	999	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1578	-	-	-	962	1061
Mov Capacity-2 Maneuver	-	-	-	-	962	-
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	991	-

Approach	EB	WB	SB
HCM Control Delay, s	7.3	0	8.7
HCM LOS			A

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1578	-	-	-	962	1061
HCM Lane V/C Ratio	0.008	-	-	-	0.027	0.005
HCM Control Delay (s)	7.299	-	-	-	8.8	8.4
HCM Lane LOS	A				A	A
HCM 95th %tile Q(veh)	0.023	-	-	-	0.082	0.016

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined



Lane Group	EBL	SBU	SBT
Lane Group Flow (vph)	26	17	34
v/c Ratio	0.09	0.06	0.01
Control Delay	16.1	16.1	0.0
Queue Delay	0.0	0.0	0.0
Total Delay	16.1	16.1	0.0
Queue Length 50th (ft)	5	3	0
Queue Length 95th (ft)	22	17	0
Internal Link Dist (ft)	580		322
Turn Bay Length (ft)	100	100	
Base Capacity (vph)	718	404	2881
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.04	0.04	0.01

Intersection Summary

Intersection	
Intersection Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	17	0	23	29	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	19	0	26	32	39

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	65	36	71	0	-	0
Stage 1	52	-	-	-	-	-
Stage 2	13	-	-	-	-	-
Follow-up Headway	3.52	3.32	2.22	-	-	-
Pot Capacity-1 Maneuver	933	1029	1527	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	1008	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	933	1029	1527	-	-	-
Mov Capacity-2 Maneuver	933	-	-	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	1008	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1527	-	1029	-	-
HCM Lane V/C Ratio	-	-	0.018	-	-
HCM Control Delay (s)	0	-	8.6	-	-
HCM Lane LOS	A		A		
HCM 95th %tile Q(veh)	0	-	0.056	-	-

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	1813	106	71	1458	20	142	7	62	10	2	2
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.97
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	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Cap, veh/h	38	3015	176	132	3462	48	322	220	183	154	94	94
Arrive On Green	0.04	1.00	1.00	0.15	1.00	1.00	0.09	0.12	0.12	0.09	0.11	0.11
Sat Flow, veh/h	1774	5229	305	1774	5499	76	3442	1863	1546	1774	843	843
Grp Volume(v), veh/h	3	1317	641	78	1085	539	167	8	73	23	0	10
Grp Sat Flow(s),veh/h/ln	1774	1863	1808	1774	1863	1849	1721	1863	1546	1774	0	1686
Q Serve(g_s), s	0.1	0.0	0.0	3.4	0.0	0.0	3.8	0.3	2.8	1.0	0.0	0.4
Cycle Q Clear(g_c), s	0.1	0.0	0.0	3.4	0.0	0.0	3.8	0.3	2.8	1.0	0.0	0.4
Prop In Lane	1.00		0.17	1.00		0.04	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	38	2148	1043	132	2345	1164	322	220	183	154	0	188
V/C Ratio(X)	0.08	0.61	0.62	0.59	0.46	0.46	0.52	0.04	0.40	0.15	0.00	0.05
Avail Cap(c_a), veh/h	362	2148	1043	362	2345	1164	703	805	668	362	0	729
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)	0.93	0.93	0.93	0.84	0.84	0.84	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.1	0.0	0.0	34.3	0.0	0.0	35.9	32.5	20.2	35.2	0.0	33.2
Incr Delay (d2), s/veh	1.2	1.2	2.5	5.0	0.6	1.1	1.8	0.1	2.0	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.1	0.4	0.7	1.6	0.2	0.4	1.7	0.2	1.4	0.5	0.0	0.2
Lane Grp Delay (d), s/veh	40.3	1.2	2.5	39.3	0.6	1.1	37.8	32.6	22.2	35.8	0.0	33.2
Lane Grp LOS	D	A	A	D	A	A	D	C	C	D		C
Approach Vol, veh/h		1961			1702			248			33	
Approach Delay, s/veh		1.7			2.5			33.0			35.0	
Approach LOS		A			A			C			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	4.8	51.0		9.2	55.4		10.8	12.8		10.2	12.3	
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5		4.5	5.3		4.5	4.5	
Max Green Setting (Gmax), s	15.5	45.5		15.5	45.5		15.5	33.7		15.5	34.5	
Max Q Clear Time (g_c+I1), s	2.1	2.0		5.4	2.0		5.8	4.8		3.0	2.4	
Green Ext Time (p_c), s	0.0	43.4		0.2	43.4		0.6	0.4		0.1	0.1	

Intersection Summary		
HCM 2010 Ctrl Delay		4.3
HCM 2010 LOS		A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	1826	31	431	1440	400	62	63	176	262	52	48
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.98
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	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	2	3	1	2	3	1	2	1	1	2	1	0
Cap, veh/h	157	2299	650	557	2806	794	163	311	258	432	217	202
Arrive On Green	0.09	0.82	0.82	0.32	1.00	1.00	0.05	0.17	0.17	0.13	0.25	0.25
Sat Flow, veh/h	3442	5588	1581	3442	5588	1581	3548	1863	1543	3442	878	819
Grp Volume(v), veh/h	85	1943	33	449	1500	417	70	168	136	305	0	116
Grp Sat Flow(s),veh/h/ln	1721	1863	1581	1721	1863	1581	1774	1863	1543	1721	0	1697
Q Serve(g_s), s	2.1	18.1	0.3	10.7	0.0	0.0	1.7	7.4	7.2	7.6	0.0	5.0
Cycle Q Clear(g_c), s	2.1	18.1	0.3	10.7	0.0	0.0	1.7	7.4	7.2	7.6	0.0	5.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.48
Lane Grp Cap(c), veh/h	157	2299	650	557	2806	794	163	311	258	432	0	419
V/C Ratio(X)	0.54	0.85	0.05	0.81	0.53	0.53	0.43	0.54	0.53	0.71	0.00	0.28
Avail Cap(c_a), veh/h	461	2299	650	845	2806	794	554	769	637	922	0	890
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)	0.80	0.80	0.80	0.87	0.87	0.87	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.8	6.3	4.7	29.0	0.0	0.0	41.6	34.2	34.1	37.6	0.0	27.3
Incr Delay (d2), s/veh	0.9	3.3	0.1	1.6	0.6	2.2	0.7	0.5	0.6	0.8	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.9	3.3	0.1	3.8	0.2	0.5	0.8	3.4	2.8	3.3	0.0	2.0
Lane Grp Delay (d), s/veh	40.7	9.5	4.8	30.6	0.6	2.2	42.3	34.7	34.7	38.4	0.0	27.4
Lane Grp LOS	D	A	A	C	A	A	D	C	C	D		C
Approach Vol, veh/h		2061			2366			374			421	
Approach Delay, s/veh		10.8			6.6			36.1			35.4	
Approach LOS		B			A			D			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.4	39.9		17.5	48.0		7.1	18.0		14.3	25.1	
Change Period (Y+Rc), s	6.3	6.3		4.0	6.3		4.0	4.2		4.0	4.2	
Max Green Setting (Gmax), s	11.0	31.7		21.0	41.7		13.0	35.8		23.0	45.8	
Max Q Clear Time (g_c+I1), s	4.1	20.1		12.7	2.0		3.7	9.4		9.6	7.0	
Green Ext Time (p_c), s	0.2	10.8		0.8	31.7		0.1	0.9		0.6	0.9	

Intersection Summary	
HCM 2010 Ctrl Delay	12.7
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	206	38	3	12	12	33	11	11	24	37	4	166
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Cap, veh/h	463	446	34	463	115	316	15	430	366	54	471	400
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.01	0.23	0.23	0.03	0.25	0.25
Sat Flow, veh/h	1774	1708	131	1774	439	1208	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	282	0	56	12	0	45	11	11	24	45	5	200
Grp Sat Flow(s),veh/h/ln	1774	0	1839	1774	0	1648	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	5.1	0.0	0.8	0.2	0.0	0.8	0.2	0.2	0.4	0.9	0.1	3.9
Cycle Q Clear(g_c), s	5.1	0.0	0.8	0.2	0.0	0.8	0.2	0.2	0.4	0.9	0.1	3.9
Prop In Lane	1.00		0.07	1.00		0.73	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	463	0	480	463	0	430	15	430	366	54	471	400
V/C Ratio(X)	0.61	0.00	0.12	0.03	0.00	0.10	0.71	0.03	0.07	0.83	0.01	0.50
Avail Cap(c_a), veh/h	1640	0	1700	1640	0	1523	1150	2349	1997	1150	2349	1997
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.8	0.0	10.2	10.0	0.0	10.2	17.9	10.8	10.9	17.5	10.1	11.6
Incr Delay (d2), s/veh	1.8	0.0	0.2	0.0	0.0	0.2	61.1	0.1	0.3	35.0	0.0	3.5
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 Back of Q (50%), veh/ln	2.0	0.0	0.3	0.1	0.0	0.3	0.3	0.1	0.2	0.8	0.0	1.6
Lane Grp Delay (d), s/veh	13.6	0.0	10.4	10.0	0.0	10.3	79.0	10.9	11.2	52.4	10.2	15.1
Lane Grp LOS	B		B	A		B	E	B	B	D	B	B
Approach Vol, veh/h		338			57			46			250	
Approach Delay, s/veh		13.1			10.2			27.3			21.7	
Approach LOS		B			B			C			C	
Timer												
Assigned Phs		4			8		5	2		1	6	
Phs Duration (G+Y+Rc), s		15.0			15.0		5.8	14.7		6.6	15.5	
Change Period (Y+Rc), s		5.5			5.5		5.5	6.3		5.5	6.3	
Max Green Setting (Gmax), s		33.5			33.5		23.5	45.7		23.5	45.7	
Max Q Clear Time (g_c+I1), s		7.1			2.8		2.2	2.4		2.9	5.9	
Green Ext Time (p_c), s		2.4			2.5		0.0	3.9		0.1	3.8	
Intersection Summary												
HCM 2010 Ctrl Delay			16.9									
HCM 2010 LOS			B									
Notes												

Intersection	
Intersection Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	11	0	1	30	23	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	0	1	33	26	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	34	0	-	0	42	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	24	-
Follow-up Headway	2.218	-	-	-	3.518	3.318
Pot Capacity-1 Maneuver	1578	-	-	-	969	1061
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	999	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1578	-	-	-	962	1061
Mov Capacity-2 Maneuver	-	-	-	-	962	-
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	991	-

Approach	EB	WB	SB
HCM Control Delay, s	7.3	0	8.7
HCM LOS			A

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1578	-	-	-	962	1061
HCM Lane V/C Ratio	0.008	-	-	-	0.027	0.005
HCM Control Delay (s)	7.299	-	-	-	8.8	8.4
HCM Lane LOS	A				A	A
HCM 95th %tile Q(veh)	0.023	-	-	-	0.082	0.016

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (veh/h)	23	0	0	0	15	0	31
Number	7	14	5	2		6	16
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3		186.3	190.0
Lanes	1	1	1	2		2	0
Cap, veh/h	46	41	6	2553		1277	1085
Arrive On Green	0.03	0.00	0.00	0.00		0.00	0.69
Sat Flow, veh/h	1774	1583	1774	3725		1863	1583
Grp Volume(v), veh/h	26	0	0	0		0	34
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1863		1863	1583
Q Serve(g_s), s	0.4	0.0	0.0	0.0		0.0	0.2
Cycle Q Clear(g_c), s	0.4	0.0	0.0	0.0		0.0	0.2
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	46	41	6	2553		1277	1085
V/C Ratio(X)	0.56	0.00	0.00	0.00		0.00	0.03
Avail Cap(c_a), veh/h	1024	914	512	2553		1277	1085
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00		0.00	1.00
Uniform Delay (d), s/veh	13.3	0.0	0.0	0.0		0.0	1.4
Incr Delay (d2), s/veh	10.1	0.0	0.0	0.0		0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile Back of Q (50%), veh/ln	0.3	0.0	0.0	0.0		0.0	0.0
Lane Grp Delay (d), s/veh	23.5	0.0	0.0	0.0		0.0	1.5
Lane Grp LOS	C						A
Approach Vol, veh/h	26			0		34	
Approach Delay, s/veh	23.5			0.0		1.5	
Approach LOS	C					A	

