DRAFT

INITIAL STUDY/
MITIGATED NEGATIVE DECLARATION

OAKHURST TOWNHOMES DEVELOPMENT PROJECT

CLAYTON, CALIFORNIA

LSA

July 2025

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INITIAL STUDY/ MITIGATED NEGATIVE DECLARATION

OAKHURST TOWNHOMES DEVELOPMENT PROJECT

CLAYTON, CALIFORNIA

Submitted to:

City of Clayton
Community Development Department
6000 Heritage Trail
Clayton, California 94517

Prepared by:

LSA
157 Park Place
Pt. Richmond, California 94801
(510) 236-6810

Project No. 20231117

July 2025

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LIST OF ABBREVIATIONS AND ACRONYMS

µg/m³	micrograms per cubic meter
AB	Assembly Bill
ABAG	Association of Bay Area Governments
ADA	Americans with Disabilities Act
ADT	average daily traffic
AERMOD	AMS/EPA Regulatory Model
AF	acre-feet
AFY	acre-feet per year
Air District	Bay Area Air District
BART	Bay Area Rapid Transportation
BERD	Built Environment Resources Directory
bgs	below ground surface
BMP	best management practices
CAL FIRE	California Department of Forestry and Fire Protection
CalEEMod	California Emissions Estimator Model
CALGreen Code	California Green Building Standards Code
California Register	California Register of Historical Resources
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCCACUC	Contra Costa County Airport Land Use Commission
CCCFPD	Contra Costa County Fire Protection District
CCCWP	Contra Costa Clean Water Program

CCR	California Code of Regulations
CCTA	Contra Costa Transportation Authority
CCWD	Contra Costa Water District
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
Central San	Central Contra Costa County Sanitary District
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGP	Construction General Permit
CH_4	methane
CHTS	California Statewide Household Travel Survey
City	City of Clayton
Clean Air Plan	Bay Area Air Quality Management District 2017 Clean Air Plan
CMC	City of Clayton Municipal Code
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
Cortese	Hazardous Waste and Substances Sites (List)
County	County of Contra Costa
CPD	Clayton Police Department
CRLF	California red-legged frog
CRPR	California Rare Plant Rank
CTS	California tiger salamander

CVLN	Confederated Villages of Lisjan Nation
DDT	dichlorodiphenyltrichloroethane
DIP	ductile-iron pipe
DMA	drainage management area
DPS	Distinct Population Segment
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
ECCCHCP	East Contra Costa County Habitat Conservation Plan
EFZs	Earthquake Fault Zones
EQ Zapp	California Earthquake Hazards Zone Application
EV	electric vehicle
FAR	Floor Area Ratio
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FIRM	Flood Insurance Rate Map
GHG	greenhouse gas
gpd	gallons per day
GPR	ground-penetrating radar
gpy	gallons of water per year
GSAs	Groundwater Sustainability Agencies
GSPs	Groundwater Sustainability Plans
GWh	gigawatt-hours
GWP	Global Warming Potential
HCP	Habitat Conservation Plan
HCP/NCCP	Habitat Conservation Plan/Natural Community Conservation Plan
HFCs	hydrofluorocarbons

I-680	Interstate 680
IPaC	Information for Planning and Consultation
ITE	Institute of Transportation Engineers
kWh	kilowatt-hours
lead	Pb
LID	Low Impact Development
LOS	level of service
LUST	leaking underground storage tanks
M-R-M	Multiple Family Residential Medium
MBTA	Migratory Bird Treaty Act
MDUSD	Mount Diablo Unified School District
MGD	million gallons per day
MLD	Most Likely Descendant
MMD	Multifamily Medium Density Residential
mpg	miles per gallon
mph	miles per hour
MRP	Municipal Regional Stormwater NPDES Permit
N_2O	nitrous oxide
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NO_2	nitrogen dioxide
NOA	Notice of Applicability
NOI	Notice of Intent
NO_X	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NWIC	Northwest Information Center

OPR	California Governor's Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PCBs	polychlorinated biphenyls
PD	Planned Development
PFCs	perfluorocarbons
PG&E	Pacific Gas & Electric Company
PM_{10}	particulate matter less than 10 microns in size
$PM_{2.5}$	particulate matter less than 2.5 microns in size
POTWs	publicly owned treatment works
PRC	Public Resources Code
PRDs	Permit Registration Documents
project	Oakhurst Townhomes Development Project
PSR	Planning Survey Report
PT	post-tensioned
RCM	Regulatory Compliance Measure
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCS	Sustainable Communities Strategy
SF_6	sulfur hexafluoride
SGMA	Sustainable Groundwater Management Act
SMARTS	Stormwater Multiple Application and Report Tracking System
SO_2	sulfur dioxide
SR-24	State Route 24
SR-4	State Route 4
Stormwater C.3 Guidebook	*Contra Costa Clean Water Program Stormwater C.3. Guidebook*

SWCP	Stormwater Control Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	toxic air contaminants
TDM	Transportation Demand Management
TMDLs	Total Maximum Daily Loads
TPAs	Transit Priority Areas
USACE	United States Army Corps of Engineers
USC	United States Code
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UWMP	Urban Water Management Plan
VHFHSZ	Very High Fire Hazard Severity Zone
VMT	vehicle miles traveled
WDID	Waste Discharge Identification Number

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1.0 PROJECT INFORMATION

1. **Project Title:**

   Oakhurst Townhomes Development Project

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

   City of Clayton
   6000 Heritage Trail
   Clayton, CA 94517

3. **Contact Person and Phone Number:**

   Farhad Mortazavi
   Interim Community Development Director
   (925) 673-7300

4. **Project Location:**

   The approximately 2.5-acre project site consists of one parcel on the southeastern corner of Clayton Road and Peacock Creek Drive in Clayton, Contra Costa County (Assessor's Parcel Number 118-370-073-9).

5. **Project Sponsor's Name and Address:**

   Alvernaz Partners LLC
   1777 N. California Boulevard, Suite 305
   Walnut Creek, CA 94596
   (925) 270-6213

6. **General Plan Designation:**

   Multifamily Medium Density Residential

7. **Zoning:**

   M-R-M (Multiple Family Residential Medium)

8. **Description of Project:**

   The proposed project involves the construction of four multi-family residential buildings containing 30 dwelling units, and associated improvements. A more detailed description of the proposed project is provided in Chapter 2.0, Project Description.

9. **Surrounding Land Uses and Setting:**

   The project site is generally surrounded by undeveloped land to the north and east, the Oakhurst Country Club golf course and Peacock Creek Drive to the west, and Clayton Road and single-family residential development to the south. A more detailed description of the surrounding land uses is provided in Chapter 2.0, Project Description.

10. Other Public Agencies Whose Approval is Required (e.g., permits, financial approval, or participation agreements):

Please see Section 2.7, Project Approvals.

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resource Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

On February 16, 2024**,** in accordance with Public Resources Code Section 21080.3.1(b) (Assembly Bill 52 – Gatto [2014]), the City of Clayton sent outreach letters to the tribes listed in the contact list provided by the Native American Heritage Commission (NAHC) on February 6, 2024. The letters were sent via electronic mail, receipt requested, to the tribal contacts, and described the project, provided maps of the project site, and invited the tribes to request consultation should they have any concerns. Additional information was requested by a member of The Ohlone Indian Tribe; the City provided the requested information on March 15, 2024. On May 8, 2024, the City met with representatives of the Confederated Villages of Lisjan Nation (CVLN) who requested the use of ground-penetrating radar (GPR) to identify possible locations of Native American archaeological sites at the project site. The results of the GPR survey and subsequent tribal consultation are summarized in Section 4.18, Tribal Cultural Resources.

2.0 PROJECT DESCRIPTION

The following describes the proposed Oakhurst Townhomes Development Project (project) that is the subject of this Initial Study prepared pursuant to the California Environmental Quality Act (CEQA, Public Resources Code Section 21000 *et seq*). The proposed project would result in the construction of 30 new townhomes in four buildings on the project site as detailed below. The City of Clayton (City) is the lead agency for review of the proposed project under CEQA.

2.1 PROJECT SITE

The following describes the project location, existing conditions, surrounding land uses, and regulatory setting.

2.1.1 Project Location

The approximately 2.5-acre project site consists of one parcel on the southeastern corner of Clayton Road and Peacock Creek Drive in Clayton, Contra Costa County (Assessor's Parcel Number 118-370-073-9). The project site is in an area consisting primarily of residential uses. The project site is bounded by undeveloped land to the north and east, the Oakhurst Country Club golf course and Peacock Creek Drive to the west, and Clayton Road and single-family residential development to the west and south.

Regional vehicular access to the project site is provided by Interstate 680 (I-680) and State Route 4 (SR-4) approximately 6.8 miles west and 5.4 miles north of the project site, respectively. The closest on- and off-ramps to I-680 are at Clayton Road and Concord Avenue approximately 6.4 miles to the west. The closest on- and off-ramps to SR-4 are at Railroad Avenue, 5.7 miles to the north. Bus stops along Clayton Road, including one stop on the west side of the project site, provide transit service to and from the project site. Figure 2-1 shows the regional and local context of the project site. Figure 2-2 depicts an aerial photograph of the project site (see Section 2.1.3 for a description of surrounding uses).

2.1.2 Existing Conditions

Elevations range from 560 feet above mean sea level at the northwestern portion of the site to 510 feet above mean sea level at the southwestern corner. The ground surface on the project site gradually slopes down to the southwest.

The project site currently consists of vacant land, which includes a partially paved, largely gravel parking lot. A Contra Costa Water District (CCWD) parcel containing a pump station with a small, wood-framed enclosure is located adjacent to the southern end of the project site. The project site was originally designated as a "park and ride lot," pursuant to Condition No. 7 of the original Oakhurst Country Club Conditions of Approval dated November 13, 1987. However, the site has not been improved and is used informally for occasional event overflow, equestrian trailer parking and/or rideshare vehicle parking.

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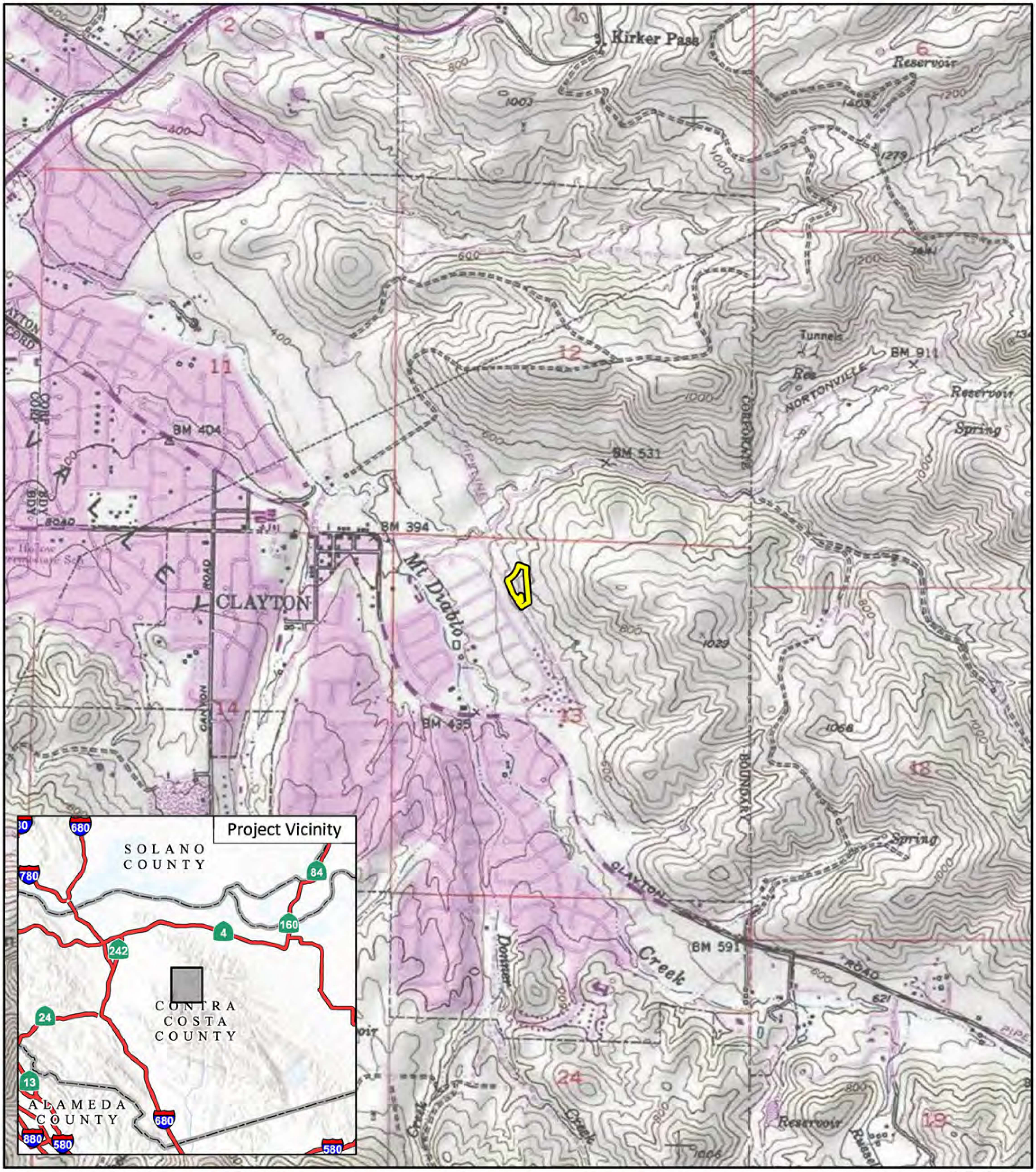

Project Location

FIGURE 2-1

0 1000 2000
FEET

SOURCE: USGS 7.5' Quad - *Clayton (1994)*, CA

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Oakhurst Townhomes

Regional Location

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LSA

Project Location

FIGURE 2-2

N

0 50 100
FEET

SOURCE: Nearmap (2023)

Oakhurst Townhomes

Project Site

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In addition to the CCWD pump station parcel adjacent to the southern end of the project site, two easements are on the project site: (1) a public service easement across the entirety of the site; and (2) a 16-foot-wide pathway easement spanning the site from north to south that provides access to the equestrian staging area on the adjacent City-owned property. The equestrian staging area provides access to trails in the undeveloped hillsides south and east of the project site.

2.1.3 Surrounding Land Uses

As shown in Figure 2-2, the project site is generally surrounded by undeveloped land to the north and east, the Oakhurst Country Club golf course and Peacock Creek Drive to the west, and Clayton Road and single-family residential development to the west and south. The Oakhurst Country Club golf course is an 18-hole golf course that is part of the Oakhurst Country Club, which also includes tennis courts, a pool, and a clubhouse. The project site is bordered immediately to the west and south by Clayton Road, across which are single-family residences.

2.1.4 Circulation and Access

The project site consists of a vacant, partially-paved, largely gravel parking lot. The project site can be accessed from the west via Peacock Creek Drive

2.1.5 Regulatory Setting

As of January 2023, the City of Clayton General Plan Land Use Map designates the project site as Multifamily Medium Density Residential (MMD). This land use designation allows multifamily units, including duplexes, triplexes, and townhouses, on sites where the property area, circulation system and other features can comfortably accommodate densities of 10.1–20 units per acre. Structural coverage can be up to 50 percent of the site area.

In January 2024, the Clayton City Council rezoned the property as part of its zoning amendments related to the recent update of the Housing Element of the Clayton General Plan. The site is currently zoned M-R-M (Multiple Family Residential Medium) District to align with the recently amended General Plan land use designation. The M-R-M District is intended to provide as much compatibility as possible with nearby single-family residential zoning districts while providing affordable housing opportunities in the City.

2.2 PROPOSED PROJECT

The proposed project involves the construction of four multi-family residential buildings containing 30 dwelling units, and associated improvements. Figure 2-3 shows the proposed parcel layout. Individual components of the proposed project are discussed below.

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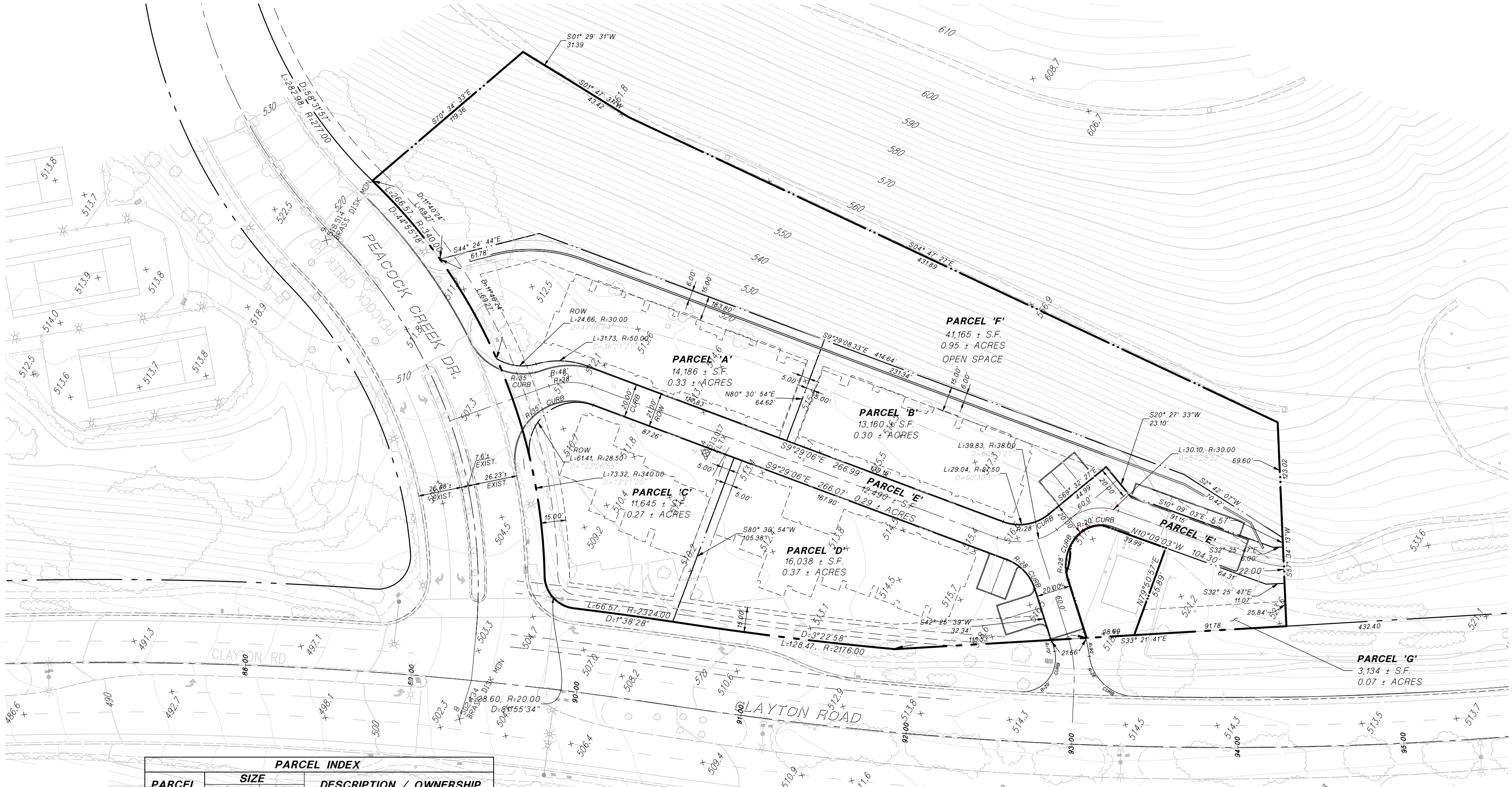
FIGURE 2-3



PARCEL INDEX			
PARCEL	SIZE S.F.	SIZE ACRES	DESCRIPTION / OWNERSHIP
A	14,186	0.326	DEVELOPMENT / HOA
B	13,160	0.302	DEVELOPMENT / HOA
C	11,645	0.267	DEVELOPMENT / HOA
D	16,038	0.368	DEVELOPMENT / HOA
E	12,490	0.287	ROADWAY / HOA
F	41,165	0.945	OPEN SPACE / HOA
G	3,134	0.072	OPEN SPACE / HOA

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0 50 100
FEET

SOURCE: P/A Design Resources, Inc.

Oakhurst Townhomes Development Project

Proposed Parcel Layout

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2.2.1 Building Program

The proposed project would construct four multi-family residential buildings containing 30 dwelling units (one building with four units [Building C], one building with eight units [Building B], and two buildings with nine units [Buildings A and D]), as shown in Figure 2-4. The units would range from 1,329 square feet to 2,072 square feet. The layout and size of each residence would vary based on the plan type but would range from 4 bedrooms and 3.5 bathrooms in the largest plan type to 3 bedrooms and 3 bathrooms in the smallest plan type. All of the townhome units would be three stories tall, include a two-car garage, and would be oriented to face an internal private drive with access from Peacock Creek Drive. The proposed project would have an overall density of 11.8 dwelling units per acre. Figures 2-5 through 2-8 illustrate the typical building elevations for each building type.

2.2.2 Open Space and Landscaping

The proposed project would include 27,690 square feet of landscaped area, including 1,960 square feet of bioretention space that would be covered in vegetation (see Figure 2-9). Proposed landscaping would include low and medium water use hardy trees, shrubs, and groundcover around the perimeter of the site. The landscape and associated irrigation have been designed to comply with the City's Water Efficient Landscape Standards, as defined in Section 17.80.050 of the City of Clayton Municipal Code. The project would result in the planting of 45 trees representing 7 different species.

Due to the site topography, a retaining wall would be constructed along the northern boundary of the proposed development. The proposed retaining wall would range from 1 to 10 feet high. A second retaining wall would also be installed along the southwestern boundary of the proposed development. This retaining wall would range from 3 to 8 feet high.

2.2.3 Access, Circulation, and Parking

As shown in Figure 2-4, vehicular access to the project site would be provided via an internal private drive with access from Peacock Creek Drive. Secondary emergency vehicle access would be provided via a gated driveway from Clayton Road. Paved pedestrian pathways would run around the perimeter of the proposed development and between the proposed buildings.

As noted above, each of the residential units would include a two-car attached garage, for a total of 60 garage parking spaces. An additional 15 guest parking spaces would be provided along the internal private drive for a total of 75 spaces on the project site.

2.2.4 Utilities and Infrastructure

The project site is located in an urban area that is currently served by existing utilities, including water, sanitary sewer, storm drainage, electricity, and telecommunications infrastructure. Existing and proposed utility connections are discussed below.

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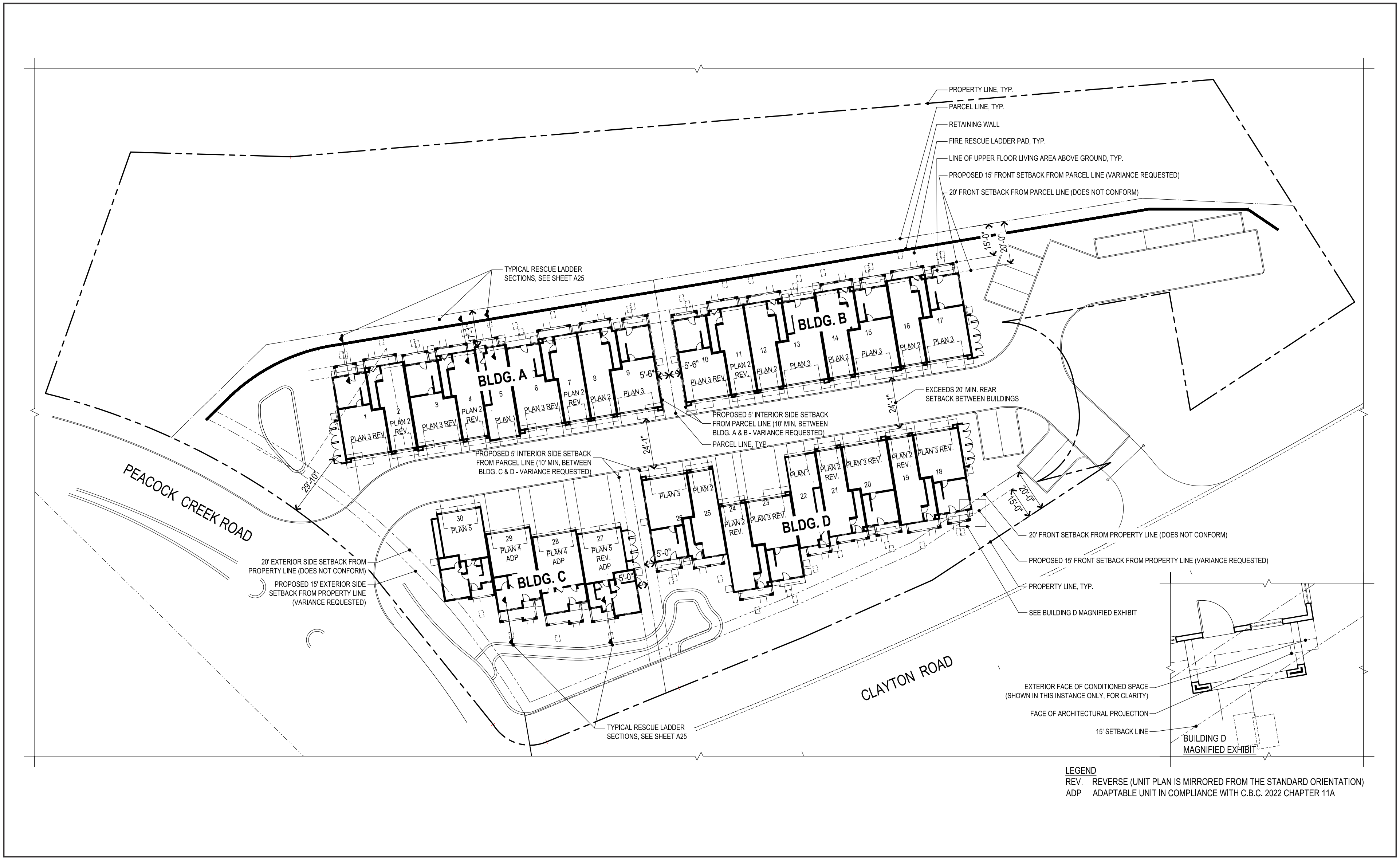

FIGURE 2-4

Oakhurst Townhomes Development Project

Proposed Site Plan

SOURCE: SDG Architects, Inc.

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FIGURE 2-5

0 15 30
FEET

SOURCE: SDG Architects, Inc.

Oakhurst Townhomes Development Project

Building A Elevations

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FIGURE 2-6

0 15 30
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SOURCE: SDG Architects, Inc.

Oakhurst Townhomes Development Project

Building B Elevations

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UNIT 5R UNIT 4 UNIT 4 UNIT 5

REAR ELEVATION

UNIT 5R

RIGHT ELEVATION

UNIT 5

LEFT ELEVATION

UNIT 5 UNIT 4 UNIT 4 UNIT 5R

FRONT ELEVATION

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FIGURE 2-7

0 15 30
FEET

SOURCE: SDG Architects, Inc.

Oakhurst Townhomes Development Project

Building C Elevations

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FIGURE 2-8

0 15 30
FEET

SOURCE: SDG Architects, Inc.

Oakhurst Townhomes Development Project

Building D Elevations

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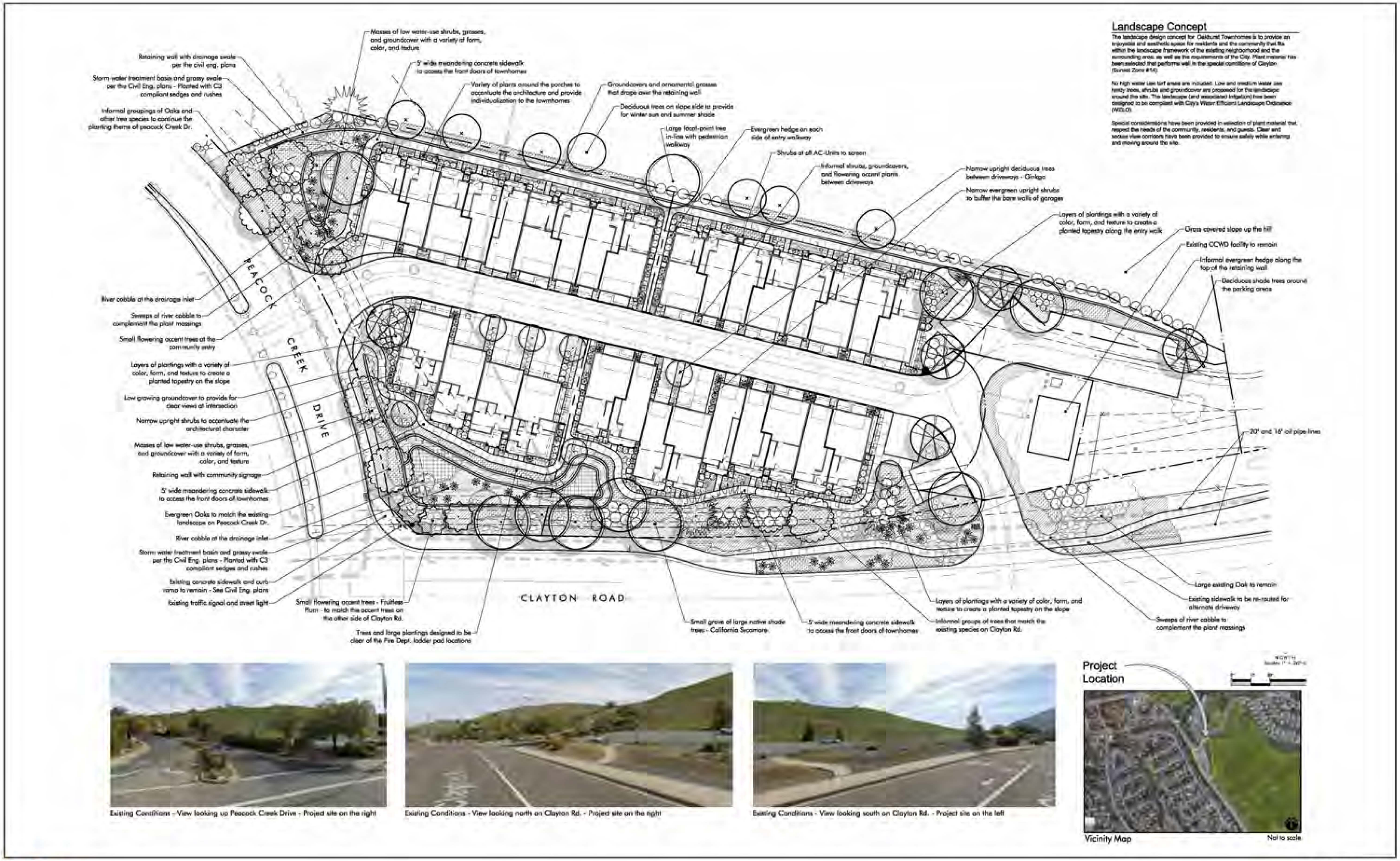

Existing Conditions - View looking up Peacock Creek Drive - Project site on the right

Existing Conditions - View looking north on Clayton Rd. - Project site on the right

Existing Conditions - View looking south on Clayton Rd. - Project site on the left

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FIGURE 2-9

N

0 40 80

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SOURCE: KLA Landscape Architecture Planning

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Oakhurst Townhomes Development Project

Preliminary Landscaping Plan

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2.2.4.1 Water

The CCWD would provide water service for the proposed project. The proposed project would include the installation of a new, 8-inch water line under the internal private drive on the site that would connect to the existing 6-inch and 12-inch mains within Peacock Creek Drive. The proposed project would also relocate the existing 6-inch and 12-inch water lines within the Clayton Road right-of-way.

2.2.4.2 Wastewater

The City of Concord Department of Public Works provides wastewater collection services for Concord and Clayton and maintains the existing sanitary sewer lines within the vicinity of the project site, including an 8-inch line west of the project site within Peacock Creek Drive. A new 8-inch sanitary sewer line would be installed under the internal private drive on the project site and would tie into the existing 6-inch line sanitary sewer line within the Peacock Creek Drive right-of-way.

2.2.4.3 Stormwater

The project site currently consists of vacant land, which includes a partially paved, largely gravel parking lot. A total of 42.4 percent (1.08 acres) of the project site is covered by impervious surfaces and, upon completion of the project, this number would decrease to 38.1 percent (0.97 acre) with the installation of new pervious surfaces, including open space. The proposed project would include two bioretention facilities totaling 1,950 square feet. These facilities would receive on-site stormwater runoff from roofs, paved surfaces, pervious walkways, and some landscaped area. Figure 2-10 shows the preliminary stormwater plan.

2.2.4.4 Electricity and Gas

Pacific Gas & Electric Company (PG&E) provides electricity service to the project site. The proposed project would relocate the existing PG&E utility boxes on site. The proposed project would include connections to the existing electricity lines that run adjacent to the project site on Clayton Road. The project would not include natural gas connections.

2.2.5 Sustainable Design Features

In compliance with the current California Building Code, including the California Green Building Standards Code, the proposed project would include the following sustainable design features:

- Installation of a rooftop photovoltaic panel array sized to meet minimum code requirements
- Installation of an electric vehicle (EV) charging outlet within individual homeowner garages
- Installation of an outdoor EV charging station at one of the guest parking spaces on the site
- Installation of required energy storage system battery storage infrastructure at individual homeowner garages
- Installation of all electric heating, cooling, and water heating appliances for all proposed dwelling units

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LEGEND

- DMA BOUNDARY
- IMPERVIOUS ROOF DRAINING TO IMP1 - RF1
- IMPERVIOUS PAVEMENT DRAINING TO IMP1 - RW1
- PERVIOUS PAVEMENT DRAINING TO IMP1 - WW1
- LANDSCAPE DRAINING TO IMP1 - LS1
- IMPERVIOUS ROOF DRAINING TO IMP2 - RF2
- PERVIOUS PAVEMENT DRAINING TO IMP2 - WW2
- LANDSCAPE DRAINING TO IMP2 - LS2
- BIORETENTION AREAS - IMP1 & IMP2 (BIORETENTION BASINS)

IMP SIZING CALCULATIONS

PROJECT TYPE: TREATMENT ONLY
DRAINAGE AREA: 69,935 SF
MEAN ANNUAL PRECIPITATION: 18 IN

IV. AREAS DRAINING TO IMPS

IMP NAME: IMP1
IMP TYPE: BIORETENTION FACILITY
SOILS GROUP: D

DMA NAME	AREA SF	POST PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA x RUNOFF FACTOR	IMP SIZING			
					IMP SIZING FACTOR	RAIN ADJUSTMENT FACTOR	MINIMUM AREA OR VOLUME	PROPOSED AREA OR VOLUME
RF1	19,475	CONVENTIONAL ROOF	1.00	19,475				
RW1	15,244	CONCRETE OR ASPHALT	1.00	15,244				
WW1	2,790	PERMEABLE PAVERS	0.10	279				
LS1	17,517	LANDSCAPE	0.10	1,752				
			TOTAL	36,750				
				AREA	0.040	1.000	1,470	1,480

IMP NAME: IMP2
IMP TYPE: BIORETENTION FACILITY
SOILS GROUP: D

DMA NAME	AREA SF	POST PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA x RUNOFF FACTOR	IMP SIZING			
					IMP SIZING FACTOR	RAIN ADJUSTMENT FACTOR	MINIMUM AREA OR VOLUME	PROPOSED AREA OR VOLUME
RF2	7,638	CONVENTIONAL ROOF	1.00	7,638				
WW2	1,531	PERMEABLE PAVERS	0.10	153				
LS2	3,863	LANDSCAPE	0.10	386				
			TOTAL	8,177				
				AREA	0.040	1.000	327	470

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FIGURE 2-10

N

0 50 100
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SOURCE: KLA Landscape Architecture Planning

Oakhurst Townhomes Development Project

Preliminary Stormwater Plan

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2.2.6 Demolition and Construction

Construction details for the proposed project are not yet known. Therefore, this analysis utilizes the California Emissions Estimator Model (CalEEMod) version 2022.1 default assumptions for the construction schedule, which anticipates construction to begin mid-2024 and occur over an approximately 11-month period.

2.3 PROJECT APPROVALS

The project applicant is requesting vesting tentative map approval; site plan review; and a variance from the minimum front setback requirement.

While the City is the CEQA Lead Agency for the proposed project, other agencies also have discretionary authority related to the project and approvals or serve as a responsible and/or trustee agency in connection to the proposed project. Table 2.A provides a list of these agencies and potential permits and approvals that may be required.

Table 2.A: Potential Permits and Approvals

Lead Agency	Permits/Approvals
City of Clayton	• Environmental review • Vesting Tentative Map approval • Site Plan approval • Variance approval • Grading permits • Building permits
Other Agencies/Entities	
Contra Costa County Fire Protection District	• Review/approve fire truck access and site fire flow design
Contra Costa Water District	• Connection to water transmission system
City of Concord	• Connection to wastewater conveyance system
Pacific Gas & Electric Co.	• Reconnection of electricity/natural gas service

Source: Compiled by LSA (2024).

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3.0 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist in Chapter 3.0.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Energy
☐ Geology/Soils	☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials
☐ Hydrology/Water Quality	☐ Land Use/Planning	☐ Mineral Resources
☐ Noise	☐ Population/Housing	☐ Public Services
☐ Recreation	☐ Transportation	☐ Tribal Cultural Resources
☐ Utilities/Service Systems	☐ Wildfire	☐ Mandatory Findings of Significance

3.1 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 although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "Potentially Significant Impact" or "Potentially Significant Unless Mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

	7/22/2025
Signature	Date

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4.0 CEQA ENVIRONMENTAL CHECKLIST

4.1 AESTHETICS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Except as provided in Public Resources Code Section 21099, 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. In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

a. Would the project have a substantial effect on a scenic vista?

Less Than Significant Impact. The City of Clayton's (City's) General Plan[1] contains goals and policies to protect the visual quality in the city, including Land Use Goal 1 and Community Design Objective 5 and its related Policies 5a and 5b, that support preserving views of the foothills and Mount Diablo, maintaining Clayton's rural atmosphere, and protecting ridgelines. In addition, the General Plan Community Design Element identifies scenic routes and corridors within Clayton that are highly traveled and provide strong visual amenities, including Concord Boulevard/Oakhurst Drive and Clayton Road. Clayton Road bounds the project site on the west. Oakhurst Drive is located 0.32 mile north of the project site.

The project site currently consists of vacant land, which includes a partially paved, largely gravel parking lot. Surrounding land uses include undeveloped land to the north and east, the Oakhurst Country Club golf course and Peacock Creek Drive to the west, and Clayton Road and single-family residential development to the west and south. Vegetation on-site primarily consists of ruderal grasslands and ornamental landscaping.

The proposed project involves the construction of four multi-family residential buildings and associated infrastructure and landscaping. The proposed multi-family residential buildings would not exceed three stories (approximately 35 feet) in height. Although implementation of the project would result in an overall increase in building height at the project site, the proposed project is within the height limit of 35 feet established in the City of Clayton Municipal Code (CMC). Further, scenic views would still exist from other public access points including Concord Boulevard/Oakhurst

1 City of Clayton. 1985. *Clayton 2000 General Plan.* As amended January 17, 2023.

Drive to the north, Clayton Road to the north and south of the project site, and existing surrounding open space areas to the east and south. In addition, although the project site is located on a parcel that is largely undeveloped, the neighborhood on the west side of Clayton Road is developed and screened with a retaining wall and landscaping, similar to the proposed project. The proposed project would not obscure any views of scenic vistas from surrounding public vantage points identified in the City's General Plan. Therefore, the proposed project would not result in a substantial adverse effect on a scenic vista, and this impact would be less than significant.

b. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Less Than Significant Impact. According to the California Department of Transportation (Caltrans),[2] the proposed project is not within view of an officially designated or eligible State Scenic Highway. The closest officially designated State Scenic Highway is the segment of Interstate 680 (I-680) between Alameda County and State Route 24 (SR-24); this stretch of the interstate highway is approximately 8 miles southwest of the project site. Given this distance and the intervening development and topography, the proposed project would not be visible from this State Scenic Highway. The City's General Plan designates Calyton Road, which borders the project site to the west, and Concord Boulevard/Oakhurst Drive as "scenic routes."[3] However, the proposed project would not substantially damage rock outcroppings or historic buildings because they are not present on the project site. Although limited tree removal would be required, new tree plantings along Clayton Road would be provided to maintain the border vegetation along this scenic route. Therefore, the proposed project would have a less than significant impact with respect to substantially damaging any rock outcroppings, historic buildings, or other scenic resources within view of a State Scenic Highway.

c. In non-urbanized areas, would the project substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

Less Than Significant Impact. The proposed project is located within an established urbanized neighborhood within the City of Clayton. Although the project site is bordered by undeveloped land to the east and south, implementation of the proposed project would be consistent with the urbanized neighborhood otherwise adjoining the project site, including the single-family residences across Clayton Road to the west and the private recreational uses across Peacock Creek Drive to the north (Oakhurst Country Club and Golf Course). In addition, public views from publicly accessible vantage points including Clayton Road and the surrounding open space areas would not be substantially degraded as a result of the proposed project since the project would front on fewer than 500 feet of Clayton Road, and there are no public trails on the City-owned undeveloped property immediately east of the site.

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2 California Department of Transportation (Caltrans). n.d. California State Scenic Highway System Map. Website: https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=465dfd3d807c46cc8e8057116f1aacaa (accessed November 28, 2022).

3 City of Clayton. 1985. op. cit.

The construction phase of the project would introduce the use of machinery (e.g., excavators and bulldozers) and the presence of construction equipment as well as construction activities, which would temporarily alter the visual character of the project site. Construction staging areas, including earth stockpiling, storage of equipment and supplies, and related activities would contribute to a disturbed site, which could be perceived by some viewers as a potential visual impact. Since construction activities would be temporary, they would not create a significant permanent impact on the visual character or quality of the site and its surroundings.

As of January 2023, the City of Clayton General Plan Land Use Map designates the project site as Multifamily Medium Density Residential (MMD). This land use designation allows multifamily units, including duplexes, triplexes, and townhouses, on sites where the property area, circulation system, and other features can comfortably accommodate densities of 10.1–20 units per acre. Structural coverage can be up to 50 percent of the site area. The proposed project would have an overall density of 11.8 dwelling units per acre.

In January 2024, the Clayton City Council rezoned the property as part of its zoning amendments related to the recent update of the Housing Element of the Clayton General Plan. The site is currently zoned M-R-M (Multiple Family Residential Medium) District to align with the recently amended General Plan land use designation. The M-R-M District is intended to provide as much compatibility as possible with nearby single-family residential zoning districts while providing affordable housing opportunities in the City. The proposed project would develop four multi-family buildings on the site, which complies with the density requirements, a 6,000-square-foot minimum lot size, and a 60-foot average lot width and 90-foot average lot depth as identified in Chapter 17.20 of the CMC. Project plans indicate 27,690 square feet, or 37.6 percent of the project site, would be planted with decorative landscaping, in excess of the minimum 20 percent site landscaping required by CMC Section 17.20.150.

Implementation of the proposed project would result in noticeable changes to the visual character of the area; however, modifications to the visual character or quality of the site and surrounding area as a result of the proposed project would not be adverse because the proposed residential buildings on site would be of a high-quality architectural design with decorative landscaping, plane breaks and variations in rooflines, and materials and colors that are complementary to the existing Country Club clubhouse and single-family residences nearby. The proposed project's landscaping and other design aspects would be consistent with the surrounding area and the City's policies and ordinances as described above. Therefore, impacts to the visual character or quality of the site and its surroundings would be less than significant.

d. *Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?*

Less Than Significant Impact. The project site is located in an urban area with a variety of existing light sources, including streetlights, interior and exterior building lighting, and light associated with traffic on nearby roadways. Development of the proposed project would incrementally increase the amount of nighttime lighting in the surrounding area due to new interior and exterior lighting at the individual residential units, street and pedestrian lighting at entrances and exits to the neighborhood, and lighting associated with additional vehicular traffic to and from the project site.

The proposed project would be required to comply with all applicable policies and standards set forth regarding light and glare, including CMC Section 8.09.030(A) which prohibits night lighting for outdoor recreational courts and requires private outdoor illumination on a residential property to be installed and maintained so that the bare bulb or lens does not glare in a way to annoy occupants of neighboring properties. Compliance with CMC section 8.09.030(A) would ensure that the project would be designed to minimize the effects of nighttime light and glare on surrounding areas.

Glare also can be produced during the daytime and is usually associated with reflective building materials such as glass, stainless steel, and aluminum. Building materials for the proposed townhome development would generally consist of stucco façades with wood siding. Glass windows would be incorporated into the new home design to be consistent with the architectural style of the surrounding development, in accordance with development standards established for the residential land use and zoning designations of the City of Clayton. Additionally, the proposed project would not utilize high gloss or reflective materials that would cause glare or reflection or generate excessive light. Therefore, impacts from new sources of substantial light or glare would be less than significant.

4.2 AGRICULTURE AND FORESTRY RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and the forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☒
d. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

a. Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No Impact. The project site currently consists of vacant land, which includes a partially paved, largely gravel parking lot. No agricultural uses are located within or adjacent to the project site. The project site is classified as "Urban and Built-Up Land" by the State Department of Conservation.[4] Therefore, the site is not classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (collectively known as "Important Farmland"). As such, the proposed project would not result in the conversion of Important Farmland to another use, and no impact would occur.

4 California Department of Conservation (DOC). 2018. Division of Land Use Resource Protection. California Important Farmland Finder. Website: maps.conservation.ca.gov/dlrp/ciff (accessed February 12, 2024).

b. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The City of Clayton General Plan Land Use Map designates the project site as Multifamily Medium Density Residential (MMD). The City of Clayton Zoning Map identifies the project site M-R-M (Multiple Family Residential Medium) District to align with the General Plan land use designation. The M-R-M District is intended to provide as much compatibility as possible with nearby single-family residential zoning districts while providing affordable housing opportunities in the City. Neither the land use designation nor the zoning classification is intended for agriculture as a primary use. In addition, the project site is not subject to a Williamson Act contract. Therefore, the proposed project would not conflict with existing zoning for agricultural use or a Williamson Act contract. No impact would occur.

c. Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?

No Impact. The project site is not considered forest land (as defined in Public Resources Code [PRC] Section 12220[g]), timberland (as defined by PRC Section 4526), and is not zoned Timberland Production (as defined by Government Code Section 51104[g]). [5] As discussed in Sections 4.2.a and 4.2.b above, the City of Clayton General Plan Land Use Map designates the project site as Multifamily Medium Density Residential (MMD) and the City of Clayton Zoning Map identifies the project site as M-R-M District. Neither the land use designation nor the zoning classification allows for timber production. Therefore, the proposed project would have no conflict with zoning for, or cause rezoning of, forest land, timberland, or timberland zoned as Timberland Production. No impact would occur.

d. Would the project result in the loss of forest land or conversion of forestland to non-forest use?

No Impact. Refer to Section 4.2.c above. The proposed project is not located on forest land or timberland and would not conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production. No impact would occur.

e. Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

No Impact. Refer to Sections 4.2.a and 4.2.c above. The proposed project would result in the development of four multi-family residential buildings on a site that is not utilized for agricultural or forestry operations; therefore, the proposed project would not involve other changes that could result in conversion of Farmland or forest land to non-agricultural or non-forest use. No impact would occur.

[5] California Department of Fish and Wildlife (CDFW). n.d. California Forests and Timberlands Map. Website: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109917&inline (accessed July 20, 2023).

4.3 AIR QUALITY

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b. 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?	☐	☒	☐	☐
c. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

The project site is located within the jurisdiction of the Bay Area Air District (Air District), which regulates air quality in the San Francisco Bay Area. Air quality conditions in the San Francisco Bay Area have improved significantly since the Air District was created in 1955. Ambient concentrations of air pollutants and the number of days during which the region exceeds air quality standards have fallen substantially. In the City of Clayton, and the rest of the air basin, exceedances of air quality standards occur primarily during meteorological conditions conducive to high pollution levels, such as cold, windless winter nights or hot, sunny summer afternoons.

Within the Air District, ambient air quality standards for ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in size (PM_{10}), particulate matter less than 2.5 microns in size ($PM_{2.5}$), and lead (Pb) have been set by both the State of California and the federal government. The State has also set standards for sulfate and visibility. The Air District is under State nonattainment status for ozone and particulate matter standards. The Air District is classified as nonattainment for the federal ozone 8-hour standard and nonattainment for the federal $PM_{2.5}$ 24-hour standard.

a. Would the project conflict with or obstruct implementation of the applicable air quality plan?

Less Than Significant Impact. The applicable air quality plan is the Air District 2017 Clean Air Plan (Clean Air Plan),[6] which was adopted on April 19, 2017. The Clean Air Plan is a comprehensive plan to improve Bay Area air quality and protect public health. The Clean Air Plan defines control strategies to reduce emissions and ambient concentrations of air pollutants; safeguard public health by reducing exposure to air pollutants that pose the greatest heath risk, with an emphasis on protecting the communities most heavily affected by air pollution; and reduce greenhouse gas (GHG) emissions to protect the climate. Consistency with the Clean Air Plan can be determined if the

[6] Bay Area Air Quality Management District (BAAQMD). 2017. *Clean Air Plan*. April 19.

project: (1) supports the goals of the Clean Air Plan; (2) includes applicable control measures from the Clean Air Plan; and (3) would not disrupt or hinder implementation of any control measures from the Clean Air Plan.

Clean Air Plan Goals. The primary goals of the Bay Area Clean Air Plan are to: attain air quality standards; reduce population exposure and protect public health in the Bay Area; and reduce GHG emissions and protect the climate.

The Air District has established significance thresholds for project construction and operational impacts at a level at which the cumulative impact of exceeding these thresholds would have an adverse impact on the region's attainment of air quality standards. The health and hazards thresholds were established to help protect public health. As discussed below, implementation of the proposed project would result in less than significant operation-period emissions and, with implementation of Mitigation Measure AIR-1, the project would result in less than significant construction-period emissions. Therefore, the project would not conflict with the Clean Air Plan goals, which are discussed in more detail below.

Clean Air Plan Control Measures. The control strategies of the Clean Air Plan include measures in the following categories: Stationary Source Measures, Transportation Measures, Energy Measures, Building Measures, Agriculture Measures, Natural and Working Lands Measures, Waste Management Measures, Water Measures, and Super-Greenhouse Gas (GHG) Pollutants Measures.

Stationary Source Control Measures. The Stationary Source Control Measures, which are designed to reduce emissions from stationary sources such as metal melting facilities, cement kilns, refineries, and glass furnaces, are incorporated into rules adopted by the Air District and then enforced by Air District Permit and Inspection programs. Since the project would not include any stationary sources, the Stationary Source Control Measures of the Clean Air Plan are not applicable to the project.

Transportation Control Measures. The Air District identifies Transportation Control Measures as part of the Clean Air Plan to decrease emissions of criteria pollutants, toxic air contaminants (TACs), and GHGs by reducing demand for motor vehicle travel, promoting efficient vehicles and transit service, decarbonizing transportation fuels, and electrifying motor vehicles and equipment. The proposed project involves the construction of 30 new single-family residential units and associated improvements. The project site is located within walking or bicycling distance from the surrounding residential areas and Oakhurst Country Club. Therefore, surrounding residential and recreational uses would be accessible via walking and bicycling. The proposed project would also provide paved pedestrian pathways that would run around the perimeter of the proposed development and between the proposed buildings which would provide access to Clayton Road and Peacock Creek Drive. Additionally, there are bicycle lanes on Clayton Road and multi-use trails in the vicinity of the project site, and bus stops are located within 0.5 mile at a walking distance from the project site, including one bus stop located adjacent to the project site next to Clayton Road. Therefore, the project would support the ability of residents and visitors to use alternative modes of transportation. As such, the project would not conflict with Air District initiatives to increase the use of alternate means of transportation.

Energy Control Measures. The Clean Air Plan also includes Energy Control Measures, which are designed to reduce emissions of criteria air pollutants, TACs, and GHGs by decreasing the amount of electricity consumed in the Bay Area, as well as decreasing the carbon intensity of the electricity used by switching to less GHG-intensive fuel sources for electricity generation. Since these measures apply to electrical utility providers and local government agencies (and not individual projects), the Energy Control Measures of the Clean Air Plan are not applicable to the proposed project.

Building Control Measures. The Air District has authority to regulate emissions from certain sources in buildings such as boilers and water heaters but has limited authority to regulate the buildings themselves. Therefore, the strategies in the control measures for this sector focus on working with local governments that do have authority over local building codes, to facilitate the adoption of best GHG control practices and policies. As identified above, the proposed project would be required to comply with the latest California Green Building Standards Code (CALGreen Code) standards. Therefore, the Building Control Measures of the Clean Air Plan are not applicable to the project.

Agriculture Control Measures. The Agriculture Control Measures are designed to primarily reduce emissions of methane (CH_4). Since the project does not include any agricultural activities, the Agriculture Control Measures of the Clean Air Plan are not applicable to the project.

Natural and Working Lands Control Measures. The Natural and Working Lands Control Measures focus on increasing carbon sequestration on rangelands and wetlands, as well as encouraging local governments to enact ordinances that promote urban-tree plantings. Since the project does not include the disturbance of any rangelands or wetlands, the Natural and Working Lands Control Measures of the Clean Air Plan are not applicable to the project.

Waste Management Control Measures. The Waste Management Control Measures focus on reducing or capturing CH_4 emissions from landfills and composting facilities, diverting organic materials away from landfills, and increasing waste diversion rates through efforts to reduce, reuse, and recycle. Future occupants of the project would be subject to compliance with local requirements for waste management (e.g., recycling and composting services) as prescribed in CMC Chapter 8.04 and more specifically in CMC Section 8.04.300. Therefore, the project would be consistent with the Waste Management Control Measures of the Clean Air Plan.

Water Control Measures. The Water Control Measures focus on reducing emissions of criteria pollutants, TACs, and GHGs by encouraging water conservation, limiting GHG emissions from publicly owned treatment works (POTWs), and promoting the use of biogas recovery systems. Since the proposed project would be required to comply with the latest CALGreen standards, which includes a variety of different measures, including reduction of wastewater and water use, the proposed project would not conflict with the Water Control Measures.

Super-GHG Control Measures. The Super-GHG Control Measures are designed to facilitate the adoption of best GHG control practices and policies through the Air District and local government agencies. Since these measures do not apply to individual projects, the Super-GHG Control Measures are not applicable to the project.

Clean Air Plan Implementation. As discussed above, the proposed project would generally implement the applicable measures outlined in the Clean Air Plan, including Transportation Control Measures. Therefore, the project would not disrupt or hinder implementation of a control measure from the Clean Air Plan, and this impact would be less than significant.

b. Would the project 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?

Less Than Significant with Mitigation Incorporated. The Air District is currently designated as a nonattainment area for State and national ozone standards and national particulate matter ambient air quality standards. The Air District nonattainment status is attributed to the region's development history. Past, present, and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's impact on air quality would be considered significant.

In developing thresholds of significance for air pollutants, the Air District considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. The following analysis assesses the potential construction- and operation-related air quality impacts and CO impacts of the proposed project.

Construction Emissions. During construction, short-term degradation of air quality may occur due to the release of particulate matter emissions (i.e., fugitive dust) generated by grading, hauling, and other activities. Emissions from construction equipment are also anticipated and would include CO, nitrogen oxide (NO_x), reactive organic gases (ROG), directly-emitted particulate matter ($PM_{2.5}$ and PM_{10}), and TACs such as diesel exhaust particulate matter.

Site preparation and project construction would involve grading, paving, and other activities. Construction-related effects on air quality from the proposed project would be greatest during the site preparation phase due to the disturbance of soils. If not properly controlled, these activities would temporarily generate particulate emissions. Sources of fugitive dust would include disturbed soils at the construction site. Unless properly controlled, vehicles leaving the site would deposit dirt and mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of operating equipment. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Water or other soil stabilizers can be used to control dust, resulting in emissions reductions of 50 percent or more. The Air District has established standard measures for reducing fugitive dust emissions (PM_{10}). With the implementation of these Basic Construction Mitigation Measures, fugitive dust emissions from construction activities would not result in adverse air quality impacts.

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO_2, NO_x, ROGs and some soot particulate ($PM_{2.5}$ and PM_{10}) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Construction emissions were estimated for the project using the California Emissions Estimator Model (CalEEMod) version 2022.1, consistent with Air District recommendations. Construction details of the proposed project are not yet fully known. Therefore, this analysis utilizes CalEEMod default assumptions for the construction schedule, which anticipates construction to begin mid-2024 and occur over an approximately 11-month period. Construction activities would include site preparation, grading, building construction, paving, and architectural coating. This analysis assumes that construction of the proposed project would not require the import or export of soil. In addition, this analysis assumes the use of Tier 2 construction equipment. Other detailed construction information is currently unavailable; therefore, this analysis utilizes CalEEMod default assumptions. Construction-related emissions are presented in Table 4.3.A. CalEEMod output sheets are included in Appendix A.

Table 4.3.A: Project Construction Emissions (in Pounds Per Day)

Project Construction	ROG	NO_X	Exhaust PM_{10}	Fugitive Dust PM_{10}	Exhaust $PM_{2.5}$	Fugitive Dust $PM_{2.5}$
Average Daily Emissions	1.9	12.4	0.5	0.2	0.5	0.1
Air District Thresholds	**54.0**	**54.0**	**54.0**	**BMP**	**82.0**	**BMP**
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Source: LSA (January 2024).
Air District = Bay Area Air Quality Management District
BMP = best management practices
NO_X = nitrogen oxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROG = reactive organic gases

As shown in Table 4.3.A, construction emissions associated with the project would be less than significant for ROG, NO_X, $PM_{2.5}$, and PM_{10} exhaust emissions. Although project construction emissions would be less than significant, the following Air District Basic Construction Mitigation Measures are recommended as best management practices to further reduce construction fugitive dust impacts of the project:

Mitigation Measure AIR-1 **Air District Basic Construction Mitigation Measures.** In order to meet the Bay Area Air District (Air District) fugitive dust threshold, the following Basic Construction Mitigation Measures shall be implemented by the project applicant during all phases of the project construction period, including site preparation, demolition, grading and vertical construction of residences: 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 tracked-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (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.
- All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
- All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
- Unpaved roads providing access to sites located 100 feet or further from a paved road shall be treated with a 6- to 12-inch layer of compacted layer of wood chips, mulch, or gravel.
- 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 the 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.
- A publicly-visible sign shall be posted with the telephone number and person to contact at the City of Clayton 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.

As shown in Table 4.3.A, construction emissions associated with the proposed project would be less than significant. The less than significant construction emissions of the project would be further reduced with implementation of Mitigation Measure AIR-1. Therefore, construction of the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standards, and impacts would be less than significant with mitigation incorporated.

Operational Emissions. Long-term air pollutant emission impacts are those associated with mobile sources (e.g., vehicle trips), energy sources (e.g., natural gas), and area sources (e.g., architectural coatings and the use of landscape maintenance equipment) related to the proposed project.

Mobile source emissions include ROG and NO_X emissions that contribute to the formation of ozone. Additionally, PM_{10} emissions result from running exhaust, tire and brake wear, and the entrainment of dust into the atmosphere from vehicles traveling on paved roadways.

Energy source emissions result from activities in buildings for which natural gas is used. As identified in the Chapter 2.0, Project Description, the proposed project would be all-electric; therefore, the proposed project would not generate energy source emissions.

Typically, area source emissions consist of direct sources of air emissions located at the project site, including architectural coatings, consumer products, and the use of landscape maintenance equipment.

Emission estimates for operation of the project were calculated using CalEEMod. Trip generation rates for the project were based on the project's trip generation estimates as identified in Section 4.17, Transportation. Based on the trip generation estimates, the proposed project would generate approximately 136 average daily trips.

The primary emissions associated with the project are regional in nature, meaning that air pollutants are rapidly dispersed on release or, in the case of vehicle emissions associated with the project, emissions are released in other areas of the Air Basin. The daily and annual emissions associated with project operational trip generation, energy, and area sources are identified in Table 4.3.B for ROG, NO_X, PM_{10}, and $PM_{2.5}$.

The results shown in Table 4.3.B indicate the project would not exceed the significance criteria for daily or annual ROG, NO_X, PM_{10} or $PM_{2.5}$ emissions. Therefore, operation of the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or State ambient air quality standard. Impacts would be less than significant.

Table 4.3.B: Project Operational Emissions

	ROG	NO_x	PM_{10}	$PM_{2.5}$
Pounds Per Day				
Mobile Source Emissions	0.5	0.5	0.9	0.2
Area Source Emissions	0.9	<0.1	<0.1	<0.1
Energy Source Emissions	0.0	0.0	0.0	0.0
Total Emissions	**1.4**	**0.5**	**0.9**	**0.2**
Air District Thresholds	54.0	54.0	82.0	54.0
Exceed Threshold?	**No**	**No**	**No**	**No**
Tons Per Year				
Mobile Source Emissions	0.1	0.1	0.2	<0.1
Area Source Emissions	0.2	<0.1	<0.1	<0.1
Energy Source Emissions	0.0	0.0	0.0	0.0
Total Emissions	**0.3**	**0.1**	**0.2**	**<0.1**
Air District Thresholds	10.0	10.0	15.0	10.0
Exceed Threshold?	**No**	**No**	**No**	**No**

Source: LSA (January 2024).
Air District = Bay Area Air District
NO_X = nitrogen oxide
$PM_{2.5}$ = particulate matter less than 10 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROG = reactive organic gases

Localized CO Impacts. Emissions and ambient concentrations of CO have decreased dramatically in the Bay Area with the introduction of the catalytic converter in 1975. No exceedances of the State or federal CO standards have been recorded at Bay Area monitoring stations since 1991. The Air District 2022 CEQA Guidelines include recommended methodologies for quantifying concentrations of localized CO levels for proposed projects. A screening level analysis using guidance from the Air District 2022 CEQA Guidelines was performed to determine the impacts of the project. The screening methodology provides a conservative indication of whether the implementation of a proposed project would result in significant CO emissions. According to the Air District 2022 CEQA Guidelines, a proposed project would result in a less than significant impact to localized CO concentrations if the following screening criteria are met:

- The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, and the regional transportation plan and local congestion management agency plans.
- Project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
- The project would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, or below-grade roadway).

Implementation of the proposed project would not conflict with the policies or programs of the Contra Costa Transportation Authority (CCTA). As identified in Section 4.17, Transportation, the proposed project would generate approximately 12 morning peak hour trips and 12 evening peak hour trips; therefore, the project's contribution to peak hour traffic volumes at intersections in the vicinity of the project site would be well below 44,000 vehicles per hour. Therefore, the proposed project would not result in localized CO concentrations that exceed State or federal standards, and impacts would be less than significant.

c. Would the project expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact. Sensitive receptors are defined as residential uses, schools, daycare centers, nursing homes, and medical centers. Individuals particularly vulnerable to diesel particulate matter are children, whose lung tissue is still developing, and the elderly, who may have serious health problems that can be aggravated by exposure to diesel particulate matter. Exposure from diesel exhaust associated with construction activity contributes to both cancer and chronic non-cancer health risks.

According to the Air District, a project would result in a significant impact if it would individually expose sensitive receptors to TACs resulting in an increased cancer risk greater than 10.0 in one million; increased non-cancer risk of greater than 1.0 on the hazard index (chronic or acute); or an annual average ambient $PM_{2.5}$ increase greater than 0.3 micrograms per cubic meter ($\mu g/m^3$).

Primary sources of TACs include cars and trucks (particularly diesel), building materials and products, industrial sources, and businesses that use chemicals like dry cleaners and service stations. Some examples of TACs include benzene, butadiene, formaldehyde, and hydrogen sulfide. Potential human health effects of TACs include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity. Individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another. TACs emitted during construction activities would be diesel particulate matter (DPM) emitted from heavy-duty construction equipment and heavy-duty trucks.

The proposed project site is located in an urban area in close proximity to existing residential uses that could be exposed to diesel emissions exhaust during the construction period. Residential uses are located southwest of the project site at approximately 180 feet across Clayton Road. The nearest worker receptor is located north of the project site at Oakhurst Country Club, and the nearest school/childcare receptor is located southwest of the project site at the Lynndi's Preschool Family Child Care facility.

To estimate the potential cancer risk from project construction equipment exhaust (including diesel particulate matter), a dispersion model was used to translate an emissions rate from the source location to a concentration at the receptor location (i.e., a nearby residential land use). Dispersion modeling varies from a simpler, more conservative screening-level analysis to a more complex and refined detailed analysis. This refined assessment was conducted using the California Air Resources Board (CARB) exposure methodology, with the air dispersion modeling performed using the United States Environmental Protection Agency (USEPA) dispersion model AERMOD. The model provides a detailed estimate of exhaust concentrations based on site and source geometry, source emissions strength, distance from the source to the receptor, and site-specific meteorological data.

Table 4.3.C, below, identifies the results of the analysis. Model snapshots of the sources are provided in Appendix B.

Table 4.3.A: Health Risks from Project Construction to Off-Site Receptors

Maximally Exposed Individual (MEI)	Carcinogenic Inhalation Health Risk in One Million	Chronic Inhalation Hazard Index	Acute Inhalation Hazard Index
Residential Receptor	7.24	0.004	0.000
Worker Receptor	2.09	0.008	0.000
School Receptor	1.85	0.001	0.000
Threshold	**10.0**	**1.0**	**1.0**

Source: LSA (January 2024).

As shown in Table 4.3.C, the cancer risk associated with project construction at the residential receptor would be 7.24 in one million, which would not exceed the Air District cancer risk of 10 in one million. The cancer risk associated with the worker and school receptors would also be less than the Air District threshold of 10 in one million. The total chronic hazard index would be 0.004 for the residential receptor, 0.008 for the worker receptor, and 0.001 for the school receptor, which would not exceed the 1.0 in one million threshold. In addition, the total acute hazard index would be nominal (0.000), which would also not exceed the threshold of 1.0. Therefore, construction of the proposed project would not exceed Air District thresholds and would not expose nearby sensitive receptors to substantial pollutant concentrations.

The proposed project would construct four multi-family residential buildings containing 30 dwelling units. The proposed project is residential in nature and does not include industrial land uses, commercial businesses utilizing chemicals, or heavy-duty construction vehicles with diesel engines that are the common sources of TAC emissions. Therefore, operation of the proposed project would not result in new substantial sources of TACs and would not expose sensitive receptors to substantial levels of TACs. This impact would be less than significant.

d. Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less Than Significant Impact. During project construction, some odors may be present due to diesel exhaust. However, these odors would be temporary and localized. Because the project's potential construction-related odor impacts are localized and temporary, they would not adversely affect a substantial number of people and would not result in frequent odor complaints. The proposed project would not include any activities or operations that would generate objectionable odors as may be more commonly observed with wastewater treatment, landfills and composters, heavy manufacturers and food processors; and once operational, the project would not be a source of odors. Therefore, the proposed project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. This impact would be less than significant.

4.4 BIOLOGICAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☒	☐

An *Application Form and Planning Survey Report to Comply with and Receive Permit Coverage Under the East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan* (PSR)[7] was prepared for the proposed project, which included background research and a field survey. The PSR is included in Appendix C of this Initial Study, and the findings of the PSR are summarized below.

Database and literature searches were conducted to gather information regarding habitat types and special-status species that have documented occurrence in or near the project site. These searches include the California Department of Fish and Wildlife (CDFW), California Natural Diversity Database (CNDDB),[8] the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered

7 Moore Biological Consultants. 2022. *Application Form and Planning Survey Report to Comply with and Receive Permit Coverage Under the East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan.* May.

8 California Department of Fish and Wildlife (CDFW). 2024. California Natural Diversity Database. RareFind. February. Website: www.wildlife.ca.gov/Data/Maps-and-Data (accessed February 2024).

Plants,[9] and the United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) online system.[10] Additionally, those "covered" and "no-take species" considered by the East Contra Costa County Habitat Conservation Plan (ECCCHCP, codified in CMC Chapter 16.55) to have the potential to occur on the project site were also assessed. At least one site visit was conducted at the site as part of the PSR. A biological resources reconnaissance-level survey was conducted on January 29, 2024, to assess current site conditions.

The project site supports the following two habitat types:

- **Ruderal Grassland:** Ruderal grassland vegetation occurs along the eastern boundary of the project site. Two small areas of grassland are also in the south part of the site. Plant species observed in the ruderal grassland include wild oats (*Avena fatua*), compact brome (*Bromus madritensis*), black mustard (*Brassica nigra*), Italian thistle (*Carduus pycnocephalus*), rose clover (*Trifolium hirtum*), stinkwort (*Dittrichia graveolens*), cut-leaf geranium (*Geranium dissectum*), prickly lettuce (*Lactuca serriola*), and filaree (*Erodium* sp.).

- **Developed/Landscaping:** The remainder of the project site consists of developed or landscaped areas. Most of this area consists of a large, gravel parking lot. The landscaped areas are situated along the west and north boundaries of the site. The landscaped areas appear to be heavily maintained and consist of trees and shrubs, such as coast redwood (*Sequoia sempervirens*), coast live oak (*Quercus agrifolia*), toyon (*Heteromeles arbutifolia*), coyote brush (*Baccharis pilularis*), and various ornamental trees and shrubs.

  Wildlife associated with the landscaped areas includes species that are adapted to urban and rural environments. Common amphibians and reptiles that could occur on the site include the California slender salamander (*Batrachoseps attenuatus*), arboreal salamander (*Aneides lugubris*), and western fence lizard (*Sceloporus occidentalis*). The trees and shrubs on the project site provide suitable foraging and/or nesting habitat for common birds, such as Anna's hummingbird (*Calypte anna*), California scrub-jay (*Aphelocoma californica*), and yellow-rumped warbler (*Setophaga coronata*), all of which have been observed on site. Ground-nesting birds, such as western meadowlark (*Sturnella neglecta*), and killdeer (*Charadrius vociferus*), could nest in the grasslands or gravel lot, respectively. Mammals such as raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), Virginia opossum (*Didelphis virginiana*), and fox squirrel (*Sciurus niger*) may also occur on the project site.

[9] California Native Plant Society (CNPS). Rare Plant Program. 2024. Inventory of Rare and Endangered Plants. Online edition, Ver. 9-05. Sacramento, CA. Website: www.rareplants.cnps.org (accessed February 1).

[10] U.S. Fish and Wildlife Service (USFWS). 2024. IPaC Information for Planning and Consultation. List of federally listed species known to occur in the project area (accessed February 1, 2024).

a. Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less Than Significant with Mitigation Incorporated. Special-status species are defined as follows:

- Species that are listed, formally proposed for listing, or designated as candidates for listing as threatened or endangered under the Federal Endangered Species Act (FESA);
- Species that are listed, or designated as candidates for listing, as rare, threatened, or endangered under the California Endangered Species Act (CESA);
- Plant species on California Rare Plant Rank (CRPR) Lists 1A, 1B, and 2 in the CNPS Inventory of Rare and Endangered Plants;
- Animal species designated as Species of Special Concern or Fully Protected by the CDFW;
- Species that meet the definition of rare, threatened, or endangered under Section 15380 of the *State CEQA Guidelines*; and
- Species considered being a taxon of special concern by the relevant local agencies.

Special-Status Plants. No special-status plants have been mapped on or adjacent to the project site. The CNDDB lists occurrences of 31 special-status plant species recorded within 5 miles of the project site. Most of these plants occur in specialized habitats such as chaparral, riparian woodland, and broadleaf forest or on serpentine or alkaline soils, which do not occur on the project site. Due to prior disturbance at the project site, the project site does not provide suitable habitat for special-status plant species. As such, the proposed project would not have a substantial adverse effect, either directly or through habitat modifications, on any special-status plant species. This impact would be less than significant.

Special-Status Wildlife. No special-status wildlife species have been recorded on or adjacent to the project site.[11] In addition, no special-status wildlife species or their sign (e.g., raptor stick nests, bat guano) were observed on the project site during the 2024 field survey. The CNDDB lists 15 special-status wildlife species occurring within 5 miles of the project site. Only three of these special-status species, burrowing owl (*Athene cunicularia*), golden eagle (*Aquila chrysaetos*), and American badger (*Taxidea taxus*), have a higher potential to occur on or near the project site due to the presence of suitable habitat in the adjacent undeveloped grasslands. San Joaquin kit fox (*Vulpes macrotis mutica*) is extremely rare in the region, but suitable habitat for this species is present in the ruderal grasslands on and adjacent to the project site. The California red-legged frog (*Rana draytonii*) and California tiger salamander (*Ambystoma californiense*) have been recorded within 5 miles of the site, but these two species are unlikely to occur due the site's distance from suitable aquatic breeding habitat for these species. Additionally, four other special-status wildlife species, the white-tailed kite

11 CDFW. 2024. op. cit.

(*Elanus leucurus*), northern harrier (*Circus hudsonius*), loggerhead shrike (*Lanius ludovicianus*), and grasshopper sparrow (*Ammodramus savannarum*), could occur at or near the site due to the presence of suitable habitat. Because of the sensitivity of some of the special-status wildlife species known to occur in the area, and/or the potential presence of some of the species on or immediately adjacent to the project site, the following special-status species are discussed further below.

California Red-Legged Frog (CRLF). CRLF is federally listed as threatened and is a State Species of Special Concern. Critical Habitat for CRLF was designated in 2010, and the project site is not located within a Critical Habitat Unit. Adult CRLF are primarily aquatic, although adjacent upland habitats are also important since they are used by adults and juveniles for escaping high water during flood events, aestivating, and dispersing to other aquatic habitats. During times of dispersal, CRLF are known to move more than 1 mile through upland habitats to reach other sources of water.

The project site does not provide the aquatic habitat necessary to support a breeding CRLF population. The closest CNDDB record of CRLF is approximately 0.7 mile from the project site.[12] The project site's uplands also likely provide minimal value to migrating CRLF, and surrounding developments around the project site present significant impediments to overland travel by CRLF to or through the project site. As such, the proposed project would not have a substantial adverse effect, either directly or through habitat modifications, on this special-status species. Therefore, this impact would be less than significant.

California Tiger Salamander (CTS). CTS (*Ambystoma californiense*) is a federally and State listed threatened species. The project site is located within the known range of the Central California "Distinct Population Segment" (DPS) of the CTS. CTS occur in grassland, oak savanna, sparse deciduous oak woodland, and occasionally in chaparral. The adults and juveniles remain below ground in the burrows of California ground squirrels, pocket gophers, and other available underground retreats during the dry period of the year. They breed during the wet season in vernal pools, stock ponds, other temporary bodies of water, and occasionally intermittent creeks. The closest record for CTS occurs approximately 2.1 miles from the project site.[13] As the project site is devoid of seasonal wetlands, ponds, and pools, it does not provide suitable breeding habitat for the CTS. Although marginal ruderal grassland habitat occurs on the project site, this habitat is unavailable for use by over summering and migrating CTS due to its isolation from extant CTS populations by the surrounding suburban development. As such, the proposed project would not have a substantial adverse effect, either directly or through habitat modifications, on this special-status species. Therefore, this impact would be less than significant.

Burrowing Owl. The burrowing owl (*Athene cunicularia*) is a California Species of Special Concern. Its nest, eggs, and young are also protected under the California Fish and Game Code. Burrowing owl habitat is usually found in annual and perennial grasslands, characterized by low growing vegetation. The burrowing owl often utilizes rodent burrows, typically California ground squirrel (*Otospermophilus beecheyi*) burrows, for nesting and cover. Burrowing owl may also

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12 CDFW. 2024. op. cit.
13 Ibid.

occasionally dig their own burrows or use man-made objects such as concrete culverts or riprap piles for cover. The nearest CNDDB occurrence of burrowing owl was recorded approximately 3.6 miles from the project site. No burrowing owls or burrows with evidence of burrowing owl occupancy were observed during the 2022 and 2024 field surveys. Although the proposed project would be very unlikely to support or impact western burrowing owls, impacts to this species would be potentially significant due to the presence of suitable burrow habitat adjacent to the project site. Implementation of Mitigation Measure BIO-1 would reduce impacts to this species to less than significant with mitigation incorporated.

Mitigation Measure BIO-1 **Burrowing Owl.** The following measures shall be implemented to reduce potential impacts to burrowing owl:

- Prior to initiating construction activities, a biologist approved by the California Department of Fish and Wildlife (CDFW) shall conduct surveys for burrowing owl within 500 feet of the project site. This measure incorporates avoidance and minimization guidelines from CDFW 2012 Staff Report on Burrowing Owl Mitigation.

- Prior to any ground disturbance related to construction activities, a CDFW-approved biologist shall conduct a pre-construction survey in areas identified in the planning surveys as having potential burrowing owl habitat. The surveys shall establish the presence or absence of western burrowing owl and/or habitat features and evaluate use by owls in accordance with CDFW survey guidelines.

- The biologist shall survey for burrowing owls and burrows on and within 500 feet of the development footprint. Surveys should take place near sunrise or sunset in accordance with CDFW guidelines. All suitable burrows or burrowing owls shall be identified and mapped. Surveys shall take place no more than 30 days prior to construction. During the breeding season (February 1–August 31), surveys shall document whether burrowing owls are nesting in or directly adjacent to disturbance areas. During the nonbreeding season (September 1–January 31), surveys shall document whether burrowing owls are using habitat in or directly adjacent to any disturbance area. Survey results will be valid only for the season (breeding or nonbreeding) during which the survey is conducted.

- If burrowing owls are found during the breeding season (February 1–August 31), the project proponent shall avoid all nest sites that could be disturbed by project construction during the remainder of the breeding season or while the nest is occupied by adults or young. Avoidance shall include establishment of a non-disturbance buffer zone (described below). Construction may occur during the breeding season if a qualified biologist monitors the nest and determines that the nest is inactive. During the nonbreeding season (September 1–January 31), the project proponent shall avoid the owls and the burrows they are using. Avoidance shall include the establishment of a buffer zone (described below).

- If occupied burrows for burrowing owls are not avoided, passive relocation may be implemented upon approval by CDFW. Owls should be excluded from burrows in the immediate impact zone and within an appropriate buffer zone as recommended by the biologist in coordination with CDFW by installing one-way doors in burrow entrances. These doors shall be in place for 48 hours prior to excavation. The project area shall be monitored daily for 1 week to confirm that the owl has abandoned the burrow. Whenever possible, burrows shall be excavated using hand tools and refilled to prevent reoccupation. Plastic tubing or a similar structure shall be inserted in the tunnels during excavation to maintain an escape route for any owls inside the burrow.

With implementation of Mitigation Measure BIO-1, which requires preconstruction surveys and establishment of buffers around identified occupied nest sites, impacts to burrowing owl would be less than significant with mitigation incorporated.

Golden Eagle. The golden eagle (*Aquila chrysaetos*) is a California Fully Protected Species. This species is known to occur in the region and could forage in the ruderal grasslands on or near the project site. The closest CNDDB occurrence was recorded approximately 4.7 miles from the site. Though the on-site trees are too small and exposed to provide suitable nest sites for this species, golden eagles could nest in the larger, sheltered trees within 0.5 mile of the site. Construction activity associated with implementation of the proposed project could result in indirect impacts to golden eagle nesting in the project vicinity. Therefore, impacts to this species are regarded as potentially significant due to the presence of suitable nesting and foraging habitat in the project area. Implementation of Mitigation Measure BIO-2 would reduce impacts to this species to less than significant with mitigation incorporated.

Mitigation Measure BIO-2 **Golden Eagle.** To avoid or minimize direct impacts to golden eagle as a result of project construction, the following measures shall be implemented, which are adapted from the Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP):

- Prior to implementation of the proposed project, a qualified biologist shall conduct a pre-construction survey to establish whether nests of golden eagles are occupied. If nests are occupied, minimization requirements and construction monitoring shall be required.

- Construction activities shall be prohibited within 0.5 mile of active nests. Nests can be built and active at almost any time of the year, although mating and egg incubation occurs late January through August, with peak activity in March through July. If site-specific conditions or the nature of the covered activity (e.g., steep topography, dense vegetation, limited activities) indicate that a smaller buffer could be appropriate or that a larger buffer should be implemented, the project applicant shall coordinate with the United States Fish and Wildlife Service (USFWS)/CDFW to determine the appropriate buffer size.

- A qualified biologist shall conduct construction monitoring to ensure that construction activities do not occur within the buffer zone established around an active nest.

With implementation of Mitigation Measure BIO-2, which requires pre-construction surveys and establishment of buffers around identified nest sites, impacts to golden eagle would be less than significant with mitigation incorporated.

Nesting Birds. The trees, shrubs, ruderal grasslands, other vegetation, structures, and gravel lot present on the project site provide suitable nesting habitat for raptors, passerines, and ground-nesting birds such as killdeer (*Charadrius vociferus*), western meadowlark (*Sturnella neglecta*), and mourning dove (*Zenaida macroura*). Nesting birds, including raptors, are protected by the California Fish and Game Code 3503, which reads, "It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." Passerines and non-passerine land birds are further protected under the Migratory Bird Treaty Act (MBTA). With implementation of Mitigation Measure BIO-3, which requires pre-construction surveys and establishment of buffers around identified nest sites, impacts to nesting birds would be less than significant with mitigation incorporated.

Mitigation Measure BIO-3 **Nesting Birds**. To avoid impacts to nesting raptors and passerines, nesting surveys shall be conducted by a qualified biologist within 7 days of commencement of earth-moving, tree removal, or construction work if this work would begin between February 1 and August 31. The nesting bird surveys shall include examination of all buildings on-site and all trees, shrubs, and grasslands within 300 feet of the entire project site. This zone of influence includes those areas outside the project site where birds could be disturbed by earth-moving vibrations and/or other construction-related noise.

If birds are identified nesting on or within 300 feet of the site, a qualified biologist shall establish a temporary protective nest buffer around the nest(s). The nest buffer shall be staked with orange construction fencing. The buffer must be of sufficient size to protect the nesting site from construction-related disturbance and should be established by a qualified ornithologist or biologist with extensive experience working with nesting birds near and on construction sites. Typically, adequate nesting buffers are 50 feet from the nest site or nest tree dripline for small birds and up to 300 feet for raptors including the white tailed kite. Upon completion of nesting surveys, if nesting birds are identified on or within a zone of influence of the project site, a qualified ornithologist/biologist shall prescribe adequate nesting buffers to protect the nesting birds from harm while the project is constructed.

If nests are found, the qualified biologist shall establish an appropriate species-specific avoidance buffer of sufficient size to prevent disturbance of the nest by project activity. The qualified biologist shall perform at least two hours of pre-construction monitoring of the nest to characterize "typical" bird behavior. The qualified biologist shall monitor the nesting birds and may increase the buffer if the qualified biologist determines the birds are showing signs of unusual or distressed behavior by project activities. Atypical nesting behaviors which may cause reproductive harm include, but are not limited to, defensive flights/vocalizations directed towards project personnel, standing up from a brooding position, and flying away from the nest. The qualified biologist shall have authority to order the cessation of all project activities if the nesting birds exhibit atypical behavior which may cause reproductive failure (nest abandonment and loss of eggs and/or young) until an appropriate buffer is established. To prevent encroachment, the established buffer(s) shall be clearly marked by high visibility material. The established buffer(s) shall remain in effect until the young have fledged or the nest has been abandoned as confirmed by the qualified biologist. Any sign of nest abandonment shall be reported to CDFW within 48 hours.

No construction or earth-moving activity shall occur within any established nest protection buffer prior to September 1 unless it is determined by a qualified ornithologist/biologist that the young have fledged (i.e., left the nest) and have attained sufficient flight skills to avoid project construction zones, or that the nesting cycle is otherwise completed. In the region of the project site, most species complete nesting by mid-July. This date can be significantly earlier or later and would have to be determined by the qualified biologist. At the end of the nesting cycle and fledging from the nest by its occupants, as determined by a qualified biologist, temporary nesting buffers may be removed, and construction may commence in established nesting buffers without further regard for the nest site.

With implementation of Mitigation Measure BIO-3, which requires pre-construction surveys and establishment of buffers around identified nest sites, impacts to nesting birds would be less than significant with mitigation incorporated.

San Joaquin Kit Fox. The San Joaquin kit fox (*Vulpes macrotis mutica*) is a Federal Endangered and State Threatened species. This fox species is extremely rare in the region, but due to the presence of suitable ruderal grassland habitat and prey (e.g., gophers and ground squirrels), this species could forage and/or den in the ruderal grasslands on and near the project site. Therefore, impacts to this species are regarded as potentially significant due to the presence of suitable denning and foraging habitat in the project area. Implementation of Mitigation Measure BIO-4 would reduce impacts to this species to less than significant with mitigation incorporated.

Mitigation Measure BIO-4 **San Joaquin Kit Fox**. To avoid or minimize direct impacts on San Joaquin kit fox, the following measures shall be implemented, based on the HCP/NCCP and the USFWS Standardized Recommendations for Protection of the San Joaquin Kit Fox prior to or during Ground Disturbance:

- Prior to any ground disturbance related to covered activities, a biologist approved by the USFWS/CDFW shall conduct a pre-construction survey in areas identified in the planning surveys as supporting suitable breeding or denning habitat for San Joaquin kit fox. The surveys shall establish the presence or absence of San Joaquin kit foxes and/or suitable dens and evaluate use by kit foxes in accordance with USFWS survey guidelines. Pre-construction surveys shall be conducted within 30 days of ground disturbance. The biologist shall survey the proposed disturbance footprint and a 250-foot radius from the perimeter of the proposed footprint to identify San Joaquin kit foxes and/or suitable dens.