Timer							
Assigned Phs			5	2		6	
Phs Duration (G+Y+Rc), s			0.0	23.0		23.0	
Change Period (Y+Rc), s			4.0	4.0		4.0	
Max Green Setting (Gmax), s			8.0	18.0		19.0	
Max Q Clear Time (g_c+I1), s			0.0	0.0		2.2	
Green Ext Time (p_c), s			0.0	0.0		0.1	

Intersection Summary							
HCM 2010 Ctrl Delay			11.0				
HCM 2010 LOS			B				

Notes

Intersection	
Intersection Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	17	0	23	29	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	19	0	26	32	39

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	65	36	71	0	-	0
Stage 1	52	-	-	-	-	-
Stage 2	13	-	-	-	-	-
Follow-up Headway	3.52	3.32	2.22	-	-	-
Pot Capacity-1 Maneuver	933	1029	1527	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	1008	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	933	1029	1527	-	-	-
Mov Capacity-2 Maneuver	933	-	-	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	1008	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1527	-	1029	-	-
HCM Lane V/C Ratio	-	-	0.018	-	-
HCM Control Delay (s)	0	-	8.6	-	-
HCM Lane LOS	A		A		
HCM 95th %tile Q(veh)	0	-	0.056	-	-

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

LONG-TERM (2030) TRAFFIC CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1117	65	13	1320	6	32	2	27	9	4	11
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		0.99	1.00		0.98	1.00		0.99	1.00		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Cap, veh/h	34	3512	205	58	3809	18	187	172	145	100	43	112
Arrive On Green	0.04	1.00	1.00	0.06	1.00	1.00	0.05	0.09	0.09	0.06	0.09	0.09
Sat Flow, veh/h	1774	5224	305	1774	5557	26	3442	1863	1573	1774	457	1187
Grp Volume(v), veh/h	1	916	443	15	1017	507	59	4	50	10	0	18
Grp Sat Flow(s),veh/h/ln	1774	1863	1804	1774	1863	1858	1721	1863	1573	1774	0	1644
Q Serve(g_s), s	0.0	0.0	0.0	0.7	0.0	0.0	1.3	0.2	2.0	0.4	0.0	0.8
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.7	0.0	0.0	1.3	0.2	2.0	0.4	0.0	0.8
Prop In Lane	1.00		0.17	1.00		0.01	1.00		1.00	1.00		0.72
Lane Grp Cap(c), veh/h	34	2505	1213	58	2553	1273	187	172	145	100	0	155
V/C Ratio(X)	0.03	0.37	0.37	0.26	0.40	0.40	0.31	0.02	0.34	0.10	0.00	0.12
Avail Cap(c_a), veh/h	304	2505	1213	304	2553	1273	589	797	673	304	0	703
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)	0.95	0.95	0.95	0.85	0.85	0.85	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.6	0.0	0.0	37.3	0.0	0.0	37.2	33.8	23.5	36.6	0.0	34.1
Incr Delay (d2), s/veh	0.5	0.4	0.8	2.9	0.4	0.8	1.4	0.1	2.0	0.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.0	0.1	0.3	0.3	0.1	0.3	0.6	0.1	1.0	0.2	0.0	0.3
Lane Grp Delay (d), s/veh	39.0	0.4	0.8	40.2	0.4	0.8	38.6	33.9	25.5	37.3	0.0	34.2
Lane Grp LOS	D	A	A	D	A	A	D	C	C	D		C
Approach Vol, veh/h		1360			1539			113			28	
Approach Delay, s/veh		0.6			0.9			32.6			35.3	
Approach LOS		A			A			C			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	4.6	58.0		5.7	59.1		7.5	10.5		7.6	10.7	
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5		4.5	5.3		4.5	4.5	
Max Green Setting (Gmax), s	12.5	52.5		12.5	52.5		12.5	32.7		12.5	33.5	
Max Q Clear Time (g_c+I1), s	2.0	2.0		2.7	2.0		3.3	4.0		2.4	2.8	
Green Ext Time (p_c), s	0.0	49.9		0.0	49.9		0.1	0.2		0.0	0.1	

Intersection Summary	
HCM 2010 Ctrl Delay	2.3
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	1045	36	220	1244	249	35	18	62	354	29	60
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		0.99	1.00		0.99	1.00		0.98	1.00		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	2	3	1	2	3	1	2	1	1	2	1	0
Cap, veh/h	163	2628	733	374	2816	786	120	155	129	667	132	269
Arrive On Green	0.09	0.94	0.94	0.22	1.00	1.00	0.03	0.08	0.08	0.19	0.24	0.24
Sat Flow, veh/h	3442	5588	1560	3442	5588	1561	3548	1863	1555	3442	541	1107
Grp Volume(v), veh/h	35	1174	40	253	1430	286	41	60	47	521	0	131
Grp Sat Flow(s),veh/h/ln	1721	1863	1560	1721	1863	1561	1774	1863	1555	1721	0	1649
Q Serve(g_s), s	0.8	1.8	0.1	5.6	0.0	0.0	0.9	2.5	2.4	12.0	0.0	5.4
Cycle Q Clear(g_c), s	0.8	1.8	0.1	5.6	0.0	0.0	0.9	2.5	2.4	12.0	0.0	5.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	163	2628	733	374	2816	786	120	155	129	667	0	401
V/C Ratio(X)	0.21	0.45	0.05	0.68	0.51	0.36	0.34	0.39	0.36	0.78	0.00	0.33
Avail Cap(c_a), veh/h	495	2628	733	826	2816	786	511	827	690	1115	0	1028
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)	0.95	0.95	0.95	0.79	0.79	0.79	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.3	1.4	1.3	31.3	0.0	0.0	39.4	36.2	36.1	31.9	0.0	25.9
Incr Delay (d2), s/veh	0.2	0.5	0.1	0.6	0.5	1.0	0.6	0.6	0.6	0.8	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.3	0.6	0.1	2.2	0.1	0.2	0.4	1.2	0.9	5.1	0.0	2.2
Lane Grp Delay (d), s/veh	36.5	1.9	1.5	31.9	0.5	1.0	40.0	36.8	36.8	32.7	0.0	26.1
Lane Grp LOS	D	A	A	C	A	A	D	D	D	C		C
Approach Vol, veh/h		1249			1969			148			652	
Approach Delay, s/veh		2.9			4.6			37.7			31.4	
Approach LOS		A			A			D			C	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.3	42.2		12.1	45.0		5.8	9.9		19.2	23.3	
Change Period (Y+Rc), s	6.3	6.3		4.0	6.3		4.0	4.2		4.0	4.2	
Max Green Setting (Gmax), s	11.0	30.7		19.0	38.7		11.0	35.8		26.0	50.8	
Max Q Clear Time (g_c+I1), s	2.8	3.8		7.6	2.0		2.9	4.5		14.0	7.4	
Green Ext Time (p_c), s	0.2	16.2		0.5	27.3		0.0	0.5		1.2	0.5	

Intersection Summary	
HCM 2010 Ctrl Delay	9.6
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	196	32	10	55	77	182	43	295	47	23	84	190
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	1	1	0	1	1	0	1	2	0	2	2	0
Cap, veh/h	627	480	152	627	174	412	117	972	153	63	461	392
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.07	0.31	0.31	0.02	0.25	0.25
Sat Flow, veh/h	1774	1358	429	1774	492	1165	1774	3143	495	3442	1863	1583
Grp Volume(v), veh/h	231	0	50	87	0	411	43	173	169	27	98	221
Grp Sat Flow(s),veh/h/ln	1774	0	1787	1774	0	1657	1774	1863	1775	1721	1863	1583
Q Serve(g_s), s	5.4	0.0	1.0	1.9	0.0	11.9	1.3	4.0	4.0	0.4	2.3	6.8
Cycle Q Clear(g_c), s	5.4	0.0	1.0	1.9	0.0	11.9	1.3	4.0	4.0	0.4	2.3	6.8
Prop In Lane	1.00		0.24	1.00		0.70	1.00		0.28	1.00		1.00
Lane Grp Cap(c), veh/h	627	0	632	627	0	586	117	576	549	63	461	392
V/C Ratio(X)	0.37	0.00	0.08	0.14	0.00	0.70	0.37	0.30	0.31	0.43	0.21	0.56
Avail Cap(c_a), veh/h	1064	0	1072	1048	0	979	747	1524	1453	1448	1524	1296
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.4	0.0	12.0	12.3	0.0	15.5	25.0	14.7	14.7	27.1	16.7	18.4
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.1	0.0	2.2	2.7	1.1	1.1	6.4	0.8	4.6
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 Back of Q (50%), veh/ln	2.3	0.0	0.4	0.8	0.0	4.8	0.6	1.8	1.7	0.2	1.1	2.9
Lane Grp Delay (d), s/veh	13.9	0.0	12.1	12.4	0.0	17.7	27.7	15.7	15.9	33.5	17.5	23.0
Lane Grp LOS	B		B	B		B	C	B	B	C	B	C
Approach Vol, veh/h		281			498			385			346	
Approach Delay, s/veh		13.6			16.8			17.1			22.2	
Approach LOS		B			B			B			C	
Timer												
Assigned Phs		4			8		5	2		1	6	
Phs Duration (G+Y+Rc), s		25.7			25.7		10.0	23.6		6.5	20.1	
Change Period (Y+Rc), s		6.0			6.0		6.3	6.3		5.5	6.3	
Max Green Setting (Gmax), s		33.5			33.0		23.5	45.7		23.5	45.7	
Max Q Clear Time (g_c+I1), s		7.4			13.9		3.3	6.0		2.4	8.8	
Green Ext Time (p_c), s		6.6			5.8		4.3	5.4		0.1	5.0	
Intersection Summary												
HCM 2010 Ctrl Delay			17.5									
HCM 2010 LOS			B									
Notes												



Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (veh/h)	19	106	302	29	0	27	16
Number	7	14	5	2		6	16
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus Adj	1.00	1.00	1.00	1.00		1.00	0.90
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3		186.3	190.0
Lanes	1	1	1	2		2	0
Cap, veh/h	180	161	452	2149		348	189
Arrive On Green	0.10	0.10	0.25	0.58		0.16	0.16
Sat Flow, veh/h	1774	1583	1774	3725		2161	1172
Grp Volume(v), veh/h	21	118	336	32		25	23
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1863		1863	1470
Q Serve(g_s), s	0.3	1.8	4.3	0.1		0.3	0.3
Cycle Q Clear(g_c), s	0.3	1.8	4.3	0.1		0.3	0.3
Prop In Lane	1.00	1.00	1.00				0.80
Lane Grp Cap(c), veh/h	180	161	452	2149		300	236
V/C Ratio(X)	0.12	0.73	0.74	0.01		0.08	0.10
Avail Cap(c_a), veh/h	1142	1019	1142	3597		1199	946
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	10.2	10.8	8.5	2.2		8.9	8.9
Incr Delay (d2), s/veh	0.3	6.4	2.4	0.0		0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile Back of Q (50%), veh/ln	0.1	0.3	1.4	0.0		0.1	0.1
Lane Grp Delay (d), s/veh	10.4	17.2	10.9	2.2		9.0	9.1
Lane Grp LOS	B	B	B	A		A	A
Approach Vol, veh/h	139			368		48	
Approach Delay, s/veh	16.2			10.2		9.0	
Approach LOS	B			B		A	

Timer							
Assigned Phs			5	2		6	
Phs Duration (G+Y+Rc), s			10.3	18.3		8.0	
Change Period (Y+Rc), s			4.0	4.0		4.0	
Max Green Setting (Gmax), s			16.0	24.0		16.0	
Max Q Clear Time (g_c+I1), s			6.3	2.1		2.3	
Green Ext Time (p_c), s			0.7	0.3		0.2	

Intersection Summary	
HCM 2010 Ctrl Delay	11.6
HCM 2010 LOS	B

Notes



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	1359	15	1524	59	4	50	10	18
v/c Ratio	0.01	0.34	0.12	0.37	0.22	0.02	0.18	0.08	0.11
Control Delay	74.0	6.1	74.5	0.9	57.8	42.0	1.5	57.8	26.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.0	6.1	74.5	0.9	57.8	42.0	1.5	57.8	26.7
Queue Length 50th (ft)	1	43	13	1	24	3	0	8	4
Queue Length 95th (ft)	m2	167	m27	34	27	7	0	26	22
Internal Link Dist (ft)		1050		900		2503			316
Turn Bay Length (ft)	200		410		215		200	50	
Base Capacity (vph)	190	3972	190	4120	369	501	490	190	456
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.34	0.08	0.37	0.16	0.01	0.10	0.05	0.04