- If San Joaquin kit foxes and/or suitable dens are identified in the survey area, the following measures shall be implemented:

    - If a San Joaquin kit fox den is discovered in the proposed development footprint, the den shall be monitored for three days by a USFWS/CDFW-approved biologist using a tracking medium or an infrared beam camera to determine if the den is currently being used.

    - Unoccupied dens shall be destroyed immediately to prevent subsequent use.

    - If a natal or pupping den is found, USFWS and CDFW shall be notified immediately. The den shall not be destroyed until the pups and adults have vacated and then only after further consultation with USFWS and CDFW.

- If kit fox activity is observed at the den during the initial monitoring period, the den shall be monitored for an additional five consecutive days from the time of the first observation to allow any resident animals to move to another den while den use is actively discouraged. For dens other than natal or pupping dens, use of the den can be discouraged by partially plugging the entrance with soil such that any resident animal can easily escape. Once the USFWS/CDFW-approved biologist has determined the den to be unoccupied, the den may be excavated under the direction of the biologist. Alternatively, if the animal is still present after five or more consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of the biologist, it is temporarily vacant (i.e., during the animal's normal foraging activities).

- If dens are identified in the survey area outside the proposed disturbance footprint, exclusion zones around each den entrance or cluster of entrances shall be demarcated. The configuration of exclusion zones should be circular, with a radius measured outward from the den entrance(s). No covered activities shall occur within the exclusion zones. Exclusion zone radii for potential dens shall be at least 50 feet and shall be demarcated with four to five flagged stakes. Exclusion zone radii for known dens shall be at least 100 feet and shall be demarcated with staking and flagging that encircles each den or cluster of dens but does not prevent access to the den by kit fox.

With implementation of Mitigation Measure BIO-4, which requires pre-construction surveys, monitoring of identified dens, and establishment of exclusion zones around den entrances, impacts to San Joaquin kit fox would be less than significant with mitigation incorporated.

American Badger. The American badger (*Taxidea taxus*) is a California Species of Special Concern. Due to the presence of suitable ruderal grassland habitat and prey (e.g., gophers and ground squirrels), this species could forage and/or den in the ruderal grasslands on and near the project site. Therefore, impacts to this species are regarded as potentially significant due to the presence of suitable denning and foraging habitat in the project area. Implementation of Mitigation Measure BIO-5 would reduce impacts to this species to less than significant with mitigation incorporated.

Mitigation Measure BIO-5 **American Badger.** The following measures shall be implemented to minimize impacts to American badger:

- A CDFW-approved biologist shall conduct a survey of the grassland habitat on and within 300 feet of the site to identify any American badger burrows on the site. The survey shall be conducted no sooner than two weeks prior to the start of construction.

- Impacts to active badger dens shall be avoided by establishing exclusion zones around all active dens, within which construction related activities shall be prohibited until denning is complete or the den is abandoned. The exclusion zone shall be determined by the CDFW-approved biologist in consultation with CDFW.

- The CDFW-approved biologist shall monitor each den once per week in order to track its status and inform the project applicant/contractor of when a den area has been cleared for construction.

- If the biologist determines that the burrow is not being used for breeding, then a one-way door shall be installed on the burrow, upon approval by the CDFW to passively exclude the badger from the burrow. Once the badger has been excluded, the burrow shall be collapsed.

With implementation of Mitigation Measure BIO-5, which requires pre-construction surveys, monitoring of identified dens, and establishment of exclusion zones around den entrances, impacts to American badger would be less than significant with mitigation incorporated.

b. Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less Than Significant Impact. The CDFW tracks the occurrences of natural plant communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. A Manual of California Vegetation, Second Edition,[14] lists vegetation alliances with State rarity rankings of S1 through S3 as considered "highly imperiled," and project impacts to "high-quality occurrences" of these alliances could be considered significant under CEQA. Most types of wetlands, including alkali wetlands, and riparian communities are also considered sensitive natural communities due to their limited distribution in California. No sensitive plant communities were identified on the project site as part of the PSR or during the field surveys. This impact would be less than significant.

[14] Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. *A Manual of California Vegetation*. Second Edition. California Native Plant Society Press, Sacramento.

c. *Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

Less Than Significant Impact. Pursuant to Section 404 of the Clean Water Act (CWA) (33 United States Code [USC] 1344), the United States Army Corps of Engineers (USACE) regulates the discharge of dredged or fill material into waters of the United States, which includes wetlands and "other waters" (e.g., stream channels, rivers) (33 Code of Federal Regulations [CFR] Parts 328 through 330). Similarly, pursuant to Section 401 of the CWA and to the Porter-Cologne Water Quality Control Act, the Regional Water Quality Control Board (RWQCB) regulates impacts to waters of the State. Pursuant to Section 1602 of the California Fish and Game Code, the CDFW regulates activities that divert, obstruct, or alter stream flow, or substantially modify the bed, channel, or bank of a stream, including riparian vegetation.

A formal wetland delineation has not been completed for the project site. The only potentially jurisdictional watercourse identified on the project site is a concrete-lined V-ditch, which although unlikely to be jurisdictional by the USACE, may be considered a water of the State under the jurisdiction of the RWQCB. If the on-site ditch is determined to be jurisdictional by the USACE and/or RWQCB, the project applicant would be required to obtain a regulatory permit from the RWQCB, implement BMPs to control erosion and pay the aquatic resources mitigation fee as required for coverage under the East Contra Costa County Habitat Conservation Plan (ECCCHCP), as specified in Regulatory Compliance Measure BIO-1. Compliance with these regulatory requirements would reduce potential impacts to waters of the State to less than significant.

Regulatory Compliance Measure BIO-1 **Potentially Jurisdictional Watercourse.** Prior to project construction and in accordance with the Clean Water Act, the project applicant shall apply to the Regional Water Quality Control Board (RWQCB) for a Notice of Applicability (NOA) under the General Waste Discharge Requirements for impacts to waters outside of federal jurisdiction. The City of Clayton shall ensure that the project applicant has obtained regulatory approval from RWQCB prior to project construction. If required, the applicant may need to provide mitigation for impacts to the ditch at a minimum 1:1 ratio in accordance with the RWQCB permit.

In addition, the applicant shall pay the aquatic resources mitigation fee, which is included in the fee submitted to the East Contra Costa County Habitat Conservancy (ECCCHC) to obtain coverage under the ECCCHCP, as codified in CMC Chapter 16.55 (Habitat Conservation Plan Implementation).

d. *Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

Less Than Significant Impact. Wildlife corridors are linear and/or regional habitats that provide connectivity to other natural vegetation communities within a landscape fractured by urbanization and other development, while regional wildlife corridors provide foraging, breeding, and retreat areas for migrating, dispersing, immigrating, and emigrating wildlife populations. Local wildlife corridors also provide access routes to food, cover, and water resources within restricted habitats.

The proposed project would not interfere with the movement of native wildlife since the project site is previously developed and has an existing gravel lot and landscaping; is surrounded by urban development to the north, west, and south; and provides only a marginal, local wildlife movement corridor. The ruderal grasslands to the east will remain undisturbed and wildlife will be able to continue use the grasslands and upslope ridgeline as a movement corridor.

The project site contains a gravel lot with landscaping and ruderal grassland vegetation and does not contain any native wildlife nursery sites, such as heron rookeries or bat roosts.

Therefore, the proposed project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. This impact would be less than significant**.**

e. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Less Than Significant Impact. The City of Clayton's Tree Protection Ordinance CMC Chapter 15.70) defines a "protected tree" as any one of the following species: ash, bay, box elder, buckeye, cherry, cottonwood, elderberry, hop tree, madrone, maple, coast live oak, canyon live oak, blue oak, California black oak, valley oak, interior live oak, sycamore, or walnut. The City requires a tree removal permit to remove any protected tree with a single trunk or multiple trunks of a cumulative trunk diameter of 6 inches or greater that is located on private or public property. A total of two, small evergreen trees within the existing slope would be removed as part of the proposed project. Neither of these two trees are "protected trees" as defined by the City. Therefore, the proposed project would not conflict with the City of Clayton's Tree Protection Ordinance. This impact would be less than significant.

f. Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

Less Than Significant Impact. As part of the project entitlements and in accordance with CMC Chapter 16.55 (Habitat Conservation Plan Implementation), a Planning Survey Report (PSR) has been prepared and submitted to the City. The PSR is the application used to apply for project coverage under the ECCCHCP. The proposed project would be in compliance with the ECCCHCP. This impact would be less than significant.

4.5 CULTURAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☐	☒	☐	☐
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c. Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

a. Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

Less Than Significant with Mitigation Incorporated. CEQA defines a "historical resource" as a resource that meets one or more of the following criteria:

- Listed in, or eligible for listing in, the California Register of Historical Resources (California Register);
- Listed in a local register of historical resources as defined in PRC Section 5020.1(k);
- Identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); or
- Determined to be a historical resource by a project's lead agency (PRC Section 21084.1 and *State CEQA Guidelines* Section 15064.5[a]).

The California Register defines a "historical resource" as a resource that meets one or more of the following criteria: (1) associated with events that have made a significant contribution to the broad patterns or local or regional history of the cultural heritage of California or the United States; (2) associated with the lives of persons important to local, California, or national history; (3) embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of a master or possesses high artistic values; or (4) has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation. Under CEQA, historical resources can include precontact (i.e., Native American) archaeological deposits, historic-period archaeological deposits, historic buildings, and historic districts.

A cultural resources study[15] was conducted for the proposed project consisting of background research and a field survey. The results of the study are summarized below.

[15] LSA Associates, Inc. 2024. Cultural Resources Assessment, Oakhurst Townhomes Project City of Clayton, Contra Costa County, California. March.

Records Search Results. On January 31, 2024, the staff of the Northwest Information Center (NWIC) conducted a records search (#23-0992) of the project site and a 0.5-mile radius. The NWIC, an affiliate of the State of California Office of Historic Preservation, is the official State repository of cultural resource records and reports for Contra Costa County. As part of the background research, local and State inventories for cultural resources were also reviewed, and the Native American Heritage Commission (NAHC) was contacted.

Data from the records search conducted at the NWIC indicate there have been 9 previous studies within 0.5 mile of the project site, three of which include portions of the project area (i.e., S-000973, S-002039, and S-022977). Although no resources were documented within the project area, a multicomponent site with both prehistoric and historic period components (07-000105, The Keller Ranch) and two historic period, built environment resources have been identified within 0.5 mile: 07-000922 (the Clayton Home) and 07-000923 (The Clayton Hotel/Pioneer Inn). The latter is listed in the Built Environment Resources Directory (BERD)[16] and has been evaluated as potentially eligible for the National Register of Historic Places/California Register of Historical Resources. The multicomponent site (07-000105) was documented approximately 0.44 miles (710 meters) west of the project area.

Field Survey. On February 27, 2024, a pedestrian field survey of the project site was conducted. Ground visibility was poor (approximately 10 percent) with the surface almost completely obscured by gravel, pavement, landscaping and vegetation. No cultural resources were identified as part of the pedestrian field survey.

Native American Heritage Commission Consultation. On January 18, 2024, LSA sent an email describing the project with maps depicting the study area to the NAHC requesting a review of the Sacred Lands File to determine the potential presence of Native American cultural resources that might be affected by the proposed project. Cody Campagne, NAHC Cultural Resource Analyst, responded via email on February 6, 2024, stating that a search of the Sacred Lands File for the study area had positive results and that there were known Native American cultural resources in the area. The NAHC provided a list of Native American individuals to contact for information regarding the identified resources.

No cultural resources were previously documented within or near the project area or identified by the survey. Due to the paucity of archaeological resources in the vicinity and the disturbed nature of the project area, the potential for in situ subsurface resources is low. Although the cultural resources study did not yield historically significant resources, there is a possibility that the proposed project could impact as-yet-unrecorded, subsurface deposits on the project site. Should archaeological deposits be encountered during project ground disturbance, a substantial adverse change in the significance of a historical resource would occur from its demolition, destruction, relocation, or alteration such that the significance of the resource would be materially impaired (*CEQA Guidelines* Section 15064.5(b)(1)). Implementation of the following mitigation measure would reduce potential impacts to historical resources to less than significant level with mitigation incorporated.

[16] California State Parks Office of Historic Preservation. 2024. Built Environment Resource Directory (BERD) Website: https://ohp.parks.ca.gov/?page_id=30338 (accessed March 7, 2024).

Mitigation Measure CULT-1 **Unanticipated Discovery of Cultural Resources.** Should an archaeological deposit be encountered during project subsurface construction activities, all ground-disturbing activities within 100 feet shall be halted, and the project site manager shall contact a qualified Project Archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archaeology to assess the situation, determine if the deposit qualifies as a historical resource, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. If the Project Archaeologist finds the deposit to be significant (i.e., eligible for listing in the California Register of Historical Resources), the project applicant shall be responsible for funding and implementing appropriate mitigation measures. Based on the scientific and cultural importance of the resource, the Project Archaeologist, contracted by the project applicant, shall define and implement appropriate measures, including recording the archaeological deposit, data recovery and analysis. Upon completion of the actions taken by the Project Archaeologist, the Project Archaeologist shall prepare a report documenting methods, findings, and recommendations; shall submit the report to the City for review; and shall submit the final report to the Northwest Information Center at Sonoma State University. Significant archaeological materials shall be submitted to an appropriate local curation facility and used for future research and public interpretive displays, as appropriate.

With implementation of Mitigation Measure CULT-1, which requires monitoring and work stoppage in the event of an archaeological discovery, potential impacts to archaeological historical resources would be reduced to a less than significant level with mitigation incorporated.

b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Less Than Significant with Mitigation Incorporated. According to *State CEQA Guidelines* Section 15064.5(c)(1), "When a project will impact an archaeological site, a lead agency shall first determine whether the site is an historical resource." Those archaeological sites that do not qualify as historical resources shall be assessed to determine if they qualify as "unique archaeological resources" (California PRC Section 21083.2).

Archaeological deposits identified during project construction would be treated by the City and project applicant—in consultation with a qualified archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archaeology—in accordance with Mitigation Measure CULT-1. With implementation of Mitigation Measure CULT-1, identified above, impacts to archaeological resources would be less than significant with mitigation incorporated.

c. Would the project disturb any human remains, including those interred outside of formal cemeteries?

Less Than Significant Impact. Based on previous archaeological investigation and analysis, there is a low potential for the disturbance of archaeological human remains. However, if human remains are encountered at the project site, State Health and Safety Code Section 7050.5 and *State CEQA Guidelines* Section 15064.5(e)(1) state that no further disturbance shall occur to the area of the find until the County Coroner has made a determination of origin and disposition of the human bone pursuant to PRC Section 5097.98. The County Coroner must be notified of the find immediately and shall make a determination within 2 working days of being notified. If the remains are determined to be Native American, the County Coroner shall notify the NAHC by phone within 24 hours, and the NAHC shall then immediately determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection and make recommendations or preferences for treatment of the remains within 48 hours of being granted access to the site. MLD recommendations may include scientific removal and nondestructive analysis of human remains and items associated with Native American burials, preservation of Native American human remains and associated items in place, relinquishment of Native American human remains and associated items to the descendants for treatment, or any other culturally appropriate treatment.

Compliance with Section 7050.5 of the California Health and Safety Code and PRC Section 5097.98 regarding the treatment of human remains would ensure that potential impacts to human remains would be less than significant.

4.6 ENERGY

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation?	☐	☐	☒	☐
b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

a. Would the project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation?

Less Than Significant Impact. The proposed project would result in a small increase in the demand for electricity and gasoline. The discussion and analysis provided below is based on data included in the California Emission Estimator Model (CalEEMod) output, which is included in Appendix A.

Construction-Period Energy Use. The proposed project would require site preparation, grading, building construction, paving, and architectural coating activities during construction. Construction of the proposed project would require energy for the manufacture and transportation of construction materials, preparation of the site for grading activities, and construction of the proposed development's improvements. Petroleum fuels (e.g., diesel and gasoline) would be the primary sources of energy for these activities. In order to increase energy efficiency on the site during project construction, the idling times for construction vehicles would be restricted to 5 minutes or less and construction workers would be required to shut off idle equipment, as required by Mitigation Measure AIR-1, as identified in Section 4.3, Air Quality. In addition, construction activities are not anticipated to result in an inefficient use of energy as gasoline and diesel fuel would be supplied by construction contractors who would conserve the use of their supplies to minimize their costs on the project. Energy usage on the project site during construction would be temporary in nature and would be relatively small in comparison to the State's available energy sources. No unusual project characteristics would necessitate the use of construction equipment that would be less energy efficient than at comparable construction sites in the region or the State. Therefore, construction energy impacts would be less than significant.

Operational Energy Use. Operational energy usage is typically associated with natural gas use, electricity consumption, and fuel used for vehicle trips. As identified in the Chapter 2.0, Project Description, the proposed project would be all-electric; therefore, the proposed project would not result in natural gas consumption. Electricity consumption was estimated for the project using default energy intensities by land use type in CalEEMod and is shown in Table 4.6.A.

In addition, the proposed project would result in energy usage associated with gasoline to fuel project-related trips. Based on the CalEEMod analysis, the proposed project would result in approximately 480,065 vehicle miles traveled (VMT) per year. The average fuel economy for light-duty vehicles (autos, pickups, vans, and sport utility vehicles [SUVs]) in the United States has steadily increased from about 14.9 miles per gallon (mpg) in 1980 to 22.9 mpg in 2021.[17] The average fuel economy for heavy-duty trucks in the United States has also steadily increased, from 5.7 mpg in 2013 to a projected 8.0 mpg in 2021.[18] Therefore, using the United States Environmental Protection Agency (USEPA) fuel economy estimates for 2021, the proposed project would result in the consumption of approximately 17,199 gallons of gasoline per year and 10,760 gallons of diesel fuel per year.

Table 4.6.A shows the estimated potential increased energy usage associated with the proposed project.

Table 4.6.A: Estimated Annual Energy Use of Proposed Project

Electricity Use (kWh per year)	Gasoline (gallons per year)	Diesel (gallons per year)
151,130	17,199	10,760

Source: LSA (January 2024).
kWh = kilowatt-hours

As shown in Table 4.6.A, the estimated potential increased electricity demand associated with the proposed project is 151,130 kilowatt-hours (kWh) per year. In 2022, California consumed approximately 287,826 gigawatt-hours (GWh) or 287,826,110,475 kWh.[19] Of this total, Contra Costa County consumed 8,338 GWh or 8,337,835,566 kWh.[20] Therefore, electricity demand associated with the proposed project would be less than 0.1 percent of Contra Costa County's total electricity demand.

In addition, the proposed project would result in energy usage associated with gasoline and diesel to fuel project-related trips. As shown above in Table 4.6.A, vehicle trips associated with the proposed project would consume approximately 17,199 gallons of gasoline per year and 10,760 gallons of diesel fuel per year. Based on fuel consumption obtained from CARB's EMission FACtor model EMFAC2021, approximately 365.0 million gallons of gasoline and approximately 62.1 million gallons of diesel fuel will be consumed from vehicle trips in Contra Costa County in 2024. Therefore, fuel demand generated by vehicle trips associated with the proposed project would increase the annual fuel use in Contra Costa County by less than 0.1 percent for gasoline fuel usage and by less than 0.1 percent for diesel fuel usage. Therefore, the proposed project would result in fuel usage that is a minimal fraction of current annual fuel consumption in Contra Costa County. Fuel consumption

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17 U.S. Department of Transportation (USDOT). 2017. "Table 4-23: Average Fuel Efficiency of U.S. Light Duty Vehicles." https://www.bts.gov/content/average-fuel-efficiency-us-light-duty-vehicles (accessed January 2024).

18 California Energy Commission (CEC). 2015. Medium and Heavy-Duty Truck Prices and Fuel Economy 2013–2026. Website: efiling.energy.ca.gov/getdocument.aspx?tn=206180 (accessed January 2024)

19 California Energy Commission (CEC). 2023. Energy Consumption Data Management Service. Electricity Consumption by County. Website: www.ecdms.energy.ca.gov/elecbycounty.aspx (accessed January 2024).

20 Ibid.

associated with vehicle trips generated by project operations would not be considered inefficient, wasteful, or unnecessary in comparison to other similar developments in the region.

In addition, proposed new development would be constructed using energy efficient modern building materials and construction practices, and the proposed project also would use new modern appliances and equipment, in accordance with the Appliance Efficiency Regulations (Title 20, California Code of Regulations [CCR] Sections 1601 through 1608). The expected energy consumption during construction and operation of the proposed project would be consistent with typical usage rates for residential uses.

Pacific Gas & Electric Company (PG&E) is the private utility that would supply the proposed project's electricity. In 2022, approximately 40 percent of PG&E's delivered electricity came from renewable sources, including solar, wind, geothermal, small hydroelectric and various forms of bioenergy.[21] PG&E reached California's 2020 renewable energy goal in 2017, and is positioned to meet the State's 60 percent by 2030 renewable energy mandate set forth in Senate Bill (SB) 100. In addition, PG&E plans to continue to provide reliable service to their customers and upgrade their distribution systems as necessary to meet future demand.

Therefore, the proposed project would not result in the wasteful, inefficient, or unnecessary consumption of fuel or energy and would incorporate renewable energy or energy efficiency measures into building design, equipment use, and transportation. Construction and operation period impacts related to consumption of energy resources would be less than significant.

b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Less Than Significant Impact. In 2002, the State Legislature passed SB 1389, which required the California Energy Commission (CEC) to develop an integrated energy plan every 2 years for electricity, natural gas, and transportation fuels for the California Energy Policy Report. The plan calls for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators in implementing incentive programs for zero emission vehicles and their infrastructure needs, and encouragement of urban designs that reduce VMT and accommodate pedestrian and bicycle access.

The most recently adopted CEC energy report is the 2023 Integrated Energy Policy Report. The 2023 Integrated Energy Policy Report provides the results of the CEC's assessments of a variety of energy issues facing California. Many of these issues will require action if the State is to meet its climate, energy, air quality, and other environmental goals while maintaining energy reliability and controlling costs. The 2023 Integrated Energy Policy Report covers a broad range of topics, including implementation of SB 350 (Clean Energy and Pollution Reduction Act of 2015), integrated resource planning, distributed energy resources, transportation electrification, solutions to increase resiliency

[21] PG&E. 2023. *Exploring Clean Energy Solutions*. Website: https://www.pge.com/en/about/corporate-responsibility-and-sustainability/taking-responsibility/clean-energy-solutions.html (accessed January 2024).

in the electricity sector, energy efficiency barriers faced by disadvantaged communities, demand response, transmission and landscape-scale planning, the California Energy Demand Preliminary Forecast, the preliminary transportation energy demand forecast, renewable gas (in response to SB 1383), updates on Southern California electricity reliability, natural gas outlook, and climate adaptation and resiliency.

As indicated above, energy usage on the project site during construction would be temporary in nature. In addition, energy usage associated with operation of the proposed project would be relatively small in comparison to the State's available energy sources, and energy impacts would be negligible at the regional level. Because California's energy conservation planning actions are conducted at a regional level and because the project's total impact to regional energy supplies would be minor, the proposed project would not conflict with California's energy conservation plans as described in the CEC 2023 Integrated Energy Policy Report. Therefore, the proposed project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency, and this impact would be less than significant.

4.7 GEOLOGY AND SOILS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Directly or indirectly cause 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? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii. Strong seismic ground shaking?	☐	☐	☒	☐
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv. Landslides?	☐	☐	☒	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☒	☐
e. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

Unless noted otherwise, the following analysis is based on the site-specific geotechnical report prepared by Alan Kropp & Associates, Inc., dated July 8, 2021[22] and an update to the geotechnical report, dated August 2, 2022.[23] Both of these geotechnical reports are included in Appendix D.

a. Would the project directly or indirectly cause 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? Refer to Division of Mines and Geology Special Publication 42.

Less Than Significant Impact. The San Francisco Bay Area is one of the most seismically active regions in the United States. The significant earthquakes that occur in the Bay Area are generally

22 Alan Kropp & Associates, Inc., Geotechnical Consultants. 2021. Geotechnical Investigation, Oakhurst Townhome Development, Clayton, California. July 8.

23 Alan Kropp & Associates, Inc., Geotechnical Consultants. 2022. Update of Geotechnical Investigation, Oakhurst Townhome Development, Clayton, California. August 2.

associated with crustal movement along well-defined active fault zones of the San Andreas Fault system, which regionally trend in a northwesterly direction. Fault rupture is generally expected to occur along active fault traces that have exhibited signs of recent geological movement (i.e., within the last 11,000 years).

The State of California enacted the Alquist-Priolo Earthquake Fault Zoning Act in 1972, requiring the State Geologist to delineate Earthquake Fault Zones (EFZs) along known active faults that have high potential for fault rupture. Active faults are defined as a fault that has surface displacement within the last 11,000 years.[24] Alquist-Priolo EFZs delineate areas around active faults with potential surface fault rupture hazards that would require specific geological investigations prior to approval of certain kinds of development within the delineated area. State regulations prohibit habitable structures from being sited within 50 feet of an active fault.

According to the California Earthquake Hazards Zone Application ("EQ Zapp"),[25] the Concord Fault is the nearest Alquist-Priolo Fault Zone; it is located 4 miles away from the project site. Based on the distance from the project site, rupture of the Concord Fault through the site is not anticipated, and the proposed project would not directly or indirectly cause substantial adverse effects related to fault rupture.

Additionally, the project site is located in the general proximity of the Clayton Fault which is not an Alquist-Priolo Zoned fault but is considered by some researchers as potentially active. The nearest identified fault trace is located more than 250 feet from the project site. Given the distance from the proposed improvement area, the geotechnical report concludes that the possibility of a fault rupture directly below the project site is low. Therefore, proposed project would not directly or indirectly cause substantial adverse effects related to fault rupture, and impacts would be less than significant.

ii. Strong seismic ground shaking?

Less Than Significant Impact. Due to the location of the project site in a seismically active area, strong seismic ground shaking at the site is highly probable during the life of the project. The intensity of ground shaking would depend on the characteristics of the fault, distance from the fault, the earthquake magnitude and duration, and site-specific geologic conditions. The geotechnical report completed for the proposed project includes design recommendations to manage potential concerns associated with strong seismic shaking including, but not limited to removal of existing undocumented fills on the project site, compaction of site soils, construction of cut and fill slopes no steeper than 2:1 (horizontal:vertical), incorporation of keyways, benching and subdrains in fill slopes, utilization of post-tensioned (PT) mat foundation on prepared native soil or engineered fill, and construction of retaining walls on spread footings. The geotechnical report is included in Appendix D.

24 California Department of Conservation (DOC). n.d.-a. Alquist-Priolo Earthquake Fault Zones. Website: www.conservation.ca.gov/cgs/alquist-priolo (accessed December 27, 2023).

25 California Department of Conservation (DOC). n.d.-b. *California Earthquake Hazards Zone Application ("EQ Zapp").* Website: https://maps.conservation.ca.gov/cgs/EQZApp/app/ (accessed December27, 2023).

An earthquake of moderate to high magnitude generated within the San Francisco Bay Region could cause considerable ground shaking at the site, similar to that which has occurred in the past in the area. To mitigate the shaking effects, structures would be designed using sound engineering judgment and the latest California Building Code (CBC) requirements in effect at the time of building permit application. Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead and live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the comparable forces that would be associated with a major earthquake. Therefore, structures would be able to: (1) resist minor earthquakes without damage; (2) resist moderate earthquakes without structural damage but with some nonstructural damage; and (3) resist major earthquakes without collapse but with some structural as well as nonstructural damage.

Compliance with CBC is a requirement for issuance of building permits for a project and a standard condition of City entitlements. Proper engineering design and construction in conformance with CBC standards and project-specific geotechnical recommendations, as outlined in Regulatory Compliance Measure GEO-1, would ensure that potential impacts associated with strong seismic ground shaking would be reduced to a less than significant level.

Regulatory Compliance Measure GEO-1 Compliance with applicable California Building Code and project-specific geotechnical recommendations. Prior to the approval of grading and/or building permits, the project applicant shall provide evidence to the City of Clayton Building Official for review and approval that on-site structures, features, and facilities have been designed and will be constructed in conformance with applicable provisions of the California Building Code in effect at the time of City review and the recommendations cited in the project-specific geotechnical report.

iii. Seismic-related ground failure, including liquefaction?

Less Than Significant Impact. Liquefaction is the transformation of loose, fine-grained sediment to a fluid-like state similar to quicksand. This phenomenon occurs due to strong seismic activity and lessens the soil's ability to support a structural foundation. The primary factors affecting the possibility of liquefaction in soil are: (1) intensity and duration of earthquake shaking; (2) soil type and relative density; (3) overburden pressures; and (4) depth to groundwater. Soil most susceptible to liquefaction is clean, loose, fine-grained sands and non-plastic silts that are saturated.

The project site is underlain by shallow bedrock, and the immediate upslope area consists of a drained, engineered buttress fill. Therefore, the geotechnical report concluded that liquefaction-induced settlements would be minimal. As such, the proposed project would not result in seismic-related ground failure, including liquefaction. This impact would be less than significant.

iv. Landslides?

Less Than Significant Impact. A landslide generally occurs on relatively steep slopes and/or on slopes underlain by weak materials. Elevations on the project site range from 560 feet above mean sea level at the northwestern portion of the site to 510 feet above mean sea level at the southwestern corner. The ground surface on the project site gradually slopes down to the southwest.

As described in the geotechnical report, the project site is encompassed within a large, mapped landslide feature, extending from the toe of the rear-yard slopes of the houses along the west (downhill) side of Clayton Road almost up to the back of the residential units in the Peacock Creek Subdivision located uphill. Mass grading associated with construction of the Peacock Creek Subdivision involved making a large cut into the toe of the slope to create the project site (park-and-drive lot) and the slope east of the project site was rebuilt as a buttress fill slope.

The landslide deposits that previously underlaid the project site have been largely (if not totally) removed by subdivision mass grading, and the remaining slide debris, located upslope, has been extensively regraded. Therefore, the geotechnical report concluded that with the incorporation of the identified site-specific design and construction recommendations, the potential for significant damage from earthquake-induced landslides would be relatively low and commensurate with generally accepted risk tolerance for hillside residential projects.

Given the relatively high and steep slope that would be located along the eastern side of the site, the planned retaining wall at the toe of slope along the eastern side of the site improvement area should be designed for moderately high earth pressures (including a temporary seismic increment of earth pressure for walls in excess of 6 feet high). It is also recommended that proposed townhome building structures maintain a minimum 10-foot setback from the face of the wall.

For the reasons described above, the proposed project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides. In addition, compliance with geotechnical recommendations and the CBC during design and construction, as specified in Regulatory Compliance Measure GEO-1, would ensure that the potential impacts associated with landslides would be less than significant.

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

Less Than Significant Impact. Topsoil is defined as the upper part of the soil profile that is relatively rich in humus and is technically known as the A-horizon of the soil profile.[26] The potential for soil erosion exists during the period of earthwork activities and between the time when earthwork is completed, and new vegetation is established or hardscape is installed. Exposed soils could be entrained in stormwater runoff and transported off the project site. As part of construction activities, a total of 1.61 acres of soil would be disturbed during site grading. Due to the fact that the proposed project would involve over 1 acre of land disturbance, the project developer would be

26 California State Mining and Geology Board. 2014. Surface Mining Reclamation Act Regulations. California Code of Regulations, Title 14, Division 2, Chapter 8, Subchapter 1.

required to comply with the Construction General Permit,[27] which requires the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) prior to any ground disturbance activities. Although designed primarily to protect stormwater quality, the SWPPP would provide the details of the erosion control measures to be applied on the project site during the construction period, including Best Management Practices (BMPs) for erosion control that are recognized by the Regional Water Quality Control Board (RWQCB). Compliance with the requirements of the Construction General Permit would ensure that the proposed project would result in less than significant impacts related to soil erosion or the loss of topsoil.

c. Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Less Than Significant Impact. As discussed above in Section 4.7.a, the site would not likely be subject to substantial adverse effects as a result of landslides or liquefaction.

Lateral spreading typically occurs as a form of horizontal displacement of relatively flat-lying alluvial material toward an open or “free” face such as an open body of water, channel, or excavation. In soils, this movement is generally due to failure along a weak plane and may often be associated with liquefaction. As cracks develop within the weakened material, blocks of soil displace laterally towards the open face. Cracking and lateral movement may gradually propagate away from the face as blocks continue to break free. Generally, failure in this mode is analytically unpredictable since it is difficult to evaluate where the first tension crack will occur.

The proposed project would be designed and constructed in accordance with standard engineering practices and the CBC and would implement recommendations outlined in the geotechnical report, as specified in Regulatory Compliance Measure GEO-1. As such, the proposed project would not result in a geologic hazard from landslide, lateral spreading, subsidence, liquefaction or collapse. This impact would be less than significant.

d. Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

Less Than Significant Impact. Expansive soils are characterized by the potential for shrinking and swelling as the moisture content of the soil decreases and increases, respectively. Expansive soil can change in volume with changes in moisture. It can shrink or swell and cause heaving and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations. Building damage due to volume changes associated with expansive soil can be reduced by: (1) deepening conventional shallow footings to below the zone of significant seasonal moisture fluctuation; (2) using a rigid mat

[27] State Water Resources Control Board (SWRCB). 2022. National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (CGP), Order No. 2022-0057-DWQ, NPDES No. CAS000002. Website: https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2022/wqo_2022-0057-dwq.pdf (accessed December 27, 2023).

foundation that is designed to resist the settlement and heave of expansive soil; or (3) blanketing the footprint of the building pad with non-expansive soil.

The near-surface fill soil, as well as the bedrock from which it was generated, was found to be moderately to highly expansive, with the potential for shrink/swell behavior with changes in moisture content. In order to account for the expansive soil conditions and the potential for transition from areas of shallow bedrock to areas of fill across the site, the geotechnical report recommends that the new townhome buildings be supported on relatively stiff mat slab foundations. The mat slab should be supported on a minimum of 6 inches of imported, compacted, non-expansive fill. In addition, imported fill material used at the site should be a non-expansive material. The purpose of these recommendations is to reduce the swell potential of the clay by compacting the soil at a high moisture content and controlling the amount of compaction. As described above in Regulatory Compliance Measure GEO-1, the proposed project would be required to comply with the CBC and the geotechnical recommendations identified in the site-specific geotechnical report. Compliance with geotechnical recommendations and the CBC during design and construction would ensure that the potential impacts associated with expansive soils would be less than significant.

e. Would the project 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. Implementation of the project would not include installation of septic tanks or alternative wastewater disposal systems. Therefore, there would be no impact to soils and wastewater disposal.

f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less Than Significant with Mitigation Incorporated. Although no paleontological resources or unique geological features are known to exist within or near the project site, the proposed project would require ground disturbance below ground surface. Therefore, the possibility of accidental discovery of paleontological resources during project construction cannot be discounted. Implementation of Mitigation Measure GEO-1, described below, would reduce potential impacts to paleontological resources to a less than significant level.

Mitigation Measure GEO-1 Should paleontological resources be encountered during project subsurface construction activities, the area shall be flagged off, all ground-disturbing activities within 25 feet of the resource shall be stopped, and work shall be redirected away from the resource. A qualified paleontologist who is contracted by the project site manager or applicant shall immediately be contacted to assess the resource and consult with agencies as appropriate to determine if the resource should be collected. For purposes of this mitigation, a “qualified paleontologist” shall be an individual with the following qualifications: (1) a graduate degree in paleontology or geology and/or a person with a demonstrated publication record in peer-reviewed paleontological journals; (2) at least 2 years of professional experience related to paleontology; (3) proficiency in recognizing fossils in the field and determining their significance; (4) expertise in local geology, stratigraphy, and biostratigraphy; and (5) experience collecting vertebrate fossils in the field.

Significant paleontological resources are those that have adequate condition of preservation and contain diagnostic elements that will make the fossil identifiable. If the paleontological resources are found to be significant and project activities cannot avoid them, the applicant and the applicant's contractors shall comply with measures to ensure that the project does not cause a substantial adverse change in the significance of the paleontological resource. The qualified paleontologist shall implement the following measures to protect the resource: construction monitoring, recording the fossil locality, data recovery and analysis, a final report, and accessioning the fossil material and technical report to a paleontological repository. Upon completion of the assessment, a report documenting methods, findings, and recommendations shall be prepared by the qualified paleontologist and submitted to the City of Clayton for review. If paleontological materials are recovered, the qualified paleontologist shall also submit this report to a paleontological repository such as the University of California Museum of Paleontology, along with significant paleontological materials.

Implementation of Mitigation Measure GEO-1 would reduce the level of the potential impact through the identification of paleontological resources during construction; the evaluation of unanticipated discoveries; and the recovery of significant paleontological data from those resources that warrant such investigation. This process would recover scientifically consequential information from at-risk resources to offset their potential loss. Therefore, with implementation of Mitigation Measure GEO-1, this impact would be less than significant with mitigation incorporated.

4.8 GREENHOUSE GAS EMISSIONS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Greenhouse gases (GHGs) are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced global climate change are:

- Carbon dioxide (CO_2);
- Methane (CH_4);
- Nitrous oxide (N_2O);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Sulfur Hexafluoride (SF_6).

Over the last 200 years, humans have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere and enhancing the natural greenhouse effect, believed to be causing global warming. While humanmade GHGs include naturally occurring GHGs such as CO_2, methane, and N_2O, some gases, like HFCs, PFCs, and SF_6 are completely new to the atmosphere.

Certain gases, such as water vapor, are short-lived in the atmosphere. Others remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is excluded from the list of GHGs above because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

These gases vary considerably in terms of Global Warming Potential (GWP), a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere (“atmospheric lifetime”). The GWP of each gas is measured relative to CO_2, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of pounds or tons of “CO_2 equivalents” (CO_2e).

a. Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less Than Significant Impact. The Air District's 2022 CEQA Guidelines identify applicable GHG significance thresholds. The Air District recommends these thresholds of significance for use in determining whether a proposed project will have a significant impact related to climate change. These thresholds evaluate a project based on its effect on California's efforts to meet the State's long-term climate goals. Applying this approach, the Air District identifies and provides supporting documentation, outlining the requirements for new land use development projects necessary to achieve California's long-term climate goal of carbon neutrality by 2045. Based on their analysis, the Air District found that new land use development projects need to incorporate design elements to do their "fair share" to implement the goal of carbon neutrality by 2045. If a project is designed and built to incorporate the identified design elements, then it will contribute its portion of what is necessary to achieve California's long-term climate goals—its "fair share"—and an agency reviewing the project under CEQA can conclude that the project will not make a cumulatively considerable contribution to global climate change. The document concludes that if a project does not incorporate these design elements, then it should be found to make a significant climate impact because it will hinder California's efforts to address climate change.

According to the Air District, a project would have a less than significant impact related to GHG emissions if it would:

a. Include, at a minimum, the following project design elements:

    1. Buildings

        a. The project will not include natural gas appliances or natural gas plumbing (in both residential and nonresidential development).

        b. The project will not result in any wasteful, inefficient, or unnecessary electrical usage as determined by the analysis required under CEQA Section 21100(b)(3) and Section 15126.2(b) of the State CEQA Guidelines.

    2. Transportation

        a. Achieve a reduction in project-generated vehicle miles traveled (VMT) below the regional average consistent with the current version of the California Climate Change Scoping Plan (currently 15 percent) or meet a locally adopted Senate Bill (SB) 743 VMT target, reflecting the recommendations provided in the Governor's Office of Planning and Research's Technical Advisory on Evaluating Transportation Impacts in CEQA:

            1. Residential projects: 15 percent below the existing VMT per capita

            2. Office projects: 15 percent below the existing VMT per employee

            3. Retail projects: no net increase in existing VMT

   b. Achieve compliance with off-street electric vehicle requirements in the most recently adopted version of CALGreen Tier 2.

b. Or be consistent with a local GHG reduction strategy that meets the criteria under State CEQA Guidelines Section 15183.5(b).

The City of Clayton does not have an adopted Climate Action Plan. Therefore, this section evaluates the proposed project's consistency with the Air District's project design element thresholds.

Natural Gas Usage. According to the Air District, a less than significant GHG impact would occur if the project does not include natural gas appliances or natural gas plumbing. The proposed project would not include the use of natural gas appliances or plumbing. Therefore, the proposed project would be consistent with this design element.

Energy Usage. According to the Air District, a less than significant GHG impact would occur if the project does not result in any wasteful, inefficient, or unnecessary energy usage as determined by the analysis required under Section 21100(b)(3) and Section 15126.2(b) of the *State CEQA Guidelines*. Energy use consumed by the proposed project would be associated with electricity consumption and fuel used for vehicle trips associated with the project. Energy consumption was estimated for the project using default energy intensities by land use type in the California Emissions Estimator Model (CalEEMod) output, which is included in Appendix A.

As discussed in Section 4.6, Energy, the estimated potential increased electricity demand associated with the proposed project is 151,130 kilowatt-hours (kWh) per year. In 2022, Contra Costa County consumed 8,338 gigawatt-hours (GWh) or 8,337,835,566 kWh. Therefore, electricity demand associated with the proposed project would be less than 0.1 percent of Contra Costa County's total electricity demand.

In addition, the proposed project would result in energy usage associated with gasoline and diesel to fuel project-related trips. As discussed in Section 4.6, Energy, vehicle trips associated with the proposed project would consume approximately 17,199 gallons of gasoline per year and 10,760 gallons of diesel fuel per year. Based on fuel consumption obtained from EMFAC2021, approximately 365.0 million gallons of gasoline and approximately 62.1 million gallons of diesel fuel will be consumed from vehicle trips in Contra Costa County in 2024. Therefore, fuel demand generated by vehicle trips associated with the proposed project would increase the annual fuel use in Contra Costa County by less than 0.1 percent for gasoline fuel usage and by less than 0.1 percent for diesel fuel usage. Therefore, the proposed project would result in fuel usage that is a minimal fraction of current annual fuel consumption in Contra Costa County.

As such, based on this analysis, as required under CEQA Section 21100(b)(3) and Section 15126.2(b) of the *State CEQA Guidelines*, the proposed project would not result in the wasteful, inefficient, or unnecessary consumption of fuel or energy and would incorporate renewable energy and energy efficiency measures into the building design, equipment use, and transportation. As such, the proposed project would be consistent with this design element.

Vehicle Miles Traveled. To meet the Air District's VMT threshold, the project must achieve a reduction in project-generated VMT below the regional average consistent with the current version of the California Climate Change Scoping Plan or meet a locally adopted Senate Bill (SB) 743 VMT target, reflecting the recommendations provided in the Governor's Office of Planning and Research's 2018 *Technical Advisory on Evaluating Transportation Impacts in CEQA*. As discussed in Section 4.17, Transportation, the proposed project would have a less than significant VMT impact. As such, the proposed project would be consistent with this design element.

Electric Vehicle Requirements. This criterion requires that the project achieve compliance with off-street electric vehicle requirements in the most recently adopted version of the California Green Building Standards Code (CALGreen Code) Tier 2 measures. The Tier 2 standard for this type of project is to have a dedicated 208/240-volt branch circuit with an overcurrent protective device of 40 amps minimum. This standard is the same as the Tier 1 standard, with which the project is required to comply. As such, the proposed project would be consistent with this design element.

The proposed project would be consistent with the Air District's project design elements related to natural gas, energy, and VMT. Therefore, the proposed project would be consistent with the Air District's GHG emission thresholds. As such, the proposed project would not generate significant GHG emissions that would have a significant effect on the environment, and this impact would be less than significant.

b. Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less Than Significant Impact. The City of Clayton has not adopted a Climate Action Plan; therefore, the proposed project was analyzed for consistency with the goals of the Scoping Plan, Executive Order (EO) B-30-15, Senate Bill (SB) 32, and Assembly Bill (AB) 197.

EO B-30-15 added the immediate target of reducing GHG emissions to 40 percent below 1990 levels by 2030. SB 32 affirms the importance of addressing climate change by codifying into statute the GHG emissions reductions target of at least 40 percent below 1990 levels by 2030 contained in EO B-30-15. The California Air Resources Board (CARB) released the 2017 Scoping Plan,[28] to reflect the 2030 target set by EO B-30-15 and codified by SB 32. SB 32 builds on AB 32 and keeps us on the path toward achieving the State's 2050 objective of reducing emissions to 80 percent below 1990 levels. The companion bill to SB 32, AB 197, provides additional direction to the CARB related to the adoption of strategies to reduce GHG emissions. Additional direction in AB 197 intended to provide easier public access to air emissions data that are collected by CARB was posted in December 2016.

The 2022 Scoping Plan[29] assesses progress toward the statutory 2030 target, while laying out a path to achieving carbon neutrality no later than 2045. The 2022 Scoping Plan Update focuses on outcomes needed to achieve carbon neutrality by assessing paths for clean technology, energy deployment, natural and working lands, and others, and is designed to meet the State's long-term

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[28] California Air Resources Board (CARB). 2017. *California's 2017 Climate Change Scoping Plan*. November.

[29] CARB. 2022. *2022 Scoping Plan for Achieving Carbon Neutrality.* December.

climate objectives and support a range of economic, environmental, energy security, environmental justice, and public health priorities.

The 2022 Scoping Plan focuses on building clean energy production and distribution infrastructure for a carbon-neutral future, including transitioning existing energy production and transmission infrastructure to produce zero-carbon electricity and hydrogen, and utilizing biogas resulting from wildfire management or landfill and dairy operations, among other substitutes. The 2022 Scoping Plan states that in almost all sectors, electrification will play an important role. The 2022 Scoping Plan evaluates clean energy and technology options and the transition away from fossil fuels, including adding four times the solar and wind capacity by 2045 and about 1,700 times the amount of current hydrogen supply. As discussed in the 2022 Scoping Plan, EO N-79-20 requires all new passenger vehicles sold in California will be zero-emission by 2035, and all other fleets will have transitioned to zero-emission as fully possible by 2045, which will reduce the percentage of fossil fuel combustion vehicles.

Energy efficient measures are intended to maximize energy efficiency building and appliance standards, pursue additional efficiency efforts including new technologies and new policy and implementation mechanisms, and pursue comparable investment in energy efficiency from all retail providers of electricity in California. In addition, these measures are designed to expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings. The proposed project would be required to comply with the CALGreen Code, regarding energy conservation and green building standards. In addition, the elimination of natural gas in new development would help projects implement their "fair share" of GHG emission reductions necessary to achieve carbon neutrality by 2045, consistent with State goals. As such, if a project does utilize natural gas, a lead agency can conclude that it would not be consistent with achieving the 2045 neutrality goal and will have a cumulative considerable impact on climate change. As discussed in Chapter 2.0, Project Description, the proposed project would not include natural gas appliances or plumbing. Therefore, the proposed project would contribute to its "fair share" of GHG emission reductions necessary to support achieving the State goals of long-term GHG emission reductions and carbon neutrality by 2045.

Water conservation and efficiency measures are intended to continue efficiency programs and use cleaner energy sources to move and treat water. Increasing the efficiency of water transport and reducing water use would reduce GHG emissions. As identified above, the proposed project would be required to comply with the latest CALGreen Code standards, which include a variety of different measures, including reduction of wastewater and water use. In addition, the proposed project would be required to comply with the California Model Water Efficient Landscape Ordinance, locally codified in Chapter 17.80 (Landscape Water Conservation Standards) of the Clayton Municipal Code. Therefore, the proposed project would not conflict with any of the water conservation and efficiency measures.

The goal of transportation and motor vehicle measures is to increase zero emission vehicles and decrease VMT. As described above, the proposed project is not expected to result in a significant increase in the generation of vehicle trips or VMT. In addition, the project site is located within 0.5-mile walking or bicycling distance from the surrounding residential areas, Oakhurst Country Club, Clayton Town Center's businesses and public park (The Grove) and the George Cardinet Trail; and with a bus stop located at the project's Clayton Road frontage, the project would support the ability of visitors to use alternative modes of transportation such as public transit. As such, the proposed project would not conflict with the transportation and motor vehicle measures.

As demonstrated above, the proposed project would comply with existing State regulations adopted to achieve the overall GHG emissions reduction goals identified in EO B-30-15, SB 32, and AB 197 and would be consistent with applicable plans and programs designed to reduce GHG emissions. Therefore, the proposed project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs. This impact would be less than significant.

4.9 HAZARDS AND HAZARDOUS MATERIALS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☒	☐

a. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less Than Significant Impact. Operation of the project would result in less than significant impacts related to the routine transport, use, storage or disposal of hazardous materials, as the proposed residential land uses would involve only small quantities of commercially available hazardous materials for routine maintenance (e.g., paint and cleaning supplies).

Construction of the proposed project would involve the use and transport of hazardous materials. These materials could include fuels, oils, paints, and other chemicals used during construction activities. Handling and transportation of hazardous materials could result in accidental releases or spills and associated health risks to workers, the public, and environment. Transport and use of hazardous materials would be subject to all applicable State and federal laws, such as Hazardous Materials Transportation Act, the Resource Conservation and Recovery Act, the California Hazardous Materials Management Act, California Health and Safety Code, and California Code of Regulations Title 8 and Title 22. Therefore, development of the proposed project would have a less than significant impact on the public and the environment related to the routine transport, use, and handling of hazardous materials.

b. Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less Than Significant Impact. As described above, small quantities of common hazardous materials would be used at the project site during construction and operation of the proposed project. Improper use, storage, or handling could result in a release of hazardous materials into the environment which could pose a risk to construction workers and the public. However, the applicant would be required to comply with existing government regulations in its use and disposal of these materials, and such materials would not be used in sufficient strength or quantity to create a substantial risk to human or environmental health. Because the project site is currently undeveloped, demolition would not be required as part of the proposed project and there is no risk of the release of hazardous building materials (e.g., lead paint, asbestos, fluorescent lights).

The project site primarily consists of vacant land with some gravel paving and landscaping but no existing structures, and the site is primarily surrounded by residential and private recreational uses. Therefore, it is unlikely the soil and groundwater are contaminated with toxic or hazardous materials of significant quantity or type that would be released during construction. Additionally, compliance with the regulations described previously in Section 4.9.a would ensure that the proposed project would not create a significant hazard to the public or the environment through accidental conditions involving the release of hazardous materials into the environment during transport, use, or disposal of hazardous materials by ensuring that these materials are properly handled during construction of the proposed project. Therefore, this impact would be less than significant.

c. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

No Impact. The nearest existing or proposed school facilities are Diablo View Middle School, which is located approximately 0.63 mile south and Mount Diablo Elementary School, which is located approximately 0.74 mile northwest of the project site. Because this distance is greater than 0.25 mile, the proposed project would not emit hazardous emissions or handle hazardous materials within 0.25 mile of an existing or proposed school; therefore, no impact would occur.

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

Less Than Significant Impact. The project site is not included on any list of hazardous materials site compiled pursuant to Government Code Section 65962.5.[30] The project site and a 1-mile radius

[30] California Environmental Protection Agency (CalEPA). 2020. Cortese List Data Resources. Website: calepa.ca.gov/sitecleanup/corteselist/ (accessed September 15, 2022).

encompassing the project site were evaluated via the State Water Resources Control Board (SWRCB) GeoTracker database,[31] the Department of Toxic Substances Control (DTSC) EnviroStor database,[32] and the Hazardous Waste and Substances Sites (Cortese) List[33] for the purposes of identifying recognized environmental conditions or historical recognized environmental conditions. Three properties with historically recognized environmental conditions were identified within 1 mile of the project site, as detailed in Table 4.9.A.

Table 4.9.A: Hazardous Materials Database Search

Property	Historically Recognized Environmental Condition	Location Relative to the Project Site	Status of the Property
AT&T Kirker Pass Road	Diesel contamination in soil associated with Leaking Underground Storage Tank.	Approximately 5,280 feet southeast from the project site.	**Completed.** Case closed as of January 22, 1997. A closure letter or other formal closure decision document has been issued for the site.
Diablo Valley Horse Ranch	Diesel contamination associated with Leaking Underground Storage Tank.	Approximately 2,076 feet west from the project site.	**Completed.** Case closed as of August 17, 1994. A closure letter or other formal closure decision document has been issued for the site.
RMC Lonestar at 515 Mitchell Canyon Road	Diesel contamination in soil associated with Leaking Underground Storage Tank.	Approximately 4,843 feet southwest from the project site.	**Completed.** Case closed as of January 15, 1997. A closure letter or other formal closure decision document has been issued for the site.

Source 1: State Water Resources Control Board (SWRCB). 2024. Geotracker Database. Website: https://geotracker.waterboards.ca.gov/ (accessed February 13, 2024).
Source 2: California Department of Toxic Substances Control. 2024. EnviroStar Database Website: https://www.envirostor.dtsc.ca.gov/public/ (accessed February 13, 2024).
Source 3: California Environmental Protection Agency (Cal/EPA). 2024. Cortese List Data Resources. Website: calepa.ca.gov/site cleanup/corteselist/ (accessed February 13, 2024).

As shown in Table 4.9.A, the regulatory oversight statuses of all of the recorded release sites, listed leaking underground storage tanks (LUSTs) and spill sites adjacent to the project corridor are closed. A closed site indicates that regulatory requirements for response actions, such as site assessment and remediation, have either been completed or were not necessary, and therefore, potential migration of residual contaminants in groundwater beneath the project site does not likely pose a risk to human health and the environment. Therefore, impacts would be less than significant.

31 State Water Resources Control Board (SWRCB). 2024. Geotracker Database. Website: https://geotracker.waterboards.ca.gov/ (accessed February 13, 2024).

32 California Department of Toxic Substances Control (DTSC). 2024. EnviroStar Database Website: https://www.envirostor.dtsc.ca.gov/public/ (accessed February 13, 2024).

33 California Environmental Protection Agency (Cal/EPA). 2024. Cortese List Data Resources. Website: calepa.ca.gov/sitecleanup/corteselist/ (accessed February 13, 2024).

e. Would the project be located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

No Impact. The City of Clayton has not adopted an airport land use plan and has no public airports within the city limits. The closest airports servicing Clayton and the project site are Buchanan Field Airport (approximately 7.4 miles from the project site), Oakland International Airport (approximately 22 miles from the project site), San Francisco International Airport (approximately 33 miles from the project site), San Jose International Airport (approximately 40 miles from the project site), and Sacramento International Airport (approximately 55 miles from the project site). All of these airports are located farther than 2 miles from the project site. Therefore, the project would result in no impact regarding safety hazards or excessive noise for people residing within the project area.

f. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact. The City of Clayton adopted its Local Hazard Mitigation Plan[34] in October 2021. The Local Hazard Mitigation Plan offers methods to mitigate natural hazards and enhance disaster resistance. The plan focuses on natural disasters, including earthquake hazards (surface faulting, ground shaking, liquefaction, landslides, and tsunamis), and weather-related hazards (flooding, landslides, wildfires, drought, and climate change).

The primary exit routes out of Clayton to the north are Pine Hollow Road, Clayton Road, and Concord Boulevard. To the south, the primary exit route out of Clayton is Marsh Creek Road. The proposed project would not alter or block adjacent roadways, and implementation of the proposed project would not be expected to impair the function of nearby emergency evacuation routes. The proposed project would design, construct, and maintain structures, roadways, and facilities in accordance with applicable standards associated with vehicular access, resulting in the provision of adequate vehicular access that would provide for adequate emergency access and evacuation. Vehicular access to the project site would be provided via an internal private drive with access from Peacock Creek Drive. Secondary emergency vehicle access would be provided via a gated driveway from Clayton Road. The proposed project design would be submitted to and approved by the Contra Costa County Fire Protection District and reviewed by the City's Police Department prior to the issuance of building permits.

Construction activities, such as installation of utility lines in public rights-of-way, may temporarily restrict vehicular traffic on the adjacent roadway. While these activities are occurring, the applicant's contractors would implement adequate and appropriate measures to facilitate the passage of persons and vehicles through/around any required road closures. As a condition of project approval pursuant to Article II (Permits) of CMC Chapter 12.04 (Street Encroachments), and prior to commencement of construction within a public right-of-way, the applicant's construction manager will be required to obtain an encroachment permit from the City Engineer and to provide lane closure and traffic control plans to the City Engineer and to local emergency service responders

[34] City of Clayton. 2021. City of Clayton Hazard Mitigation Plan*.* October 12.

(i.e., ambulance companies, the fire department, and the police department). Adherence to the emergency access measures required by the City would ensure a less than significant impact related to implementation of or physical interference with an adopted emergency response plan or emergency evacuation plan.

g. Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

Less Than Significant Impact. According to the California Department of Forestry and Fire Protection (CAL FIRE), the project site is within a local responsibly area (LRA), meaning the local government is financially responsible for wildland fire protection but is not considered to be within a Very High Fire Hazard Severity Zone (VHFHSZ).[35] Although the project site is not designated as a VHFHSZ, wildfire is a serious hazard in Clayton due to the natural vegetation in the trail system and adjacent parklands, which are extremely flammable during the summer and fall.[36] Fire services to the Clayton area are provided by the Contra Costa County Fire Protection District (CCCFPD). The nearest CCCFPD station is located at 6500 Center Street (approximately 0.5 mile from the project site) and would provide fire station services to the project site.

The project site is bordered by undeveloped land to the south and east and by the Oakhurst Country Club Golf Course to the north. The proposed project is required to be designed in compliance with all applicable State and local standards and recommendations for new development (e.g., the CCCFPD's requirements for providing a water supply system for fire protection and adequate emergency and fire access). In addition, the project would be required to comply with the current California Fire Code, as specified in Section 15.09 of the CMC. The California Fire Code calls for the installation, maintenance, and ongoing inspection of fire protection systems under the direction of the local Fire Chief. In addition, the Fire Code authorizes the Fire Chief to specify water supply and road design standards. Prior to approval of final maps and improvement plans for any development project within Clayton, plan review and approval by the CCCFPD is required.

The proposed project would also be subject to requirements in Section 13000 *et seq*. of the California Health and Safety Code, the California Building Code (CBC), and the California State Fire Code, which include regulations concerning the following: building standards for fire protection; fire protection and notification systems such as extinguishers and smoke alarms; safety for firefighters and emergency responders during emergency operations; minimum standards for hazardous vegetation and fuel management, defensible space, and building construction; and minimum standards for emergency access and water supply for fire response.

Compliance with these existing regulatory requirements would reduce impacts related to the exposure of people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires to a less than significant level.

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35 California Department of Forestry and Fire Protection (CAL FIRE). n.d. FHSZ Viewer. Website: https://egis.fire.ca.gov/FHSZ/ (accessed February 13, 2024).

36 City of Clayton. 2021. op. cit.

4.10 HYDROLOGY AND WATER QUALITY

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	☐	☐	☒	☐
b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:	☐	☐	☒	☐
i. Result in substantial erosion or siltation on- or off-site;	☐	☐	☒	☐
ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☒	☐
iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☒	☐
iv. Impede or redirect flood flows?	☐	☐	☐	☒
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

The following discussion is partially based on the project-specific *Hydrology Analysis for Oakhurst Townhomes* (Appendix E) and the *Stormwater Control Plan for Oakhurst Country Club* (SWCP) (Appendix F) prepared by P/A Design Resources Inc. and dated March 10, 2023, and March 2023, respectively.

a. Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

Less Than Significant Impact. The State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs) regulate the quality of surface water and groundwater bodies throughout California. In the City of Clayton, the San Francisco Bay Regional Water Quality Control Board (San Francisco Bay RWQCB) is responsible for implementation of the Water Quality Control Plan (Basin Plan). The Basin Plan establishes beneficial water uses and water quality objectives for waterways and water bodies within the region. Section 303(d) of the federal Clean Water Act (CWA) requires that states identify water bodies including bays, rivers, streams, creeks, and coastal areas that do not meet water quality standards and the pollutants that are causing the impairment. Total Maximum Daily Loads (TMDLs) describe the maximum amount of a pollutant that a water body can receive while still meeting established water quality standards. A TMDL establishes limits for pollutant discharges into impaired water bodies.

The approximately 2.55-acre project site currently consists of vacant land, which includes a partially paved, largely gravel parking lot. A Contra Costa Water District (CCWD) pump station parcel containing a small, wood-framed enclosure is at the southern end of the project site. The project site is located adjacent to a hillside and elevations range from 560 feet above mean sea level at the northwestern portion of the site to 510 feet above mean sea level at the southwestern corner. The parking lot area is relatively flat with slopes under 5 percent, while the eastern side of the project site has steep slopes of around 50 percent. In the City, stormwater collected by the storm drain system discharges into the local creaks and ultimately flows into the San Francisco Bay and the Delta without being treated.[37] Under existing conditions, stormwater from the project site is collected by an existing storm drain line that runs through the site and discharges to an existing catch basin located in Peacock Creek Drive (i.e., northwest corner of the project site). This storm drain line also collects runoff from approximately 3.47 acres of the adjacent, off-site hillside to the east. Stormwater collected in the existing catch basin in Peacock Creek Drive then enters storm drains that flow to Clayton Road, west of the project site, which discharges into Peacock Creek. Peacock Creek discharges into Mount Diablo Creek, which ultimately discharges into Suisun Bay.[38]

The SWRCB Surface Water Quality Assessment 2020-2022 Integrated Report for Clean Water Act Sections 303(d) and 305(b) does not list any impairments for Peacock Creek. Mount Diablo Creek is listed as an impaired water body for pesticides (diazinon) and toxicity, and Suisun Bay is listed as an impaired water body for pesticides (chlordane, dichlorodiphenyltrichloroethane [DDT], and dieldrin), toxic organics (dioxin compounds, furan compounds, polychlorinated biphenyls [PCBs]), invasive species, and metals (mercury and selenium).[39]

Runoff water quality is regulated by the National Pollutant Discharge Elimination System (NPDES) Program (established through the federal CWA). The NPDES program objective is to control and reduce pollutant discharges to surface water bodies. Compliance with NPDES permits is mandated by State and federal statutes and regulations. Locally, the NPDES Program is administered by the San Francisco Bay RWQCB.

Construction activities are subject to the SWRCB NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit), Order

37 City of Clayton. *Stormwater Management and NPDES.* Website: https://claytonca.gov/engineering-and-public-works/stormwater/ (accessed February 1, 2024).

38 Contra Costa Clean Water Program (CCCWP). 2003. *Contra Costa County Watershed Atlas, Chapter 10: Mount Diablo Creek Watershed.* November.

39 State Water Resources Control Board (SWRCB). 2023. *2020-2022 California Integrated Report (Clean Water Act Section 303(d) List and 305(b) Report)*. Website: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.waterboards.ca.gov%2Fwater_issues%2Fprograms%2Ftmdl%2F2020_2022state_ir_reports_revised_final%2Fapx-a-303d-list.xlsx&wdOrigin=BROWSELINK (accessed February 1, 2024).

No. 2022-0057-DWQ, NPDES No. CAS000002.[40] Any construction activity, including grading, that would result in the disturbance of 1 acre or more would require compliance with SWRCB's Construction General Permit, which requires preparation of a Storm Water Pollution Prevention Plan (SWPPP) and implementation of Construction Best Management Practices (BMPs) during construction activities. Construction BMPs would include, but not be limited to, Erosion Control and Sediment Control BMPs designed to minimize erosion and retain sediment on site and Good Housekeeping BMPs to prevent spills, leaks, and discharge of construction debris and waste into receiving waters.

Project operations are subject to the California Regional Water Quality Control Board San Francisco Bay Region Municipal Regional Stormwater NPDES Permit, Order No. R2-2022-0018, as amended by Order No. R2-2023-0019, NPDES Permit No. CAS612008 (Municipal Regional Stormwater NPDES Permit [MRP]). The MRP prohibits discharges, sets limits on pollutants being discharged into receiving waters, and requires implementation of technology-based standards. The MRP requires co-permittees to develop and implement standard design and post-development BMP guidance to guide application of Low Impact Development (LID) BMPs to the maximum extent practicable.

MRP Provision C.3 addresses post-construction stormwater management requirements for regulated projects. Regulated projects include new development and redevelopment projects that create or replace 5,000 square feet or more area of impervious surface, and special land use categories that create or replace 5,000 square feet or more area of impervious surface. Provision C.3 requires regulated projects to implement LID source control, site design, and stormwater treatment. LID employs principles such as preserving and recreating natural landscape features and minimizing impervious surfaces to create functional and appealing site drainage that treats stormwater as a resource, rather than a waste product. Practices used to adhere to these LID principles include measures such as rain barrels and cisterns, green roofs, permeable pavement, preserving undeveloped open space, and biotreatment through rain gardens, bioretention areas, bioswales, and planter/tree boxes.

MRP Provision C.3.g pertains to hydromodification management, which requires certain regulated projects to ensure that stormwater discharges from the project site do not cause an increase in the erosion potential of the receiving stream over the existing condition. Provision C.3.g provides various exceptions from hydromodification management requirements, including if the post-project impervious surface area is less than or the same as the pre-project impervious surface area or is less than 1 acre.

Chapter 13.12, Stormwater Management and Discharge Control, of the City's Municipal Code[41] also regulates stormwater discharge in the City. The intent of Chapter 13.12 is to protect and enhance the water quality in the City's watercourses pursuant to, and consistent with the Porter-Cologne

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40 State Water Resources Control Board (SWRCB). 2022. NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order No. 2022-0057-DWQ, NPDES No. CAS000002)

41 City of Clayton. *Municipal Code Title 13: Waters and Sewers, Chapter 13.12: Stormwater Management and Discharge Control.* Website: https://library.municode.com/ca/clayton/codes/municipal_code?nodeId=TIT13WASE_CH13.12STMADICO (accessed February 2, 2024).

Water Quality Control Act and the CWA and carries out the conditions in the MRP that require implementation of appropriate source control and site design measures and stormwater treatment measures for development projects. Chapter 13.12 requires that any project subject to the development runoff requirements in the MRP shall prepare a stormwater control plan that meets the criteria in the most recent version of the *Contra Costa Clean Water Program Stormwater C.3. Guidebook* (Stormwater C.3 Guidebook).[42]

Construction. The proposed project involves the construction of four multi-family residential buildings containing 30 dwelling units, and associated improvements. The project site currently consists of vacant land, which includes a partially paved, largely gravel parking lot. According to the SWCP prepared for the proposed project, construction activities would result in the disturbance of approximately 1.61 acres on the project site.

Pollutants of concern during construction include sediments, trash, petroleum products, concrete waste (dry and wet), sanitary waste, and chemicals. Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality. During construction activities, excavated soil would be exposed, and there would be an increased potential for soil erosion and sedimentation compared to existing conditions. In addition, chemicals, liquid products, petroleum products (e.g., paints, solvents, and fuels), and concrete-related waste may be spilled or leaked, and they have the potential to be transported via stormwater runoff into receiving waters.

Because construction of the proposed project would disturb greater than 1 acre of soil, the proposed project is subject to the requirements of the Construction General Permit. As specified in Regulatory Compliance Measure (RCM) HYD-1 and as required by the Construction General Permit, the Construction Contractor would be required to prepare a SWPPP and implement construction BMPs detailed in the SWPPP during construction activities. Construction BMPs would include, but are not limited to, Erosion Control and Sediment Control BMPs designed to minimize erosion and retain sediment on site and Good Housekeeping BMPs to prevent spills, leaks, and discharge of construction debris and waste into receiving waters. BMP implementation must be consistent with the BMP requirements in the most recent version of the California Stormwater Quality Association's Stormwater Best Management Handbook: Construction. The SWPPP would also include a construction site monitoring program that identifies requirements for dry weather visual observations of pollutants at all discharge locations and, as appropriate (depending on the risk level), sampling of the site effluent and receiving waters. A Qualified SWPPP Practitioner will be responsible for implementing the BMPs at the site and performing all required monitoring and inspection/maintenance/repair activities.

Regulatory Compliance Measure HYD-1 **Construction General Permit**. Prior to the commencement of any land-disturbing activities, the Construction Contractor shall obtain coverage under the State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System

[42] Contra Costa Clean Water Program. 2022. *Stormwater C.3 Guidebook, Stormwater Quality Requirements for Development Applications, 8th Addition.* December 23.

(NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order No. 2022-0057-DWQ, National Pollutant Discharge Elimination System No. CAS000002) (Construction General Permit). This shall include submission of Permit Registration Documents (PRDs), including a Notice of Intent for coverage under the permit to the SWRCB via the Stormwater Multiple Application and Report Tracking System (SMARTS). The project applicant shall provide the Waste Discharge Identification Number (WDID) to the City of Clayton (City), or to the City's designee, to demonstrate proof of coverage under the Construction General Permit. Project construction shall not be initiated until a WDID is received from the SWRCB and is provided to the City or to the City's designee.

According to the SWCP prepared for the proposed project, subsurface exploration via exploratory borings at the project site encountered groundwater at depths of 10.5 feet to 16 feet below ground surface (bgs). The proposed project would require excavation for establishment of building pads and utility trenching.

In the event that groundwater or perched groundwater is encountered during construction, it would be necessary to obtain coverage under the San Francisco Bay RWQCB's General Waste Discharge Requirements for Discharge or Reclamation of Extracted Brackish Groundwater, Reverse Osmosis Concentrate Resulting from Treated Brackish Groundwater, and Extracted Groundwater from Structural Dewatering Requiring Treatment to Surface Waters (Order No. R2-2018-0026, NPDES No. CAG912004) (Groundwater General Permit), as specified in RCM HYD-2. The Groundwater General Permit would require testing and treatment (as necessary) during groundwater dewatering prior to release to surface waters to ensure that discharges do not exceed water quality limits specified in the permit. With adherence to RCM HYD-2, groundwater dewatering, if necessary, during construction activities, would not introduce pollutants to receiving waters at levels that would violate water quality standards or water discharge requirements, degrade water quality, or alter the quality of the receiving water.

Further, dewatered groundwater would be discharged to the storm drain system, which discharges to Peacock Creek and subsequently Mount Diablo Creek, rather than back into groundwater and therefore would not introduce pollutants to groundwater. Infiltration of stormwater has the potential to affect groundwater quality in areas of shallow groundwater. As discussed above, groundwater could occur at depths from 10.5 to 16 feet bgs at the project site. Pollutants in stormwater are generally removed by soil through absorption as water infiltrates. In areas of deep groundwater, there is more absorption potential and, as a result, less potential for pollutants to reach groundwater. Due to the depth to groundwater, it is not expected that any stormwater that may infiltrate during construction would affect groundwater quality because there is not a direct path for pollutants to reach groundwater. In addition, the SWCP indicates the existing soils on the project site have low permeability which renders deep infiltration of runoff unfeasible. Therefore, project construction activities would not substantially degrade groundwater quality.

Regulatory Compliance Measure HYD-2 **Groundwater General Permit.** If groundwater dewatering is required during construction or excavation activities, the Construction Contractor shall obtain coverage under the San Francisco Bay Regional Water Quality Control Board's (RWQCB) General Waste Discharge Requirements for Discharge or Reclamation of Extracted Brackish Groundwater, Reverse Osmosis Concentrate Resulting from Treated Brackish Groundwater, and Extracted Groundwater from Structural Dewatering Requirement Treatment to Surface Waters (Order No. R2-2018-0026, NPDES No. CAG912004) (Groundwater General Permit), or any other subsequent permit. This shall include submission of a Notice of Intent (NOI) for coverage under the permit to the San Francisco Bay RWQCB at least 60 days prior to the start of excavation activities and anticipated discharge of dewatered groundwater to surface waters. Groundwater dewatering activities shall comply with all applicable provisions in the permit, including water sampling, analysis, treatment (if required), and reporting of dewatering-related discharges. Upon completion of groundwater dewatering activities, a Notice of Termination shall be submitted to the San Francisco Bay RWQCB.

With implementation of RCM HYD-1 and RCM HYD-2, which require compliance with the Construction General Permit and Groundwater General Permit, construction impacts related to water quality standards, waste discharge requirements, and water quality for both surface and groundwater would be less than significant, and no mitigation is required.

Operation. Pollutants of concern from long-term operations include pathogens (bacteria/viruses), metals, nutrients, motor vehicle lubricants, coolants, disc brake dust, toxic organic compounds, pesticides/herbicides, sediments/total suspended solids, trash and debris, and oil and grease. The SWRCB Surface Water Quality Assessment 2020-2022 Integrated Report for Clean Water Act Sections 303(d) and 305(b) does not list any impairments for Peacock Creek. Mount Diablo Creek is listed as an impaired water body for pesticides (diazinon) and toxicity, and Suisun Bay is listed as an impaired water body for pesticides (chlordane, dichlorodiphenyltrichloroethane [DDT], and dieldrin), toxic organics (dioxin compounds, furan compounds, polychlorinated biphenyls [PCBs), invasive species, and metals (mercury and selenium).[43] TDMLs have been adopted to address pesticides and toxicity concentrations in Mount Diablo Creek and pesticides, toxic organics, and metals in Suisun Bay, which would be applicable to the proposed project.

The proposed project would be required to comply with the requirements of the MRP, and associated guidance documents. MRP Provision C.3 addresses post-construction stormwater management requirements for regulated projects. Regulated projects include new development and redevelopment projects that create or replace 5,000 square feet or more area of impervious surface and special land use categories that create or replace 5,000 square feet or more area of impervious surface. As the proposed project would result in the replacement of approximately 0.97 acres (approximately 42,357 square feet) of impervious surface area, the proposed project would be considered a regulated project and is subject to the development requirements of the MRP. Provision C.3 requires regulated projects to implement LID source control, site design, and stormwater treatment to treat 100 percent of the runoff form the project site. LID BMPs mimic a project site's natural hydrology by using design measures that capture, filter, store, evaporate, detain, and infiltrate runoff rather than allowing runoff to flow directly to piped or impervious storm drains. LID employs principles such as preserving and recreating natural landscape features and minimizing impervious surfaces to create functional and appealing site drainage that treats stormwater as a resource, rather than a waste product. Practices used to adhere to these LID principles include measures such as rain barrels and cisterns, green roofs, permeable pavement, preserving undeveloped open space, and biotreatment through rain gardens, bioretention areas, bioswales, and planter/tree boxes. Site design BMPs are stormwater management strategies that emphasize conservation and use of existing site features to reduce the amount of runoff and pollutant loading generated from a site. Source control BMPs are preventative measures that are implemented to prevent the introduction of pollutants into stormwater. Stormwater treatment BMPs are structural BMPs designed to treat and reduce pollutants in stormwater runoff prior to releasing it to receiving waters. The proposed project would divide the site into two drainage management areas and would include the construction of two bioretention basins totaling approximately 1,950 square feet. The basins would be designed to meet the criteria outlined in the Stormwater C.3 Guidebook and appropriately sized to treat 100 percent of stormwater runoff from the project site as required by the MRP.

MRP Provision C.3.g pertains to hydromodification management, which requires certain regulated projects to ensure that stormwater discharges from the project site do not cause an increase in the erosion potential of the receiving stream over the existing condition. Provision C.3.g provides various exceptions from hydromodification management requirements, including if the post project impervious surface area is less than or the same as the pre-project impervious surface area or is less than 1 acre. As the proposed project would result in a decrease in imperious surface area on the project site from approximately 1.08 acres (42.4 percent of the project site) to 0.97 acres

[43] State Water Resources Control Board (SWRCB). 2023. *2020-2022 California Integrated Report (Clean Water Act Section 303(d) List and 305(b) Report)*. Website: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.waterboards.ca.gov%2Fwater_issues%2Fprograms%2Ftmdl%2F2020_2022state_ir_reports_revised_final%2Fapx-a-303d-list.xlsx&wdOrigin=BROWSELINK (accessed February 1, 2024).

(38.1 percent of the project site), which would also be less than 1 acre, the proposed project would be exempt from hydromodification management requirements.

Compliance with the MRP for new development and redevelopment in the City is achieved through adherence with Clayton Municipal Code (CMC) Chapter 13.12. The purpose of Chapter 13.12 is to protect and enhance the water quality in the City's watercourses pursuant to, and consistent with the Porter-Cologne Water Quality Control Act and the CWA, and carries out the conditions in the MRP that require implementation of appropriate source control and site design measures and stormwater treatment measures for development projects. As specified in RCM HYD-3 and as required by CMC Chapter 13.12, prior to the start of any land-disturbing activities, the proposed project would be required to prepare and submit a stormwater control plan that meets the criteria in the most recent version of the Stormwater C.3 Guidebook and the development runoff requirements of the MRP.

Adherence to CMC Chapter 13.12, which requires compliance with the MRP and preparation of a stormwater control plan as specified in RCM HYD-3, would ensure LID source control, site design, and stormwater treatment BMPs are implemented during project operation that would capture, treat, and reduce pollutants of concern in 100 percent of stormwater runoff from the project site.

Regulatory Compliance Measure HYD-3 **City Municipal Code Chapter 13.12 and MRP**. Prior to construction, the project applicant shall prepare and submit a stormwater control plan that meets the criteria in the most recent version of the *Contra Costa Clean Water Program Stormwater C.3. Guidebook* (Stormwater C.3 Guidebook), as well as the development runoff requirements in the California Regional Water Quality Control Board San Francisco Ba Region Municipal Regional Stormwater NPDES Permit, Order No. R2-2022-0018, as amended by Order No. R2-2023-0019, NPDES Permit No. CAS612008 (Municipal Regional Stormwater NPDES Permit [MRP]). The City shall ensure the implementation of all applicable BMPs included in the Stormwater C.3 Guidebook.

With implementation of RCM HYD-3, which requires compliance with the CMC Chapter 13.12 and MRP, operational impacts related to a violation of any water quality standards or waste discharge requirements would be less than significant.

Overall, because the proposed project would be required to comply with existing regulations including the Construction General Permit, Groundwater Genera Permit, CMC Chapter 13.12, and the MRP (RCM HYD-1 through RCM HYD-3), the proposed project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality. Impacts would be less than significant**,** and no mitigation is required.

b. Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Less Than Significant Impact. According to the California Department of Water Resources (DWR), the project site is not located within any groundwater basin. In addition, the SWCP indicates the existing soils on the project site have low permeability which renders deep infiltration of runoff unfeasible. The nearest groundwater basin is the Clayton Valley Groundwater Basin located approximately 0.1-mile west of the project site.[44] The Clayton Valley Groundwater Basin is located in northern Contra Costa County along the south shore of Suisun Bay. The basin is about 40 miles northeast of San Francisco. It is bounded by Suisun Bay on the north, Mount Diablo Creek on the east, and the Concord Fault on the west.[45] Groundwater recharge in the Clayton Valley Groundwater Basin occurs primarily through natural infiltration and seepage of precipitation.[46] The Clayton Valley Groundwater Basin is managed by several agencies including the CCWD, San Francisco Bay RWQCB, and SWQCB. The Clayton Valley Groundwater Basin is designated as a Very Low Priority basin pursuant to the Sustainable Groundwater Management Act (SGMA). Although no published groundwater storage capacity data for the basin is available, hydrographs created from DWR well data in the Clayton Valley Groundwater Basin indicate that groundwater levels have shown a slight gradual decline over the period of record.[47]

Construction. Although the project site is not located within any groundwater basin, the SWCP prepared for the proposed project indicates that groundwater was encountered during subsurface exploration at depths of 10.5 feet to 16 feet bgs. The proposed project would require excavation for establishment of building pads and utility trenching. In the event that groundwater dewatering is required during excavation, it would be conducted in accordance with the Groundwater General Permit, as specified in RCM HYD-2, which sets forth procedures to follow that would reduce potential impacts to a less than significant level. In addition, if groundwater dewatering is required during construction of the proposed project, dewatering activities would be temporary, and the volume of groundwater removed would not be substantial. Therefore, construction of the proposed project would not substantially decrease groundwater supplies such that the project may impede sustainable groundwater management of the basin.

Because the project site is not located within any groundwater basin and the existing soils on the project site have low permeability which renders deep infiltration of runoff unfeasible, the site is not a significant source of groundwater recharge for the Clayton Valley Groundwater Basin. Therefore, construction of the proposed project would not substantially interfere with groundwater recharge such that the project may impede sustainable groundwater management of the nearby basin.

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44 California Department of Water Resources. n.d. *Groundwater Basin Boundary Assessment Tool.* Website: https://gis.water.ca.gov/app/bbat/ (accessed February 2, 2024).

45 State Water Resources Control Board Division of Water Rights (DWR). 2004. *Clayton Valley Groundwater Basin Bulletin 118*. February 27.

46 State Water Resources Control Board. 2021. *Clayton, Ygnacio, and Arroyo del Hambre Valley Groundwater Subbasins (2-5, 2-6, and 3-31).* September 14.

47 State Water Resources Control Board Division of Water Rights (DWR). 2004. *Clayton Valley Groundwater Basin Bulletin 118*. February 27.

Construction impacts associated with substantial decrease in groundwater supplies or interference with groundwater recharge would be less than significant, and no mitigation is required.

Operation. The proposed project would develop the site with four multi-family residential buildings containing 30 dwelling units, and associated improvements, increasing the water demand at the project site from existing conditions. Water service for the proposed project would be provided by the CCWD. CCWD provides treated and untreated water to approximately 500,000 people in Contra Costa County, including the City of Clayton.[48] The CCWD's service area encompasses most of central and northeastern Contra Costa County, a total area of more than 140,000 acres. The CCWD diverts water from the Delta at four intake facilities located at Rock Slough, Old River, Middle River at Victoria Canal, and Mallard Slough. The backbone of the CCWD's water conveyance system is the 48-mile Contra Costa Canal, which starts at Rock Slough and ends at the Martinez Reservoir. Four untreated water reservoirs, Los Vaqueros, Contra Loma, Mallard, and Martinez, provide a total of approximately 165,000 acre-feet (AF) of storage. These reservoirs are used to store water for blending and water quality purposes, dry-year and emergency use, supply during peak demands, and flow regulation.[49] Water supply from CCWD primarily comes from these surface waters; and minimal groundwater production from municipal customer owned wells and private wells occurs within the CCWD's service area.[50] As such, operation of the proposed project would involve the use of surface water sources for potable water and would not rely on groundwater. Therefore, operation of the proposed project would not substantially decrease groundwater supplies such that the project may impede sustainable groundwater management of the basin.

As described above, the project site is not located within any groundwater basin, and the existing soils on the project site have low permeability, which renders deep infiltration of runoff unfeasible. Therefore, the site is not a significant source of groundwater recharge for the Clayton Valley Groundwater Basin. Nevertheless, development of the proposed project would result in a decrease in impervious surfaces on the project site from approximately 1.08 acres (42.4 percent of the project site) to 0.97 acres (38.1 percent of the project site), which could increase on-site shallow infiltration.

Because implementation of the proposed project would not contribute to a substantial depletion of groundwater supplies, the project site is not a significant source of groundwater recharge, and development of the proposed project would increase on-site shallow infiltration due to a decrease in impervious surface area compared to existing conditions, the proposed project would not result in a significant decrease in groundwater recharge that would result in a net deficit in aquifer volume or a lowering of the local groundwater table level. Therefore, operation the proposed project would not interfere with groundwater recharge. Impacts would be less than significant.

For the reasons listed above, impacts related to the decrease of groundwater supplies or interference with groundwater recharge would be less than significant.

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48 Contra Costa Water District (CCWD). 2021. *2020 Urban Water Management Plan*. June.

49 Ibid.

50 Contra Costa Water District (CCWD). 2021. *2020 Urban Water Management Plan*. June.

c. *Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:*

   i. *Result in substantial erosion or siltation on- or off-site;*

Less Than Significant Impact. Under existing conditions, stormwater from the project site is collected by an existing storm drain line that runs through the site and discharges to an existing catch basin located in Peacock Creek Drive (i.e., northwest corner of the project site). This storm drain line also collects runoff from approximately 3.47 acres of the adjacent, off-site hillside to the east. Stormwater collected in the existing catch basin in Peacock Creek Drive then enters storm drains that flow to Clayton Road, west of the project site, which discharges into Peacock Creek. Peacock Creek discharges into Mount Diablo Creek, which ultimately discharges into Suisun Bay.[51] With implementation of the proposed project, the project site would be divided into two drainage management areas (i.e., DMA 1 and DMA 2) to manage stormwater runoff. The proposed project would also implement LID BMPs, including two bioretention basins totaling approximately 1,950 square feet. The two DMAs are discussed below. Figure 2-10, in Chapter 2.0, Project Description, depicts the preliminary stormwater plan.

- **DMA 1** would manage stormwater runoff from the western portion of the project site that incudes Buildings C and D and the western halves of Buildings A and B. DMA 1 accounts for the majority of the impervious areas on the site. Stormwater runoff from impervious areas (e.g., asphalt and roofs) and pervious areas (e.g., landscaped areas and pervious walkways) within DMA 1 would be directed to the 1,480-square-foot bioretention basin located at the northwest corner of the project site via an on-site stormwater collection system. Overflows from the bioretention basin (stormwater runoff volume that exceeds the storage volume of the bioretention basin) would be directed off site via a storm drainpipe and discharged into an existing catch basin in Peacock Creek Drive, similar to existing conditions.