Intersection Summary

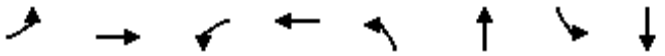
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	35	1174	40	253	1430	286	41	49	45	521	131
v/c Ratio	0.11	0.44	0.05	0.64	0.52	0.30	0.22	0.27	0.15	0.82	0.29
Control Delay	39.8	14.2	0.6	70.6	13.6	2.0	61.2	28.3	1.0	61.7	14.4
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	39.8	14.2	0.6	70.6	13.6	2.0	61.2	28.3	1.0	61.7	14.4
Queue Length 50th (ft)	13	161	0	106	126	0	17	17	0	217	30
Queue Length 95th (ft)	32	400	7	m141	423	m78	34	44	0	197	34
Internal Link Dist (ft)		900			775			542			1064
Turn Bay Length (ft)	300		620	285		245	70			160	
Base Capacity (vph)	316	2653	865	528	2767	957	316	476	551	713	722
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	0.11	0.44	0.05	0.48	0.52	0.30	0.13	0.10	0.08	0.73	0.18

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	231	50	87	411	43	342	27	319
v/c Ratio	0.65	0.14	0.14	0.66	0.21	0.51	0.10	0.48
Control Delay	46.7	30.3	28.1	31.8	44.8	38.5	48.9	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.7	30.3	28.1	31.8	44.8	38.5	48.9	16.5
Queue Length 50th (ft)	142	22	40	197	25	103	8	31
Queue Length 95th (ft)	223	54	64	216	65	164	24	71
Internal Link Dist (ft)		1118		2495		753		2575
Turn Bay Length (ft)	95		115		130		230	
Base Capacity (vph)	625	640	615	624	438	1675	850	1642
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.08	0.14	0.66	0.10	0.20	0.03	0.19

Intersection Summary



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	21	118	336	32	48
v/c Ratio	0.06	0.30	0.53	0.01	0.06
Control Delay	14.4	6.4	12.9	2.9	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.4	6.4	12.9	2.9	11.4
Queue Length 50th (ft)	4	0	51	1	2
Queue Length 95th (ft)	17	30	117	4	13
Internal Link Dist (ft)	2495			1842	2503
Turn Bay Length (ft)	100		100		
Base Capacity (vph)	876	843	876	2674	1663
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.14	0.38	0.01	0.03

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	1872	93	37	1559	20	148	7	35	10	5	5
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.97
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	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Cap, veh/h	39	3139	156	86	3419	44	335	199	165	180	94	94
Arrive On Green	0.04	1.00	1.00	0.10	1.00	1.00	0.10	0.11	0.11	0.10	0.11	0.10
Sat Flow, veh/h	1774	5279	262	1774	5505	71	3442	1863	1544	1774	843	843
Grp Volume(v), veh/h	3	1346	659	41	1159	576	174	8	41	23	0	24
Grp Sat Flow(s),veh/h/ln	1774	1863	1816	1774	1863	1850	1721	1863	1544	1774	0	1686
Q Serve(g_s), s	0.1	0.0	0.0	1.8	0.0	0.0	3.9	0.3	1.6	1.0	0.0	1.0
Cycle Q Clear(g_c), s	0.1	0.0	0.0	1.8	0.0	0.0	3.9	0.3	1.6	1.0	0.0	1.0
Prop In Lane	1.00		0.14	1.00		0.04	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	39	2215	1080	86	2314	1149	335	199	165	180	0	187
V/C Ratio(X)	0.08	0.61	0.61	0.48	0.50	0.50	0.52	0.04	0.25	0.13	0.00	0.13
Avail Cap(c_a), veh/h	374	2215	1080	374	2314	1149	725	831	688	374	0	752
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)	0.78	0.78	0.78	0.83	0.83	0.83	0.98	0.98	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.8	0.0	0.0	35.5	0.0	0.0	34.6	32.3	21.1	33.0	0.0	32.5
Incr Delay (d2), s/veh	0.9	1.0	2.0	4.8	0.6	1.3	1.7	0.1	1.1	0.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.1	0.3	0.6	0.9	0.2	0.4	1.7	0.1	0.8	0.4	0.0	0.4
Lane Grp Delay (d), s/veh	38.8	1.0	2.0	40.3	0.6	1.3	36.4	32.4	22.2	33.5	0.0	32.6
Lane Grp LOS	D	A	A	D	A	A	D	C	C	C		C
Approach Vol, veh/h		2008			1776			223			47	
Approach Delay, s/veh		1.4			1.8			33.6			33.0	
Approach LOS		A			A			C			C	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	4.8	51.0		6.9	53.1		10.9	11.6		11.2	12.0	
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5		4.5	5.3		4.5	4.5	
Max Green Setting (Gmax), s	15.5	45.5		15.5	45.5		15.5	33.7		15.5	34.5	
Max Q Clear Time (g_c+I1), s	2.1	2.0		3.8	2.0		5.9	3.6		3.0	3.0	
Green Ext Time (p_c), s	0.0	43.4		0.1	43.4		0.6	0.2		0.1	0.1	

Intersection Summary	
HCM 2010 Ctrl Delay	3.7
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	82	1838	34	431	1462	415	70	63	176	263	52	49
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.98
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	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	2	3	1	2	3	1	2	1	1	2	1	0
Cap, veh/h	161	2300	651	557	2800	792	178	311	258	433	211	201
Arrive On Green	0.09	0.82	0.82	0.32	1.00	1.00	0.05	0.17	0.17	0.13	0.24	0.24
Sat Flow, veh/h	3442	5588	1581	3442	5588	1581	3548	1863	1543	3442	869	826
Grp Volume(v), veh/h	87	1955	36	449	1523	432	80	168	136	306	0	117
Grp Sat Flow(s),veh/h/ln	1721	1863	1581	1721	1863	1581	1774	1863	1543	1721	0	1695
Q Serve(g_s), s	2.2	18.5	0.4	10.7	0.0	0.0	2.0	7.4	7.2	7.7	0.0	5.0
Cycle Q Clear(g_c), s	2.2	18.5	0.4	10.7	0.0	0.0	2.0	7.4	7.2	7.7	0.0	5.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.49
Lane Grp Cap(c), veh/h	161	2300	651	557	2800	792	178	311	258	433	0	412
V/C Ratio(X)	0.54	0.85	0.06	0.81	0.54	0.55	0.45	0.54	0.53	0.71	0.00	0.28
Avail Cap(c_a), veh/h	460	2300	651	843	2800	792	553	767	636	920	0	887
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)	0.79	0.79	0.79	0.70	0.70	0.70	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.8	6.3	4.7	29.1	0.0	0.0	41.4	34.2	34.2	37.7	0.0	27.7
Incr Delay (d2), s/veh	0.8	3.3	0.1	1.3	0.5	1.9	0.7	0.5	0.6	0.8	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.9	3.4	0.2	3.8	0.1	0.4	0.9	3.4	2.8	3.3	0.0	2.1
Lane Grp Delay (d), s/veh	40.6	9.6	4.8	30.4	0.5	1.9	42.1	34.8	34.8	38.5	0.0	27.8
Lane Grp LOS	D	A	A	C	A	A	D	C	C	D		C
Approach Vol, veh/h		2078			2404			384			423	
Approach Delay, s/veh		10.9			6.3			36.3			35.5	
Approach LOS		B			A			D			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.5	40.0		17.5	48.0		7.5	18.0		14.3	24.8	
Change Period (Y+Rc), s	6.3	6.3		4.0	6.3		4.0	4.2		4.0	4.2	
Max Green Setting (Gmax), s	11.0	31.7		21.0	41.7		13.0	35.8		23.0	45.8	
Max Q Clear Time (g_c+I1), s	4.2	20.5		12.7	2.0		4.0	9.4		9.7	7.0	
Green Ext Time (p_c), s	0.2	10.5		0.8	32.1		0.1	0.9		0.6	0.9	

Intersection Summary	
HCM 2010 Ctrl Delay	12.6
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	206	35	24	55	10	30	58	157	107	33	198	166
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Cap, veh/h	430	250	172	430	100	299	74	817	523	49	710	569
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.04	0.38	0.38	0.03	0.37	0.37
Sat Flow, veh/h	1774	1029	708	1774	411	1233	1774	2124	1361	1774	1918	1537
Grp Volume(v), veh/h	282	0	81	55	0	40	58	136	128	40	232	207
Grp Sat Flow(s),veh/h/ln	1774	0	1737	1774	0	1643	1774	1863	1623	1774	1863	1592
Q Serve(g_s), s	7.2	0.0	1.9	1.2	0.0	0.9	1.6	2.4	2.6	1.1	4.5	4.7
Cycle Q Clear(g_c), s	7.2	0.0	1.9	1.2	0.0	0.9	1.6	2.4	2.6	1.1	4.5	4.7
Prop In Lane	1.00		0.41	1.00		0.75	1.00		0.84	1.00		0.97
Lane Grp Cap(c), veh/h	430	0	421	430	0	399	74	716	624	49	690	589
V/C Ratio(X)	0.66	0.00	0.19	0.13	0.00	0.10	0.78	0.19	0.20	0.82	0.34	0.35
Avail Cap(c_a), veh/h	1187	0	1162	1187	0	1099	833	1700	1481	833	1700	1453
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.1	0.0	15.1	14.8	0.0	14.7	23.8	10.2	10.3	24.2	11.3	11.4
Incr Delay (d2), s/veh	2.4	0.0	0.3	0.2	0.0	0.2	21.9	0.5	0.6	36.2	1.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	3.1	0.0	0.8	0.5	0.0	0.4	1.1	1.0	0.9	0.9	1.9	1.7
Lane Grp Delay (d), s/veh	19.5	0.0	15.4	15.0	0.0	14.9	45.6	10.7	10.9	60.4	12.4	12.7
Lane Grp LOS	B		B	B		B	D	B	B	E	B	B
Approach Vol, veh/h		363			95			322			479	
Approach Delay, s/veh		18.6			15.0			17.1			16.5	
Approach LOS		B			B			B			B	

Timer												
Assigned Phs		4			8		5	2		1	6	
Phs Duration (G+Y+Rc), s		17.6			17.6		7.6	25.6		6.9	24.8	
Change Period (Y+Rc), s		5.5			5.5		5.5	6.3		5.5	6.3	
Max Green Setting (Gmax), s		33.5			33.5		23.5	45.7		23.5	45.7	
Max Q Clear Time (g_c+I1), s		9.2			3.2		3.6	4.6		3.1	6.7	
Green Ext Time (p_c), s		2.8			2.9		0.2	12.0		0.1	11.8	

Intersection Summary		
HCM 2010 Ctrl Delay	17.1	
HCM 2010 LOS	B	

Notes

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (veh/h)	93	85	57	19	0	9	16
Number	7	14	5	2		6	16
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3		186.3	190.0
Lanes	1	1	1	2		2	0
Cap, veh/h	237	212	105	1724		376	320
Arrive On Green	0.13	0.13	0.06	0.46		0.20	0.20
Sat Flow, veh/h	1774	1583	1774	3725		1863	1583
Grp Volume(v), veh/h	103	94	63	21		10	18
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1863		1863	1583
Q Serve(g_s), s	1.1	1.1	0.7	0.1		0.1	0.2
Cycle Q Clear(g_c), s	1.1	1.1	0.7	0.1		0.1	0.2
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	237	212	105	1724		376	320
V/C Ratio(X)	0.43	0.44	0.60	0.01		0.03	0.06
Avail Cap(c_a), veh/h	1522	1358	716	3383		1692	1438
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	7.9	7.9	9.1	2.9		6.3	6.4
Incr Delay (d2), s/veh	1.3	1.5	5.4	0.0		0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile Back of Q (50%), veh/ln	0.4	0.1	0.3	0.0		0.0	0.0
Lane Grp Delay (d), s/veh	9.2	9.4	14.5	2.9		6.4	6.5
Lane Grp LOS	A	A	B	A		A	A
Approach Vol, veh/h	197			84		28	
Approach Delay, s/veh	9.3			11.6		6.4	
Approach LOS	A			B		A	