- **DMA 2** would manage stormwater runoff from the eastern portion of the project site that includes the eastern halves of Buildings A and B. DMA 2 accounts for the remaining impervious areas that are not managed by DMA 1. Stormwater runoff from impervious areas (e.g., asphalt and roofs) and pervious areas (e.g., landscaped areas and pervious walkways) within DMA 2 would be directed to the 470-square-foot bioretention basin located at the northeast corner of the project site via an on-site stormwater collection system. Overflows from the bioretention basin (stormwater runoff volume that exceeds the storage volume of the bioretention basin) would be directed off site via a storm drainpipe and discharged into a proposed catch basin in Peacock Creek Drive, located east of the existing catch basin in Peacock Creek Drive.

The two bioretention basins within DMA 1 and DMA 2 would be designed to store and treat 100 percent of stormwater runoff from the project site in accordance with CMC Chapter 13.12 and the MRP.

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[51] Contra Costa Clean Water Program (CCCWP). 2003. *Contra Costa County Watershed Atlas, Chapter 10: Mount Diablo Creek Watershed.* November.

Construction. Under existing conditions, stormwater from the project site is collected by an existing storm drain line that runs through the site and discharges to an existing catch basin located in Peacock Creek Drive (i.e., northwest corner of the project site). During construction activities, approximately 1.61 acres of soil would be disturbed. During grading and other construction activities, soil would be exposed, drainage patterns would be temporarily altered, and there would be an increased potential for soil erosion and siltation compared to existing conditions. Additionally, during a storm event, soil erosion and siltation could occur at an accelerated rate. As specified in RCM HYD-1, the proposed project would be required to comply with the Construction General Permit, which requires the preparation of a SWPPP to identify construction BMPs to be implemented during construction of the proposed project to reduce impacts on water quality, including those impacts associated with soil erosion and siltation. Compliance with the requirements in the Construction General Permit, including implementation of construction BMPs, would ensure that construction impacts related to on- or off-site erosion or siltation would be less than significant.

Operation. After the completion of project construction, the proposed project would not significantly alter the existing drainage pattern of the site. In addition, the proposed project would result in a decrease in impervious surface area on the project site from approximately 1.08 acres (42.4 percent of the project site) to 0.97 acres (38.1 percent of the project site), which would result in a net decrease in stormwater runoff that could lead to downstream erosion in receiving waters. Further, as discussed above, the proposed project would be required to prepare a stormwater control plan, which would demonstrate that the stormwater facilities meet water quality treatment and stormwater rate and volume requirements in compliance with the requirements of CMC Chapter 13.12 and the MRP, as specified in RCM HYD-3. With implementation of RCM HYD-3, operational impacts related to on- or off-site erosion or siltation would be less than significant.

Overall, because the proposed project would be required to comply with existing regulations including the Construction General Permit, CMC Chapter 13.12, and the MRP (RCM HYD-1 and RCM HYD-3), the proposed project would not result in substantial erosion or siltation on- or off-site. Impacts would be less than significant.

ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

Less Than Significant Impact. The proposed project's potential to substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site is discussed below.

Construction. Project construction would comply with the requirements of the Construction General Permit and would include the preparation and implementation of a SWPPP pursuant to RCM HYD-1. The SWPPP would include construction BMPs (e.g., soil binders, straw mulch, non-vegetative stabilization, fiber rolls, sandbag barrier, straw bale barrier, stabilized construction entrance/exit, stabilized construction roadway, and entrance/outlet tire wash) to control the rate and amount of on-site surface runoff and to direct flows to ensure that stormwater runoff from the construction site does not result in on- or off-site flooding. With adherence to RCM HYD-1, construction impacts related to a substantial increase in the rate or amount of surface runoff that would result in on- or off-site flooding would be less than significant.

Operation. Development of the proposed project would result in a decrease in impervious surfaces on the project site from approximately 1.08 acres (42.4 percent of the project site) to 0.97 acres (38.1 percent of the project site), which could have the potential to decrease the volume and rate of stormwater runoff discharged from the project site. The proposed project would also include two bioretention basins totaling 1,950 square feet, which would be used for stormwater treatment and peak flow mitigation prior to discharging runoff into the City's storm drain system, in compliance with the requirements of CMC Chapter 13.12 and the MRP, as specified in RCM HYD-3. Therefore, with implementation of the requirements of CMC Chapter 13.12 and the MRP, including the implementation of LID techniques to address the volume and rate of stormwater runoff in the post-project condition, the proposed project would not substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site. Impacts would be less than significant.

Overall, because the proposed project would be required to comply with existing regulations including the Construction General Permit, CMC Chapter 13.12, and the MRP (RCM HYD-1 and RCM HYD-3), the proposed project would not substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite. Impacts would be less than significant.

iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

Less Than Significant Impact. The proposed project's potential to create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff is discussed below.

Stormwater Drainage System Capacity. Stormwater at the project site would be directed to two on-site bioretention basins totaling 1,950 square feet. The bioretention basins would be designed to store and treat 100 percent of stormwater runoff from the project site in accordance with CMC Chapter 13.12 and the MRP. In addition to addressing the rate and volume of stormwater runoff, the on-site bioretention basins would target and reduce pollutants of concern in stormwater runoff.

Therefore, the proposed project would not contribute to an exceedance of existing or planned stormwater drainage systems, and impacts would be less than significant. No mitigation is required.

Polluted Runoff. Implementation of BMPs to reduce pollutants of concern in stormwater runoff in compliance with the Construction General Permit, CMC Chapter 13.12, and the MRP, as detailed in RCM HYD-1 and RCM HYD-3, would ensure that the proposed project would result in less than significant impacts related to discharge of polluted runoff during project construction and operations. Therefore, the proposed project would not contribute additional sources of polluted runoff, and impacts would be less than significant.

iv. Impede or redirect flood flows?

No Impact. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 06013C0308F (effective June 16, 2009), the entirety of the project site is located in

Zone X, which is identified as an area of minimal flood hazard.[52] The project site is not located within a 100-year floodplain. Therefore, the proposed project would not impede or redirect flood flows, and there would be no impact.

d. In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation?

Less Than Significant Impact. The proposed project's potential to risk release of pollutants due to project inundation is discussed below.

Flooding. As discussed above, according to FEMA FIRM No. 06013C0308F (effective June 16, 2009), the entirety of the project site is located in Zone X, which is identified as an area of minimal flood hazard. During construction, BMPs would be implemented to ensure that during a rain event, pollutants would be retained on site and would be prevented from reaching downstream receiving waters in accordance with RCM HYD-1. During operation, the proposed project would include two bioretention basins totaling 1,950 square feet, pursuant to the requirements of RCM HYD-3, which would ensure that pollutants would be treated and prevented from reaching downstream receiving waters. Impacts associated with the release of pollutants resulting from inundation of the project site due to flooding would be less than significant.

Tsunami. The project site is approximately 34 miles east of the Pacific Ocean. Based on the distance from the Pacific Ocean, the project site is not located in a tsunami hazard zone and would not result in the release of pollutants due to inundation caused by a tsunami. Impacts associated with the release of pollutants resulting from inundation of the project site due to a tsunami would be less than significant.

Seiches. Seiches are waves that are created in an enclosed body of water such as a bay, lake, or harbor and go up and down or oscillate and do not progress forward like standard ocean waves. The nearest sizeable, enclosed body of water to the project site is the Contra Loma Reservoir, which is located approximately 5.7 miles northeast of the project site. Because impacts from seiches are very localized and the project site is located miles from enclosed bodies of water, impacts associated with the release of pollutants due to inundation cause by a seiche would be less than significant.

Dam Inundation. According to the DWR Division of Safety of Dams, the project site is not located within a dam inundation area.[53] Therefore, the proposed project would not result in the release of pollutants due to flooding cause by a dam failure. No impact would occur.

With implementation of RCM HYD-1 and RCM HYD-3, including the incorporation of two bioretention basins totaling 1,950 square feet that would address the volume and rate of post-project stormwater flows, and because the project site is not within a tsunami, seiche, or dam inundation hazard zone, implementation of the proposed project would not result in the release of

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52 Federal Emergency Management Agency (FEMA). 2017. Flood Insurance Rate Map No. 06013C0308F. Map Effective June 16, 2009. Website: https://msc.fema.gov/portal/search?AddressQuery=1001%20Peacock%20Creek%20Dr%20Clayton%2C%20CA%2094517 (accessed February 2, 2024).

53 Department of Water Resources Division of Safety of Dams. *California Dam Breach Inundation Map.* Website: https://fmds.water.ca.gov/maps/damim/ (accessed February 2, 2024).

pollutants from a flood, dam inundation, tsunami, or seiche, and impacts would be less than significant. No mitigation is required.

e. Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Less Than Significant Impact. The project is within the jurisdiction of the San Francisco Bay RWQCB. The San Francisco Bay RWQCB adopted a Water Quality Control Plan (i.e., Basin Plan) (amended March 7, 2023)[54] that designates beneficial uses for all surface and groundwater within their jurisdiction and establishes the water quality objectives and standards necessary to protect those beneficial uses. As previously discussed, the proposed project would comply with existing NPDES permit requirements, including the Construction General Permit and MRP, and would implement construction and operational BMPs to reduce pollutants of concern in stormwater runoff as detailed in RCM HYD-1 and RCM HYD-3. Compliance with these regulatory requirements would ensure that the proposed project would not degrade or alter water quality, which would cause the receiving waters to exceed the water quality objectives, or impair the beneficial use of receiving waters. As such, the proposed project would not result in water quality impacts that would conflict with the Basin Plan. Construction and operational impacts related to a conflict with the Basin Plan would be less than significant.

The Sustainable Groundwater Management Act (SGMA) was enacted in September 2014. SGMA requires governments and water agencies located within high- and medium-priority groundwater basins to halt overdraft of the basins. SGMA requires the formation of local Groundwater Sustainability Agencies (GSAs), which are required to adopt Groundwater Sustainability Plans (GSPs) to manage the sustainability of the groundwater basins. As previously discussed, the project site is not located within any groundwater basin. The nearest groundwater basin is the Clayton Valley Groundwater Basin located approximately 0.1-mile west of the project site. The Clayton Valley Groundwater Basin is designated as a Very Low Priority basin pursuant to the SGMA; therefore, development of a GSP or an approved GSP alternative is not required.

As previously discussed, the SWCP prepared for the proposed project indicates that subsurface exploration via exploratory borings at the project site encountered groundwater at depths of 10.5 feet to 16 feet bgs. The proposed project would require excavation for building pads and utility trenching. In the event that perched water is encountered and groundwater dewatering is necessary, adherence to RCM HYD-2 would ensure compliance with the Groundwater General Permit, which would require testing and treatment (as necessary) of groundwater encountered during groundwater dewatering prior to its release to surface waters, to ensure that discharges do not exceed water quality limits specified in the permit. In addition, if groundwater dewatering is required during construction of the proposed project, dewatering activities would be temporary, and the volume of groundwater removed would not be substantial. Therefore, construction of the proposed project would not substantially decrease groundwater supplies such that the project may impede sustainable groundwater management of the basin. Operation of the proposed project

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54 San Francisco Bay Regional Water Quality Control Board (San Francisco Bay RWQCB). 2023. *Water Quality Control Plan (Basin Plan) for the San Francisco Bay Basin*. March 7. Website: https://www.waterboards.ca.gov/sanfranciscobay/basin_planning.html (accessed February 2, 2024).

would involve the use of surface water sources for potable water and would not rely on groundwater. Therefore, operation of the proposed project would not substantially decrease groundwater supplies such that the project may impede sustainable groundwater management of the basin.

Further, because the project site is not located within any groundwater basin and the existing soils on the project site have low permeability, which renders deep infiltration of runoff unfeasible, the site is not a significant source of groundwater recharge for the Clayton Valley Groundwater Basin.

For the reasons above and with implementation of RCM HYD-1 through RCM HYD-3, impacts related to conflict with, or obstruction of, implementation of water quality control plans or sustainable groundwater management plans would be less than significant.

4.11 LAND USE AND PLANNING

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Physically divide an established community?	☐	☐	☒	☐
b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐

a. Would the project physically divide an established community?

Less Than Significant Impact. The physical division of an established community typically refers to the construction of a physical feature (e.g., an interstate highway or railroad tracks) or removal of a means of access (e.g., a local road or bridge) that would impair mobility within an existing community, or between a community and outlying area. For instance, the construction of an interstate highway through an existing community may constrain travel from one side of the community to another; similarly, such construction may also impair travel to areas outside the community.

The project site currently consists of vacant land, which includes a partially paved, largely gravel parking lot. The project site is surrounded by undeveloped land to the north and east, the Oakhurst Country Club golf course and Peacock Creek Drive to the west, and Clayton Road and single-family residences to the south. Because the project site is located within an already developed area, development of the proposed project site would not physically divide an established community but would rather provide continuity with adjacent residential uses. Additionally, the project would not alter any established street grid or permanently close any streets or sidewalks. Therefore, impacts would be less than significant.

b. Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

Less Than Significant Impact. As of January 2023, the City of Clayton General Plan Land Use Map designates the project site as Multifamily Medium Density Residential (MMD). The MMD land use designation allows multifamily units, including duplexes, triplexes, and townhouses, on sites where the property area, circulation system and other features can comfortably accommodate densities of 10.1–20 units per acre. Structural coverage can be up to 50 percent of the site area. The proposed project would have an overall density of 11.8 dwelling units per acre, which is within the allowable range established by the City.

In January 2024, the Clayton City Council rezoned the property as part of its zoning amendments related to the recent update of the Housing Element of the Clayton General Plan. The site is currently zoned M-R-M (Multiple Family Residential Medium) District to align with the recently amended General Plan land use designation. The M-R-M District is intended to provide as much compatibility as possible with nearby single-family residential zoning districts while providing affordable housing opportunities in the City.

It should be noted that according to CEQA, conflicts with land use goals and policies do not, in and of themselves, constitute a significant environmental impact. Policy conflicts are considered to be environmental impacts only when they would result in direct physical impacts or where those conflicts relate to avoiding or mitigating environmental impacts. As such, physical environmental impacts associated with the project are discussed in this Initial Study under specific topical sections. Therefore, the proposed project would not conflict with any applicable land use plans, policies, or regulations that were adopted for the purpose of avoiding or mitigating an environmental effect, and this impact would be less than significant.

4.12 MINERAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

a. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No Impact. According to the Contra Costa County General Plan,[55] the most valuable mineral resources mined within Contra Costa County are crushed rock in the Concord area, shale in the Port Costa area, and sand and sandstone in the Byron area. None of these resources are located in proximity to the project site. There are also regionally significant deposits of diabase, an intrusive igneous rock used as road base and riprap to prevent streambank erosion. The project site is located approximately 2 miles northeast of the Mount Zion quarry and does not overlap with any quarry-associated activities. No mines or quarries are located within the project site. Due to the fact that the project site is not within the immediate vicinity of the Mount Zion quarry or any regions identified within Contra Costa County as having known, valuable mineral resources, the project would not interfere with existing operations or access to these deposits. Furthermore, the project site is not located within an identified mineral resource zone as defined by the California Surface Mining and Reclamation Act of 1975. Therefore, the proposed project would have no impact to mineral resources.

b. Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No Impact. Refer to Section 4.12.a. The proposed project would have no impact on mineral resource recovery sites.

[55] County of Contra Costa. 2005. *Contra Costa County General Plan 2005-2020: Conservation Element*, 8.9 Mineral Resource Areas, pg. 8-33.

4.13 NOISE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project result in:				
a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b. Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 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?	☐	☐	☐	☒

Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, or sleep. Several noise measurement scales exist that are used to describe noise in a particular location. A decibel (dB) is a unit of measurement that indicates the relative intensity of a sound. Sound levels in dB are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, and 30 dB is 1,000 times more intense. Each 10 dB increase in sound level is perceived as approximately a doubling of loudness; and similarly, each 10 dB decrease in sound level is perceived as half as loud. Sound intensity is normally measured through the A-weighted sound level (dBA), and this scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. The A-weighted sound level is the basis for 24-hour sound measurements which better represent how humans are more sensitive to sound at night.

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate or be reduced, resulting in a 6 dB reduction in the noise level for each doubling of distance from a single point source of noise to the noise sensitive receptor of concern.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous sound level (L_{eq}) is the total sound energy of time varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq}, the community noise equivalent level (CNEL), and the day-night average level (L_{dn}) based on A-weighted decibels (dBA). CNEL is the time varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale, but without the adjustment for events occurring during the evening relaxation hours. CNEL and L_{dn} are within one dBA of each other and are normally exchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours.

Regulatory Framework. A project would result in a significant noise effect if it would substantially increase the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of applicable regulatory agencies, including, as appropriate, the City of Clayton.

The City of Clayton General Plan Noise Element Policy 2a establishes 60 dB L_{dn} and 45 dB L_{dn} as acceptable exterior and interior noise environments for residential land uses, respectively. In addition, the General Plan Noise Element Policy 3b restricts hours of construction to 7:00 am to 5:30 p.m. on weekdays and 9:00 a.m. to 6:00 p.m. on weekends when adjacent neighbors are affected.

Though the City does not have daytime construction noise level limits for activities that occur with the specified hours of the General Plan, to determine potential CEQA noise impacts, construction noise was assessed using criteria from the Federal Transit Administration's *Transit Noise and Vibration Impact Assessment Manual* (FTA Manual). [56] The FTA's detailed assessment construction noise criteria for residential uses is 80 dBA L_{eq}.

Vibration standards included in the FTA Manual were used to evaluate vibration impacts because the City does not have vibration standards. Table 4.13.A provides the criteria for assessing the potential for interference or annoyance from vibration levels in a building, while Table 4.13.B lists the potential vibration building damage criteria associated with construction activities.

Table 4.13.A: Interpretation of Vibration Criteria for Detailed Analysis

Land Use	Max L_v (VdB)[1]	Description of Use
Workshop	90	Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration.
Office	84	Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration.
Residential Day	78	Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20×).
Residential Night and Operating Rooms	72	Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power microscopes (100×) and other equipment of low sensitivity.

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] As measured in 1/3-Octave bands of frequency over the frequency range 8 to 80 Hertz.
FTA = Federal Transit Administration
L_V = velocity in decibels
VdB = vibration velocity decibels
Max = maximum

[56] Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123.* September. Website: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf (accessed March 2024).

Table 4.13.B: Construction Vibration Damage Criteria

Building Category	PPV (in/sec)
Reinforced concrete, steel, or timber (no plaster)	0.50
Engineered concrete and masonry (no plaster)	0.30
Non-engineered timber and masonry buildings	0.20
Buildings extremely susceptible to vibration damage	0.12

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
FTA = Federal Transit Administration
PPV = peak particle velocity
in/sec = inch/inches per second

Existing Setting. The primary existing noise sources in the project area are transportation facilities, which include Clayton Road and Peacock Creek Drive. Noise-sensitive receptors include residences, schools, hospitals, and similar uses that are sensitive to noise. Noise-sensitive land uses located adjacent to the project include residences to northeast, residences to the west across Clayton Road, and the Oakhurst Country Club to the north across Peacock Creek Drive. Noise-sensitive land uses located adjacent to the project were evaluated for potential noise and vibration impacts.

Ambient Noise Levels. One long-term (24-hour) noise level measurement was conducted on June 12, 2023, using Larson Davis Spark 706RC dosimeters to document the existing noise environment on the project site. Table 4.13.C summarizes the results of the long-term noise level measurement along with a description of the measurement locations and noise sources that occurred during the measurement. As shown in Table 4.13.C, the calculated L_{dn} level at LT-1 was 67.1 dBA, respectively. In addition, the daytime noise levels ranged from 58.5 to 50.6 dBA L_{eq} and nighttime average noise levels ranged from 45.4 to 67.8 L_{eq}. Also, the daytime maximum instantaneous noise level ranged from 74.9 to 92.0 dBA, and the nighttime instantaneous noise level ranged from 72.3 to 84.9 dBA. The long-term noise level measurement survey sheet along with the detailed hourly L_{eq} and L_{max} results are provided in Appendix G. Figure 4.13-1 shows the long-term monitoring location.

Table 4.13.C: Existing Noise Level Measurements

Monitor No.	Location Description	Noise Levels (dBA)					Noise Sources
		Daytime[1]		Nighttime[3]		L_{dn}	
		L_{eq}	L_{max}	L_{eq}	L_{max}		
LT-1	East of Clayton Road south of Peacock Creek Drive	58.5-50.6	74.9-92.0	45.4-67.8	72.3-84.9	67.1	Traffic on Clayton Road and Peacock Creek Drive.

Source: Compiled by LSA (2024).
[1] Daytime = Hours between 7:00 a.m. and 7:00 p.m.
[2] Nighttime = Hours between 10:00 p.m. and 7:00 a.m.
dBA = A-weighted decibel(s)
ft = foot/feet
L_{eq} = equivalent continuous sound level
L_{dn} = Day/night noise level

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LSA

LEGEND

Project Site Boundary

LT-1 Long-term Noise Monitoring Location

0 100 200

FEET

SOURCE: Google Earth (2024)

FIGURE 4.13-1

Oakhurst Townhomes Development Project

Noise Monitoring Locations

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Existing Traffic Noise. The FHWA Highway Traffic Noise Prediction Model (FHWA RD-77-108)[57] was used to evaluate traffic-related noise conditions along roadway segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime and nighttime hours. The resulting noise levels are weighted and summed over 24-hour periods to determine the L_{dn} values. The existing Average Daily Traffic (ADT) volumes without project were obtained from the *Traffic Impact Study for the Proposed Peacock Creek Townhomes*[58]. The standard vehicle mix for California roadways was used for roadways in the project area. Table 4.13.D shows the existing traffic noise levels without and with project on roadways in the project area. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix G.

Table 4.13.D: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 dBA L_{dn} (ft)	Centerline to 65 dBA L_{dn} (ft)	Centerline to 60 dBA L_{dn} (ft)	L_{dn} (dBA) 50 ft from Centerline of Outermost Lane
Clayton Road West of Oakhurst Drive	8,800	< 50	69	139	64.1
Clayton Road East of Oakhurst Drive	8,670	< 50	69	138	64.0
Clayton Road North of Peacock Creek Drive	8,540	< 50	68	137	64.0
Clayton Road South of Peacock Creek Drive	7,500	< 50	63	126	63.4
Oakhurst Drive North of Clayton Road	5,010	< 50	< 50	98	61.6
Peacock Creek Drive East of Clayton Road	1,220	< 50	< 50	< 50	53.2

Source: Compiled by LSA Associates, Inc. (2024).
ADT = average daily traffic
dBA = A-weighted decibels
ft = feet
L_{dn} = Day/night noise level

Noise Land Use Compatibility Analysis. In *California Building Industry Association v. Bay Area Air Quality Management District*, the Supreme Court of California ruled that "CEQA generally does not require an analysis of how existing environmental conditions will affect a project's future users or residents."[59] With this ruling, CEQA no longer considers the impact of the environment on a project to be an environmental impact, unless the project could exacerbate an existing environmental hazard. Therefore, an environmental document is not required to include an evaluation of whether the project would have the potential to expose project site residential receptors to excessive noise from existing noise sources near the project site, and such an analysis is not included the impact analysis below. However, the City of Clayton General Plan requires that a noise analysis be completed for a residential project to ensure that the residents are not exposed to noise levels in excess of General Plan standards. To address this requirement, an analysis of noise levels that would

[57] United States Federal Highway Administration (FHWA). 1977. Highway Traffic Noise Prediction Model, FHWA RD 77-108.

[58] Advanced Mobility Group (AMG). 2022. Traffic Impact Study for the Proposed Peacock Creek Townhomes. November 15.

[59] *California Building Industry Association v. Bay Area Air Quality Management District*. 2015. 62 Cal.4th 369, 386.

be experienced in the private exterior living areas as well as inside the proposed residences was conducted. That analysis is provided in Appendix H.

a. *Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

Less Than Significant Impact. The potential for the project to generate a substantial temporary or permanent increase in ambient noise levels is described below.

Short-Term Construction Noise. Two types of short-term noise impacts could occur during roadway construction. First, construction crew commutes and the transport of construction equipment and materials to the project site would incrementally increase noise levels on roadways leading to the project site. The pieces of construction equipment for construction activities would be moved onto the site, would remain for the duration of each construction phase, and would not add to the daily traffic volume in the project vicinity. Although there would be a relatively high single-event noise exposure potential causing intermittent noise nuisance (passing trucks at 50 feet would generate up to a maximum of 84 dBA), the effect on longer-term ambient noise levels would be small because the daily construction-related vehicle trips are small when compared to existing daily traffic volume on Clayton Road and Oakhurst Drive.

The project anticipates site preparation and grading, building construction, paving, and architectural coating phases of construction. The project construction phase that would generate the most automobile trips out of all of the construction phases would be when the building construction phase and the architectural coating phase occur at the same time, at 58 trips per day based on the California Emissions Estimator Model (CalEEMod, Version 2022.1) in Appendix A. Based on Table 4.13.D, Clayton Road and Oakhurst Drive have an estimated existing average daily traffic volume of 7,500 and 5,010, respectively, near the project site. Based on the information above, construction-related traffic would increase noise by up to 0.1 dBA. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, short-term construction-related impacts associated with worker commute and transport of construction equipment and material to the project site would be less than significant. No mitigation measures are required.

The second type of short-term noise impact is related to noise generated from construction activities. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. As noted above, the project anticipates site preparation and grading, building construction, paving, and architectural coating phases of construction. These various sequential phases change the character of the noise generated on a project site. Therefore, the noise levels vary as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase.

Table 4.13.E lists the L_{max} recommended for noise impact assessments for typical construction equipment included in the *FHWA Highway Construction Noise Handbook*[60], based on a distance of 50 feet between the equipment and a noise receptor.

Table 4.13.E: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor[1]	Maximum Noise Level (L_{max}) at 50 ft[2]
Backhoe	40	80
Compactor (ground)	20	80
Compressor	40	80
Crane	16	85
Dozer	40	85
Dump Truck	40	84
Excavator	40	85
Flatbed Truck	40	84
Forklift	20	85
Front-End Loader	40	80
Grader	40	85
Impact Pile Driver	20	95
Jackhammer	20	85
Pickup Truck	40	55
Pneumatic Tools	50	85
Pump	50	77
Rock Drill	20	85
Roller	20	85
Scraper	40	85
Tractor	40	84
Welder	40	73

Source: *FHWA Highway Construction Noise Handbook,* Table 9.1 (FHWA 2006).
Note: The noise levels reported in this table are rounded to the nearest whole number.
1 Usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power.
2 Maximum noise levels were developed based on Spec 721.560 from the CA/T program to be consistent with the City of Boston, Massachusetts, Noise Code for the "Big Dig" project.
CA/T = Central Artery/Tunnel
ft = foot/feet
FHWA = United States Federal Highway Administration
L_{max} = maximum instantaneous noise level

Table 4.13.F lists the anticipated construction equipment for each construction phase based on the CalEEMod (version 2022.1) results in Appendix A. Also, Table 4.13.F shows the combined noise level (L_{max} and L_{eq}) noise level at a distance of 50 feet for each construction phase along with the number of each construction equipment, acoustical usage factor, and the noise level (L_{max} and L_{eq}) for each construction equipment at a distance of 50 feet based on the quantity. As shown in Table 4.13.F, construction noise levels would reach up to 92.3 dBA L_{max} (87.1 dBA L_{eq}) at a distance of 50 feet.

60 United States Federal Highway Administration (FHWA). 2006. FHWA Highway Construction Noise Handbook. Roadway Construction Noise Model, FHWA HEP-06-015. DOT-VNTSC-FHWA-06-02. NTIS No. PB2006-109012. August.

Table 4.13.F: Summary of Construction Phase, Equipment, and Noise Levels

Construction Phase	Construction Equipment	Quantity	Reference Noise Level at 50 ft (dBA L_{max})	Acoustical Usage Factor[1] (%)	Noise Level at 50 ft (dBA)		Combined Noise Level at 50 ft (dBA)	
					L_{max}	L_{eq}	L_{max}	L_{eq}
Site Preparation	Grader	1	85	40	85.0	81.0	88.6	84.7
	Scraper	1	85	40	85.0	81.0		
	Front End Loader	1	80	40	80.0	76.0		
Grading	Grader	1	85	40	85.0	81.0	88.6	84.7
	Dozer	1	85	40	85.0	81.0		
	Front End Loader	1	80	40	80.0	76.0		
Building Construction	Crane	1	85	16	85.0	77.0	90.0	84.5
	Man Lift	1	85	20	85.0	78.0		
	Generator	1	82	50	82.0	79.0		
	Front End Loader	2	80	40	83.0	79.0		
	Welder / Torch	1	73	40	73.0	69.0		
Paving	Front End Loader	1	80	40	80.0	76.0	92.3	87.1
	Paver	1	85	50	85.0	82.0		
	Pavement Scarafier	2	85	20	88.0	81.0		
	Roller	1	85	20	85.0	78.0		
	Concrete Mixer Truck	1	85	40	85.0	81.0		
Architectural Coating	Compressor (air)	1	80	40	80.0	76.0	80.0	76.0

Source: Compiled by LSA Associates, Inc. (2024).
[1] The acoustical usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power.
dBA = A-weighted decibels
ft = foot/feet
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level

The closest residential property line is located west of the project site and is approximately 265 feet from the center of the project site. Outside the walls of the residence, the closest residential property may be subject to short-term construction noise reaching 72.6 dBA L_{eq} generated by construction activities in the project area. Construction noise is temporary and would stop once project construction is completed. Further, the proposed project must comply with the construction hours specified in the City's General Plan Noise Element Policy 3b, which states that construction activities are allowed between the hours of 7:00 a.m. to 5:30 p.m. on weekdays and 9:00 a.m. to 6:00 p.m. on weekends. Compliance with this policy would ensure construction-related noise would not be generated during the more sensitive nighttime hours.

As it relates to off-site uses, construction-related noise levels would remain below the daytime 80 dBA L_{eq} 8-hour construction noise level criteria established by the FTA for residential and similar sensitive uses and therefore would be considered less than significant. With implementation of the actions within Mitigation Measure NOI-1, construction noise would be further minimized to surrounding receptors.

Mitigation Measure NOI-1 **Best Management Practices for Construction Noise.** In addition to compliance with the City of Clayton Noise Element, which allows construction to occur between the hours of 7:00 a.m. to 5:30 p.m. on weekdays and 9:00 a.m. to 6:00 p.m. on weekends, the following recommendations would reduce construction noise to the extent feasible:

- The project construction contractor shall equip all construction equipment, fixed or mobile, with properly operating and maintained noise mufflers, consistent with manufacturer's standards.

- The project construction contractor shall locate staging areas away from off-site residential uses during all phases of construction.

- The project construction contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site whenever feasible.

As noted above, construction-related noise impacts would be considered less than significant. With implementation of Mitigation Measure NOI-1, which requires implementation of BMPs for construction noise (including equipment mufflers and placement of noise equipment away from sensitive receptors), potential impacts associated with construction noise would be further reduced below acceptable levels.

Long-Term Noise Impacts. The project's potential to generate long-term noise impacts are discussed below.

Long-Term (Operational) Traffic Noise. The FHWA Highway Traffic Noise Prediction Model (FHWA RD-77-108)[61] was used to evaluate traffic-related noise conditions along roadway segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resulting noise levels are weighted and summed over 24-hour periods to determine the L_{dn} values. The existing, near-term, and cumulative Average Daily Traffic (ADT) volumes without and with project were obtained from the *Traffic Impact Study for the Proposed Peacock Creek Townhomes*[62]. The standard vehicle mix for California roadways was used for roadways in the project area. Tables 4.13.G, 4.13.H, and 4.13.I shows the existing, near-term, and cumulative traffic noise levels without and with project, respectively, on roadways in the project area. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix G.

[61] United States Federal Highway Administration (FHWA). 1977. Highway Traffic Noise Prediction Model, FHWA RD 77-108.

[62] Advanced Mobility Group (AMG). 2022. Traffic Impact Study for the Proposed Peacock Creek Townhomes. November 15.

Table 4.13.G: Existing Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Conditions					With Project Conditions					
	ADT	Centerline to 70 dBA L_{dn} (ft)	Centerline to 65 dBA L_{dn} (ft)	Centerline to 60 dBA L_{dn} (ft)	L_{dn} (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA L_{dn} (ft)	Centerline to 65 dBA L_{dn} (ft)	Centerline to 60 dBA L_{dn} (ft)	L_{dn} (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions (dBA)
Clayton Road West of Oakhurst Drive	8,800	< 50	69	139	64.1	8,890	< 50	70	140	64.1	0.0
Clayton Road East of Oakhurst Drive	8,670	< 50	69	138	64.0	8,770	< 50	69	139	64.1	0.1
Clayton Road North of Peacock Creek Drive	8,540	< 50	68	137	64.0	8,800	< 50	69	139	64.1	0.1
Clayton Road South of Peacock Creek Drive	7,500	< 50	63	126	63.4	7,570	< 50	64	127	63.4	0.0
Oakhurst Drive North of Clayton Road	5,010	< 50	< 50	98	61.6	5,020	< 50	< 50	98	61.7	0.1
Peacock Creek Drive East of Clayton Road	1,220	< 50	< 50	< 50	53.2	1,550	< 50	< 50	< 50	54.3	1.1

Source: Compiled by LSA (2024).
ADT = average daily traffic
dBA = A-weighted decibel
ft = foot/feet
L_{dn} = Day/night noise level

Table 4.13.H: Near-Term Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Conditions					With Project Conditions					
	ADT	Centerline to 70 dBA L_{dn} (ft)	Centerline to 65 dBA L_{dn} (ft)	Centerline to 60 dBA L_{dn} (ft)	L_{dn} (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA L_{dn} (ft)	Centerline to 65 dBA L_{dn} (ft)	Centerline to 60 dBA L_{dn} (ft)	L_{dn} (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions (dBA)
Clayton Road West of Oakhurst Drive	8,850	< 50	69	140	64.1	8,940	< 50	70	141	64.2	0.1
Clayton Road East of Oakhurst Drive	8,720	< 50	69	138	64.1	8,820	< 50	69	139	64.1	0.0
Clayton Road North of Peacock Creek Drive	8,750	< 50	69	139	64.1	8,850	< 50	69	140	64.1	0.0
Clayton Road South of Peacock Creek Drive	7,550	< 50	64	126	63.4	7,570	< 50	64	127	63.4	0.0
Oakhurst Drive North of Clayton Road	5,010	< 50	< 50	98	61.6	5,020	< 50	< 50	98	61.7	0.1
Peacock Creek Drive East of Clayton Road	1,380	< 50	< 50	< 50	53.8	1,500	< 50	< 50	< 50	54.1	0.3

Source: Compiled by LSA (2024).
ADT = average daily traffic
dBA = A-weighted decibel
ft = foot/feet
L_{dn} = Day/night noise level

Table 4.13.I: Cumulative Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Conditions					With Project Conditions					
	ADT	Centerline to 70 dBA L_{dn} (ft)	Centerline to 65 dBA L_{dn} (ft)	Centerline to 60 dBA L_{dn} (ft)	L_{dn} (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA L_{dn} (ft)	Centerline to 65 dBA L_{dn} (ft)	Centerline to 60 dBA L_{dn} (ft)	L_{dn} (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions (dBA)
Clayton Road West of Oakhurst Drive	9,420	< 50	72	146	64.4	9,510	< 50	72	146	64.4	0.0
Clayton Road East of Oakhurst Drive	9,390	< 50	72	145	64.4	9,490	< 50	72	146	64.4	0.0
Clayton Road North of Peacock Creek Drive	9,640	< 50	73	148	64.5	9,740	< 50	73	149	64.5	0.0
Clayton Road South of Peacock Creek Drive	8,330	< 50	67	134	63.9	8,350	< 50	67	135	63.9	0.0
Oakhurst Drive North of Clayton Road	6,270	< 50	58	112	62.6	6,280	< 50	58	113	62.6	0.0
Peacock Creek Drive East of Clayton Road	1,490	< 50	< 50	< 50	54.1	1,610	< 50	< 50	< 50	54.5	0.4

Source: Compiled by LSA (2024).
ADT = average daily traffic
dBA = A-weighted decibel
ft = foot/feet
L_{dn} = Day/night noise level

Also, Tables 4.13.G, 4.13.H, and 4.13.I shows that the project-related traffic would increase noise by up to 1.1 dBA. Noise level increases of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, traffic noise impacts from project-related traffic on off-site sensitive receptors would be less than significant.

Long-Term (Operational) Stationary Noise. The proposed project would include on-site heating, ventilation, and air conditioning (HVAC) units for each residence that could potentially operate 24 hours per day. As worst-case scenario, the HVAC units are assumed to be located on the rooftop of the dwelling unit. Each HVAC unit would generate a noise level of 44.4 dBA L_{eq} at a distance of 50 feet. The specifications of a typical HVAC equipment, including the reference noise level, are provided in Appendix G.

Table 4.13.J shows the HVAC noise level at the closest residential property line, which is west of the project site along with the number of HVAC units from each building, the reference noise level at 50 feet, total noise level for the number of HVAC units, distance from the center of each building to the residential property line, distance attenuation, and the combined noise level at the residential property line.

Table 4.13.J: HVAC Noise

Land Use	Direction	Building	No. of Units	Reference Noise Level at 50 ft (dBA L_{eq})	Total Noise Level (dBA L_{eq})	Distance (ft)	Distance Attenuation (dBA)	Noise Level (dBA L_{eq})	Combined Noise Level (dBA L_{eq})
Residence	West	Building A	9	44.4	53.9	285	15.1	38.8	46.0
		Building B	8	44.4	53.4	245	13.8	39.6	
		Building C	4	44.4	50.4	205	12.3	38.1	
		Building D	9	44.4	53.9	190	11.6	42.3	

Source: Compiled by LSA (2024).
dBA = A-weighted decibel(s)
ft = foot/feet
L_{eq} = equivalent continuous sound level

As shown in Table 4.13.J, all 30 HVAC units operating on-site would generate a noise level of 46 dBA L_{eq} at the closest residential property line west of the project site. This noise level is equivalent to 52.4 dBA L_{dn}. The measured noise level near the project boundary at LT-1 was 67.1 dBA L_{dn}. Noise levels at the residential property would be similar to 67.1 dBA L_{dn} because the distance from the roadway centerline to the residential property line west of the project site is similar to the distance from the roadway centerline to LT-1. Noise levels generated from on-site HVAC units would increase ambient noise levels by 0.1 dBA and would be masked by traffic on Clayton Road. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, noise impacts from project operations would be less than significant.

b. Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact. The potential for the project to generate excessive groundborne vibration or groundborne noise is described below.

Short-Term Construction Vibration. This construction vibration impact analysis discusses the level of human annoyance using vibration levels in RMS (VdB) and assesses the potential for building damage using vibration levels in PPV (in/sec). Vibration levels calculated in RMS velocity are best for characterizing human response to building vibration, whereas vibration levels in PPV are best for characterizing damage potential.

Table 4.13.K shows the reference vibration levels at a distance of 25 feet for each type of standard construction equipment from the FTA Manual[63]. Project construction is expected to require the use of large bulldozers and loaded trucks, which would generate ground-borne vibration levels of up to 87 VdB (0.089 PPV [in/sec]) and 86 VdB (0.076 PPV [in/sec]), respectively, when measured at 25 feet.

Table 4.13.K: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	PPV (in/sec)	L_V (VdB)[1]
Pile Driver (Sonic), Typical	0.170	93
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large Bulldozer[2]	**0.089**	**87**
Caisson Drilling	0.089	87
Loaded Trucks[2]	**0.076**	**86**
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

[1] RMS vibration velocity in decibels (VdB) is 1 µin/sec.
[2] The equipment shown in **bold** text is expected to be used on site.

µin/sec = microinches per second
ft = foot/feet
FTA = Federal Transit Administration
in/sec = inches per second
L_V = vibration velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

The greatest vibration levels are anticipated to occur during the site preparation and grading phase. All other phases are expected to result in lower vibration levels. The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project boundary (assuming the construction equipment would be used at or near the project boundary) because vibration impacts normally occur within the buildings.

[63] FTA. 2018. op. cit.

The formula for vibration transmission is provided below:

$$L_v dB (D) = L_v dB (25 \text{ feet}) - 30 \text{ Log } (D/25)$$

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

Table 4.13.L lists the projected vibration levels from various construction equipment expected to be used on the project site along with the distance from center of the project site to the nearest building structure. As shown in Table 4.13.L, the residential building to the west is approximately 330 feet from the center of the project site and would experience vibration levels of up to 53 VdB. This vibration level would not have the potential to result in community annoyance because vibration levels would not exceed the FTA community annoyance threshold of 78 VdB for daytime residences. Other building structures that surround the project site would experience lower vibration levels because they are farther away.

Table 4.13.L: Potential Construction Vibration Annoyance

Land Use	Direction	Equipment/ Activity	Reference Vibration Level (VdB) at 25 ft	Distance to Structure (ft)[1]	Vibration Level (VdB)
Oakhurst Country Club (1001 Peacock Creek Drive)	North	Large bulldozers	87	740	43
		Loaded trucks	86	740	42
Residence (1218 Easley Drive)	West	Large bulldozers	87	330	53
		Loaded trucks	86	330	52

Source: Compiled by LSA (2023).
Note: The FTA threshold perception is 65 VdB.
[1] Distance from the center of the project site to the building structure.
ft = foot/feet
VdB = vibration velocity decibels
FTA = Federal Transit Administration

Similarly, Table 4.13.M lists the projected vibration levels from various construction equipment expected to be used on the project site at the project construction boundary to the nearest building structure. As shown in Table 4.13.M, the residential building to the west is approximately 180 feet from the project construction boundary and would experience vibration levels of up to 0.005 in/sec (PPV). This vibration level would not have the potential to result in building damage because the residential buildings would be constructed equivalent to non-engineered timber and masonry, and vibration levels would not exceed the FTA vibration damage threshold of 0.20 in/sec (PPV). Other building structures that surround the project site would experience lower vibration levels because they are farther away and would be constructed equivalent to non-engineered timber and masonry.

Long-Term (Operational) Vibration. The project would not generate vibration. In addition, vibration levels generated from project-related traffic on roadways within the project area (Clayton Road and Peacock Creek Drive) would be unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. Therefore, vibration impacts from project-related operations would occur, and no vibration reduction measures are required.

Table 4.13.M: Potential Construction Vibration Damage

Land Use	Direction	Equipment/ Activity	Reference Vibration Level at 25 ft	Distance to Structure (ft)[1]	Vibration Level
			PPV (in/sec)		PPV (in/sec)
Oakhurst Country Club (1001 Peacock Creek Drive)	North	Large bulldozers	0.089	460	0.001
		Loaded trucks	0.076	460	0.001
Residence (1218 Easley Drive)	West	Large bulldozers	0.089	180	0.005
		Loaded trucks	0.076	180	0.004

Source: Compiled by LSA (2024).
Note: The FTA-recommended building damage threshold is 0.20 PPV [in/sec]) at the receiving non-engineered timber and masonry building.
1 Distance from the project construction boundary to the building structure.
ft = foot/feet
FTA = Federal Transit Administration
in/sec = inches per second
PPV = peak particle velocity

c. *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 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?*

No Impact. The closest airport to the project site is Buchanan Field Airport, which is 7.4 miles to the northwest. The Contra Costa Airport Land Use Compatibility Plan[64] for Buchanan Field Airport shows that the project is outside of the airport's 55 dBA CNEL noise contour. Also, there are no private airstrips located within 2 miles of the project site. Therefore, the proposed project would not expose people residing or working in the project area to excessive noise levels generated from nearby airport operations.

64 Contra Costa County Airport Land Use Commission (CCCACUC). 2000. Contra Costa County Airport Land Use Compatibility Plan. December 13.

4.14 POPULATION AND HOUSING

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Induce substantial unplanned 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 people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐

a. Would the project induce substantial unplanned 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)?

Less Than Significant Impact. The proposed project involves the construction of four multi-family residential buildings containing 30 dwelling units. Based on the City of Clayton's average household size of 2.88 persons per household,[65] the proposed project would increase the local population by approximately 86 persons. The population of the City was estimated to be approximately 10,973 persons as of July 1, 2021.[66] The anticipated population growth associated with the proposed project represents less than a 1 percent increase to the City's current population. According to projections from the Association of Bay Area Governments (ABAG),[67] the number of households in North Contra Costa County (the region of Contra Costa County that contains the City of Clayton) is anticipated to increase approximately 58 percent from 2015 to 2050, to 134,000 households. The proposed project represents approximately 0.02 percent of the household growth in the region anticipated through 2050.

Since the project would create new housing, project implementation would induce population growth in the area. This population growth, however, would not be considered substantial or unplanned because the proposed project is consistent with the City's General Plan land use and zoning designations for the site and would, thus, be consistent with the growth assumed for build out of the General Plan.

b. Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

Less Than Significant Impact. The proposed project involves the construction of four multi-family residential buildings containing 30 dwelling units. The project site currently consists of vacant land, which includes a partially paved, largely gravel parking lot. Therefore, there would be no demolition

65 United States Census Bureau. 2021b. *QuickFacts, Clayton City, California*. Website: https://www.census.gov/quickfacts/fact/table/claytoncitycalifornia,US/PST045221 (accessed December 26, 2023).

66 Ibid.

67 Association of Bay Area Governments (ABAG). 2021. Plan Bay Area 2050 Growth Pattern.

or removal of housing on the project site. Additionally, the proposed project would result in a net gain of 30 residential units. Therefore, the proposed project would not involve the displacement of substantial numbers of existing housing or people and would not require the construction of replacement housing elsewhere. Impacts related to displacement would be less than significant.

4.15 PUBLIC SERVICES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. 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?

Less Than Significant Impact. The proposed project involves the construction of four multi-family residential buildings containing 30 dwelling units, and associated improvements, which is expected to incrementally increase the demand for fire protection services because it would increase the site's population by approximately 86 residents. The Contra Costa County Fire Protection District (CCCFPD) provides fire prevention, suppression, and emergency medical response for advanced and basic life support to nine cities, including Clayton, and much of the unincorporated territory in the central and western portions of Contra Costa County. The CCCFPD operates 33 active stations and has plans to open 2 more fire stations in its jurisdictional area. Contra Costa County Fire Station No. 11, located in the City of Clayton at 6500 Center Street, is the closest fire station to the project site (approximately 0.5 mile from the project site).

As noted in Section 4.14, Population and Housing, the proposed project would result in an incremental increase in the population of Clayton and therefore would incrementally increase the demand for emergency fire services and emergency medical services. Project design features incorporated into the structural design and layout of the residential units would keep service demand increases to a minimum. For example, the project would be constructed in accordance with the current California Building Code (CBC) (at the time of writing, the 2022 CBC), which requires all on-site structures to incorporate construction techniques and materials such as roofs, eaves, exterior walls, vents, appendages, windows, and doors that are resistant to and/or perform at high levels against ignition during the exposure to fire. Fire sprinklers would be required in each residential unit to further reduce fire risk and service demand. Vehicular access to the project site would be provided via an internal private drive with access from Peacock Creek Drive. Secondary emergency vehicle access would be provided via a gated driveway from Clayton Road. These access roads would be developed to City and Fire Code Standards to allow emergency vehicles ease of access and maneuverability.

The CCCFPD would continue providing services to the project site and would not likely require additional firefighters to serve the proposed project because the project site is within the station's existing area of service. The construction of a new or expanded fire station would also not be required, as the project would be developed on a site surrounded by other developed properties that are currently within the service area of CCCFPD. The potential increase in demand for service is not expected to adversely affect existing response times to the site or within Clayton or the CCCFPD service area more broadly. Therefore, the proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or the 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 fire protection, and this impact would be less than significant.

ii. Police protection?

Less Than Significant Impact. Police protection services would be provided for the project by the Clayton Police Department (CPD). The proposed project's construction of four multi-family residential buildings containing 30 dwelling units, and the associated population increase therefrom would incrementally increase the demand for police protection services. The CPD does not base service standards on an industry standard; instead, the City aims for a response time of 5 minutes, 90 percent of the time (Clayton General Plan Growth Management Element, Public Facilities and Services Performance Standard 1). The project site is located in an established residential neighborhood of Clayton, which is already served by the CPD. The closest CPD police station to the project site is located at 6000 Heritage Trail, which is approximately 0.7 mile northwest of the project site. Average travel time between the nearest police station and the project site is approximately 3 minutes.

Based on the proposed project's location in proximity to existing CPD facilities and within the existing service area of the CPD, development of the proposed project would not cause law enforcement staffing, facilities, or equipment to operate at a deficient level of service. The project itself would not require the construction of new or physically altered law enforcement protection facilities, the construction of which could result in an environmental impact. Impacts associated with the need to expand law enforcement protection services and facilities in order to maintain acceptable levels of service would be less than significant.

iii. Schools?

Less Than Significant Impact. The project site is located within the Mount Diablo Unified School District (MDUSD). The MDUSD boundary encompasses 31 elementary schools (serving Kindergarten through Fifth Grade), nine middle schools (serving Sixth through Eighth Grades), and five high schools (serving Ninth through Twelfth Grades), including one charter high school that operates independently but is within the MDUSD geographic boundary. It should be noted that Mount Diablo Elementary School and Diablo View Middle School are currently the only schools located within the Clayton city limits; all the other schools reside outside the city limits. The closest public schools to the project site are as follows:

- **Clayton Valley Charter High School, 1101 Alberta Way:** approximately 2.8 miles[68] west of the project site
- **Highlands Elementary School, 1326 Pennsylvania Boulevard**: approximately 2.1 miles west of the project site
- **Mount Diablo Elementary School, 5880 Mt. Zion Drive**: approximately 1.4 miles northwest of the project site
- **Pine Hollow Middle School, 5522 Pine Hollow Road**: approximately 2.0 miles west of the project site
- **Diablo View Middle School, 300 Diablo View Lane**: approximately 0.8 mile south of the project site
- **Ygnacio Valley High School, 755 Oak Grove Road**: approximately 7.2 miles west of the project site
- **Concord High School, 4200 Concord Boulevard**: approximately 4.8 miles northwest of the project site
- **Northgate High School, 425 Castle Rock Road:** approximately 7.5 miles southwest of the project site

Based on the locations of the abovementioned schools' proximity to the project site, students generated by the site's population increase are anticipated to attend one or more of these schools. Table 4.15.A shows the current and past enrollment data for Clayton Valley Charter High School, Highlands Elementary School, Mount Diablo Elementary School, Pine Hollow Middle School, Diablo View Middle School, Ygnacio Valley High School, Concord High School and Northgate High School.

As shown in Table 4.15.A, enrollment data for the MDUSD has decreased incrementally over the past 3 school years. In addition, enrollment in Highlands Elementary School, Mount Diablo Elementary School, Diablo View Middle School, Ygnacio Valley High School, and Concord High School has decreased in the last 3 school years. Clayton Valley Charter High School, Northgate High School, and Pine Hollow Middle School show a relatively constant enrollment rate. The proposed project would include the development of four multi-family residential buildings containing 30 dwelling units that would generate school-aged children who would be anticipated to attend MDUSD's Highlands Elementary School, Mount Diablo Elementary School, Pine Hollow Middle School, Diablo View Middle School, Ygnacio Valley High School, Concord High School, and Northgate High School.

[68] Distances from the project site to nearby schools represents the driving distance.

Table 4.15.A: Mount Diablo Unified School District Enrollment Data

District/School	2019-2020 Enrollment	2020-2021 Enrollment	2021-2022 Enrollment
Mt. Diablo Unified School District	30,740	29,908	29,789
Highlands Elementary School	529	512	482
Mt. Diablo Elementary School	786	743	667
Pine Hollow Middle School	569	562	579
Clayton Valley Charter High School	2,234	2,266	2,346
Northgate High School	1,487	1,492	1,496
Diablo View Middle School	622	577	534
Ygnacio Valley High School	1,285	1,265	1,230
Concord High School	1,295	1,187	1,167

Source: California Department of Education. n.d. Data Quest Website: https://dq.cde.ca.gov/dataquest/dataquest.asp (accessed February 2024).

The proposed project would increase the population in the local area and would consequently add students to the local school system. The MDUSD has accounted for its projected student population as part of its facility planning, which is based on the County of Contra Costa (County) build out, and MDUSD charges fees to builders of new development within district boundaries to offset the costs for construction of new school facilities. Developers of properties in Clayton are required to show the County Building Department evidence of payment of fees to MDUSD before they can receive a building permit for their project. Under State law (California Government Code Section 65995 and Education Code Section 17620), payment of school impact fees established by the school district prior to the issuance of a building permit constitutes full mitigation for impacts to school facilities. Therefore, the project's impacts with regard to construction of new or physically altered educational facilities, the construction of which could result in an environmental impact would be less than significant.

iv. Parks?

Less Than Significant Impact. The proposed project involves the construction of four multi-family residential buildings containing 30 dwelling units, which would induce population growth in the area. The increase in residents within the area may result in an incremental increase in demand for and use of local parks and recreation areas. Clayton Municipal Code (CMC) Section 17.28.100 requires that 20 percent of the net project area be open space. Approximately 41 percent (1.02 acres) of the 2.5-acre proposed project site would be open space.

Although Easley Estates Park is located west of the project site and project residents would be expected to use the park, the proposed project is required to dedicate on-site park areas or pay the requisite development fees in accordance with CMC Section 16.12.010. Compliance with all development standards and necessary fees would ensure that impacts associated with the need to expand park facilities (in order to maintain acceptable levels of service) would be less than significant.

v. Other public facilities?

Less Than Significant Impact. The proposed project is expected to generate approximately 86 additional residents who would be added to the City of Clayton population. The proposed project is consistent with the General Plan land use designation and zoning, so the projected increase in population would be consistent with planned population growth in Clayton, as anticipated by the General Plan and regional planning documents. This minimal increase in population would incrementally increase the need for a number of public services, including those listed above and others such as libraries and City administrative facilities, which would be offset through the payment of development impact fees and property taxes following occupancy of the units. However, the project is not expected to result in the need to construct or expand such facilities. Therefore, impacts would be less than significant.

4.16 RECREATION

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Less Than Significant Impact. The City of Clayton has seven parks and rentable facilities, including the Clayton Community Park, four neighborhood parks (The Grove, Lydia Lane Park, North Valley Park, and Westwood Park), a dog park, and an equestrian staging area. The closest park to the project site is Easley Estates Park, approximately 0.5 mile west of the project site. Easley Estates Park is an 11.7-acre neighborhood park with walking trails that runs along Mount Diablo Creek. The project site is also bordered to the west by the Oakhurst Country Club Golf Course (a private 18-hole golf course) that is part of the Oakhurst Country Club, which also includes tennis courts, a pool, and a clubhouse.

The project does not incorporate active park facilities. Although Easly Estates Park is located west of the project site, and project residents would be expected to use Easly Estates Park, the project is still required to either dedicate on-site park areas or pay fees in lieu of dedication, in accordance with Section 16.12.010 of the CMC.

Although the proposed project would incrementally increase the public use of surrounding parks and trails (e.g., Easly Estates Park), this increase is not anticipated to be such that substantial physical deterioration of the facility would occur. Since the proposed project would include two on-site open space parcels totaling 1.02 acres, the proposed project would nominally contribute to the increased use of existing neighborhood parks, regional parks, or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. Impacts would be less than significant.

b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Less Than Significant Impact. Refer to Section 4.16.a. The proposed project would include open space parcels totaling 1.02 acres. The open space parcels would include two landscaped bioretention facilities totaling approximately 1,960 square feet and landscaped areas totaling 27,690 square feet. The project, however, does not incorporate active park facilities. Although the proposed project would incrementally increase the public use of surrounding parks and trails (e.g., Easly Estates Park), this increase is not anticipated to be such that substantial physical deterioration of the facility would occur. As discussed throughout this environmental document, development of the project would consider all potential environmental impacts, including those that would occur with development of the on-site open space. The proposed project actions do not include the expansion of existing recreational facilities, and impacts pertaining to the development of the on-site open space would be less than significant.

4.17 TRANSPORTATION

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b. Conflict or be inconsistent with CEQA Guidelines §15064.3, subdivision (b)?	☐	☐	☒	☐
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d. Result in inadequate emergency access?	☐	☐	☒	☐

The following section is based on the Traffic Impact Study[69] prepared for the proposed project (Appendix I). The Traffic Impact Study describes the existing and future conditions for transportation and circulation both with and without the proposed project. The study presents information on the regional and local roadway networks, pedestrian, and transit conditions, and provides an analysis of the effects on transportation facilities associated with the project.

Two study intersection were included in the analysis: Clayton Road and Peacock Drive, and Clayton Road and Oakhurst Drive. The primary transportation facilities that would be affected by the project are:

Peacock Creek Drive: Peacock Creek Drive is a two-lane north-south divided local street adjacent to the proposed Peacock Creek Townhomes Project. It extends from Clayton Road in the south and connects to the Peacock Creek residential neighborhood to the north. The roadway is adjacent to entrances to the City of Clayton Open Space Hiking Trail. Sidewalk is available on both sides of the street. The speed limit is 25 miles per hour (mph).

Oakhurst Drive: Oakhurst Drive is a four-lane east-west divided residential collector street that extends from Concord Boulevard to Clayton Road. The speed limit is 40 mph.

Clayton Road: Clayton Road is a major east-west arterial roadway serving Clayton, which provides connections to State Route 242, the Bay Area Rapid Transportation (BART) Transit Line, and the City of Concord. It is located to the west of the project site and serves as a major transit route (all Clayton Transit Routes travel on Clayton Road) in Clayton. Class II Bikeway facilities are available along this roadway from Clayton City Limits in the east to the Clayton Road and Peacock Drive intersection in the west. The corridor includes sidewalks on both sides along its length and provides an entrance to Black Diamond Trail, north of the project site. The speed limit is 45 mph approaching the project site.

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69 Advanced Mobility Group. 2025. *Traffic Impact Study for Proposed Peacock Creek Townhomes in Clayton, California.* May 30.

a. Would the project conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

Less Than Significant Impact. The proposed project involves the construction of four multi-family residential buildings containing 30 dwelling units. Vehicular access to the project site would be provided via an internal private drive with access from Peacock Creek Drive. Secondary emergency vehicle access would be provided via a gated driveway from Clayton Road.

Trip Generation. Trip generation is defined as the number of "vehicle trips" produced by a particular land use or project. A trip is defined as a one-direction vehicle movement. The total number of trips generated by each land use includes the inbound and outbound trips. The trip generation estimates for the proposed land use (Multifamily Housing (Mid-Rise)) was calculated using the standard reference Trip Generation, 11th Edition, published by the Institute of Transportation Engineers (ITE). The estimated potential trip generation of the proposed project is shown in Table 4.17.A. It is estimated that the project will generate approximately 12 trips during both the AM and PM peak hours. For purposes of determining the reasonable worst-case impacts of traffic on the surrounding street network from a proposed project, the trips generated by this proposed development are estimated for the peak commuting hours, which represent the peak of "adjacent street traffic." This is the time period when the project trips would generally contribute to the greatest amount of congestion.

Table 4.17.A: Trip Generation

Land Use	Size	ADT	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Town Home – ITE Code 221	30 units	136	3	9	12	7	5	12

Source: Advanced Mobility Group. 2025. *Traffic Impact Study for Proposed Peacock Creek Townhomes in Clayton, California*. May 30.
ADT = average daily traffic
ITE = Institute of Transportation Engineers

Roadway Analysis. On December 28, 2018, the California Office of Administrative Law and the California Governor's Office of Planning and Research (OPR) cleared and adopted the revised *State CEQA Guidelines* Section 15064.3. Among the changes to the guidelines was the removal of vehicle delay and level of service (LOS) as the sole basis of determining environmental impacts under CEQA. With the implementation of the adopted guidelines, transportation impacts are to be evaluated based on a project's effect on vehicle miles traveled (VMT). On July 1, 2020, the provisions of *State CEQA Guidelines* Section 15064.3 became effective statewide. The discussion of the project's consistency with *State CEQA Guidelines* Section 15064.3 is discussed under Section 4.17.b, below.

Construction activities associated with the proposed project would result in an increase in traffic on local roadways during the construction period due to heavy equipment transport to and from the site, arrival and departure of construction workers, and import/export of construction material. Prior to issuance of grading and building permits, the project applicant would be required to submit a Traffic Control Plan. The Traffic Control Plan would indicate how parking for construction workers would be provided during construction and ensure a safe flow of traffic in the project area during construction. Measures to be included in the Traffic Control Plan would include, but are not limited to: (a) truck drivers would be notified of and required to use the most direct route between the site and the freeway as determined by the City Engineer; (b) all site ingress and egress would occur only at the main driveways to the project site, and construction activities may require installation of temporary traffic controls as determined by the City Engineer; (c) specifically designated travel routes for large vehicles would be monitored and controlled by flaggers for large construction vehicle ingress and egress; and (d) any debris and/or mud on nearby streets caused by trucks would be monitored daily and may require instituting a street cleaning program.

Traffic associated with construction would be short-term and temporary and would be subject to a Traffic Control Plan and oversight by the City Engineer in accordance with CMC Chapter 12.04, in addition to Clayton General Plan Circulation Element Implementation Measure 13 that authorizes the City to restrict travel by certain commercial or excessively noisy vehicles on designated residential streets. Therefore, demolition and construction activities associated with the proposed project would not conflict with a local policy or regulation related to the roadway system. This impact would be less than significant.

Pedestrian Facilities. According to the United States Census Bureau,[70] pedestrian trips comprise approximately 1.9 percent of the total commute mode share in the City of Clayton. According to the Traffic Impact Study, the proposed project would generate additional pedestrian traffic in the area. However, the proposed project would not generate a significant increase in pedestrian and bicycle traffic in the area in comparison to the existing volumes, given the size and nature of the proposed project. A travel survey conducted by Caltrans estimates that each household makes approximately 9.2 trips per day.[71] Based on the percentage mode share above, the proposed project is estimated to generate approximately 5 pedestrian trips[72] per day. The volume of pedestrian trips generated by the project would not exceed the carrying capacity of the sidewalks and crosswalks nearby.

Pedestrian facilities in the study area include sidewalks, crosswalks, and Americans with Disabilities Act (ADA) curb ramps. Sidewalks along the perimeter of the project site are at least 5 feet wide. The crosswalk at Peacock Creek Drive and Clayton Road is adjacent to the project site at the east side of the intersection. This crossing also has ADA-accessible curb ramps and pedestrian pushbuttons. Entrances to the City of Clayton Open Space Hiking Trail are accessible along Peacock Creek Drive. The Clayton Road/Oakhurst Drive intersection has crosswalks at each intersection leg. ADA-accessible curb ramps are available at the north leg of the intersection. Additionally, access to the Black Diamond Hiking Trail is provided along Clayton Road at two pedestrian entrances located between the Clayton Road/Oakhurst Drive and Peacock Creek Drive/Clayton Road intersections.

Consistent with existing City policies, the proposed project would provide the required accessible ramps, in compliance with the ADA, for the sidewalks on Peacock Creek Drive at the proposed driveway. The proposed project would also maintain access to the existing trail that runs along

70 United States Census Bureau. 2021a. *5-year ACS Data Table B08134: Means of Transportation to Work by Travel Time to Work.* Website: https://data.census.gov/table?q=B08134:+MEANS+OF++TRANSPORTATION+TO+WORK+BY+TRAVEL+TIME+TO+WORK&g=160XX00US0613882 (accessed January 19, 2023).

71 California Department of Transportation (Caltrans). n.d. *California Household Travel Survey: More Californians are Walking, Biking, and Riding Transit.*

72 9.2 household trips x 30 households x 0.019 pedestrian trips = 5.24 pedestrian trips per day

Clayton Road. The proposed project also includes internal pedestrian pathways to provide access through the site. Therefore, the proposed project would have a less than significant impact on pedestrian facilities.

Bicycle Facilities. United States Census Bureau data indicate that bicycle trips comprise approximately 0.4 percent of the total commute mode share in Clayton.[73] According to the Traffic Impact Study, the low volume of bicycle trips generated by the project would not exceed the bicycle-carrying capacity of streets surrounding the site, and the increase in bicycle trips would not by itself require new off-site bicycle facilities.

Class II bicycle facilities are available near the project site on Clayton Road and at the intersection of Peacock Drive and Clayton Road. The proposed project, by itself, would not require additional bicycle facilities to serve the project site. The proposed project would not preclude, modify, or otherwise affect existing or proposed bicycle projects or relevant policies identified in the City of Clayton General Plan. Therefore, the proposed project would have a less than significant impact on bicycle facilities.

Transit Service. County Connection Transit is the one public transit operator providing service within or adjacent to the study area. The County Connection currently operates a total of 31 fixed route bus routes on weekdays throughout Central Contra Costa County with limited service to Clayton. The routes that serve Clayton are Route 10 (weekdays) and Route 310 (weekends), both of which provide access to the Concord Bay Area Rapid Transit (BART) station. These routes have a frequency of 30 minutes on weekdays and 1 hour on weekends and run from about 6:00 a.m. to 7:30 p.m. on weekdays and from about 8:00 a.m. to 9:00 p.m. on weekends. Currently, the bus stops for Routes 10 and 310 nearest the proposed project are located at the Peacock Creek Road/Clayton Road intersection adjacent to the project site.

According to the United States Census, transit trips comprise approximately 8.6 percent of the total commute mode share in Clayton.[74] In addition to commute trips, there would be additional transit trips to nearby schools, parks, and shopping areas. According to the Traffic Impact Study, the proposed project, by itself, would not require additional transit service to the area or improvements to existing transit service frequencies. The proposed project would not preclude, modify, or otherwise affect existing or proposed transit projects or policies identified in the City of Clayton General Plan. Additionally, the proposed project would not result in degradation of the level of service (or a significant increase in delay) on any roadways currently being utilized by transit service in the area and would not increase ridership beyond existing capacity. Therefore, the proposed project would have a less than significant impact related to transit service.

b. Would the project conflict or be inconsistent with CEQA Guidelines §15064.3, subdivision (b)?

Less Than Significant Impact. *State CEQA Guidelines* Section15064.3, subdivision (b) seeks to evaluate a project's potential impact related to its vehicle miles traveled (VMT). An evaluation of the project's VMT impacts was conducted according to the Contra Costa Transportation Authority

73 United States Census Bureau. 2021a. op. cit.
74 Ibid.

(CCTA) VMT Analysis Methodology for Land Use Projects in Contra Costa[75] because the City does not currently have adopted CEQA thresholds for VMT. This methodology was subsequently codified in the implementation guide for the County's Growth Management Program Implementation Guide.[76]

Contra Costa County established five screening criteria that lead agencies can apply to screen projects out of conducting project-level VMT analysis:

- **CEQA Exemption.** Any project that is exempt from CEQA is not required to conduct a VMT analysis.

- **Small Projects.** Small projects can be presumed to cause a less than significant VMT impact. Smal projects are defined as having 10,000 square feet or less of non-residential space or 20 residential units or less, or otherwise generating less than 836 VMT per day.[77]

- **Local Serving Uses.** Projects that consist of Local-Serving Uses can generally be presumed to have a less than significant impact absent substantial evidence to the contrary, since these types of projects will primarily draw users and customers from a relatively small geographic area that will lead to short-distance trips and trips that are linked to other destinations.

- **Projects Located In Transit Priority Areas (TPAs).[78]** Projects located within a TPA can be presumed to have a less than significant impact absent substantial evidence to the contrary. This exemption would not apply if the project:

  - Has a Floor Area Ratio (FAR) of less than 0.75;

[75] Contra Costa Transportation Authority (CCTA). 2020. *VMT Analysis Methodology for Land Use Projects in Contra Costa, Growth Management Task Force Review Draft.* July 9.

[76] Contra Costa Transportation Authority (CCTA). 2021. *Implementation Guide, Growth Management Program Implementation Documents*. February 17.

[77] This threshold ties directly to the OPR Technical Advisory which notes that CEQA provides a categorical exemption for existing facilities, including additions to existing structures of up to 10,000 square feet, so long as the project is in an area where public infrastructure is available to allow for maximum planned development and the project is not in an environmentally sensitive area. (CEQA Guidelines, § 15301, subd. (e)(2).) Using statewide average data from the California Statewide Household Travel Survey (CHTS), the amount of daily VMT associated with 10,000 square feet of non-residential space is 836 VMT. Also using statewide average CHTS data, this level of VMT is associated with 20 housing units. Therefore, absent substantial evidence otherwise, it is reasonable to conclude that the addition of 20 housing units or 10,000 square feet of non-residential space could be considered not to lead to a significant impact.

[78] A Transit Priority Area is defined as an area of close proximity to a significant transit mode, defined as a one-half mile area around an existing major transit stop or an existing stop along a high-quality transit corridor. Public Resources Code, § 21064.3 defines major transit stop as a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of 15 minutes or less during the morning and afternoon peak commute periods. Public Resources Code, § 21155 defines a 'high-quality transit corridor' as a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours. Locations of the Transit Priority Areas (TPAs) in Contra Costa County can be found in maps available on the CCTA website.

   - Includes more parking for use by residents, customers, or employees than required by the lead agency (if the lead agency allows by does not require the project to supply a certain amount of parking);
   - Is inconsistent with the applicable Sustainable Communities Strategy (SCS) (as determined by the lead agency with input from the Metropolitan Transportation Commission); or
   - Results in a net reduction in multi-family housing units.
- **Projects Located in Low VMT Areas.** Residential and employment-generating projects located within a low VMT-generating area can be presumed to have a less than significant impact absent substantial evidence to the contrary. A low VMT area is defined as follows:
   - For housing projects: Cities and unincorporated portions within Contra Costa Transportation Authority's (CCTA) five subregions that have existing home-based VMT per capita that is 85 percent or less of the existing County-wide average.
   - For employment generation projects: Cities and unincorporated portions of CCTA's five subregions that have existing home-work VMT per worker that is 85 percent or less of the existing regional average.

The proposed project would result in the construction of 30 multi-family residential units, which exceeds the small project threshold; is not considered a locally-serving use; and is not located within a designated TPA.[79] As described in the Traffic Impact Study, the City of Clayton has a home-based VMT per resident of 23.23. It is estimated that Contra Costa County VMT is approximately 18.4. Therefore, the proposed project is not located in a low VMT area, as the City's VMT per capita exceeds that of the County.

SB 743 guidelines recommend that VMT thresholds for residential and employment-based land use projects be set at 15 percent below the existing baseline city residential VMT/capita or regional employment VMT/employee. Based on the City's home-based VMT per resident, 15 percent below the baseline threshold of 23.23 is 19.75 VMT per resident.

The Traffic Impact Study includes an analysis of trips and work data for the census tract within which the project is located to estimate the potential trip reductions associated with remote work. The census data indicate that approximately 61.6 percent of the population generated by the proposed project would be employed with 55.6 percent of those working remotely. Based on this information, it was estimated that the potential reduction in VMT due to remote work is approximately 618. The resulting total VMT associated with the proposed project is approximately 563, or 15.77 VMT per resident. Therefore, the proposed project would not contribute to a significant VMT impact as the VMT per resident would be below the 15 percent threshold of 19.75 VMT per resident.

[79] Contra Costa Transportation Authority (CCTA). Transit Priority Areas Website: https://ccta1.maps.arcgis.com/apps/webappviewer/index.html?id=4135020bb272458f 824152fedb78a088 (accessed February 13, 2024).

Further, based on the location and design of the proposed project and CCTA Technical Procedures,[80] implementation of the transportation demand management (TDM) measures that are included in the project design would result in an approximately 25 percent reduction in VMT. Those strategies and the associated VMT reduction are shown in Table 4.17.B.

Table 4.17.B: Potential VMT Reduction Strategies

CCTA Strategies	TDM Strategy	Maximum Potential VMT Reduction for Affected Trips	Percent Use Estimated	Comments
1	Increase residential density	30%	15%	Medium density housing on Clayton Road, convenience to downtown, and compatibility with City housing goals and state housing mandates.
18	Provide pedestrian network improvements	6.40%	3%	Project provides connection to sidewalk and new crosswalk on Clayton Road. Direct connection to downtown.
25	Extend transit network coverage/hours	4.60%	2%	Will work with County Connection to extend coverage
26	Increase transit service frequency	11.30%	5%	Will work with County Connection (Bus Service for Lines 10 and 310) to increase frequency.
		Total Potential VMT Reduction	**25%**	

Source: *Traffic Impact Study for Proposed Peacock Creek Townhomes in Clayton, California* (Advanced Mobility Group, May 30, 2025).
VMT = vehicle miles traveled

Based on the analysis above, with implementation of these VMT reduction strategies, the proposed project's impact related to VMT would be less than significant.

c. Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Less Than Significant Impact. The design, construction, and maintenance of project access locations and on-site roads would be in compliance with the City's Municipal Code and would meet all emergency access standards. Vehicular access to the project site would be provided via an internal private drive with access from Peacock Creek Drive. As described in the Traffic Impact Study, the Peacock Creek Road intersection providing access to the project site is forecasted to operate acceptably with implementation of the proposed project and would not meet any of the Caltrans warrants for a traffic signal. Therefore, operations for through traffic on Peacock Drive would not be significantly affected. Additionally, the project site is located within an already developed area with mostly residential uses and would therefore be consistent with surrounding land uses. This impact would be less than significant.

[80] Contra Costa Transportation Authority (CCTA). 2022. CCTA Technical Procedures, Appendix 1. Summary of Potential VMT Reduction Strategies.

d. Would the project result in inadequate emergency access?

Less Than Significant Impact. The design, construction, and maintenance of project access locations and on-site roads would be in compliance with the City's Municipal Code and would meet all emergency access standards. The Contra Costa County Fire Protection District (CCCFPD) would also review the proposed site plan and Fire Access Plan and would provide input on final design in relation to emergency access prior to issuance of a building permit. Vehicular access to the project site would be provided via an internal private drive with access from Peacock Creek Drive. Secondary emergency vehicle access would be provided via a gated driveway from Clayton Road. These access points would be developed to City and Fire Code Standards to allow emergency vehicles ease of access and maneuverability. All lane widths within the project site would meet the minimum width that can accommodate an emergency vehicle; therefore, the width of the internal roadways would be adequate. The Traffic Impact Study concludes that due to the low number of project-generated trips, the project would not be expected to adversely impact operations at nearby signalized intersections or roadways. Therefore, the proposed project should not result in any significant changes to emergency vehicle response times in the area. The proposed project would not alter or block adjacent roadways, and implementation of the proposed project would not be expected to impair the function of nearby emergency evacuation routes. Therefore, the proposed project would not result in inadequate emergency access. This impact would be less than significant.

4.18 TRIBAL CULTURAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)? Or	☐	☒	☐	☐
ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

a. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)? Or

Less Than Significant with Mitigation Incorporated. Enacted in 2014 and codified in part in PRC Section 21080.3.1, Assembly Bill (AB) 52 (Gatto) amended CEQA to require tribal cultural resources to be considered as potentially significant cultural resources under the CEQA environmental review process. The procedures under AB 52 offer Tribes an opportunity to take an active role in the CEQA process in order to protect tribal cultural resources. Pursuant to AB 52, if a Native American identifies tribal cultural resources within a project site, the Native American shall contact the local lead agency.

On February 16, 2024**,** in accordance with Public Resources Code Section 21080.3.1(b) (Assembly Bill 52 – Gatto [2014]), the City of Clayton sent outreach letters to the tribes listed in the contact list provided by the Native American Heritage Commission (NAHC) on February 6, 2024. The letters were sent via electronic mail, receipt requested, to the tribal contacts, and described the project, provided maps of the project site, and invited the tribes to request consultation should they have any concerns. Additional information was requested by a member of The Ohlone Indian Tribe and the City provided the requested information on March 15, 2024.

On May 8, 2024, the City met with representatives of the Confederated Villages of Lisjan Nation (CVLN) who requested the use of ground-penetrating radar (GPR) to identify possible locations of Native American archaeological sites at the project site. The archaeological GPR survey was conducted on August 17, 2024. A total of 87 individual transect profiles were collected, ranging from less than 3 meters to over 90 meters in length. No buried organic surfaces were noted during the survey, and stratification at the site shows no evidence of a Native American site. The City sent the results of the GPR survey to the CVLN on May 15, 2025. The tribe responded on June 10, 2025, with recommendations for potential resource protection. The City agreed to the tribal representative's recommendations. As discussed in Section 4.5, Cultural Resources, no cultural resources were previously documented within or near the project area or identified by the survey. Due to the paucity of archaeological resources in the vicinity and the disturbed nature of the project area, the potential for in situ subsurface resources is low. Therefore, no known significant archaeological or tribal cultural resources are located within the project site that are listed or eligible for listing in the California Register of Historical Resources (California Register) or in a local register of historical resources as defined in PRC Section 5020.1(k).

Although the cultural resources study did not yield historically significant resources, there is a possibility that the proposed project could impact as-yet-unrecorded, subsurface deposits on the project site that could be eligible for listing in the California Register or in a local register of historical resources as defined in PRC Section 5020.1(k).

Implementation of Mitigation Measures TCR-1 and TCR-2 would satisfy the agreement between the City and tribal representatives under AB 52 and reduce potential impacts from the proposed project to a less than significant level.

Mitigation Measure TCR-1 **Inadvertent Discovery of Tribal Cultural Resources.** If cultural resources of Native American origin are identified during grading or excavation of the proposed project, all ground-disturbing activities within 100 feet shall cease until an archaeologist has evaluated the nature and significance of the find as a historic property and a representative from the Confederated Villages of Lisjan Nation is consulted by the government agency. If the entity in consultation with the consulting Tribe(s), determines that the resource is a Tribal Cultural Resource and thus significant under CEQA, the entity shall retain a qualified archaeologist and a Tribal monitor, at the applicant's expense, to prepare a mitigation plan, which shall be implemented in consultation with the consulting Tribe. The mitigation plan shall include avoidance of the resource or, if avoidance of the resource is not feasible, the plan shall outline appropriate treatment of the resource in coordination with the consulting Tribe and, if applicable, a qualified archaeologist. Examples of appropriate mitigation for Tribal Cultural Resources include, but are not limited to, protecting the cultural character and integrity of the resources, protecting traditional use of the resources, protecting the confidentiality of the resources, or heritage recovery.

Mitigation Measure CUL-2: **Inadvertent Discovery of Human Remains.** If human remains are encountered during construction and ground-disturbing activities, all work within 100 feet of the remains should be redirected and the County Coroner notified immediately. At the same time, an archaeologist shall be contacted to assess the situation. If the human remains are of Native American origin, the Coroner must notify the Native American Heritage Commission (NAHC) within 24 hours of this identification. The NAHC will identify a Native American Most Likely Descendant (MLD) to inspect the site and provide recommendations for the proper treatment of the remains and any associated funerary objects. There shall be no pictures taken or testing done on the Native American human remains. All bone, if not identifiable as human or animal, shall be treated as human remains and the appropriate protocols followed. The archaeologist shall recover information, as appropriate, and in accordance with the recommendations of the MLD and/or Tribal representative. Upon completion of the archaeologist's assessment, a report should be prepared documenting methods and results, as well as recommendations regarding the treatment of the human remains and any associated archaeological materials. The report should be submitted to the lead government agency, the NWIC and the consulting Tribe. Tribal representatives will rebury the Native American human remains and associated funerary objects with the appropriate dignity, either in accordance with the recommendations of the MLD if available or in the project vicinity at a location agreed upon between the Tribe and the consultant, where the reburial would be accessible to Tribal members in perpetuity and would not be subject to further disturbance. The discovery and reburial are to be kept confidential and secure to prevent any further disturbance.

In the event that previously unidentified resources or human remains are discovered during ground-disturbing activities, implementation of Mitigation Measure TCR-1, Mitigation Measure TCR-2, and Mitigation Measure CULT-1, as detailed in Section 4.5, Cultural Resources, and compliance with Section 7050.5 of the California Health and Safety Code and PRC Section 5097.98 would reduce the potential construction-period discovery of previously unidentified subsurface deposits and human remains that may be of tribal origin to a less than significant level. With implementation of Mitigation Measures CULT-1, TCR-1, and TCR-2, impacts to tribal cultural resources would be less than significant with mitigation incorporated.

ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Less Than Significant with Mitigation Incorporated. Please refer to response 4.18.b. Although the cultural resources study did not yield historically significant resources, there is a possibility that the proposed project could impact as-yet-unrecorded, subsurface deposits on the project site that could be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In the event that previously unidentified tribal cultural resources are discovered during ground-disturbing activities, implementation of Mitigation Measure TCR-1, Mitigation Measure TCR-2, and Mitigation Measure CULT-1, as detailed in Section 4.5, Cultural Resources, and compliance with Section 7050.5 of the California Health and Safety Code and PRC Section 5097.98 would reduce the potential construction-period discovery of previously unidentified subsurface deposits and human remains that may be of tribal origin to a less than significant level. With implementation of Mitigation Measures CULT-1, TRC-1, and TCR-2, impacts to tribal cultural resources would be less than significant with mitigation incorporated.

4.19 UTILITIES AND SERVICE SYSTEMS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c. 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?	☐	☐	☒	☐
d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

a. Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

Less Than Significant Impact. The project site is located in an urban area that is currently served by existing utilities, including water, sanitary sewer, storm drainage, electricity, gas, and telecommunications infrastructure.

Water. Water service in the City of Clayton is provided by the Contra Costa Water District (CCWD). The proposed project would include the installation of new 8-inch-diameter water lines on the site that would connect to the existing 12-inch-diameter main located within Peacock Creek Drive. The proposed project would connect directly to existing mains that have sufficient capacity to accommodate the proposed project. The proposed project would also require relocation of the existing 6-inch-diameter ductile-iron pipes (DIP) water line and 12-inch-diameter water line that run through the site further south along Clayton Road, outside of the development footprint. All water infrastructure improvements, including new connections, would be required to be constructed in compliance with the applicable regulations in Title 5 of the CCWD Code of Regulations.[81] Title 5 includes requirements governing the application for water service, installation of new service connections, cross-connections, water main extensions, and fire taps. Relocation of the existing

81 Contra Costa Water District (CCWD). 2023. Contra Costa Water District Code of Regulations, Title 5, Water Supply and Rates. January. Website: https://www.ccwater.com/DocumentCenter/View/281/Title-5-Water-Supply-and-Rates-PDF (accessed February 25, 2024).

water lines would also be coordinated with the Contra Costa Water District to ensure that no significant disruptions in water service occur during project construction. The construction and operation of these water facilities would not result in additional environmental effects beyond those described in this Initial Study. The new water lines and relocated water lines would be constructed in conformance with City standards, and their construction would not cause significant environmental effects.

CCWD updated its Urban Water Management Plan (UWMP) in 2020, and it was adopted in 2021. According to the UWMP, the average daily water demand within the entire CCWD service area is projected to be 147,400 acre-feet per year (AFY) in 2025, 165,000 AFY in 2035, and 175,900 AFY in 2045.[82] In addition, the UWMP indicated the CCWD does not anticipate any supply deficits in normal years or single-dry years throughout the planning horizon. However, there may be supply shortfalls in future years of up to 15 percent of demand in the later years of multiple dry year conditions.[83] As discussed below in Section 4.19.b, the proposed project would not substantially increase demand for water and therefore would not exceed the capacity of existing water treatment facilities. As such, the proposed project would not require the construction of new water treatment facilities. Therefore, the impact of the proposed project on water infrastructure would be less than significant.

Wastewater. The wastewater collection systems within Clayton are owned by the City of Clayton and maintained by the City of Concord, which has a contract with the Central Contra Costa County Sanitary District (Central San) to treat the wastewater. City of Concord Sanitation maintains existing sanitary sewer lines within the vicinity of the project site, including a 6-inch-diameter line within Peacock Creek Drive. A new 8-inch-diameter sanitary sewer line would be installed within the proposed access driveway, connecting to the existing sewer line in Peacock Creek Drive. The final size of these facilities would be determined prior to issuance of a grading permit and parcel map recordation. All wastewater infrastructure improvements, including new lines and connections, would be required to be constructed in compliance with Central San's Standard Specifications for Design and Construction (Standard Specs 2022).[84] The Standard Specs 2022 include requirements governing the application for wastewater service, installation of new service lines and connections, construction requirements, pipeline alignments, and materials. These standards and specifications are intended to ensure that installation of wastewater facilities is conducted in accordance with the Health and Safety Code of California. The construction and operation of wastewater facilities would not result in additional environmental effects beyond those described in this Initial Study; therefore, this impact would be less than significant. The new sanitary sewer line would be constructed in conformance with City standards, and their construction would not cause significant environmental effects.

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82 Contra Costa Water District (CCWD). 2021. 2020 *Urban Water Management Plan*, Table 1-3: Current and Projected Water Demand (AFY). June.

83 Contra Costa Water District (CCWD). 2021. 2020 *Urban Water Management Plan.* June.

84 Central Contra Costa County Sanitary District (Central San). 2023. Standard Specifications for Design & Construction. 2022 Edition. Website: https://www.centralsan.org/sites/main/files/file-attachments/standard_specs_2022_final.pdf?1658154154 (accessed February 25, 2024).