Timer							
Assigned Phs			5	2		6	
Phs Duration (G+Y+Rc), s			5.2	13.2		8.0	
Change Period (Y+Rc), s			4.0	4.0		4.0	
Max Green Setting (Gmax), s			8.0	18.0		18.0	
Max Q Clear Time (g_c+I1), s			2.7	2.1		2.2	
Green Ext Time (p_c), s			0.0	0.1		0.1	

Intersection Summary	
HCM 2010 Ctrl Delay	9.6
HCM 2010 LOS	A

Notes



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	2005	41	1735	174	8	41	23	24
v/c Ratio	0.03	0.59	0.28	0.46	0.47	0.04	0.15	0.16	0.15
Control Delay	78.0	7.3	84.4	2.5	58.2	46.0	1.2	56.8	33.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.0	7.3	84.4	2.5	58.2	46.0	1.2	56.8	33.3
Queue Length 50th (ft)	3	87	36	46	72	6	0	18	10
Queue Length 95th (ft)	m5	631	m70	65	101	17	0	22	11
Internal Link Dist (ft)		1050		900		2503			316
Turn Bay Length (ft)	200		410		215		200	50	
Base Capacity (vph)	231	3403	231	3783	448	515	500	231	482
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.59	0.18	0.46	0.39	0.02	0.08	0.10	0.05

Intersection Summary

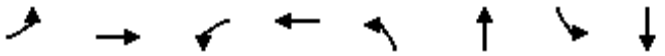
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	87	1955	36	449	1523	432	80	142	130	306	117
v/c Ratio	0.28	0.81	0.04	0.78	0.54	0.42	0.36	0.57	0.37	0.69	0.32
Control Delay	46.3	23.3	1.0	76.9	11.9	2.2	62.3	45.3	4.3	61.9	27.8
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	46.3	23.3	1.0	76.9	11.9	2.2	62.3	45.3	4.3	61.9	27.8
Queue Length 50th (ft)	36	224	0	205	102	0	34	89	0	128	56
Queue Length 95th (ft)	m53	#894	m3	211	326	45	58	129	13	162	82
Internal Link Dist (ft)		900			775			542			1064
Turn Bay Length (ft)	300		620	285		245	70			160	
Base Capacity (vph)	316	2424	802	613	2810	1019	369	488	549	633	644
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	0.28	0.81	0.04	0.73	0.54	0.42	0.22	0.29	0.24	0.48	0.18

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	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	282	81	55	40	58	264	40	439
v/c Ratio	0.58	0.16	0.23	0.16	0.24	0.26	0.18	0.49
Control Delay	32.0	20.4	38.9	19.8	38.9	16.8	39.3	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	20.4	38.9	19.8	38.9	16.8	39.3	21.8
Queue Length 50th (ft)	122	23	25	4	26	32	18	67
Queue Length 95th (ft)	182	50	71	38	74	78	53	124
Internal Link Dist (ft)		1118		2495		753		2575
Turn Bay Length (ft)	95		115		130		230	
Base Capacity (vph)	924	917	924	868	656	2163	656	2158
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.09	0.06	0.05	0.09	0.12	0.06	0.20

Intersection Summary



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	103	94	63	21	28
v/c Ratio	0.23	0.20	0.15	0.01	0.02
Control Delay	10.8	4.4	11.0	4.3	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	4.4	11.0	4.3	7.8
Queue Length 50th (ft)	7	0	5	1	0
Queue Length 95th (ft)	38	19	28	3	7
Internal Link Dist (ft)	2495			1842	2503
Turn Bay Length (ft)	100		100		
Base Capacity (vph)	1065	990	501	2446	2214
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.10	0.09	0.13	0.01	0.01

Intersection Summary

LONG-TERM (2030) PLUS PROJECT TRAFFIC CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1117	68	24	1320	6	42	2	58	9	4	11
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		0.99	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Cap, veh/h	34	3426	208	72	3775	17	200	229	194	63	46	119
Arrive On Green	0.04	1.00	1.00	0.08	1.00	1.00	0.06	0.12	0.12	0.04	0.10	0.09
Sat Flow, veh/h	1774	5211	317	1774	5557	26	3442	1863	1576	1774	457	1188
Grp Volume(v), veh/h	1	918	444	28	1017	507	78	4	107	10	0	18
Grp Sat Flow(s),veh/h/ln	1774	1863	1802	1774	1863	1858	1721	1863	1576	1774	0	1644
Q Serve(g_s), s	0.0	0.0	0.0	1.3	0.0	0.0	1.8	0.2	4.3	0.5	0.0	0.8
Cycle Q Clear(g_c), s	0.0	0.0	0.0	1.3	0.0	0.0	1.8	0.2	4.3	0.5	0.0	0.8
Prop In Lane	1.00		0.18	1.00		0.01	1.00		1.00	1.00		0.72
Lane Grp Cap(c), veh/h	34	2449	1185	72	2530	1262	200	229	194	63	0	165
V/C Ratio(X)	0.03	0.37	0.37	0.39	0.40	0.40	0.39	0.02	0.55	0.16	0.00	0.11
Avail Cap(c_a), veh/h	297	2449	1185	297	2530	1262	576	779	659	297	0	688
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)	0.95	0.95	0.95	0.85	0.85	0.85	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.5	0.0	0.0	37.4	0.0	0.0	38.0	32.3	22.6	39.1	0.0	34.4
Incr Delay (d2), s/veh	0.5	0.4	0.9	4.0	0.4	0.8	1.8	0.0	3.5	1.7	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.0	0.1	0.3	0.6	0.1	0.3	0.8	0.1	2.1	0.2	0.0	0.4
Lane Grp Delay (d), s/veh	40.0	0.4	0.9	41.5	0.4	0.8	39.7	32.3	26.1	40.8	0.0	34.5
Lane Grp LOS	D	A	A	D	A	A	D	C	C	D		C
Approach Vol, veh/h		1363			1552			189			28	
Approach Delay, s/veh		0.6			1.3			31.8			36.8	
Approach LOS		A			A			C			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	4.6	58.0		6.4	59.8		7.9	13.3		6.0	11.4	
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5		4.5	5.3		4.5	4.5	
Max Green Setting (Gmax), s	12.5	52.5		12.5	52.5		12.5	32.7		12.5	33.5	
Max Q Clear Time (g_c+I1), s	2.0	2.0		3.3	2.0		3.8	6.3		2.5	2.8	
Green Ext Time (p_c), s	0.0	50.0		0.0	50.0		0.2	0.6		0.0	0.1	

Intersection Summary	
HCM 2010 Ctrl Delay	3.1
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	1075	38	220	1255	249	35	18	62	354	29	60
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		0.99	1.00		0.99	1.00		0.98	1.00		0.99
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	2	3	1	2	3	1	2	1	1	2	1	0
Cap, veh/h	163	2628	733	374	2816	786	120	155	129	667	132	269
Arrive On Green	0.09	0.94	0.94	0.22	1.00	1.00	0.03	0.08	0.08	0.19	0.24	0.24
Sat Flow, veh/h	3442	5588	1560	3442	5588	1561	3548	1863	1555	3442	541	1107
Grp Volume(v), veh/h	35	1208	43	253	1443	286	41	60	47	521	0	131
Grp Sat Flow(s),veh/h/ln	1721	1863	1560	1721	1863	1561	1774	1863	1555	1721	0	1649
Q Serve(g_s), s	0.8	1.9	0.1	5.6	0.0	0.0	0.9	2.5	2.4	12.0	0.0	5.4
Cycle Q Clear(g_c), s	0.8	1.9	0.1	5.6	0.0	0.0	0.9	2.5	2.4	12.0	0.0	5.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	163	2628	733	374	2816	786	120	155	129	667	0	401
V/C Ratio(X)	0.21	0.46	0.06	0.68	0.51	0.36	0.34	0.39	0.36	0.78	0.00	0.33
Avail Cap(c_a), veh/h	495	2628	733	826	2816	786	511	827	690	1115	0	1029
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)	0.94	0.94	0.94	0.79	0.79	0.79	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.3	1.4	1.3	31.3	0.0	0.0	39.4	36.2	36.1	31.9	0.0	25.9
Incr Delay (d2), s/veh	0.2	0.5	0.1	0.6	0.5	1.0	0.6	0.6	0.6	0.8	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.3	0.6	0.1	2.2	0.1	0.2	0.4	1.2	0.9	5.1	0.0	2.2
Lane Grp Delay (d), s/veh	36.5	1.9	1.5	31.9	0.5	1.0	40.0	36.8	36.8	32.7	0.0	26.1
Lane Grp LOS	D	A	A	C	A	A	D	D	D	C		C
Approach Vol, veh/h		1286			1982			148			652	
Approach Delay, s/veh		2.8			4.6			37.7			31.4	
Approach LOS		A			A			D			C	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.3	42.2		12.1	45.0		5.8	9.9		19.2	23.3	
Change Period (Y+Rc), s	6.3	6.3		4.0	6.3		4.0	4.2		4.0	4.2	
Max Green Setting (Gmax), s	11.0	30.7		19.0	38.7		11.0	35.8		26.0	50.8	
Max Q Clear Time (g_c+I1), s	2.8	3.9		7.6	2.0		2.9	4.5		14.0	7.4	
Green Ext Time (p_c), s	0.2	16.6		0.5	27.5		0.0	0.5		1.2	0.5	

Intersection Summary	
HCM 2010 Ctrl Delay	9.5
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	196	32	10	59	89	188	43	295	48	25	84	190
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Cap, veh/h	640	490	155	640	193	408	54	1043	168	34	600	510
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.36	0.03	0.33	0.33	0.02	0.32	0.32
Sat Flow, veh/h	1774	1358	429	1774	534	1129	1774	3133	504	1774	1863	1583
Grp Volume(v), veh/h	231	0	50	94	0	439	43	174	169	29	98	221
Grp Sat Flow(s),veh/h/ln	1774	0	1787	1774	0	1663	1774	1863	1774	1774	1863	1583
Q Serve(g_s), s	5.8	0.0	1.1	2.2	0.0	13.8	1.5	4.1	4.2	1.0	2.3	6.6
Cycle Q Clear(g_c), s	5.8	0.0	1.1	2.2	0.0	13.8	1.5	4.1	4.2	1.0	2.3	6.6
Prop In Lane	1.00		0.24	1.00		0.68	1.00		0.28	1.00		1.00
Lane Grp Cap(c), veh/h	640	0	645	640	0	601	54	620	591	34	600	510
V/C Ratio(X)	0.36	0.00	0.08	0.15	0.00	0.73	0.80	0.28	0.29	0.84	0.16	0.43
Avail Cap(c_a), veh/h	985	0	992	985	0	923	691	1410	1343	691	1410	1199
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	0.0	12.7	13.0	0.0	16.7	29.1	14.8	14.8	29.5	14.6	16.1
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.1	0.0	2.5	30.8	0.9	1.0	50.3	0.5	2.1
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 Back of Q (50%), veh/ln	2.4	0.0	0.5	0.9	0.0	5.7	1.1	1.8	1.8	0.9	1.0	2.6
Lane Grp Delay (d), s/veh	14.7	0.0	12.8	13.2	0.0	19.2	59.9	15.7	15.8	79.8	15.1	18.2
Lane Grp LOS	B		B	B		B	E	B	B	E	B	B
Approach Vol, veh/h		281			533			386			348	
Approach Delay, s/veh		14.3			18.1			20.7			22.5	
Approach LOS		B			B			C			C	

Timer												
Assigned Phs		4			8		5	2		1	6	
Phs Duration (G+Y+Rc), s		27.3			27.3		7.3	26.4		6.7	25.7	
Change Period (Y+Rc), s		5.5			5.5		5.5	6.3		5.5	6.3	
Max Green Setting (Gmax), s		33.5			33.5		23.5	45.7		23.5	45.7	
Max Q Clear Time (g_c+I1), s		7.8			15.8		3.5	6.2		3.0	8.6	
Green Ext Time (p_c), s		6.9			6.0		0.1	11.0		0.1	10.8	

Intersection Summary		
HCM 2010 Ctrl Delay		19.0
HCM 2010 LOS		B

Notes

Intersection	
Intersection Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	7	145	336	8	23	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	161	373	9	26	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	382	0	-	0	555	378
Stage 1	-	-	-	-	378	-
Stage 2	-	-	-	-	177	-
Follow-up Headway	2.218	-	-	-	3.518	3.318
Pot Capacity-1 Maneuver	1176	-	-	-	493	669
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	854	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1176	-	-	-	490	669
Mov Capacity-2 Maneuver	-	-	-	-	490	-
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	848	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	11.9
HCM LOS			B