Stormwater Drainage. Under existing conditions, stormwater from the project site is collected by an existing storm drain line that runs through the site and discharges to an existing catch basin located in Peacock Creek Road (i.e., northwest corner of the project site). This storm drain line also collects runoff from approximately 3.47 acres of the adjacent, off-site hillside to the east. Stormwater collected in the existing catch basin in Peacock Creek Road then enters storm drains that flow to Clayton Road, west of the project site, which discharges into Peacock Creek. Peacock Creek discharges into Mount Diablo Creek, which ultimately discharges into Suisun Bay.[85]

The approximately 2.55-acre project site currently consists of vacant land, which includes a partially paved, largely gravel parking lot. A CCWD pump station parcel containing a small, wood-framed enclosure is at the southern end of the project site. The existing soils on the project site have low permeability which renders deep infiltration of runoff unfeasible. Development of the proposed project would result in a decrease in impervious surfaces on the project site from approximately 1.08 acres (42.4 percent of the project site) to 0.97 acre (38.1 percent of the project site), which could increase on-site shallow infiltration and the amount of stormwater entering the surrounding stormwater drainage system. With implementation of the proposed project, the project site would be divided into two Drainage Management Areas (i.e., DMA 1 and DMA 2) to manage stormwater runoff. The proposed project would also implement Low Impact Development (LID) Best Management Practices (BMPs), including two bioretention basins totaling approximately 1,950 square feet. Stormwater runoff from impervious areas (e.g., asphalt and roofs) and pervious areas (e.g., landscaped areas and pervious walkways) within DMA 1 would be directed to the 1,480-square-foot bioretention basin located at the northwest corner of the project site via an on-site stormwater collection system. Overflows from the bioretention basin (stormwater runoff volume that exceeds the storage volume of the bioretention basin) would be directed off site via a storm drainpipe and discharged into an existing catch basin in Peacock Creek Drive, similar to existing conditions. Stormwater runoff from impervious areas (e.g., asphalt and roofs) and pervious areas (e.g., landscaped areas and pervious walkways) within DMA 2 would be directed to the 470-square-foot bioretention basin located at the northeast corner of the project site via an on-site stormwater collection system. Overflows from the bioretention basin (stormwater runoff volume that exceeds the storage volume of the bioretention basin) would be directed off site via a storm drainpipe and discharged into a proposed catch basin in Peacock Creek Drive, located east of the existing catch basin in Peacock Creek Drive.

The proposed drainage facilities would be designed in compliance with Clayton Municipal Code (CMC) Chapter 13.12 and the Municipal Regional Stormwater NPDES Permit (MRP) as detailed in Regulatory Compliance Measure (RCM) HYD-3, as detailed in Section 4.10, Hydrology and Water Quality. The proposed drainage facilities would be designed to meet the criteria outlined in the *Contra Costa Clean Water Program Stormwater C.3. Guidebook* (Stormwater C.3 Guidebook) as required by CMC Chapter 13.12 and the MRP. After the completion of project construction, the proposed project would not significantly alter the existing drainage pattern of the site. Therefore, the proposed project would not result in an exceedance of planned or existing stormwater drainage systems, and impacts would be less than significant.

[85] Contra Costa Clean Water Program (CCCWP). 2003. *Contra Costa County Watershed Atlas, Chapter 10: Mount Diablo Creek Watershed.* November.

Electricity. Electricity and gas service is provided to the project site by Pacific Gas & Electric Company (PG&E). The proposed project would include connections to the existing electricity lines that run adjacent to the project site on Clayton Road. The proposed project would not require any new infrastructure aside from project-specific tie-ins and lines to serve the proposed project. As part of the proposed project, the existing PG&E utility boxes and lines that serve the CCWD pump station in the southwestern portion of the project would be relocated to accommodate the proposed development. Relocation of these facilities would be conducted in coordination with PG&E and in compliance with PG&E standards. Therefore, the proposed project would not require or result in the relocation or construction of new or expanded utility and service systems, the construction or relocation of which could cause significant environmental effects.

Telecommunication. Cable, internet, and telephone services are provided to Clayton residents by major third-party purveyors. Cellular services provided by all major cellular networks are available in in the City. Construction and operational activities associated with the proposed project would not expand the service area covered by existing telecommunication facilities. In addition, the proposed project would not involve the construction or relocation of new or expanded telecommunication facilities. Therefore, implementation of the proposed project would result in no impacts related to the construction or relocation of existing telecommunication facilities.

The proposed project would connect to existing utility services within or adjacent to the project site and would not require extension of utilities beyond existing service areas. Therefore, the proposed project would not require or result in the relocation or construction of new or expanded utility and service systems, the construction or relocation of which could cause significant environmental effects. This impact would be less than significant.

b. Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

Less Than Significant Impact. According to the comparison of available supply with projected demands from the 2020 UWMP for the CCWD, the CCWD does not anticipate any supply deficits in normal years through the year 2045.[86] In future years, multiple-year drought conditions could cause supply shortfalls; however, any potential supply shortfall experiences during a drought would be met through a short-term conservation program or short-term water purchases. Because the proposed project is consistent with the current land use and zoning designations for the site, development of the project would be considered consistent with the growth assumptions utilized to estimate the CCWD's projected water demands. Thus, the project's associated increase in water demand would have been accounted for in the CCWD UWMP.

According to the UWMP, the average daily water demand within the entire CCWD service area is projected to be 147,400 AFY in 2025; 165,000 AFY in 2035; and 175,900 AFY in 2045.[87] According to the California Emissions Estimator Model (CalEEMod) results, provided in Appendix A, operation of the proposed project is anticipated to demand approximately 1,495,695 gallons of water per year

86 Contra Costa Water District (CCWD). 2021. 2020 *Urban Water Management Plan.* June.
87 Contra Costa Water District (CCWD). 2021. 2020 *Urban Water Management Plan*, Table 1-3: Current and Projected Water Demand (AFY). June.

(gpy) (4.6 AFY). Of that annual demand, approximately 1,091,770 gpy would be associated with indoor water use, and approximately 403,925 gpy would be associated with outdoor water use. This represents a negligible portion (less than 0.01 percent) of the average daily water demand within the entire CCWD service area for future years 2025, 2035, and 2045.

In addition, the project design would be required to adhere to California Building Code (CBC) standards for water conservation (e.g., low-flow plumbing fixtures) as well as the City's water-conservation guidelines for landscaping as set forth in CMC Chapter 17.80. With compliance with the CBC and consistency with the CMC, the proposed project would have a less than significant impact on water supply in normal, dry, and multiple dry years.

c. *Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?*

Less Than Significant Impact. The wastewater collection systems within Clayton are owned by the City of Clayton and maintained by the City of Concord, which has a contract with the Central San to treat the wastewater. The sewage collection system in the Central San comprises approximately 1,500 miles of wastewater sewer mains and 18 pumping stations throughout the service area that pipe wastewater to the Central San Treatment Plant located at 5019 Imhoff Place in Martinez, California, approximately 7.5 miles northwest of the project site. The treatment plant treats an average of 34 million gallons per day (MGD) of wastewater and has a permitted physical capacity of 54 MGD.[88] As such, approximately 63 percent of the allowable capacity is treated on a daily basis. According to the Growth Management Element of the City's General Plan, the plant's maximum capacity of 54 MGD is projected to accommodate build out until 2040.[89]

The proposed project would generate additional wastewater flows into the regional wastewater treatment plant operated by Central San. The proposed project is consistent with the land use designation and zoning for the site; therefore, the project would be consistent with what is anticipated for build out under the City's General Plan and would have been included in the capacity project's calculations for the wastewater treatment plant. The proposed project would result in typical wastewater discharges that would not require new methods or equipment for treatment that are not currently permitted for the Central San Treatment Plant, which would serve the proposed project. Based on the CalEEMod results, the proposed project is estimated to produce approximately 982,593 gallons of wastewater per year (2,692 gallons per day [gpd]).[90] This represents a negligible portion (less than 0.01 percent) of the Central San Treatment Plant's permitted physical capacity of 54 MGD. In addition, considering that approximately 63 percent of

88 Central Contra Costa County Sanitary District (Central San). n.d. Website: https://www.centralsan.org/about (accessed January 23, 2023).

89 City of Clayton. July 1985 amended July 2016. City of Clayton 2000 General Plan Section XI: Growth Management Element. Page 16.

90 In the absence of an official wastewater generation rate, wastewater can be reasonably assumed to be 90 percent of water use.
1,091,770 gallons of indoor water use per year * 0.9 = 982,593
982,593 gpy = 2,692 gpd

the allowable capacity of the treatment plant is treated on a daily basis, the treatment plant would have sufficient capacity to serve the proposed project. The increase of wastewater as a result of the proposed project would not be considered an adverse impact to the plant's current capacity because of the relatively small increase in demand and the remaining available capacity of the wastewater treatment plant. As such, wastewater generated from the proposed project would not cause the Central San Treatment Plant to violate any wastewater treatment requirements, and this impact would be less than significant.

d. Would the project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Less Than Significant Impact. Household garbage, yard waste, and recycling is collected within Clayton by Allied Waste Systems, Inc. (dba Republic Services). Republic Services is a nationwide solid waste disposal service provider operating in 47 states. Solid waste in Clayton is transported to the Keller Canyon Landfill located at 901 Bailey Road in Pittsburg, Contra Costa County, which is approximately 3.7 miles north of the project site. The landfill has a maximum permitted capacity of 75,018,280 cubic yards and a remaining capacity of 63,408,410 cubic yards as of November 2004. The landfill accepts a maximum of 3,500 tons per day and has an expected closure date of December 2050.[91] Household hazardous waste can be disposed of at the Central San Treatment Plant's Household Hazardous Waste Collection Facility located on Imhoff Place in Martinez, approximately 7.5 miles northwest of the project site.[92]

On average, multi-family residential uses generate approximately 9 pounds per dwelling unit of garbage per day.[93] Based on these rates, the proposed project would generate approximately 360 pounds per day of solid waste. As noted above, the Keller Canyon Landfill has adequate capacity to serve the proposed project. As such, the project would be served by a landfill with sufficient capacity to accommodate the project's waste disposal needs, and impacts associated with the disposition of solid waste would be less than significant.

e. Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Less Than Significant Impact. The proposed project would be required to comply with all federal, State, and local solid waste statutes and/or regulations related to solid waste and, as noted above, the Keller Canyon Landfill has adequate capacity to serve the proposed project. Therefore, the proposed project would result in a less than significant impact related to solid waste regulations.

[91] California Department of Resources Recycling and Recovery (CalRecycle). n.d. Solid Waste Information System (SWIS), Keller Canyon Landfill (07-AA-0032). Website: https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/4407?siteID=228 (accessed January 23, 2023).

[92] Central Contra Costa County Sanitary District (Central San). n.d. Website: https://www.centralsan.org/about (accessed January 23, 2023).

[93] California Department of Resources Recycling and Recovery (CalRecycle). 2019. Estimated Solid Waste Generation Rates. Website: www2.calrecycle.ca.gov/wastecharacterization/general/rates (accessed February 13, 2024).

4.20 WILDFIRE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a. Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒
d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☒	☐

a. Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact. As previously discussed in Section 4.9.f. under Hazards and Hazardous Materials, the proposed project would design, construct, and maintain structures, roadways, and facilities in accordance with applicable standards associated with vehicular access, resulting in the provision of primary and secondary vehicular accesses that would provide for adequate emergency access and evacuation. The proposed project would not alter or block adjacent roadways, and implementation of the proposed project would not be expected to impair the function of nearby emergency evacuation routes. In addition, operation of the proposed project would not cause permanent alterations to vehicle circulation routes and patterns nor impede public access or travel upon public rights-of-way, as no existing roadways or routes would be closed with the project. Prior to approval of final maps and improvement plans for any development project within the City, plan review and approval by the Contra Costa County Fire Protection District (CCCFPD) is required. Internal roadways and ingress/egress for each site would be required to meet State and local standards regarding turning radius, road width, and emergency vehicle access. Therefore, potential impacts to an adopted emergency response plan or emergency evacuation plan would be less than significant.

b. Would the project, due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Less Than Significant Impact. The proposed project site is located in a Local Responsibility Area, but not located within a Very High Fire Hazard Severity Zone (VHFHSZ).[94] Elevations range from 560 feet above mean sea level at the northwestern portion of the site to 510 feet above mean sea level at the southwestern corner. The ground surface on the project site gradually slopes down to the southwest. Prevailing winds in Clayton are most often from the west from mid-February to mid-November and from the north from mid-November to mid-February. Winds may push wildfire smoke into the area of the proposed project; however, these conditions would be temporary and, if conditions warranted, the local air quality control district would warn residents of potential impacts due to wildfire smoke.

Although the project site is not designated as a VHFHSZ, wildfire is a serious hazard in Clayton due to its location within a wildland urban interface. Although the project site is primarily surrounded by existing residential development, the project site is located adjacent to undeveloped land to the north and east covered with natural vegetation that could be flammable during summer and fall.

Construction of the proposed project would involve the use of some flammable materials (e.g., gasoline, diesel fuel, hydraulic oils, paints, solvents) or other wastes. During construction, there would be increased human activity and ignition sources, including equipment that could create sparks, be a source of heat, or leak flammable materials on the project site. The project would be required to comply with requirements of the Occupational Safety and Health Administration (OSHA), including federal statutes in 29 CFR 1926.150, Fire Protection and Prevention. As specified in 29 CFR 1926.150, all construction equipment is required to have fire suppression equipment (e.g., a fire extinguisher) on board or at the work site, secondary containment would be required for fuel-powered equipment, and a spill kit would be required to be kept on site during construction for use in case of any leaks or spills of flammable materials. These existing requirements would reduce the potential exacerbation of wildfire risks related to construction activities.

Operation of the proposed project would be consistent with surrounding residential uses and the zoning for the project site. The proposed project is required to be designed in compliance with all applicable State and local standards and recommendations for new development (e.g., the CCCFPD's requirements for providing a water supply system for fire protection and adequate emergency and fire access). The project would be required to comply with the California Fire Code applicable at the time of building permit application. The current California Fire Code calls for the installation, maintenance, and ongoing inspection of fire protection systems under the direction of the local Fire Chief. In addition, the California Fire Code authorizes the Fire Chief to specify water supply and road design standards. Prior to approval of final maps and improvement plans for any development project within Clayton, plan review and approval by the CCCFPD is required.

The proposed project would also be subject to requirements in Section 13000 *et seq*. of the California Health and Safety Code, the California Building Code (CBC), and the California State Fire

94 California Department of Forestry and Fire Protection (CAL FIRE). n.d. op. cit.

Code, which include regulations concerning the following: building standards for fire protection; fire protection and notification systems (e.g., extinguishers and smoke alarms); safety for firefighters and emergency responders during emergency operations; minimum standards for hazardous vegetation and fuel management, defensible space, and building construction; and minimum standards for emergency access and water supply for fire response.

Compliance with these existing regulatory requirements would ensure that the proposed project would not exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. Impacts would be less than significant.

c. Would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

No Impact. The proposed project involves the construction of four multi-family residential units containing 30 dwelling units including an interior roadway. Utility connections would be constructed in conformance with City standards as detailed in Section 4.19, Utilities and Service Systems. The project is located in an urbanized area that is served by existing water and roadway infrastructure and does not require the installation or maintenance of wildland protection features (e.g., fire roads, fuel breaks, or emergency water sources). In the absence of any need for such features, no impact (temporary or ongoing) would result from development of the proposed uses.

d. Would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

Less Than Significant Impact. Construction of the proposed project would be required to obtain coverage under the National Pollutant Discharge Elimination System (NPDES) General Construction stormwater permit. As discussed in Section 4.10, Hydrology and Water Quality, the proposed project would implement a Storm Water Pollution Prevention Plan (SWPPP) that specifies best management practices (BMPs) and erosion control measures to be used during construction to manage runoff flows. Additionally, the proposed project would be required to implement Low Impact Development (LID) techniques as required by the Municipal Regional Stormwater NPDES Permit (MRP) and, as detailed in Section 4.10, would not significantly alter drainage patterns compared to existing conditions. Furthermore, the project site is not located within a flood zone or within an area identified as having potential for landslides. Therefore, the proposed project would not have the potential to expose people or structures to downslope or downstream flooding or landslides. This impact would be less than significant.

4.21 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Does the project have the potential to substantially degrade the 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, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☒	☐	☐
c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

a. Does the project have the potential to substantially degrade the 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, substantially 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 with Mitigation Incorporated. Implementation of the mitigation measures recommended in this Initial Study would ensure that the construction and operation of the proposed project would not substantially degrade the quality of the environment; reduce the habitat, population, or range of a plant or animal species; or eliminate important examples of California history or prehistory.

As discussed in Section 4.4, Biological Resources, no special-status wildlife has been mapped on or adjacent to the project site. In addition, no special-status species or their sign (e.g., raptor stick nests, bat guano) have been observed on the project site during field surveys. However, because of the sensitivity of some of the special-status wildlife species known to occur in the area, and/or the potential presence of some of the species on or immediately adjacent to the project site, potential impacts to special-status wildlife species including burrowing owl, golden eagle, nesting birds, San Joaquin kit fox, and American badger were evaluated. Implementation of Mitigation Measures BIO-1 through BIO-5, would reduce potential impacts to these special status species to a less than significant level. Implementation of Regulatory Compliance Measure BIO-1, which requires the project applicant to obtain regulatory approval and implement appropriate mitigation as specified by the regulatory agencies, would reduce potential impacts to jurisdictional waters to less than significant. Implementation of Mitigation Measure BIO-6, which requires compliance with the City's Tree Protection Ordinance adopted in Clayton Municipal Code Chapter 15.70, as well as additional project-specific measures, such as a 3:1 tree replacement ratio, temporary irrigation and monitoring, and construction policies and guidelines for tree preservation and protection, would reduce potential impacts to protected trees to a less than significant level.

As discussed in Section 4.5, Cultural Resources, no cultural resources were previously documented within or near the project area or identified by the survey. Due to the paucity of archaeological resources in the vicinity and the disturbed nature of the project area, the potential for in situ subsurface resources is low. Although the cultural resources study did not yield historically significant resources, there is a possibility that the proposed project could impact as-yet-unrecorded, subsurface deposits on the project site. Implementation of Mitigation Measure CULT-1, which details processes to follow should an archaeological deposit be encountered during project subsurface construction activities, would reduce impacts to known, unknown, or potential cultural resources that may be located within the project site to less than significant levels. Mitigation Measures TCR-1 and TCR-2 are prescribed to reduce impacts to previously unknown tribal cultural resources that may be located within the project site to less than significant levels. Additionally, the project applicant is required to comply with California Code of Regulations (CCR) Section 15064.5(e), California Health and Safety Code Section 7050.5, and Public Resources Code (PRC) Section 5097.98 as a matter of policy in the event human remains are encountered at any time. Adherence to Mitigation Measures CULT-1, and TCR-1 through TCR-2, as well as regulations governing human remains, would reduce potential impacts to cultural resources to a less than significant level.

In addition, although no paleontological resources or unique geological features are known to exist within or near the project site, the proposed project would require ground disturbance below ground surface. Therefore, the possibility of accidental discovery of paleontological resources during project construction cannot be discounted. Implementation of Mitigation Measure GEO-1 details processes to follow should paleontological resources be encountered during project subsurface construction activities and would reduce potential impacts to paleontological resources to a less than significant level.

As such, implementation of the proposed project would not substantially degrade the 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, substantially 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. Impacts would be less than significant with mitigation incorporated.

b. Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Less Than Significant with Mitigation Incorporated. The *State CEQA Guidelines* require a discussion of significant environmental impacts that would result from project-related actions in combination with “closely related past, present, and probably future projects: located in the immediate vicinity” (*State CEQA Guidelines* Section 15130[b][1][A]). Cumulative environmental impacts are those impacts that by themselves are not significant, but when considered with impacts occurring from other projects in the vicinity would result in a cumulative impact. Related projects considered to have the potential of creating cumulative impacts in association with the proposed project consist of projects that are reasonably foreseeable and that would be constructed or operated during the life of the proposed project.

The proposed project's impacts would be individually limited and not cumulatively considerable. The potentially significant impacts that can be reduced to a less than significant level with implementation of recommended mitigation measures include the topics of air quality, biological resources, cultural resources, geology and soils, noise, and tribal cultural resources. These impacts would primarily be related to construction-period activities, would be temporary in nature, and would not substantially contribute to any potential cumulative impacts associated with these topics. For the topic of air quality, potentially significant impacts to air quality standards associated with project construction would be reduced to less than significant levels with implementation of Mitigation Measure AIR-1. For the topic of biological resources, implementation of Mitigation Measures BIO-1 through BIO-5 would ensure that impacts to special-status species, including burrowing owl, golden eagle, nesting birds, San Joaquin kit fox, and American badger are reduced to a less than significant level. For the topic of cultural resources, potentially significant impacts to archaeological and cultural resources would be reduced to less than significant levels with implementation of Mitigation Measure CULT-1. For the topic of noise, implementation of the actions within Mitigation Measure NOI-1, would further minimize impacts related to construction noise for surrounding receptors. For the topic of tribal cultural resources, potentially significant impacts would be reduced to less than significant levels with implementation of Mitigation Measures TCR-1 and TCR-2.

For the topics of aesthetics, agricultural and forestry resources, energy, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, population and housing, public services, recreation, transportation, utilities and service systems, and wildfire, the project would have no impacts or less than significant impacts and, therefore, would not substantially contribute to any potential cumulative impacts for these topics. All environmental impacts that could occur as a result of the proposed project would be reduced to a less than significant level through the implementation of the mitigation measures recommended in this document.

Implementation of these measures would ensure that the impacts of the project would be below established thresholds of significance and that these impacts would not combine with the impacts of other cumulative projects to result in a cumulatively considerable impact on the environment as a result of project development. Therefore, this impact would be less than significant with mitigation incorporated.

c. *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*

No Impact. The proposed project would not result in any environmental effects that would cause substantial direct or indirect adverse effects to human beings, beyond those topics previously discussed in Sections 4.1 through 4.21 of this IS/MND.

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5.0 LIST OF PREPARERS

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APPENDIX A

CALEEMOD OUTPUT SHEETS

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Oakhurst Townhomes Development Project Custom Report

Table of Contents

8. User Changes to Default Data

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Oakhurst Townhomes Development Project
Construction Start Date	6/3/2024
Operational Year	2025
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.60
Precipitation (days)	13.8
Location	Clayton Rd & Peacock Creek Dr, Clayton, CA 94517, USA
County	Contra Costa
City	Clayton
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	1340
EDFZ	1
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.21

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

Condo/Townhouse	30.0	Dwelling Unit	1.90	31,800	27,690	0.00	87.0	—
Parking Lot	75.0	Space	0.60	0.00	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.85	20.3	15.4	0.03	0.72	2.84	3.40	0.66	1.36	1.86	—	2,783	2,783	0.11	0.04	2,794
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.85	17.8	14.7	0.03	0.72	0.24	0.95	0.66	0.06	0.72	—	2,630	2,630	0.11	0.04	2,645
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.46	6.01	4.87	0.01	0.23	0.12	0.35	0.21	0.04	0.25	—	881	881	0.04	0.01	886
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.27	1.10	0.89	< 0.005	0.04	0.02	0.06	0.04	0.01	0.05	—	146	146	0.01	< 0.005	147

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e

Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.65	20.3	15.4	0.03	0.65	2.84	3.40	0.60	1.36	1.86	—	2,783	2,783	0.11	0.04	2,794
2025	4.85	17.8	14.9	0.03	0.72	0.24	0.95	0.66	0.06	0.72	—	2,650	2,650	0.10	0.04	2,665
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.65	16.7	13.6	0.02	0.65	0.20	0.85	0.60	0.05	0.65	—	2,467	2,467	0.10	0.04	2,481
2025	4.85	17.8	14.7	0.03	0.72	0.24	0.95	0.66	0.06	0.72	—	2,630	2,630	0.11	0.04	2,645
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.23	6.01	4.87	0.01	0.23	0.12	0.35	0.21	0.04	0.25	—	881	881	0.04	0.01	886
2025	1.46	5.20	4.30	0.01	0.21	0.07	0.28	0.20	0.02	0.21	—	763	763	0.03	0.01	768
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.04	1.10	0.89	< 0.005	0.04	0.02	0.06	0.04	0.01	0.05	—	146	146	0.01	< 0.005	147
2025	0.27	0.95	0.78	< 0.005	0.04	0.01	0.05	0.04	< 0.005	0.04	—	126	126	0.01	< 0.005	127

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.51	0.45	6.27	0.01	0.01	0.93	0.94	0.01	0.24	0.24	14.1	1,164	1,178	1.47	0.05	1,233
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.32	0.51	4.22	0.01	0.01	0.93	0.94	0.01	0.24	0.24	14.1	1,086	1,100	1.48	0.05	1,153

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.39	0.48	4.90	0.01	0.01	0.92	0.93	0.01	0.23	0.24	14.1	1,096	1,110	1.47	0.05	1,165
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.25	0.09	0.89	< 0.005	< 0.005	0.17	0.17	< 0.005	0.04	0.04	2.33	182	184	0.24	0.01	193

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.55	0.43	4.57	0.01	0.01	0.93	0.94	0.01	0.24	0.24	—	1,070	1,070	0.04	0.04	1,087
Area	0.96	0.02	1.70	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	4.55	4.55	< 0.005	< 0.005	4.57
Energy	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	84.5	84.5	0.01	< 0.005	85.3
Water	—	—	—	—	—	—	—	—	—	—	2.09	5.06	7.16	0.22	0.01	14.1
Waste	—	—	—	—	—	—	—	—	—	—	12.0	0.00	12.0	1.20	0.00	41.9
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.23
Total	1.51	0.45	6.27	0.01	0.01	0.93	0.94	0.01	0.24	0.24	14.1	1,164	1,178	1.47	0.05	1,233
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.51	0.51	4.22	0.01	0.01	0.93	0.94	0.01	0.24	0.24	—	996	996	0.05	0.05	1,011
Area	0.81	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
Energy	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	84.5	84.5	0.01	< 0.005	85.3
Water	—	—	—	—	—	—	—	—	—	—	2.09	5.06	7.16	0.22	0.01	14.1
Waste	—	—	—	—	—	—	—	—	—	—	12.0	0.00	12.0	1.20	0.00	41.9
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.23

Total	1.32	0.51	4.22	0.01	0.01	0.93	0.94	0.01	0.24	0.24	14.1	1,086	1,100	1.48	0.05	1,153
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.51	0.47	4.06	0.01	0.01	0.92	0.93	0.01	0.23	0.24	—	1,005	1,005	0.05	0.04	1,021
Area	0.88	0.01	0.84	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	2.24	2.24	< 0.005	< 0.005	2.25
Energy	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	84.5	84.5	0.01	< 0.005	85.3
Water	—	—	—	—	—	—	—	—	—	—	2.09	5.06	7.16	0.22	0.01	14.1
Waste	—	—	—	—	—	—	—	—	—	—	12.0	0.00	12.0	1.20	0.00	41.9
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.23
Total	1.39	0.48	4.90	0.01	0.01	0.92	0.93	0.01	0.23	0.24	14.1	1,096	1,110	1.47	0.05	1,165
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.09	0.09	0.74	< 0.005	< 0.005	0.17	0.17	< 0.005	0.04	0.04	—	166	166	0.01	0.01	169
Area	0.16	< 0.005	0.15	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	0.37	0.37	< 0.005	< 0.005	0.37
Energy	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	14.0	14.0	< 0.005	< 0.005	14.1
Water	—	—	—	—	—	—	—	—	—	—	0.35	0.84	1.18	0.04	< 0.005	2.33
Waste	—	—	—	—	—	—	—	—	—	—	1.98	0.00	1.98	0.20	0.00	6.94
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.04
Total	0.25	0.09	0.89	< 0.005	< 0.005	0.17	0.17	< 0.005	0.04	0.04	2.33	182	184	0.24	0.01	193

3. Construction Emissions Details

3.1. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.56	20.3	15.0	0.03	0.55	—	0.55	0.50	—	0.50	—	2,716	2,716	0.11	0.02	2,725
Dust From Material Movement	—	—	—	—	—	0.62	0.62	—	0.07	0.07	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.17	0.12	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	22.3	22.3	< 0.005	< 0.005	22.4
Dust From Material Movement	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.03	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.70	3.70	< 0.005	< 0.005	3.71
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.34	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	67.4	67.4	< 0.005	< 0.005	68.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.51	0.51	< 0.005	< 0.005	0.52
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.08	0.08	< 0.005	< 0.005	0.09
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

3.3. Grading (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.56	18.8	14.2	0.02	0.55	—	0.55	0.51	—	0.51	—	2,454	2,454	0.10	0.02	2,462
Dust From Material Movement	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.01	0.31	0.23	< 0.005	0.01	—	0.01	0.01	—	0.01	—	40.3	40.3	< 0.005	< 0.005	40.5
Dust From Material Movement	—	—	—	—	—	0.05	0.05	—	0.02	0.02	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.06	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.68	6.68	< 0.005	< 0.005	6.70
Dust From Material Movement	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.45	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	89.9	89.9	< 0.005	< 0.005	91.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.37	1.37	< 0.005	< 0.005	1.39
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.23	0.23	< 0.005	< 0.005	0.23

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

3.5. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.57	16.5	12.8	0.02	0.65	—	0.65	0.60	—	0.60	—	2,201	2,201	0.09	0.02	2,209
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.57	16.5	12.8	0.02	0.65	—	0.65	0.60	—	0.60	—	2,201	2,201	0.09	0.02	2,209
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.19	5.47	4.22	0.01	0.21	—	0.21	0.20	—	0.20	—	728	728	0.03	0.01	730
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	1.00	0.77	< 0.005	0.04	—	0.04	0.04	—	0.04	—	121	121	< 0.005	< 0.005	121
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.06	0.97	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	194	194	< 0.005	0.01	197
Vendor	< 0.005	0.12	0.06	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	87.9	87.9	< 0.005	0.01	92.1
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.82	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	178	178	0.01	0.01	180
Vendor	< 0.005	0.13	0.06	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	88.0	88.0	< 0.005	0.01	92.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.27	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	59.4	59.4	< 0.005	< 0.005	60.3
Vendor	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	29.1	29.1	< 0.005	< 0.005	30.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.83	9.83	< 0.005	< 0.005	9.98
Vendor	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.81	4.81	< 0.005	< 0.005	5.04
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

3.7. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.57	16.5	12.8	0.02	0.65	—	0.65	0.60	—	0.60	—	2,201	2,201	0.09	0.02	2,209
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.57	16.5	12.8	0.02	0.65	—	0.65	0.60	—	0.60	—	2,201	2,201	0.09	0.02	2,209
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	4.53	3.50	0.01	0.18	—	0.18	0.16	—	0.16	—	603	603	0.02	< 0.005	605
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.83	0.64	< 0.005	0.03	—	0.03	0.03	—	0.03	—	99.8	99.8	< 0.005	< 0.005	100
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.05	0.91	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	190	190	< 0.005	0.01	193
Vendor	< 0.005	0.11	0.05	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	86.5	86.5	< 0.005	0.01	90.6
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.77	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	174	174	< 0.005	0.01	177

Vendor	< 0.005	0.12	0.06	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	86.6	86.6	< 0.005	0.01	90.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.21	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	48.2	48.2	< 0.005	< 0.005	49.0
Vendor	< 0.005	0.03	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	23.7	23.7	< 0.005	< 0.005	24.8
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.99	7.99	< 0.005	< 0.005	8.11
Vendor	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.92	3.92	< 0.005	< 0.005	4.10
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

3.9. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.40	10.4	8.32	0.01	0.46	—	0.46	0.43	—	0.43	—	1,244	1,244	0.05	0.01	1,248
Paving	0.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.01	0.28	0.23	< 0.005	0.01	—	0.01	0.01	—	0.01	—	34.1	34.1	< 0.005	< 0.005	34.2
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.64	5.64	< 0.005	< 0.005	5.66
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.63	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	132	132	< 0.005	< 0.005	134
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.35	3.35	< 0.005	< 0.005	3.40
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.55	0.55	< 0.005	< 0.005	0.56
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

3.11. Architectural Coating (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	1.09	0.96	< 0.005	0.07	—	0.07	0.06	—	0.06	—	134	134	0.01	< 0.005	134
Architectural Coatings	4.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	1.09	0.96	< 0.005	0.07	—	0.07	0.06	—	0.06	—	134	134	0.01	< 0.005	134
Architectural Coatings	4.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.33	0.29	< 0.005	0.02	—	0.02	0.02	—	0.02	—	40.2	40.2	< 0.005	< 0.005	40.4
Architectural Coatings	1.25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.06	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.66	6.66	< 0.005	< 0.005	6.68
Architectural Coatings	0.23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.18	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	38.1	38.1	< 0.005	< 0.005	38.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.15	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	34.8	34.8	< 0.005	< 0.005	35.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.6	10.6	< 0.005	< 0.005	10.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.76	1.76	< 0.005	< 0.005	1.78
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	0.55	0.43	4.57	0.01	0.01	0.93	0.94	0.01	0.24	0.24	—	1,070	1,070	0.04	0.04	1,087
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Total	0.55	0.43	4.57	0.01	0.01	0.93	0.94	0.01	0.24	0.24	—	1,070	1,070	0.04	0.04	1,087
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	0.51	0.51	4.22	0.01	0.01	0.93	0.94	0.01	0.24	0.24	—	996	996	0.05	0.05	1,011
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Total	0.51	0.51	4.22	0.01	0.01	0.93	0.94	0.01	0.24	0.24	—	996	996	0.05	0.05	1,011
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	0.09	0.09	0.74	< 0.005	< 0.005	0.17	0.17	< 0.005	0.04	0.04	—	166	166	0.01	0.01	169
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Total	0.09	0.09	0.74	< 0.005	< 0.005	0.17	0.17	< 0.005	0.04	0.04	—	166	166	0.01	0.01	169

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	71.7	71.7	0.01	< 0.005	72.4
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	12.8	12.8	< 0.005	< 0.005	12.9
Total	—	—	—	—	—	—	—	—	—	—	—	84.5	84.5	0.01	< 0.005	85.3
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	71.7	71.7	0.01	< 0.005	72.4
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	12.8	12.8	< 0.005	< 0.005	12.9
Total	—	—	—	—	—	—	—	—	—	—	—	84.5	84.5	0.01	< 0.005	85.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	11.9	11.9	< 0.005	< 0.005	12.0
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	2.12	2.12	< 0.005	< 0.005	2.14
Total	—	—	—	—	—	—	—	—	—	—	—	14.0	14.0	< 0.005	< 0.005	14.1

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	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
Parking Lot	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
Total	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	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
Parking Lot	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
Total	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	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
Parking Lot	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
Total	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

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	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

Consumer Products	0.68	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.15	0.02	1.70	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.55	4.55	< 0.005	< 0.005	4.57
Total	0.96	0.02	1.70	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	4.55	4.55	< 0.005	< 0.005	4.57
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	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
Consumer Products	0.68	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	0.81	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	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
Consumer Products	0.12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.01	< 0.005	0.15	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.37	0.37	< 0.005	< 0.005	0.37
Total	0.16	< 0.005	0.15	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	0.37	0.37	< 0.005	< 0.005	0.37

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	2.09	5.06	7.16	0.22	0.01	14.1
Parking Lot	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	2.09	5.06	7.16	0.22	0.01	14.1
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	2.09	5.06	7.16	0.22	0.01	14.1
Parking Lot	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	2.09	5.06	7.16	0.22	0.01	14.1
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	0.35	0.84	1.18	0.04	< 0.005	2.33
Parking Lot	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	0.35	0.84	1.18	0.04	< 0.005	2.33

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	12.0	0.00	12.0	1.20	0.00	41.9
Parking Lot	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	12.0	0.00	12.0	1.20	0.00	41.9
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	12.0	0.00	12.0	1.20	0.00	41.9
Parking Lot	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	12.0	0.00	12.0	1.20	0.00	41.9
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	1.98	0.00	1.98	0.20	0.00	6.94
Parking Lot	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	1.98	0.00	1.98	0.20	0.00	6.94

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.23
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.23
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.23
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.23
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.04
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.04

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	7/2/2024	7/6/2024	5.00	3.00	—
Grading	Grading	7/7/2024	7/15/2024	5.00	6.00	—
Building Construction	Building Construction	7/16/2024	5/20/2025	5.00	220	—
Paving	Paving	5/21/2025	6/4/2025	5.00	10.0	—
Architectural Coating	Architectural Coating	1/20/2025	6/20/2025	5.00	110	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

Site Preparation	Graders	Diesel	Tier 2	1.00	8.00	148	0.41
Site Preparation	Scrapers	Diesel	Tier 2	1.00	8.00	423	0.48
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Tier 2	1.00	7.00	84.0	0.37
Grading	Graders	Diesel	Tier 2	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Tier 2	1.00	8.00	367	0.40
Grading	Tractors/Loaders/Backhoes	Diesel	Tier 2	2.00	7.00	84.0	0.37
Building Construction	Cranes	Diesel	Tier 2	1.00	8.00	367	0.29
Building Construction	Forklifts	Diesel	Tier 2	2.00	7.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Tier 2	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Tier 2	1.00	6.00	84.0	0.37
Building Construction	Welders	Diesel	Tier 2	3.00	8.00	46.0	0.45
Paving	Tractors/Loaders/Backhoes	Diesel	Tier 2	1.00	8.00	84.0	0.37
Paving	Pavers	Diesel	Tier 2	1.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Tier 2	1.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Tier 2	2.00	8.00	36.0	0.38
Paving	Cement and Mortar Mixers	Diesel	Tier 2	1.00	8.00	10.0	0.56
Architectural Coating	Air Compressors	Diesel	Tier 2	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	7.50	11.7	LDA,LDT1,LDT2

Site Preparation	Vendor	—	8.40	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	10.0	11.7	LDA,LDT1,LDT2
Grading	Vendor	—	8.40	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	21.6	11.7	LDA,LDT1,LDT2
Building Construction	Vendor	3.21	8.40	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	11.7	LDA,LDT1,LDT2
Paving	Vendor	—	8.40	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	4.32	11.7	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	8.40	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Reduction	PM2.5 Reduction
Water unpaved roads twice daily	55%	55%
Limit vehicle speeds on unpaved roads to 25 mph	44%	44%
Sweep paved roads once per month	9%	9%

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	64,395	21,465	0.00	0.00	1,568

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	0.00	0.00	4.50	0.00	—
Grading	0.00	0.00	6.00	0.00	—
Paving	0.00	0.00	0.00	0.00	0.60

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Condo/Townhouse	—	0%
Parking Lot	0.60	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	204	0.03	< 0.005
2025	0.00	204	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Condo/Townhouse	136	136	136	49,636	1,315	1,315	1,315	480,065
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

Hearth Type	Unmitigated (number)
Condo/Townhouse	—
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	0
Conventional Wood Stoves	0
Catalytic Wood Stoves	0

Non-Catalytic Wood Stoves	0
Pellet Wood Stoves	0

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
64395	21,465	0.00	0.00	1,568

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Condo/Townhouse	128,235	204	0.0330	0.0040	0.00
Parking Lot	22,895	204	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Condo/Townhouse	1,091,770	403,925
Parking Lot	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Condo/Townhouse	22.2	—
Parking Lot	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Condo/Townhouse	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Condo/Townhouse	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

8. User Changes to Default Data

Screen	Justification

Land Use	Total project site area is 2.5 acres. Parking lot area includes internal roads and paved areas. Project would construct 30 dwelling units and would include 27,690 sq ft of landscape
Construction: Construction Phases	No demolition. Default construction schedule with overlap of architectural coating and building phases
Construction: Off-Road Equipment	Default with tier 2 engine
Operations: Vehicle Data	Based on a trip generation of 136 ADT, per the TIA
Operations: Hearths	No wood burning hearths
Operations: Energy Use	All electric development

APPENDIX B

MODEL SNAPSHOTS

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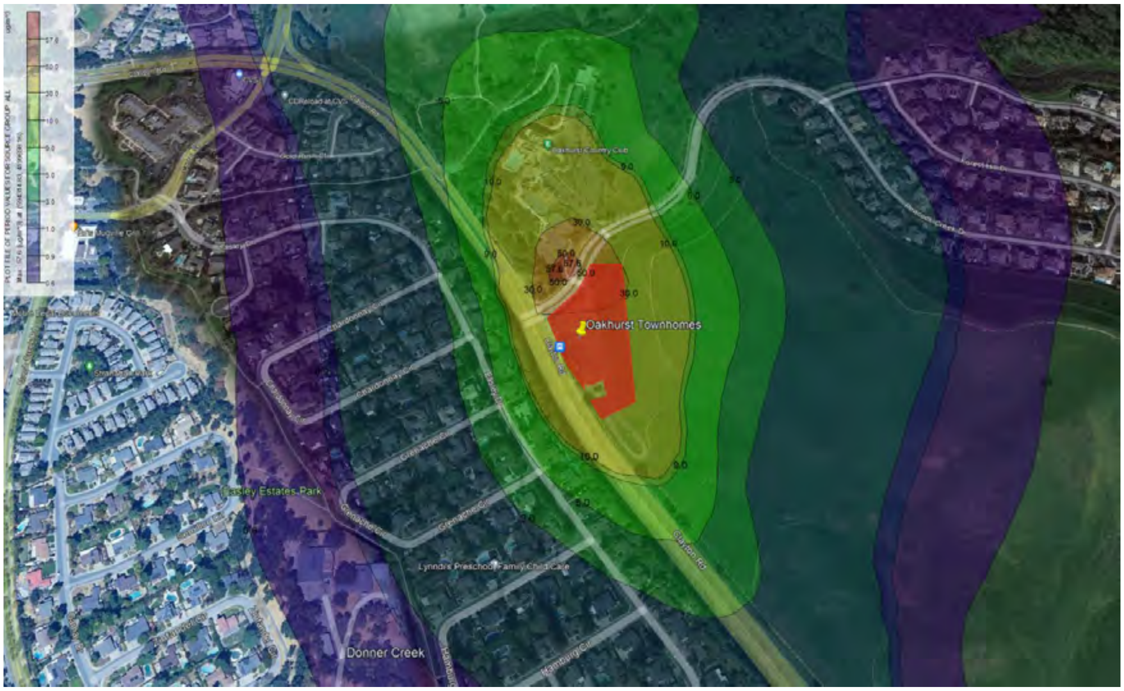
Project Location

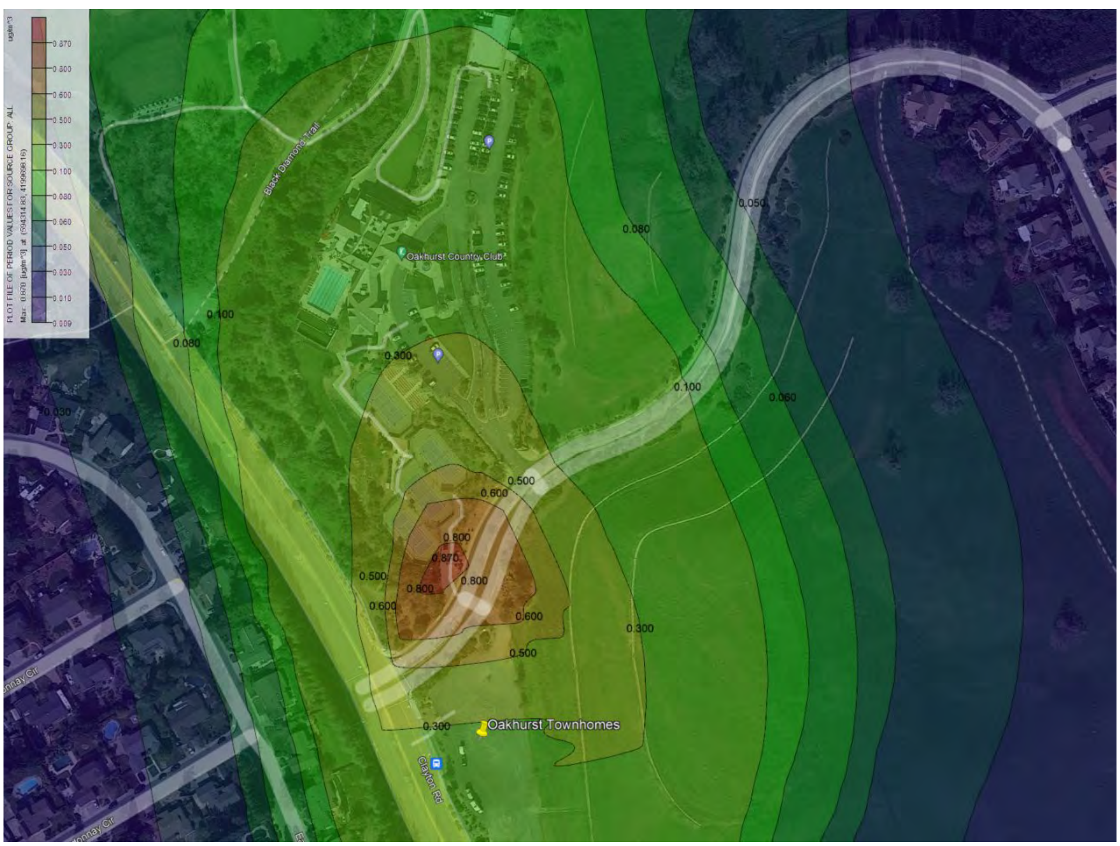
Site Plan

Receptor Grid

Construction Cancer Risk – Sensitive Receptor



Construction Cancer Risk – Worker Receptor



APPENDIX C

PLANNING SURVEY REPORT

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Application Form and Planning Survey Report

To Comply With and Receive Permit Coverage Under The East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan

Please complete this application to apply for take authorization under the state and federal East Contra Costa County HCP/NCCP incidental take permits. The East Contra Costa County Habitat Conservancy ("Conservancy") or local jurisdiction (City of Brentwood, City of Clayton, City of Oakley, City of Pittsburg, and Contra Costa County) may request more information in order to deem the application complete.