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1176	-	-	-	490	669
HCM Lane V/C Ratio	0.007	-	-	-	0.052	0.027
HCM Control Delay (s)	8.082	-	-	-	12.8	10.5
HCM Lane LOS	A				B	B
HCM 95th %tile Q(veh)	0.02	-	-	-	0.165	0.082

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (veh/h)	46	109	304	29	20	30	27
Number	7	14	5	2		6	16
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3		186.3	190.0
Lanes	1	1	1	2		2	0
Cap, veh/h	208	185	453	2121		302	240
Arrive On Green	0.12	0.12	0.26	0.57		0.16	0.16
Sat Flow, veh/h	1774	1583	1774	3725		1922	1533
Grp Volume(v), veh/h	51	121	338	32		32	31
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1863		1863	1592
Q Serve(g_s), s	0.7	1.9	4.5	0.1		0.4	0.4
Cycle Q Clear(g_c), s	0.7	1.9	4.5	0.1		0.4	0.4
Prop In Lane	1.00	1.00	1.00				0.96
Lane Grp Cap(c), veh/h	208	185	453	2121		292	250
V/C Ratio(X)	0.25	0.65	0.75	0.02		0.11	0.12
Avail Cap(c_a), veh/h	1113	994	1113	3507		1169	999
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	10.2	10.8	8.7	2.4		9.2	9.2
Incr Delay (d2), s/veh	0.6	3.9	2.5	0.0		0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile Back of Q (50%), veh/ln	0.3	0.2	1.4	0.0		0.1	0.1
Lane Grp Delay (d), s/veh	10.8	14.6	11.2	2.4		9.4	9.5
Lane Grp LOS	B	B	B	A		A	A
Approach Vol, veh/h	172			370		63	
Approach Delay, s/veh	13.5			10.4		9.4	
Approach LOS	B			B		A	

Timer							
Assigned Phs			5	2		6	
Phs Duration (G+Y+Rc), s			10.5	18.5		8.0	
Change Period (Y+Rc), s			4.0	4.0		4.0	
Max Green Setting (Gmax), s			16.0	24.0		16.0	
Max Q Clear Time (g_c+I1), s			6.5	2.1		2.4	
Green Ext Time (p_c), s			0.7	0.4		0.3	

Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B

Notes

Intersection	
Intersection Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	29	0	101	62	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	32	0	112	69	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	130	39	79	0	-	0
Stage 1	74	-	-	-	-	-
Stage 2	56	-	-	-	-	-
Follow-up Headway	3.52	3.32	2.22	-	-	-
Pot Capacity-1 Maneuver	851	1024	1517	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	960	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	851	1024	1517	-	-	-
Mov Capacity-2 Maneuver	851	-	-	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	960	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1517	-	1024	-	-
HCM Lane V/C Ratio	-	-	0.031	-	-
HCM Control Delay (s)	0	-	8.6	-	-
HCM Lane LOS	A		A		
HCM 95th %tile Q(veh)	0	-	0.097	-	-

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	1362	28	1524	78	4	107	10	18
v/c Ratio	0.01	0.37	0.21	0.38	0.27	0.02	0.36	0.08	0.11
Control Delay	74.0	7.4	76.1	0.9	57.9	41.5	10.8	57.8	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.0	7.4	76.1	0.9	57.9	41.5	10.8	57.8	27.0
Queue Length 50th (ft)	1	92	25	1	32	3	0	8	4
Queue Length 95th (ft)	m2	168	m49	34	34	7	0	26	23
Internal Link Dist (ft)		1050		900		2101			316
Turn Bay Length (ft)	200		410		215		200	50	
Base Capacity (vph)	190	3715	190	3988	369	501	498	190	456
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.37	0.15	0.38	0.21	0.01	0.21	0.05	0.04

Intersection Summary

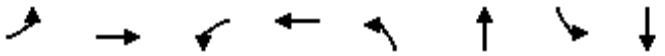
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	35	1208	43	253	1443	286	41	49	45	521	131
v/c Ratio	0.11	0.46	0.05	0.64	0.52	0.30	0.22	0.27	0.15	0.82	0.29
Control Delay	40.1	14.2	0.6	70.6	13.7	2.0	61.2	28.3	1.0	61.7	14.4
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	40.1	14.2	0.6	70.6	13.7	2.0	61.2	28.3	1.0	61.7	14.4
Queue Length 50th (ft)	14	168	1	106	127	0	17	17	0	217	30
Queue Length 95th (ft)	31	415	5	m141	428	m79	34	44	0	197	34
Internal Link Dist (ft)		900			775			542			1064
Turn Bay Length (ft)	300		620	285		245	70			160	
Base Capacity (vph)	316	2653	865	528	2767	957	316	476	551	713	722
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	0.11	0.46	0.05	0.48	0.52	0.30	0.13	0.10	0.08	0.73	0.18

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	231	50	94	439	43	343	29	319
v/c Ratio	0.65	0.14	0.15	0.70	0.26	0.51	0.19	0.42
Control Delay	47.5	31.0	28.7	34.7	51.1	39.2	51.2	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	31.0	28.7	34.7	51.1	39.2	51.2	14.4
Queue Length 50th (ft)	144	23	44	226	27	105	18	29
Queue Length 95th (ft)	228	55	70	247	70	170	50	67
Internal Link Dist (ft)		1118		1835		753		2575
Turn Bay Length (ft)	95		115		130		230	
Base Capacity (vph)	619	633	619	624	434	1658	434	1628
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.08	0.15	0.70	0.10	0.21	0.07	0.20

Intersection Summary

Intersection	
Intersection Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	7	145	336	8	23	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	161	373	9	26	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	382	0	-	0	555	378
Stage 1	-	-	-	-	378	-
Stage 2	-	-	-	-	177	-
Follow-up Headway	2.218	-	-	-	3.518	3.318
Pot Capacity-1 Maneuver	1176	-	-	-	493	669
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	854	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1176	-	-	-	490	669
Mov Capacity-2 Maneuver	-	-	-	-	490	-
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	848	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	11.9
HCM LOS			B

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1176	-	-	-	490	669
HCM Lane V/C Ratio	0.007	-	-	-	0.052	0.027
HCM Control Delay (s)	8.082	-	-	-	12.8	10.5
HCM Lane LOS	A				B	B
HCM 95th %tile Q(veh)	0.02	-	-	-	0.165	0.082

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined



Lane Group	EBL	EBR	NBL	NBT	SBU	SBT
Lane Group Flow (vph)	51	121	338	32	22	63
v/c Ratio	0.16	0.31	0.57	0.01	0.07	0.09
Control Delay	15.3	6.5	14.7	6.0	15.6	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	6.5	14.7	6.0	15.6	10.4
Queue Length 50th (ft)	9	0	53	1	4	3
Queue Length 95th (ft)	31	30	119	8	18	15
Internal Link Dist (ft)	580			1842		322
Turn Bay Length (ft)	100		100		100	
Base Capacity (vph)	799	781	799	2414	399	1502
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.15	0.42	0.01	0.06	0.04

Intersection Summary

Intersection	
Intersection Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	29	0	101	62	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	32	0	112	69	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	130	39	79	0	-	0
Stage 1	74	-	-	-	-	-
Stage 2	56	-	-	-	-	-
Follow-up Headway	3.52	3.32	2.22	-	-	-
Pot Capacity-1 Maneuver	851	1024	1517	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	960	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	851	1024	1517	-	-	-
Mov Capacity-2 Maneuver	851	-	-	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	960	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1517	-	1024	-	-
HCM Lane V/C Ratio	-	-	0.031	-	-
HCM Control Delay (s)	0	-	8.6	-	-
HCM Lane LOS	A		A		
HCM 95th %tile Q(veh)	0	-	0.097	-	-

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	1872	104	72	1559	20	154	7	53	10	5	5
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.97
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	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Cap, veh/h	37	3004	166	133	3448	44	338	209	174	172	94	94
Arrive On Green	0.04	1.00	1.00	0.15	1.00	1.00	0.10	0.11	0.11	0.10	0.11	0.11
Sat Flow, veh/h	1774	5246	290	1774	5505	71	3442	1863	1545	1774	843	843
Grp Volume(v), veh/h	3	1355	661	79	1159	576	181	8	62	23	0	24
Grp Sat Flow(s),veh/h/ln	1774	1863	1811	1774	1863	1850	1721	1863	1545	1774	0	1686
Q Serve(g_s), s	0.1	0.0	0.0	3.5	0.0	0.0	4.2	0.3	2.4	1.0	0.0	1.1
Cycle Q Clear(g_c), s	0.1	0.0	0.0	3.5	0.0	0.0	4.2	0.3	2.4	1.0	0.0	1.1
Prop In Lane	1.00		0.16	1.00		0.04	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	37	2133	1037	133	2333	1159	338	209	174	172	0	187
V/C Ratio(X)	0.08	0.64	0.64	0.60	0.50	0.50	0.54	0.04	0.36	0.13	0.00	0.13
Avail Cap(c_a), veh/h	360	2133	1037	360	2333	1159	698	800	663	360	0	724
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)	0.78	0.78	0.78	0.82	0.82	0.82	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.4	0.0	0.0	34.5	0.0	0.0	36.0	33.2	20.6	34.6	0.0	33.7
Incr Delay (d2), s/veh	1.0	1.1	2.3	4.9	0.6	1.3	1.9	0.1	1.8	0.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.1	0.3	0.7	1.6	0.2	0.4	1.8	0.2	1.2	0.5	0.0	0.5
Lane Grp Delay (d), s/veh	40.4	1.1	2.3	39.4	0.6	1.3	37.8	33.3	22.3	35.1	0.0	33.8
Lane Grp LOS	D	A	A	D	A	A	D	C	C	D		C
Approach Vol, veh/h		2019			1814			251			47	
Approach Delay, s/veh		1.6			2.5			33.9			34.5	
Approach LOS		A			A			C			C	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	4.8	51.0		9.3	55.5		11.2	12.4		11.1	12.3	
Change Period (Y+Rc), s	4.5	5.5		4.5	5.5		4.5	5.3		4.5	4.5	
Max Green Setting (Gmax), s	15.5	45.5		15.5	45.5		15.5	33.7		15.5	34.5	
Max Q Clear Time (g_c+I1), s	2.1	2.0		5.5	2.0		6.2	4.4		3.0	3.1	
Green Ext Time (p_c), s	0.0	43.4		0.2	43.4		0.6	0.3		0.1	0.1	

Intersection Summary	
HCM 2010 Ctrl Delay	4.3
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	82	1857	35	431	1495	415	72	63	176	263	52	49
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.98
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	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	2	3	1	2	3	1	2	1	1	2	1	0
Cap, veh/h	161	2300	651	557	2800	792	181	311	258	433	210	200
Arrive On Green	0.09	0.82	0.82	0.32	1.00	1.00	0.05	0.17	0.17	0.13	0.24	0.24
Sat Flow, veh/h	3442	5588	1581	3442	5588	1581	3548	1863	1543	3442	869	826
Grp Volume(v), veh/h	87	1976	37	449	1557	432	82	168	136	306	0	117
Grp Sat Flow(s),veh/h/ln	1721	1863	1581	1721	1863	1581	1774	1863	1543	1721	0	1695
Q Serve(g_s), s	2.2	19.2	0.4	10.7	0.0	0.0	2.0	7.4	7.2	7.7	0.0	5.0
Cycle Q Clear(g_c), s	2.2	19.2	0.4	10.7	0.0	0.0	2.0	7.4	7.2	7.7	0.0	5.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.49
Lane Grp Cap(c), veh/h	161	2300	651	557	2800	792	181	311	258	433	0	410
V/C Ratio(X)	0.54	0.86	0.06	0.81	0.56	0.55	0.45	0.54	0.53	0.71	0.00	0.29
Avail Cap(c_a), veh/h	460	2300	651	843	2800	792	553	768	636	920	0	887
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)	0.77	0.77	0.77	0.70	0.70	0.70	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.8	6.4	4.7	29.1	0.0	0.0	41.4	34.2	34.2	37.7	0.0	27.7
Incr Delay (d2), s/veh	0.8	3.5	0.1	1.3	0.6	1.9	0.7	0.5	0.6	0.8	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.9	3.4	0.2	3.8	0.1	0.4	0.9	3.4	2.8	3.3	0.0	2.1
Lane Grp Delay (d), s/veh	40.6	9.9	4.8	30.4	0.6	1.9	42.1	34.8	34.8	38.5	0.0	27.8
Lane Grp LOS	D	A	A	C	A	A	D	C	C	D		C
Approach Vol, veh/h		2100			2438			386			423	
Approach Delay, s/veh		11.0			6.3			36.3			35.5	
Approach LOS		B			A			D			D	

Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.5	40.0		17.5	48.0		7.6	18.0		14.3	24.7	
Change Period (Y+Rc), s	6.3	6.3		4.0	6.3		4.0	4.2		4.0	4.2	
Max Green Setting (Gmax), s	11.0	31.7		21.0	41.7		13.0	35.8		23.0	45.8	
Max Q Clear Time (g_c+I1), s	4.2	21.2		12.7	2.0		4.0	9.4		9.7	7.0	
Green Ext Time (p_c), s	0.2	9.9		0.8	32.5		0.1	0.9		0.6	0.9	

Intersection Summary	
HCM 2010 Ctrl Delay	12.6
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	206	47	24	58	17	34	58	157	112	40	198	166
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Cap, veh/h	437	285	147	437	137	273	74	787	527	60	709	568
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.04	0.38	0.38	0.03	0.37	0.37
Sat Flow, veh/h	1774	1159	598	1774	555	1110	1774	2084	1395	1774	1918	1537
Grp Volume(v), veh/h	282	0	97	58	0	51	58	139	130	48	232	207
Grp Sat Flow(s),veh/h/ln	1774	0	1756	1774	0	1665	1774	1863	1617	1774	1863	1592
Q Serve(g_s), s	7.2	0.0	2.2	1.3	0.0	1.2	1.6	2.5	2.7	1.4	4.5	4.8
Cycle Q Clear(g_c), s	7.2	0.0	2.2	1.3	0.0	1.2	1.6	2.5	2.7	1.4	4.5	4.8
Prop In Lane	1.00		0.34	1.00		0.67	1.00		0.86	1.00		0.97
Lane Grp Cap(c), veh/h	437	0	432	437	0	410	74	704	611	60	689	588
V/C Ratio(X)	0.65	0.00	0.22	0.13	0.00	0.12	0.78	0.20	0.21	0.80	0.34	0.35
Avail Cap(c_a), veh/h	1176	0	1164	1176	0	1104	825	1684	1462	825	1684	1439
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.1	0.0	15.2	14.8	0.0	14.8	24.0	10.6	10.6	24.2	11.5	11.5
Incr Delay (d2), s/veh	2.3	0.0	0.4	0.2	0.0	0.2	21.8	0.5	0.6	28.3	1.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	3.3	0.0	0.9	0.6	0.0	0.5	1.1	1.0	1.0	1.0	1.9	1.7
Lane Grp Delay (d), s/veh	19.4	0.0	15.6	15.0	0.0	15.0	45.8	11.1	11.3	52.6	12.5	12.8
Lane Grp LOS	B		B	B		B	D	B	B	D	B	B
Approach Vol, veh/h		379			109			327			487	
Approach Delay, s/veh		18.4			15.0			17.3			16.6	
Approach LOS		B			B			B			B	
Timer												
Assigned Phs		4			8		5	2		1	6	
Phs Duration (G+Y+Rc), s		17.9			17.9		7.6	25.4		7.2	25.0	
Change Period (Y+Rc), s		5.5			5.5		5.5	6.3		5.5	6.3	
Max Green Setting (Gmax), s		33.5			33.5		23.5	45.7		23.5	45.7	
Max Q Clear Time (g_c+I1), s		9.2			3.3		3.6	4.7		3.4	6.8	
Green Ext Time (p_c), s		3.1			3.2		0.2	12.1		0.1	11.9	
Intersection Summary												
HCM 2010 Ctrl Delay			17.2									
HCM 2010 LOS			B									
Notes												

Intersection	
Intersection Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	24	197	102	24	16	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	219	113	27	18	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	140	0	-	0	399	127
Stage 1	-	-	-	-	127	-
Stage 2	-	-	-	-	272	-
Follow-up Headway	2.218	-	-	-	3.518	3.318
Pot Capacity-1 Maneuver	1443	-	-	-	607	923
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	774	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1443	-	-	-	596	923
Mov Capacity-2 Maneuver	-	-	-	-	596	-
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	760	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	10.3
HCM LOS			B

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1443	-	-	-	596	923
HCM Lane V/C Ratio	0.018	-	-	-	0.03	0.012
HCM Control Delay (s)	7.542	-	-	-	11.2	8.9
HCM Lane LOS	A				B	A
HCM 95th %tile Q(veh)	0.056	-	-	-	0.092	0.037

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Volume (veh/h)	107	87	63	19	13	11	38
Number	7	14	5	2		6	16
Initial Q (Qb), veh	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				1.00
Parking Bus Adj	1.00	1.00	1.00	1.00		1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3		186.3	190.0
Lanes	1	1	1	2		2	0
Cap, veh/h	247	221	114	1723		371	315
Arrive On Green	0.14	0.14	0.06	0.46		0.20	0.20
Sat Flow, veh/h	1774	1583	1774	3725		1863	1583
Grp Volume(v), veh/h	119	97	70	21		12	42
Grp Sat Flow(s),veh/h/ln	1774	1583	1774	1863		1863	1583
Q Serve(g_s), s	1.2	1.1	0.8	0.1		0.1	0.4
Cycle Q Clear(g_c), s	1.2	1.1	0.8	0.1		0.1	0.4
Prop In Lane	1.00	1.00	1.00				1.00
Lane Grp Cap(c), veh/h	247	221	114	1723		371	315
V/C Ratio(X)	0.48	0.44	0.61	0.01		0.03	0.13
Avail Cap(c_a), veh/h	1501	1339	706	3337		1668	1418
HCM Platoon Ratio	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	8.0	7.9	9.2	2.9		6.5	6.6
Incr Delay (d2), s/veh	1.4	1.4	5.2	0.0		0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0		0.0	0.0
%ile Back of Q (50%), veh/ln	0.5	0.1	0.4	0.0		0.0	0.1
Lane Grp Delay (d), s/veh	9.4	9.3	14.4	2.9		6.5	6.8
Lane Grp LOS	A	A	B	A		A	A
Approach Vol, veh/h	216			91		54	
Approach Delay, s/veh	9.4			11.7		6.7	
Approach LOS	A			B		A	

Timer							
Assigned Phs			5	2		6	
Phs Duration (G+Y+Rc), s			5.3	13.3		8.0	
Change Period (Y+Rc), s			4.0	4.0		4.0	
Max Green Setting (Gmax), s			8.0	18.0		18.0	
Max Q Clear Time (g_c+I1), s			2.8	2.1		2.4	
Green Ext Time (p_c), s			0.0	0.2		0.2	

Intersection Summary	
HCM 2010 Ctrl Delay	9.6
HCM 2010 LOS	A

Notes

Intersection	
Intersection Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	17	6	10	142	67	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	7	11	158	74	31

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	191	53	106	0	-	0
Stage 1	90	-	-	-	-	-
Stage 2	101	-	-	-	-	-
Follow-up Headway	3.52	3.32	2.22	-	-	-
Pot Capacity-1 Maneuver	780	1003	1483	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	912	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	774	1003	1483	-	-	-
Mov Capacity-2 Maneuver	774	-	-	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	905	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	0.5	0
HCM LOS	A		

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1483	-	774	1003	-	-
HCM Lane V/C Ratio	0.007	-	0.024	0.007	-	-
HCM Control Delay (s)	7.446	-	9.8	8.6	-	-
HCM Lane LOS	A		A	A		
HCM 95th %tile Q(veh)	0.023	-	0.075	0.02	-	-

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	2016	79	1735	181	8	62	23	24
v/c Ratio	0.03	0.61	0.43	0.46	0.48	0.04	0.23	0.15	0.15
Control Delay	78.0	8.8	86.3	2.5	58.3	46.0	4.1	56.6	33.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.0	8.8	86.3	2.5	58.3	46.0	4.1	56.6	33.3
Queue Length 50th (ft)	3	89	71	45	75	6	0	18	10
Queue Length 95th (ft)	m5	#686	122	65	104	17	9	22	11
Internal Link Dist (ft)		1050		900		2101			316
Turn Bay Length (ft)	200		410		215		200	50	
Base Capacity (vph)	231	3298	233	3775	448	515	500	231	482
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.61	0.34	0.46	0.40	0.02	0.12	0.10	0.05

Intersection Summary

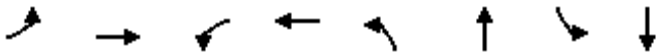
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	87	1976	37	449	1557	432	82	142	130	306	117
v/c Ratio	0.28	0.82	0.05	0.78	0.55	0.43	0.37	0.57	0.37	0.69	0.32
Control Delay	46.8	23.7	1.4	76.9	12.0	2.3	62.3	45.3	4.3	61.9	27.9
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	46.8	23.7	1.4	76.9	12.0	2.3	62.3	45.3	4.3	61.9	27.9
Queue Length 50th (ft)	36	145	0	205	105	0	34	89	0	128	56
Queue Length 95th (ft)	m51	#905	m4	211	343	47	59	129	13	162	82
Internal Link Dist (ft)		900			775			542			1064
Turn Bay Length (ft)	300		620	285		245	70			160	
Base Capacity (vph)	316	2424	802	613	2810	1016	369	488	549	633	644
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	0.28	0.82	0.05	0.73	0.55	0.43	0.22	0.29	0.24	0.48	0.18

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	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	282	97	58	51	58	269	48	439
v/c Ratio	0.58	0.19	0.24	0.20	0.24	0.26	0.21	0.49
Control Delay	32.1	22.7	39.2	21.0	39.2	16.8	39.4	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	22.7	39.2	21.0	39.2	16.8	39.4	22.0
Queue Length 50th (ft)	123	31	27	8	27	33	22	68
Queue Length 95th (ft)	182	62	75	45	75	79	59	124
Internal Link Dist (ft)		1118		1835		753		2575
Turn Bay Length (ft)	95		115		130		230	
Base Capacity (vph)	919	921	919	879	653	2152	653	2147
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.11	0.06	0.06	0.09	0.13	0.07	0.20

Intersection Summary

Intersection	
Intersection Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	24	197	102	24	16	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	219	113	27	18	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	140	0	-	0	399	127
Stage 1	-	-	-	-	127	-
Stage 2	-	-	-	-	272	-
Follow-up Headway	2.218	-	-	-	3.518	3.318
Pot Capacity-1 Maneuver	1443	-	-	-	607	923
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	774	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1443	-	-	-	596	923
Mov Capacity-2 Maneuver	-	-	-	-	596	-
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	760	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	10.3
HCM LOS			B

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1443	-	-	-	596	923
HCM Lane V/C Ratio	0.018	-	-	-	0.03	0.012
HCM Control Delay (s)	7.542	-	-	-	11.2	8.9
HCM Lane LOS	A				B	A
HCM 95th %tile Q(veh)	0.056	-	-	-	0.092	0.037

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined



Lane Group	EBL	EBR	NBL	NBT	SBU	SBT
Lane Group Flow (vph)	119	97	70	21	14	54
v/c Ratio	0.26	0.20	0.17	0.01	0.04	0.04
Control Delay	10.9	4.3	11.2	8.2	11.6	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	4.3	11.2	8.2	11.6	6.3
Queue Length 50th (ft)	8	0	5	1	1	0
Queue Length 95th (ft)	43	20	31	6	11	10
Internal Link Dist (ft)	580			1842		322
Turn Bay Length (ft)	100		100		100	
Base Capacity (vph)	1081	1005	509	2478	509	2201
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.10	0.14	0.01	0.03	0.02

Intersection Summary

Intersection	
Intersection Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	17	6	10	142	67	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	7	11	158	74	31

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	191	53	106	0	-	0
Stage 1	90	-	-	-	-	-
Stage 2	101	-	-	-	-	-
Follow-up Headway	3.52	3.32	2.22	-	-	-
Pot Capacity-1 Maneuver	780	1003	1483	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	912	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	774	1003	1483	-	-	-
Mov Capacity-2 Maneuver	774	-	-	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	905	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	0.5	0
HCM LOS	A		

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1483	-	774	1003	-	-
HCM Lane V/C Ratio	0.007	-	0.024	0.007	-	-
HCM Control Delay (s)	7.446	-	9.8	8.6	-	-
HCM Lane LOS	A		A	A		
HCM 95th %tile Q(veh)	0.023	-	0.075	0.02	-	-

Notes
~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

QUEUING SUMMARY

Antioch Heidorn Village Queuing Summary

Scenarios Analyzed	Turning Movement	Lone Tree Way						Prewett Ranch Dr									Heidorn Ranch		
		Heidorn Ranch Rd #1			Canada Valley Rd #2			Hillcrest Ave #3			South Project Driveway #4			Heidorn Ranch Rd #5			East Project Driveway #6		
		Link	AM	PM	Link	AM	PM	Link	AM	PM	Link	AM	PM	Link	AM	PM	Link	AM	PM
Existing Traffic	EBL	200	<25	<25	300	52	80	95	33	38	Future Intersections								
	EBR				620	<25	<25												
	WBL	410	43	55	285	146	201	115	<25	<25									
	WBR				245	77	<25												
	NBL	215	31	88	70	30	49	130	<25	<25									
	NBR	200	<25	<25															
	SBL	50	26	<25	160	359	265	230	<25	<25									
	SBR																		
Existing + Project Traffic	EBL	200	<25	<25	300	53	79	95	33	38				100	26	<25			
	EBR				620	<25	<25												
	WBL	410	65	122	285	146	201	115	<25	<25									
	WBR				245	77	<25												
	NBL	215	42	94	70	30	51	130	<25	<25				100	<25	<25	100	<25	<25
	NBR	200	<25	<25															
	SBL	50	26	<25	160	359	265	230	<25	<25				100	<25	<25			
	SBR																		
Near-Term Traffic	EBL	200	<25	<25	300	32	54	95	160	136	Future Intersections								
	EBR				620	<25	<25												
	WBL	410	33	51	285	152	199	115	<25	<25									
	WBR				245	91	<25												
	NBL	215	31	91	70	32	51	130	<25	<25									
	NBR	200	<25	<25															
	SBL	50	26	<25	160	190	162	230	37	40									
	SBR																		
Near-Term + Project Traffic	EBL	200	<25	<25	300	31	52	95	163	138				100	26	<25			
	EBR				620	<25	<25												
	WBL	410	60	123	285	151	200	115	<25	<25									
	WBR				245	92	<25												
	NBL	215	42	97	70	32	53	130	<25	<25				100	<25	<25	100	<25	<25
	NBR	200	<25	<25															
	SBL	50	26	<25	160	190	162	230	38	44				100	<25	<25			
	SBR																		
Long-Term Traffic	EBL	200	<25	<25	300	32	53	95	223	182	Future Intersection			100	<25	34	Future Intersection		
	EBR				620	<25	<25												
	WBL	410	27	70	285	141	211	115	64	71									
	WBR				245	78	45												
	NBL	215	27	101	70	34	58	130	65	74				100	117	28			
	NBR	200	<25	<25															
	SBL	50	26	<25	160	197	162	230	<25	53				100	<25	<25			
	SBR																		
Long-Term + Project Traffic	EBL	200	<25	<25	300	30	51	95	226	182				100	31	43			
	EBR				620	<25	<25												
	WBL	410	51	122	285	141	211	115	69	75									
	WBR				245	79	47												
	NBL	215	38	104	70	34	59	130	69	75				100	119	31	100	<25	<25
	NBR	200	<25	<25															
	SBL	50	26	<25	160	197	162	230	50	59				100	<25	<25			
	SBR																		

Note: Locations where the queue length exceeds the link storage by 25 feet or more are shown in shaded cells.

HEIDORN VILLAGE SUBDIVISION
MITIGATION MONITORING AND REPORTING PROGRAM

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
Air Quality					
The project is not likely to expose sensitive receptors to substantial pollutant concentrations. However, best management practices are necessary during demolition, trenching, and grading activities to avoid generation of dust that may affect nearby sensitive receptors	Significant Unless Mitigation Incorporated	**Mitigation Measure AIR-1:** Construction BMPs include measures to control dust emissions. The following BMPs shall be implemented during construction: • All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. • All haul trucks transporting soil, sand, or other loose material off-site shall be covered. • All visible mud or dirt track-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. • All vehicle speeds on unpaved roads shall be limited to 15 mph. • All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. • 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. • 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. • Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours.	Less-than-significant	City of Antioch	During construction

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
		The Air District's phone number shall also be visible to ensure compliance with applicable regulations.			
		Mitigation Measure AIR-2: Minimize construction-related emissions by requiring that all construction equipment meet the following conditions: • All diesel-powered off-road equipment larger than 50 horsepower and operating on the site for more than two days continuously shall meet U.S. EPA particulate matter emissions standards for Tier 2 engines or equivalent; • All portable construction equipment shall meet California Air Resource Board's most recent certification standard for particulate matter emissions; and • Minimize the number of hours that equipment will operate, including the use of idling restrictions.	Less-than-significant	City of Antioch	During construction
Biological Resources					
The project would have potentially significant impacts to the following animal species because of physical observation or the presence of suitable habitat: • California Red-legged Frog • Vernal Pool Fairy Shrimp • Vernal Pool Tadpole Shrimp • Swainson's Hawk • San Joaquin Kit Fox • American Badger • Burrowing Owl • White-Tailed Kite • Loggerhead Shrike	Potentially Significant Unless Mitigation Incorporated	**Mitigation Measure BIO-1:** Prior to the commencement of construction activities, temporary exclusionary fencing shall be installed along the southern property boundary of the project site, between the project and the adjacent detention basin and Sand Creek. The fencing shall be installed in a manner to prevent California red-legged frogs from dispersing from the detention basin or Sand Creek into the construction zone. Fencing shall be maintained throughout the duration of construction activities, and shall be approved by a qualified biologist (subject to the approval of the City of Antioch) to confirm the adequacy of the fencing to prevent frogs from entering the construction zone prior to the commencement of construction activities. Immediately preceding the installation of the exclusionary fencing, the qualified biologist shall survey the construction zone to ensure that no frogs are present in the construction zone. Should a California red-legged frog be observed during the survey, all construction activities shall be immediately halted and the United States Fish and Wildlife Service (USFWS) shall be immediately contacted. Any California red-legged frogs present may only be	Less-than-significant	City of Antioch	Pre-construction, during construction

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
		removed by a permitted biologist (authorized by the USFWS). Construction activities may only proceed once it is determined by the qualified biologist that California red-legged frogs are not present in the construction zone. The fencing may be removed between construction phases if there would be a prolonged period when construction would not occur. However, consistent with the requirements described above, the fencing shall be reinstalled and a clearance survey would be required prior to the re-commencement of construction activities. Should the fencing remain in place between construction phases or during prolonged periods when construction would not occur, then the fencing shall be inspected by a qualified biologist and any necessary repairs made by the project applicant prior to the re-commencement of construction activities.			
		Mitigation Measure BIO-2a: Assuming the project is approved, a qualified biologist shall monitor the project site during the winter and spring preceding construction activities to determine if suitable habitat for vernal pool fairy and tadpole shrimp (i.e., pools that persist for at least three weeks before drying) occurs on the project site. The biologist shall submit his/her findings to the City for review. If no suitable habitat is found, no further actions would be required. If potentially suitable pools are observed, or if the applicant chooses to assume the presence of these species, then **Mitigation Measure BIO-2b** shall be implemented.	Less-than-significant	City of Antioch	Pre-construction
		Mitigation Measure BIO-2b: If it is found or assumed that suitable habitat is present, prior to the commencement of construction on the project site, a qualified biologist shall conduct protocol surveys for vernal pool fairy shrimp and tadpole shrimp. These surveys may be conducted concurrently with **Mitigation Measure BIO-2a**. The surveys shall be conducted according to the accepted USFWS survey protocol, which includes either two years of wet season surveys (with eight individual surveys per wet season), or one wet season survey followed by a dry season survey. If no vernal pool fairy shrimp or tadpole shrimp are observed during the surveys, then no further	Less-than-significant	City of Antioch	Pre-construction

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
		action would be required.			
		Mitigation Measure BIO-2c: If the survey in **Mitigation Measure BIO-2b** above concludes that fairy shrimp and or tadpole shrimp are present on the project site, prior to the issuance of grading permits, the loss of vernal pool fairy and tadpole shrimp habitat shall be compensated for through the purchase of credits at a 3:1 ratio at an USFWS-approved mitigation bank. The amount of project-related habitat loss may be determined as follows: • Any areas of suitable habitat (i.e., ponding for at least three weeks) on the site will be mapped during the winter months and may be assumed to be occupied habitat; or • The area of habitat found to be occupied during the implementation of **Mitigation Measure BIO-2b** (see above) shall be compensated for. The availability of credits at an USFWS-approved mitigation bank shall be demonstrated prior to the issuance of a grading permit, or other equivalent compensation must be approved by the USFWS.	Less-than-significant	City of Antioch	Pre-construction
		Mitigation Measure BIO-3: If construction would commence during the nesting/breeding season of native bird species potentially nesting on or near the site (typically February through August in the project region), a pre-construction survey of the project vicinity for nesting birds shall be conducted. This survey shall be conducted by a qualified biologist (experienced with the nesting behavior of bird species of the region) within 14 days of the commencement of construction activities. The intent of the survey shall be to determine if active nests of special status bird species or other species protected by the Migratory Bird Treaty Act and/or the California Fish and Game Code are present within the construction zone or within 500 feet of the construction zone. The survey area shall include all trees and shrubs, as well as fallow fields (which could be utilized by burrowing owls) in the construction	Less-than-significant	City of Antioch	Pre-construction, during construction

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
		zone and a surrounding 500 feet area (where access is possible). The surveys shall be timed such that the last survey is concluded no more than two weeks prior to initiation of construction or tree removal. If the initiation of ground disturbance activities is delayed following a survey, then an additional pre-construction survey shall be conducted such that no more than two weeks will have elapsed between the final survey and the commencement of ground disturbance activities. If the survey finds that active nests are located in construction areas or are within 500 feet of construction and would be subject to prolonged construction-related noise, a no-disturbance buffer zone shall be created around active nests during the breeding season or until a qualified biologist determines that all young have fledged. The size of the buffer zones and types of construction activities restricted within them will be determined by taking into account factors such as the following: • Noise and human disturbance levels at the construction site at the time of the survey and the noise and disturbance expected during the construction activity; • Distance and amount of vegetation or other screening between the construction site and the nest; and • Sensitivity of individual nesting species and behaviors of the nesting birds. Limits of construction to avoid an active nest shall be established in the field with flagging, fencing, or another appropriate barrier, and construction personnel shall be instructed on the sensitivity of nest areas. A qualified biologist shall serve as a construction monitor during those periods when construction activities would occur near active nest areas of Swainson's hawk to ensure that no impacts on these nests occur.			
		Mitigation Measure BIO-3b: A qualified biologist will contact the CDFW to confirm whether the Swainson's hawk nest located 3.5	Less-than-significant	City of Antioch	Pre-construction

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
		miles north of the project site is still considered "active" and to determine if there is additional survey data regarding the current status of the nest 0.8 mile south of the project site along Sand Creek. The biologist shall provide the City with a summary of his/her findings. If it is determined that the project site is within 10 miles of an active Swaison's hawk nest, the applicant will mitigate for the loss of suitable Swainson's hawk foraging habitat by implementing one of the below measures: • **Active nest identified within 1 mile of the project site:** One acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. At least 10% of the land requirements shall be met by fee title acquisition or a conservation easement allowing the active management of the habitat, with the remaining 90% of the protected land protected by a conservation easement (subject to CDFW approval); or One-half acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. All of the land requirements shall be met by fee title acquisition or a conservation easement (subject to CDFW approval). • **Nest identified within 5 miles (but greater than 1 mile) of the project site**: 0.75 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. All of the land requirements may be met by fee title acquisition or a conservation easement (subject to CDFW approval). • **Nest identified within 10 miles (but greater than 5 miles) of the project site:** 0.5 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. All of the land requirements may be met by fee title acquisition or a conservation easement (subject to CDFW approval).			
		Mitigation Measure BIO-4: No less than 14 days and no more than 30 days prior to the beginning of ground-disturbance activities, a qualified biologist shall conduct a preconstruction survey for San	Less-than-significant	City of Antioch	Pre-construction

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
		Joaquin kit fox (SJKF). The survey shall include searching for signs of SJKF presence, identifying any potential habitat features, and evaluating habitat use by SJKF. The status of any identified potential den sites shall be determined. The USFWS shall be immediately contacted if an individual SJKF or sign of the species is observed during the survey. Under no circumstances shall an individual SJKF be relocated or an active den destroyed without authorization from the USFWS. Construction shall only proceed once the qualified biologist has determined that SJKF is not present, or in the event that SJKF or signs of species presence is observed during the preconstruction survey, until the USFWS has issued take authorization (in the form of a Biological Opinion).			
		Mitigation Measure BIO-5: Within 30 days of the commencement of construction, the project site shall be surveyed for potential badger den sites by a qualified biologist. If an occupied den is found, then any badgers present shall be removed from the den either by trapping or the use of exclusionary devices. If trapped, the badgers shall be moved to other suitable habitat. Once any badgers were trapped or excluded, the dens would be excavated by hand and refilled to prevent reoccupation. Exclusion would continue until the badgers had been successfully excluded from the site, as determined by a qualified biologist.	Less-than-significant	City of Antioch	Pre-construction
		Mitigation Measure BIO-6: A qualified biologist shall conduct clearance surveys for burrowing owls on the project site. The survey shall be conducted no more than 14 days prior to commencement of construction activities. If burrowing owls are observed using burrows during the non-breeding season (typically September through January), or after young have fledged following the conclusion of the breeding season, owls shall be excluded from all active burrows through the use of exclusion devices placed in occupied burrows in accordance with CDFW protocols (CDFW 1995). Specifically, exclusion devices, utilizing one-way doors, shall be installed in the entrance of all active burrows. The devices shall be left in the burrows for at least 48 hours	Less-than-significant	City of Antioch	Pre-construction

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
		to ensure that all owls have been excluded from the burrows. Each of the burrows shall then be excavated by hand and refilled to prevent reoccupation. Exclusion shall continue until the owls have been successfully excluded from the site, as determined by a qualified biologist. In the event that nesting owls are observed, disturbance to the nests, as determined by a qualified biologist, will be avoided until all young have fledged. The implementation of **Mitigation Measure BIO-3a**: above, would further ensure that any owls potentially occurring on the project site during the nesting seasons would not be harmed.			
		Mitigation Measure BIO-7a: Prior to the commencement of construction activities, a preliminary jurisdictional delineation shall be conducted and the results shall be submitted to the ACOE for verification. If ACOE determines that jurisdictional wetlands or other waters are not present, no future actions with the ACOE would be required. If the ACOE and/or RWQCB determine that wetlands and/or other waters under their jurisdiction are present, the applicant will apply for the required permits/certifications prior to any fill of the features and comply with all conditions and mitigation requirements of any such permits. At a minimum, the applicant shall ensure that no net loss of jurisdictional wetlands occurs; this may be achieved through purchasing credits at an approved wetland mitigation bank or through the creation and implementation of a wetland creation plan.	Less-than-significant	City of Antioch	Pre-construction
		Mitigation Measure BIO-7b: Prior to the commencement of construction activities, the applicant shall coordinate with the CDFW regarding their potential jurisdiction over the onsite drainage ditch. If CDFW takes jurisdiction over the drainage ditch, then the applicant will apply for and obtain a Lake and Streambed Alteration Agreement prior to disturbance to the drainage ditch.	Less-than-significant	City of Antioch	Pre-construction
Cultural Resources					
The project could potentially damage or destroy Native American cultural resources through	Potentially Significant Unless Mitigation	**Mitigation Measure CUL-1:** In the event that unrecorded archaeological resources are encountered during project grading, site preparation, or construction, the City shall require that construction and/or grading activities within 100 feet of any find is temporarily	Less-than-significant	City of Antioch	During construction

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
grading and soil disturbances.	Incorporated	halted until a qualified archaeologist meeting federal criteria under 36 CFR 61 can assess the significance of the find and provide proper management recommendations. Prehistoric cultural material includes, but is not limited to; shell ridden deposits, hearth remains, stone and/or shell artifacts, and/or burials. Historic material, including but not limited to whole or fragmentary ceramic, glass or metal objects, wood, nails, brick, or other materials may occur within the project site in deposits such as old privies, dumps, or even as part of the fill. Deposits of prehistoric or historic archaeological materials are optimally avoided by project activities. However, if the deposits cannot be avoided, the City shall require that a qualified archaeologist evaluate the resources for their potential historic significance. If the deposits are determined to be historically significant by the qualified archaeologist, the resources are optimally avoided, but if avoidance is not feasible, impacts shall be mitigated in accordance with the recommendations of the qualified archaeologist, in coordination with the City and CEQA Guidelines Section 15126.4 (b)(3)(C), which requires implementation of a data recovery plan. Upon completion of the qualified archaeologist's assessment, he/she shall prepare a report documenting the methods and results, and provide recommendations for the treatment of the discovered archaeological materials. The report shall be submitted to the City and the Northwest Information Center. Once the report is reviewed and approved by the City and any appropriate resource recovery and/or mitigation measures are completed, project construction activity within the area of the find may resume.			
		Mitigation Measure CUL-2: Prior to the issuance of grading permits, the City shall require that the project applicant and contractor provide documentation that all construction crews that will work on the project site have undergone a training session to inform them of the potential for previously undiscovered archaeological resources, federal or state-eligible cultural resources, and human remains within the project site, of the laws protecting these resources and	Less-than-significant	City of Antioch	Pre-construction

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
		penalties associated with destruction or removal expect by qualified archaeologist, and of the procedures to follow should they discover cultural resources during project-related work.			
		Mitigation Measure CUL-3: In the event that buried paleontological resources are encountered during project grading, site preparation, and/or construction, construction and/or grading activities within 100 feet of the find shall be temporarily halted until a qualified paleontologist can assess the significance of the find and provide proper management recommendations.	Less-than-significant	City of Antioch	During construction
		Mitigation Measure CUL-4: If human remains are encountered during grading within the project site, the City shall require that work within 25 feet of the discovery shall be stopped and the project contractor shall immediately notify the Contra Costa County Coroner. At the same time, a qualified archaeologist meeting federal criteria under 36 CFR 61 shall be contacted by the project applicants and project contractor to assess the situation and consult with the appropriate agencies. If the human remains are of Native American origin, the Coroner shall notify the NAHC within 24 hours of this identification. The NAHC will identify a Most Likely Descendant (MLD) to inspect the site and provide recommendations for the proper treatment of the remains and any associated grave goods. Upon completion of the assessment, the qualified archaeologist shall prepare a report documenting the background to the finds, 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, the City, and the Northwest Information Center. Once the report is reviewed and approved by the City, and any appropriate treatment completed, project construction activity within the area of the find may resume.	Less-than-significant	City of Antioch	During construction
Geology & Soils					
The project site could be subject to moderate to strong seismic ground	Potentially Significant Unless	**Mitigation Measure GEO-1:** Prior to the issuance of building permits, the City shall ascertain that all buildings and structures on the project site will be constructed in conformance with the provisions of the	Less-than-significant	City of Antioch	Design

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
shaking should earthquakes occur along the five major active faults located within 45 miles of the project site.	Mitigation Incorporated	most recent version of the California Uniform Building Code (UBC) adopted by the City. The Geotechnical Study prepared by The PRA Group, Inc., January 31, 2007, incorporated herein by reference, includes seismic shaking criteria for consideration by the project structural engineer in the design of the building foundation. The final choice of design parameters remains the purview of the project structural engineer, subject to the review and approval of the City Engineer.			
		Mitigation Measure GEO-2: Prior to foundation placement and the issuance of a building permit, the City shall ascertain that the applicant/contractor has performed moisture conditioning of all pads. Upon completion of grading operations, the applicant/contractor shall submit to the City an inventory of the final pad grade soil condition conducted by a qualified geotechnical engineer. The inventory shall identify potential expansive and corrosive conditions and make geotechnical design recommendations for the proposed foundation systems. The findings of this inventory shall be incorporated into project plan revisions to the satisfaction of the Building Division. The City shall not issue a building permit for the project until the above measures are completed to the satisfaction of the Chief Building Inspector.	Less-than-significant	City of Antioch	Pre-construction
Hazards & Hazardous Materials					
The project could potentially 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.	Potentially Significant Unless Mitigation Incorporated	**Mitigation Measure HAZ-1:** Prior to the issuance of any grading permit, the project applicant shall enlist a qualified professional to prepare a Phase II ESA under pertinent industry standards and state/local guidelines. The Phase II ESA shall, at minimum, consist of the collection and analysis of soil samples to determine the presence/concentration of hazardous materials. The findings of this investigation shall be documented in a written report and submitted to the City. If the results of the Phase II ESA confirm the presence of hazards or hazardous materials, site remediation shall be required with oversight by applicable state and local regulatory agencies, depending on the nature and extent of contamination. The impact of specific remedies implemented on air quality and resulting health	Less-than-significant	City of Antioch	Pre-construction

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
		effects, nuisance conditions, risk of upset in the event of an accident, and transportation of contaminated material associated with the remediation shall be addressed prior to implementation of the site remedy.			
Noise					
The project could result in a substantial increase in ambient noise levels through construction activities unless best management controls are implemented at the construction site.	Potentially Significant Unless Mitigation Incorporated	**Mitigation Measure NOI-1:** The following construction best management controls, as identified in the Antioch General Plan and Municipal Code and the Brentwood General Plan, shall be implemented at the construction site: • Per the most conservative restrictions between Section 5-17.04 of the City's Municipal Code and Action N 1e of City of Brentwood's General Plan, construction activities, including haul truck deliveries, shall be limited to the hours of: 8:00 AM to 5:00 PM on weekdays within 300 feet of occupied dwelling units, and the Heritage Baptist Church and Academy, ▪ 7:00 AM to 6:00 PM on weekdays for construction located more than 300 feet from occupied dwelling units and the Heritage Baptist Church/Academy, ▪ 9:00 AM to 5:00 PM on Saturdays, and ▪ No construction shall occur on Sundays or public holidays. • Prohibit unnecessary idling of internal combustion engines. Equip all equipment driven by internal combustion engines with mufflers which are in good mechanical condition, appropriate for the equipment, and no less effective that those originally installed by the manufacturer. • Utilize "quiet" air compressors and other stationary noise sources where technology exists. • Locate stationary noise-generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors and place equipment so that emitted noise is directed away from nearby sensitive receptors. • Construct temporary noise barriers, where feasible, to screen stationary noise-generating equipment when located within 200	Less-than-significant	City of Antioch	During construction

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
		feet of adjoining sensitive land uses. Temporary noise barrier fences would provide a 5 dBA noise reduction if the noise barrier interrupts the line-of-sight between the noise source and receiver and if the barrier is constructed in a manner that eliminates any cracks or gaps. • Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site. • Construct units at the perimeter of the site and immediately adjacent to existing residences as early as possible so that the completed buildings will provide acoustical shielding for existing residences to the north and west. Constructing units along the western and northern perimeters of the site would provide approximately 10 dB of noise reduction during the remainder of project construction activities. • Designate a "disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and instituting reasonable measures as warranted to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule. • Coordinate with the City to notice to the residents immediately adjacent to the project site and the Heritage Baptist Academy regarding the project construction schedule. The notice shall include the contact information for the disturbance coordinator.			
		Mitigation Measure NOI-2: Prior to the issuance of a grading permit, the applicant shall submit a construction-related noise mitigation plan to the Community Development Director for review and approval. The plan should depict the location of construction equipment, storage, and maintenance areas, and document incorporation of the best management controls identified in Mitigation Measure NOI-1 above.	Less-than-significant	City of Antioch	Pre-construction
Public Services					

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measure	Level of Significance After Mitigation	Responsible Agency	Timing
The project would contribute incrementally to a currently existing need for an additional fire facility.	Potentially Significant Unless Mitigation Incorporated	**Mitigation Measure PUB-1:** At the time of building permit issuance, the City shall impose and collect a fire facility impact fee according to the fee schedule established by the City and in place at the time of tentative map approval.	Less-than-significant	City of Antioch	Pre-construction