I. PROJECT OVERVIEW

PROJECT INFORMATION	
PROJECT NAME: Oakhurst Townhome Project	
PROJECT TYPE: ☒ Residential ☐ Commercial ☐ Transportation ☐ Utility ☐ Other	
PROJECT DESCRIPTION (BRIEF): Construction of 6 buildings consisting of 26-unit townhomes with associated parking areas on a previously developed gravel parking area. A detailed project description is included in Attachment A.	
PROJECT ADDRESS/LOCATION: The site is located just south of the entrance to the entrance to the Oakhurst Country Club in Clayton, Contra Costa County, California.	
PARCEL/PROJECT SIZE (ACRES): The overall parcel is 2.546 +/- acres. The proposed townhomes project will be developed on 1.46+/- acres and the remaining acreage (1.086+/- acres) will not be subject to disturbance and will remain in open space.	
PROJECT APN(S): 118-370-073	
APPLICATION SUBMITTAL DATE: May 2022	**FINAL PSR DATE:** (City/County/Conservancy use)
LEAD PLANNER: Ms. Dana Ayers (Community Development Director) **JURISDICTION:** ☐ City of Brentwood ☒ City of Clayton ☐ City of Oakley ☐ City of Pittsburg ☐ Contra Costa County ☐ Participating Special Entity* *Participating Special Entities are organizations not subject to the authority of a local jurisdiction. Such organizations may include school districts, irrigation districts, transportation agencies, local park districts, geological hazard abatement districts, or other utilities or special districts that own land or provide public services.	
DEVELOPMENT FEE ZONE: ☐ Zone I ☒ Zone II ☐ Zone III ☐ Zone IV See figure 9-1 of the HCP/NCCP at www.cocohcp.org for a generalized development fee zone map. Detailed development fee zone maps by jurisdiction are available from the jurisdiction.	

PROJECT APPLICANT INFORMATION	
APPLICANT'S NAME: Empire Acres LLC	
AUTHORIZED AGENT'S NAME AND TITLE: Grant Alvernaz	
PHONE NO.: 925-270-6213	**APPLICANT'S E-MAIL:** Grant@apwest.com
MAILING ADDRESS: 1777 N. California BLVD, Ste. 305, Walnut Creek, CA 94596	

BIOLOGIST INFORMATION[1]	
BIOLOGICAL/ENVIRONMENTAL FIRM: Moore Biological Consultants	
CONTACT NAME AND TITLE: Diane S. Moore, M.S.	
PHONE NO.: (209) 745-1159	**CONTACT'S E-MAIL:** moorebio@softcom.net
MAILING ADDRESS: Moore Biological Consultants, 10330 Twin Cities Rd., Ste. 30, Galt, CA	

[1] A USFWS/CDFW-approved biologist (project-specific) is required to conduct the surveys. Please submit biologist(s) approval request to the Conservancy.

II. PROJECT DETAILS

Please complete and/or provide the following attachments:

1) **Project Description**
Attach as **Attachment A: Project Description**. Provide a detailed written description that concisely and completely describes the project and location. Include the following information:
    - All activities proposed for the site or project, including roads utilized, construction staging areas, and the installation of underground facilities, to ensure the entire project is covered by the HCP/NCCP permit
    - Proposed construction dates, including details on construction phases, if applicable
    - Reference a City/County application number for the project, if applicable
    - General Best Management Practices, if applicable
    - If the project will have temporary impacts, please provide a restoration plan describing how the site will be restored to pre-project conditions, including revegetation seed mixes or plantings and timing

2) **Project Vicinity Map**
Provide a project vicinity map. Attach as **Figure 1** in **Attachment B: Figures**.

3) **Project Site Plans**
Provide any project site plans for the project. Attach as **Figure 2** in **Attachment B: Figures**.

4) **CEQA Document**
Indicate the status of CEQA documents prepared for the project. Provide additional comments below table if necessary.

Type of Document	Status	Date Completed
☒ Initial Study/MND	Not yet initiated	
☐ Notice of Preparation		
☐ Draft EIR		
☐ Final EIR		
☐ Notice of Categorical Exemption		
☐ Notice of Statutory Exemption		
☐ Other (describe)		

III. EXISTING CONDITIONS AND IMPACTS

Please complete and/or provide the following attachments:

1) **Field-Verified Land Cover Map**[2]
Attach a field-verified land cover map in **Attachment B: Figures** and label as **Figure 3**. The map should contain all land cover types present on-site overlaid on aerial/satellite imagery. Map colors for the land cover types should conform to the HCP/NCCP (see *Figure 3-3: Landcover in the Inventory Area* for land cover type legend).

2) **Photographs of the Project Site**
Attach representative photos of the project site in **Attachment B: Figures** and label as **Figure 4**. Please provide captions for each photo.

[2] For PSEs and city or county public works projects, please also identify permanent and temporary impact areas by overlaying crosshatching (permanent impacts) and hatching (temporary impacts) on the land cover map.

3) Land Cover Types and Impacts and Supplemental Tables

- For all terrestrial land cover types please provide calculations to the nearest **hundredth of an acre (0.01)**.
  For aquatic land cover types please provide calculations to the nearest **thousandth of an acre (0.001)**.

- **Permanent Impacts** are broadly defined in the ECCC HCP/NCCP to include all areas removed from an undeveloped or habitat-providing state and includes land in the same parcel or project that is not developed, graded, physically altered, or directly affected in any way but is isolated from natural areas by the covered activity. Unless such undeveloped land is dedicated to the Preserve System or is a deed-restricted creek setback, the development mitigation fee will apply (if proposed, would require Conservancy approval).
- **Temporary Impacts** are broadly defined in the ECCC HCP/NCCP as any impact on vegetation or habitat that does not result in permanent habitat removal (i.e. vegetation can eventually recover).
- If **wetland (riparian woodland/scrub, wetland, or aquatic)** land cover types are present on the parcel but will not be impacted please discuss in the following section 4) Jurisdictional Wetlands and Waters. Wetland impact fees will only be charged if wetland features are impacted. However, development fees will apply to the entire parcel.
- **Stream** land cover type is considered a linear feature where impacts are calculated based on length impacted. The acreage within a stream, below Top of Bank (TOB), must be assigned to the adjacent land cover type(s). Insert area of impact to stream below TOB in parentheses after the Land Cover acreage number (e.g., Riparian Woodland/Scrub: 10 (0.036) – where 10 is the total impacted acreage including 0.036 acre, which is the acreage within stream TOB). Complete following supplemental **Stream Feature Detail** table to provide information for linear feet.
- **Total Impacts** acreage should be the total parcel acreage (development project) or project footprint acreage (rural infrastructure or utility project).

Proposed for HCP/NCCP Dedication on the Parcel (Requires Conservancy Approval)

Table 1: Land Cover Types and Impacts (1.460+/- acre "Townhome" site)

Land Cover Type	Permanent Impacts	Temporary Impacts	*Stream Setback*	*Preserve System Dedication*
Grassland				
Annual Grassland				
Alkali Grassland				
Ruderal	0.16 acres			
Shrubland				
Chaparral and Scrub				
Woodland				
Oak Savannah				
Oak Woodland				
Riparian				
Riparian Woodland/Scrub				
Wetland				
Permanent Wetland				
Seasonal Wetland				
Alkali Wetland				
Aquatic				
Aquatic (Reservoir/Open Water)				
Slough/Channel				
Pond				
Stream (in linear feet)		-	-	-
Irrigated Agriculture				
Pasture				
Cropland				
Orchard				
Vineyard				
Other				
Nonnative woodland				
Wind turbines				
Developed (not counted toward Fees)				
Urban	1.30 acres			
Aqueduct				
Turf				
Landfill				
TOTAL IMPACTS	1.46 acres			

Identify any uncommon vegetation and uncommon landscape features[3]:

Supplemental to Table 1: Uncommon Vegetation and Landscape Features

	Permanent Impacts	Temporary Impacts
Uncommon Grassland Alliances		
Purple Needlegrass Grassland		
Blue Wildrye Grassland		
Creeping Ryegrass Grassland		
Wildflower Fields		
Squirreltail Grassland		
One-sided Bluegrass Grassland		
Serpentine Bunchgrass Grassland		
Saltgrass Grassland		
Alkali Sacaton Bunchgrass Grassland		
☐ Other		
Uncommon Landscape Features		
Rock Outcrops		
Caves		
Springs and seeps		
Scalds		
Sand Deposits		
☐ Mines[4]		
☐ Buildings (bat roosts)[3]		
☒ Potential nest sites (trees or cliffs)[3]	8	

There are 8 potential nest trees within the "Townhome" portion of the site that will be developed (Figure 5a).

Please provide details of impacts to stream features:

Stream Name: N/A

Watershed: N/A

Supplemental to Table 1: Stream Feature Detail[5]

Stream Width	Stream Type[6]	Permanent Impacts (linear feet)[7]	Temporary Impacts (linear feet)[7]
☐ ≤ 25 feet wide ☐ > 25 feet wide	☐ Perennial ☐ Intermittent ☐ Ephemeral, 3rd or higher order ☐ Ephemeral, 1st or 2nd order		
☐ ≤ 25 feet wide ☐ > 25 feet wide	☐ Perennial ☐ Intermittent ☐ Ephemeral, 3rd or higher order ☐ Ephemeral, 1st or 2nd order		
☐ ≤ 25 feet wide ☐ > 25 feet wide	☐ Perennial ☐ Intermittent ☐ Ephemeral, 3rd or higher order ☐ Ephemeral, 1st or 2nd order		

3 These acreages are for Conservancy tracking purposes. Impacts to these uncommon vegetation and landscape features should be accounted for within the land cover types in Table 1 (e.g., x acres of purple needlegrass in this supplemental table should be accounted for within annual grassland in Table 1).
4 Insert amount/number, not acreage. Provide additional information on these features in Attachment A: Project Description.
5 Use more than 1 row as necessary to describe impacts to streams on site.
6 See glossary (Appendix A) for definition of stream type and order.
7 Stream length is measured along stream centerline, based on length of impact to any part of the stream channel, TOB to TOB.

4) **Summary of Land Cover Types**
Please provide a written summary of descriptions for land cover types found on site including characteristic vegetation.

Ruderal Grassland: The 1.46+/- acre "Townhome" portion of the project site that will be developed consists of approximately 0.16 acres of ruderal grassland vegetation primarily located at the base of a steep hillside along the east edge of the site. There are also two small areas of grassland in the south part of the site (Figure 3). Oats (*Avena fatua*) and compact brome (*Bromus madritensis*) are the dominant grass species in the ruderal grasslands. Other common grassland species intermixed within the grasses include black mustard (*Brassica nigra*), Italian thistle (*Carduus pycnocephalus*), rose clover (*Trifolium hirtum*), and filaree (*Erodium* sp.).

A majority of the ruderal grassland land cover falls within the 1.086+/- acres of "Open Space" that will not be developed as part of the project.

Urban/Developed: There is a total of 1.30 of the urban/developed land cover type within the 1.46+/- acre of the "Townhome" portion of the site that will be developed (Figure 3). A majority of this land cover type consists of a large graveled area designated as a "Park and Ride" lot for the community but never used as such. Also included in this land cover type are the landscaped strips along the west and north edge of the site. The landscaped areas are heavily maintained and consist of bare dirt and ornamental shrubs and trees.

The 8 largest trees within "Townhome" portion of the site have been identified as potential nest trees (Figure 5a). These trees are either redwoods (*Sequoia sempervirens*) or live oaks (*Quercus agrifolia*). The remaining four trees in the site are within the "Open Space" portion of the site that will not be subject to disturbance.

5) **Jurisdictional Wetlands and Waters**

If wetlands and waters are present on the project site, project proponents must conduct a delineation of jurisdictional wetlands and waters. Jurisdictional wetlands and waters are defined on pages 1-18 and 1-19 of the ECCC HCP/NCCP as the following land cover types: permanent wetland, seasonal wetland, alkali wetland, aquatic, pond, slough/channel, and stream. It should be noted that these features differ for federal and state jurisdictions. If you have identified any of these land cover types in Table 1, complete the section below.

a) Attach the wetland delineation report as **Attachment E: Wetland Delineation.** If a wetland delineation has not been completed, please explain below in section 4c.

b) **Please check the following permits the project may require. Please submit copies of these permits to the Conservancy prior to the start of construction:**

☐ CWA Section 404 Permit[8] ☐ CWA Section 401 Water Quality Certification

☐ Waste Discharge Requirements ☐ Lake and Streambed Alteration Agreement

c) **Provide any additional information on impacts to jurisdictional wetland and waters below, including status of the permit(s):**

No potential jurisdictional Waters of the U.S. or wetlands were observed in the project site. The site consists entirely of disturbed ruderal grassland vegetation and previously developed areas. On-site grasses are upland (i.e., non-wetland) species and soils appear well draining.

[8] The USACE Sacramento District issued a Regional General Permit 1 (RGP) related to ECCC HCP/NCCP covered activities. The RGP is designed to streamline wetland permitting in the entire ECCC HCP/NCCP Plan Area by coordinating the avoidance, minimization, and mitigation measures in the Plan with the Corps' wetland permitting requirement. Applicants seeking authorization under this RGP shall notify the Corps in accordance with RGP general condition number 18 (Notification).

Species-Specific Planning Survey Requirements

Based on the land cover types found on-site and identified in Table 1, check the applicable boxes in Table 2a.

Table 2a. Species –Specific Planning Survey Requirements

Land Cover Type in Project Area	Required Survey Species	Habitat Element in Project Area	Planning Survey Requirement[9]	Info in HCP
☒ Grasslands, oak savannah, agriculture, or ruderal	☐ San Joaquin kit fox	Assumed if within modeled range of species	If within modeled range of species, identify and map potential breeding or denning habitat within the project site and a 250-ft radius around the project footprint.	pp. 6-37 to 6-38
	☒ Western burrowing owl	Assumed	Identify and map potential breeding habitat within the project site and a 500-ft radius around the project footprint. Please note the HCP requires buffers for occupied burrows. Surveys may need to encompass an area larger than the project footprint.	pp. 6-39 to 6-41
☐ Aquatic (ponds, wetlands, streams, sloughs, channels, and marshes)	☐ Giant garter snake	Aquatic habitat accessible from the San Joaquin River	Identify and map potential habitat.	pp. 6-43 to 6-45
	☐ California tiger salamander	Ponds and wetlands Vernal pools Reservoirs Small lakes	Identify and map potential breeding habitat. Document habitat quality and features. Provide the Conservancy with photo-documentation and report.	pp. 6-45
	☐ California red-legged frog	Slow-moving streams, ponds and wetlands	Identify and map potential breeding habitat. Document habitat quality and features. Provide the Conservancy with photo-documentation and report.	p. 6-46
	☐ Covered shrimp	Seasonal wetlands Vernal pools Sandstone rock outcrops Sandstone depressions	Identify and map potential habitat. Please note the HCP requires a 50 foot non-disturbance buffer from seasonal wetlands that may be occupied by covered shrimp. Surveys may need to encompass an area larger than the project footprint.	pp. 6-46 to 6-48
☒ Any	☐ Townsend's big-eared bat	Rock formations with caves Mines Abandoned buildings outside urban area	Map and document potential breeding or roosting habitat.	pp. 6-36 to 6-37
	☐ Swainson's hawk	Potential nest sites within 1,000 feet of project	Inspect large trees for presence of nest sites. Document and map.	pp. 6-41 to 6-43
	☒ Golden Eagle	Potential nest sites with ½ mile of project	Inspect large trees for presence of nest sites. Document and map.	pp. 6-38 to 6-39

Surveys for all covered species must be conducted by a qualified biologist (USFWS/CDFW project-specific approved). Please submit biologist approval request to the East Contra Costa County Habitat Conservancy.
Surveys for all covered species must be conducted according to the respective USFWS or CDFW survey protocols, as identified in Chapter 6.4.3 in the HCP/NCCP.

6) Planning Survey Species Habitat Maps

Provide Planning Survey Species Habitat Maps as required in Table 2a, attach as **Figure 5** in **Attachment B: Figures**.

[9] The planning survey requirements in this table are not comprehensive. Please refer to Chapter 6.4.3 in the ECCC HCP/NCCP for more detail.

7) **Results of Species Specific Surveys**
Provide a written summary describing the results of the planning surveys. Please discuss the location, quantity, and quality of suitable habitat for specified covered wildlife species on the project site.

General Setting: The project site is located in Clayton, in Contra Costa County, California (Figure 1). The site is in Section 13 within Township 1 North, Range 1 West of the USGS Clayton topographic quadrangle. The site slopes to the west and site elevations range from approximately 500 to 600 feet above mean sea level; there is a notable steep hill along the east edge of the site.

Land uses in this portion of Contra Costa County are primarily residential and open space, mostly used for rangeland and pockets of oak woodlands. The Oakhurst County Club is situated just north of the site. Peacock Creek Drive borders the north edge of the site and Clayton Road borders the west edge. Ruderal grassland, similar to that found within the site, is situated to the east and south. Lands in the project vicinity are a mixture of residential subdivisions, open rangeland, and oak woodlands.

The grasslands in the site provide potentially suitable habitat for western burrowing owl (*Athene cunicularia*). Golden eagle (*Aquila chrysaetos*) could nest in trees within 0.5 miles of the site. Each of these species is discussed below.

Western Burrowing Owl: The site consists of ruderal grassland vegetation that is within the range of western burrowing owl. California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB) contains no occurrences of western burrowing owl within 500 feet of the site (Figure 5b) and the nearest record is approximately 4 miles northwest of the project site (CNDDB, 2022). The site is just outside of the modeled range of the species as depicted in Appendix D of the ECCCHCP/NCCP. The site was inspected for burrowing owls and ground squirrel burrows with evidence of burrowing owl occupancy (i.e., white wash, pellets, feathers). Comprehensive inspection of potential burrowing owl habitat was accomplished by walking meandering transects throughout the property. No western burrowing owls or burrows with evidence of burrowing owl occupancy were observed during the field survey.

Golden Eagle: The site consists of ruderal grassland that is within the range of golden eagle. CDFW's CNDDB contains no occurrences of golden eagle within 0.5 miles of the site (Figure 5b). The site is just outside of the modeled range of the species as depicted in Appendix D of the ECCCHCP/NCCP. The small size of the site makes it highly unlikely that golden eagles would forage in the site. No golden eagles were observed during the survey. While none of the trees in the site are large enough to support nesting golden eagles, there are suitable nest trees within 0.5 miles of the site.

8) **Covered and No-Take Plants**
Please check the applicable boxes in Table 2b based on the land cover types found in the project area. If suitable land cover types are present on site, surveys must be conducted using approved CDFW/USFWS methods during the appropriate season for identification of covered and no-take species (see page 6-9 of the ECCC HCP/NCCP). Reference populations of covered and no-take plants should be visited, where possible, prior to conducting surveys to confirm that the plant species is visible and detectable at the time surveys are conducted. <u>In order to complete all the necessary covered and no-take plant surveys, spring, summer, and fall surveys may be required.</u>

<u>Table 2b. Covered and No-Take Plant Species</u>

Plant Species	Covered (C) or No-Take (N)	Associated Land Cover Type	Typical Habitat or Physical Conditions, if Known	Typical Blooming Period	Suitable Land Cover Type Present
Adobe navarretia (*Navarretia nigelliformis* ssp. *radians*) [a]	C	Annual Grassland	Generally found on clay barrens in Annual Grassland [b]	Apr–Jun	☐ Yes ☒ No
Alkali milkvetch (*Astragalus tener* ssp. *tener*)	N	Alkali grassland Alkali wetland Annual grassland Seasonal wetland	Generally found in vernally moist habitat in soils with a slight to strongly elevated pH	Mar–Jun	☐ Yes ☒ No

Big tarplant (*Blepharizonia plumosa*)	C	Annual grassland	Elevation below 1500 feet [d] most often on Altamont Series or Complex soils	Jul–Oct	☐ Yes ☒ No
Brewer's dwarf flax (*Hesperolinon breweri*)	C	Annual grassland Chaparral and scrub Oak savanna Oak woodland	Generally, restricted to grassland areas within a 500+ buffer from oak woodland and/or chaparral/scrub [d]	May–Jul	☐ Yes ☒ No
Brittlescale (*Atriplex depressa*)	C	Alkali grassland Alkali wetland	Restricted to soils of the Pescadero or Solano soil series; generally found in southeastern region of plan area [d]	May–Oct	☐ Yes ☒ No
Caper-fruited tropidocarpum (*Tropidocarpum capparideum)*	N	Alkali grassland		Mar–Apr	☐ Yes ☒ No
Contra Costa goldfields (*Lasthenia conjugens*)	N	Alkali grassland Alkali wetland Annual grassland Seasonal wetland	Generally found in vernal pools	Mar–Jun	☐ Yes ☒ No
Diablo Helianthella (*Helianthella castanea*)	C	Chaparral and scrub Oak savanna Oak woodland	Elevations generally above 650 feet [d]	Mar–Jun	☐ Yes ☒ No
Diamond-petaled poppy (*Eschscholzia rhombipetala*)	N	Annual grassland		Mar–Apr	☐ Yes ☒ No
Large-flowered fiddleneck (*Amsinckia grandiflora*)	N	Annual grassland	Generally on clay soil	Apr–May	☐ Yes ☒ No
Mount Diablo buckwheat (*Eriogonum truncatum*)	N	Annual grassland Chaparral and scrub	Ecotone of grassland and chaparral/scrub	Apr–Sep	☐ Yes ☒ No
Mount Diablo fairy-lantern (*Calochortus pulchellus*)	C	Annual grassland Chaparral and scrub Oak savanna Oak woodland	Elevations generally between 650 and 2,600[d]	Apr–Jun	☐ Yes ☒ No
Mount Diablo Manzanita (*Arctostaphylos auriculata*)	C	Chaparral and scrub	Elevations generally between 700 and 1,860 feet; restricted to the eastern and northern flanks of Mt. Diablo [d] and the vicinity of Black Diamond Mines	Jan–Mar	☐ Yes ☒ No
Recurved larkspur (*Delphinium recurvatum*)	C	Alkali grassland Alkali wetland		Mar–Jun	☐ Yes ☒ No
Round-leaved filaree (*California macrophylla*) [c]	C	Annual grassland		Mar–May	☐ Yes ☒ No
San Joaquin spearscale (*Extriplex joaquiniana*) [e]	C	Alkali grassland Alkali wetland		Apr–Oct	☐ Yes ☒ No
Showy madia (*Madia radiata*)	C	Annual grassland Oak savanna Oak woodland	Primarily occupies open grassland or grassland on edge of oak woodland	Mar–May	☐ Yes ☒ No

[a] The species *Navarretia nigelliformis* subsp. *nigelliformis* is no longer considered to occur within Contra Costa County based on specimen annotations at the UC and Jepson Herbaria at the University of California Berkeley as well as the opinions of experts in the genus. This taxon is now recognized as *Navarretia nigelliformis* subsp. *radians.* Any subspecies of *Navarretia nigelliformis* encountered as a part of botanical surveys in support of a PSR should be considered as covered under this HCP/NCCP.
[b] Habitat for the *Navarretia nigelliformis* subspecies that occurs within the inventory are is inaccurately described in the HCP/NCCP as vernal pools. The entity within the Inventory generally occupies clay barrens within Annual Grassland habitat, which is an upland habitat type.
[c] From California Native Plant Society. 2007. *Inventory of Rare and Endangered Plants* (online edition, v7-07d). Sacramento, CA. Species may be identifiable outside of the typical blooming period; a professional botanist shall determine if a covered or no take plant occurs on the project site. Reference population of covered and no-take plants should be visited, where possible, prior to conducting surveys to confirm that the plant is visible and detectable at the time surveys are conducted.
[d] See Species Profiles in Appendix D of the Final HCP/NCCP. Reference populations of covered and no-take plants should be visited, where possible, prior to conducting surveys to confirm that the plant species is visible and detectable at the time surveys are conducted.
[e] In the recent update to the Jepson eflora (JFP 2013) *Atriplex joaquinana* has been circumscribed and segregated into a new genus called *Extriplex* based on the work of Elizabeth Zacharias and Bruce Baldwin (2010). The etymology of the genus *Extriplex* means, "beyond or outside Atriplex".

9) Results of Covered and No-Take Plant Species

Provide a written summary describing the results of the planning surveys conducted as required in Table 2b. Describe the methods used to survey the site for all covered and no-take plants, including the dates and times of all surveys conducted (see Tables 3-8 and 6-5 of the ECCC HCP/NCCP for covered and no-take plants), including reference populations visited prior to conducting surveys.

If any covered or no-take plant species were found, include the following information in the results summary:

- Description and number of occurrences and their rough population size.
- Description of the "health" of each occurrence, as defined on pages 5-49 and 5-50 of the HCP/NCCP.
- A map of all the occurrences.
- Justification of surveying time window, if outside of the plant's blooming period.
- The CNDDB form(s) submitted to CDFW (if this is a new occurrence).
- A description of the anticipated impacts that the covered activity will have on the occurrence and how the project will avoid impacts to all covered and no-take plant species. If impacts to covered plant species cannot be avoided and plants will be removed by covered activity, the Conservancy must be notified and has the option to salvage the covered plants. All projects must demonstrate avoidance of all six no-take plants (see table 6-5 of the HCP/NCCP).

Survey Methods

Surveys for special-status plants was not warranted due to the highly disturbed nature of the ruderal grasslands in the site.

IV. SPECIES-SPECIFIC AVOIDANCE AND MINIMIZATION REQUIREMENTS

Please complete and/or provide the following attachments:

1) **Species-Specific Avoidance and Minimization for Selected Covered Wildlife**
Complete the following table and check the applicable box for covered species determined by the planning surveys.

Table 3. Summary of Applicable Preconstruction Surveys, Avoidance and Minimization, and Construction Monitoring Requirements[10]

Species	Preconstruction Survey Requirements	Avoidance and Minimization Requirements	Construction Monitoring Required	Info in HCP
☒ San Joaquin kit fox	• On project footprint and 250-ft radius, map all dens (>5 in. diameter) and determine status • Provide written survey results to USFWS within 5 working days after surveying	• Monitor dens • Destroy unoccupied dens • Discourage use of occupied (non-natal) dens	• Establish exclusion zones (>50 ft for potential dens, and >100 ft for known dens) • Notify USFWS of occupied natal dens	pp. 6-37 to 6-38
☒ Western burrowing owl	• On project footprint and 500-ft radius, identify and map all owls and burrows, and determine status • Document use of habitat (e.g. breeding, foraging)	• Avoid occupied nests during breeding season (Feb-Sep) • Avoid occupied burrows during nonbreeding season (Sep – Feb) • Install one-way doors in occupied burrow (if avoidance not possible) • Monitor burrows with doors installed	• Establish buffer zones (250 ft around nests) • Establish buffer zones (160 ft around burrows)	pp. 6-39 to 6-41
☐ Giant garter snake	• Delineate aquatic habitat up to 200 ft from water's edge on each side • Document any occurrences	• Limit construction to Oct-May • Dewater habitat April 15 – Sep 30 prior to construction • Minimize clearing for construction	• Delineate 200 ft buffer around potential habitat near construction • Provide field report on monitoring efforts • Stop construction activities if snake is encountered; allow snake to passively relocate • Remove temporary fill or debris from construction site • Mandatory training for construction personnel	pp. 6-43 to 6-45
☐ California tiger salamander	• Provide written notification to USFWS and CDFW regarding timing of construction and likelihood of occurrence on site	• Allow agency staff to translocate species, if requested	• None	p. 6-45

[10] The requirements in this table are not comprehensive; they are detailed in the next section on the following page.

☐ California red-legged frog	• Provide written notification to USFWS and CDFW regarding timing of construction and likelihood of occurrence on site	• Allow agency staff to translocate species, if requested	• None	p. 6-46
☐ Covered shrimp	• Establish presence/absence • Document and evaluate use of all habitat features (e.g. vernal pools, rock outcrops)	• Establish buffer near construction activities • Prohibit incompatible activities	• Establish buffer around outer edge of all hydric vegetation associated with habitat (50 ft or immediate watershed, whichever is larger) • Mandatory training for construction personnel	pp. 6-46 to 6-48
☐ Townsend's big-eared bat	• Establish presence/absence • Determine if potential sites were recently occupied (guano)	• Seal hibernacula before Nov • Seal nursery sites before April • Delay construction near occupied sites until hibernation or nursery seasons are over	• None	pp. 6-36 to 6-37
☐ Swainson's hawk	• Determine whether potential nests are occupied	• No construction within 1,000 ft of occupied nests within breeding season (March 15 - Sep 15) • If necessary, remove active nest tree after nesting season to prevent occupancy in second year.	• Establish 1,000 ft buffer around active nest and monitor compliance (no activity within established buffer)	pp. 6-41 to 6-43
☒ Golden Eagle	• Establish presence/absence of nesting eagles	• No construction within ½ mile near active nests (most activity late Jan – Aug)	• Establish ½ mile buffer around active nest and monitor compliance with buffer	pp. 6-38 to 6-39

2) Required Preconstruction Surveys, Avoidance and Minimization, and Construction Monitoring

All preconstruction surveys shall be conducted in accordance with the requirements set forth in Section 6.4.3, Species-Level Measures, and Table 6-1 of the ECCC HCP/NCCP. Detailed descriptions of preconstruction surveys, avoidance and minimization, and construction monitoring applicable to each of the wildlife species in Table 3 are located below. Please remove the species-specific measures that do not apply to your project (highlight entire section and delete).

WESTERN BURROWING OWL

Preconstruction Surveys

Prior to any ground disturbance related to covered activities, a USFWS/CDFW- approved biologist will conduct a preconstruction survey in areas identified in the planning surveys as having potential burrowing owl habitat. The surveys will establish the presence or absence of western burrowing owl and/or habitat features and evaluate use by owls in accordance with CDFW survey guidelines (California Department of Fish and Game 1995).

On the parcel where the activity is proposed, the biologist will survey the proposed disturbance footprint and a 500-foot radius from the perimeter of the proposed footprint to identify burrows and owls. Adjacent parcels under different land ownership will not be surveyed. Surveys should take place near sunrise or sunset in accordance with CDFW guidelines. All burrows or burrowing owls will be identified and mapped. Surveys will take place no more than 30 days prior to construction. During the breeding season (February 1– August 31), surveys will document whether burrowing owls are nesting in or directly adjacent to disturbance areas. During the nonbreeding season (September 1–January 31), surveys will document whether burrowing owls are using habitat in or directly adjacent to any disturbance area. Survey results will be valid only for the season (breeding or nonbreeding) during which the survey is conducted.

Avoidance and Minimization and Construction Monitoring

This measure incorporates avoidance and minimization guidelines from CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 1995).

If burrowing owls are found during the breeding season (February 1 – August 31), the project proponent will avoid all nest sites that could be disturbed by project construction during the remainder of the breeding season or while the nest is occupied by adults or young. Avoidance will include establishment of a non-disturbance buffer zone (described below). Construction may occur during the breeding season if a qualified biologist monitors the nest and determines that the birds have not begun egg-laying and incubation or that the juveniles from the occupied burrows have fledged. During the nonbreeding season (September 1 – January 31), the project proponent should avoid the owls and the burrows they are using, if possible. Avoidance will include the establishment of a buffer zone (described below).

During the breeding season, buffer zones of at least 250 feet in which no construction activities can occur will be established around each occupied burrow (nest site). Buffer zones of 160 feet will be established around each burrow being used during the nonbreeding season. The buffers will be delineated by highly visible, temporary construction fencing.

If occupied burrows for burrowing owls are not avoided, passive relocation will be implemented. Owls should be excluded from burrows in the immediate impact zone and within a 160-foot buffer zone by installing one-way doors in burrow entrances. These doors should be in place for 48 hours prior to excavation. The project area should be monitored daily for 1 week to confirm that the owl has abandoned the burrow. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation (California Department of Fish and Game 1995). Plastic tubing or a similar structure should be inserted in the tunnels during excavation to maintain an escape route for any owls inside the burrow.

GOLDEN EAGLE

Preconstruction Survey

Prior to implementation of covered activities, a qualified biologist will conduct a preconstruction survey to establish whether nests of golden eagles are occupied (see Section 6.3.1, *Planning Surveys*). If nests are occupied, minimization requirements and construction monitoring will be required.

Avoidance and Minimization

Covered activities will be prohibited within 0.5 mile of active nests. Nests can be built and active at almost any time of the year, although mating and egg incubation occurs late January through August, with peak activity in March through July. If site-specific conditions or the nature of the covered activity (e.g., steep topography, dense vegetation, limited activities) indicate that a smaller buffer could be appropriate or that a larger buffer should be implemented, the Implementing Entity will coordinate with CDFW/USFWS to determine the appropriate buffer size.

Construction Monitoring

Construction monitoring will focus on ensuring that no covered activities occur within the buffer zone established around an active nest. Although no known golden eagle nest sites occur within or near the ULL, covered activities inside and outside of the Preserve System have the potential to disturb golden eagle nest sites. Construction monitoring will ensure that direct effects to golden eagles are minimized.

3) Construction Monitoring Plan

Before implementing a covered activity, the applicant will develop and submit a construction monitoring plan to the planning department of the local land use jurisdiction and the East Contra Costa County Habitat Conservancy for review and approval. Elements of a brief construction monitoring plan will include the following:

- Results of planning and preconstruction surveys.[11]
- Description of avoidance and minimization measures to be implemented, including a description of project-specific refinements to the measures or additional measures not included in the HCP/NCCP.
- Description of monitoring activities, including monitoring frequency and duration, and specific activities to be monitored.
- Description of the onsite authority of the construction monitor to modify implementation of the activity.

☒ Check box to acknowledge this requirement.

[11] If the preconstruction surveys do not trigger construction monitoring, results of preconstruction surveys should still be submitted to the local jurisdiction and the East Contra Costa County Habitat Conservancy.

V. SPECIFIC CONDITIONS ON COVERED ACTIVITIES

1) Check off the HCP conservation measures that apply to the project.

APPLIES TO ALL PROJECTS

☒ **Conservation Measure 1.11. Avoid Direct Impacts on Extremely Rare Plants, Fully Protected Wildlife Species, or Migratory Birds.** This conservation measure applies to all projects. All projects will avoid all impacts on extremely rare plants and fully protected species listed in Table 6-5 of the ECCC HCP/NCCP. See HCP pp. 6-23 to 6-25, and Table 6-5.

APPLIES TO PROJECTS THAT IMPACT COVERED PLANT SPECIES

☐ **Conservation Measure 3.10. Plant Salvage when Impacts are Unavoidable.** This condition applies to projects that cannot avoid impacts on covered plants and help protect covered plants by prescribing salvage whenever avoidance of impacts is not feasible. Project proponents wishing to remove populations of covered plants must notify the Conservancy of their construction schedule to allow the Conservancy the option of salvaging the populations. See HCP pp. 6-48 to 6-50.

APPLIES TO PROJECTS THAT INCLUDE ARE ADJACENT TO STREAMS, PONDS, OR WETLANDS

☐ **Conservation Measure 2.12. Wetland, Pond, and Stream Avoidance and Minimization.** All projects will implement measures described in the HCP to avoid and minimize impacts on wetlands, ponds, streams, and riparian woodland/scrub. See HCP pp. 6-33 to 6-35.

APPLIES TO NEW DEVELOPMENT PROJECTS

☒ **Conservation Measure 1.10. Maintain Hydrologic Conditions and Minimize Erosion.** All new development must avoid or minimize direct and indirect impacts on local hydrological conditions and erosion by incorporating the applicable Provision C.3 Amendments of the Contra Costa County Clean Water Program's (CCCCWP's) amended NPDES Permit (order no. R2-2003-0022; permit no. CAS002912). The overall goal of this measure is to ensure that new development covered under the HCP has no or minimal adverse effects on downstream fisheries to avoid take of fish listed under ESA or CESA. See HCP pp. 6-21 to 6-22.

APPLIES TO NEW DEVELOPMENT PROJECTS THAT INCLUDE OR ARE ADJACENT TO STREAMS, PONDS, OR WETLANDS

☐ **Conservation Measure 1.7. Establish Stream Setbacks.** A stream setback will be applied to all development projects covered by the HCP according to the stream types listed in Table 6-2 of the HCP. See HCP pp. 6-15 to 6-18 and Table 6-2.

APPLIES TO NEW DEVELOPMENT PROJECTS ADJACENT TO EXISTING PUBLIC OPEN SPACE, HCP PRESERVES, OR LIKELY HCP ACQUISITION SITES

☒ **Conservation Measure 1.6. Minimize Development Footprint Adjacent to Open Space.** Project applicants are encouraged to minimize their development footprint and set aside portions of their land to contribute to the HCP Preserve System. Land set aside that contributes to the HCP biological goals and objectives may be credited against development fees. See HCP pages 6-14 to 6-15.

☐ **Conservation Measure 1.8. Establish Fuel Management Buffer to Protect Preserves and Property.** Buffer zones will provide a buffer between development and wildlands that allows adequate fuel management to minimize the risk of wildlife damage to property or to the preserve. The minimum buffer zone for new development is 100 feet. See HCP pages 6-18 to 6-19.

☐ **Conservation Measure 1.9. Incorporate Urban-Wildlife Interface Design Elements.** These projects will incorporate design elements at the urban-wildlife interface to minimize the indirect impacts of development on the adjacent preserve. See HCP pp. 6-20 to 6-21.

APPLIES TO ROAD MAINTENANCE PROJECTS OUTSIDE THE UDA

☐ **Conservation Measure 1.12. Implement Best Management Practices for Rural Road Maintenance.** Road maintenance activities have the potential to affect covered species by introducing sediment and other pollutants into downstream waterways, spreading invasive weeds, and disturbing breeding wildlife. In order to avoid and minimize these impacts, BMPs described in the HCP will be used where appropriate and feasible. See HCP pp. 6-25 to 6-26.

APPLIES TO NEW ROADS OR ROAD IMPROVEMENTS OUTSIDE THE UDA

☐ **Conservation Measure 1.14. Design Requirements for Covered Roads Outside the Urban Development Area (UDA).** New roads or road improvements outside the UDA have impacts on many covered species far beyond the direct impacts of their project footprints. To minimize the impacts of new, expanded, and improved roads in agricultural and natural areas of the inventory area, road and bridge construction projects will adopt siting, design, and construction requirements described in the HCP and listed in Table 6-6. See HCP pp. 6-27 to 6-33 and Table 6-6.

APPLIES TO FLOOD CONTROL MAINTENANCE ACTIVITIES

☐ **Conservation Measure 1.13. Implement Best Management Practices for Flood Control Facility Maintenance.** Flood control maintenance activities have the potential to affect covered species by introducing sediment and other pollutants into downstream waterways and disturbing breeding wildlife. In order to avoid and minimize these impacts, BMPs described in the HCP will be used where appropriate and feasible. See HCP pp. 6-26 to 6-27.

2) **For all checked conservation measures, describe how the project will comply with each measure. Attach as Attachment C: Project Compliance to HCP Conditions.**

VI. MITIGATION MEASURES

1) **Mitigation Fee Calculator(s)**
Complete and attach the fee calculator (use permanent and/or temporary impact fee calculator as appropriate), and attach as **Attachment D: Fee Calculator(s)**.

2) **Briefly describe the amount of fees to be paid <u>and</u> when applicant plans to submit payment.**

The 1.46+/- acre "Townhome" site is within Fee Zone 2. A portion (1.30+/- acres) of the site falls under the Urban/Developed land cover type and fees are exempt from that acreage. A total of 0.16 acres of ruderal grassland will be subject to Fee Zone 2. Based on 2022 rates, the fees can be estimated as follows:

0.16 acres of permanent impacts at a cost of $37,875.90 per acre = $6,060.14

Construction is expected to commence in late-2022 or early-2023. The fees will be paid prior to the start of construction at the current fee in place at that time.

ATTACHMENT A: PROJECT DESCRIPTION

Oakhurst Townhome Project

Project Description
May 2022

The overall 2.546+/- acre project site is just south of the entrance to the Oakhurst Country Club in Clayton, Contra Costa County, California. The site is within Section 13, in Township 1 North, Range 1 West of the USGS 7.5-minute Clayton topographic quadrangle (Figure 1). The site slopes to the west and site elevations range from approximately 500 to 600 feet above mean sea level; there is a notably steep hill along the east edge of the site.

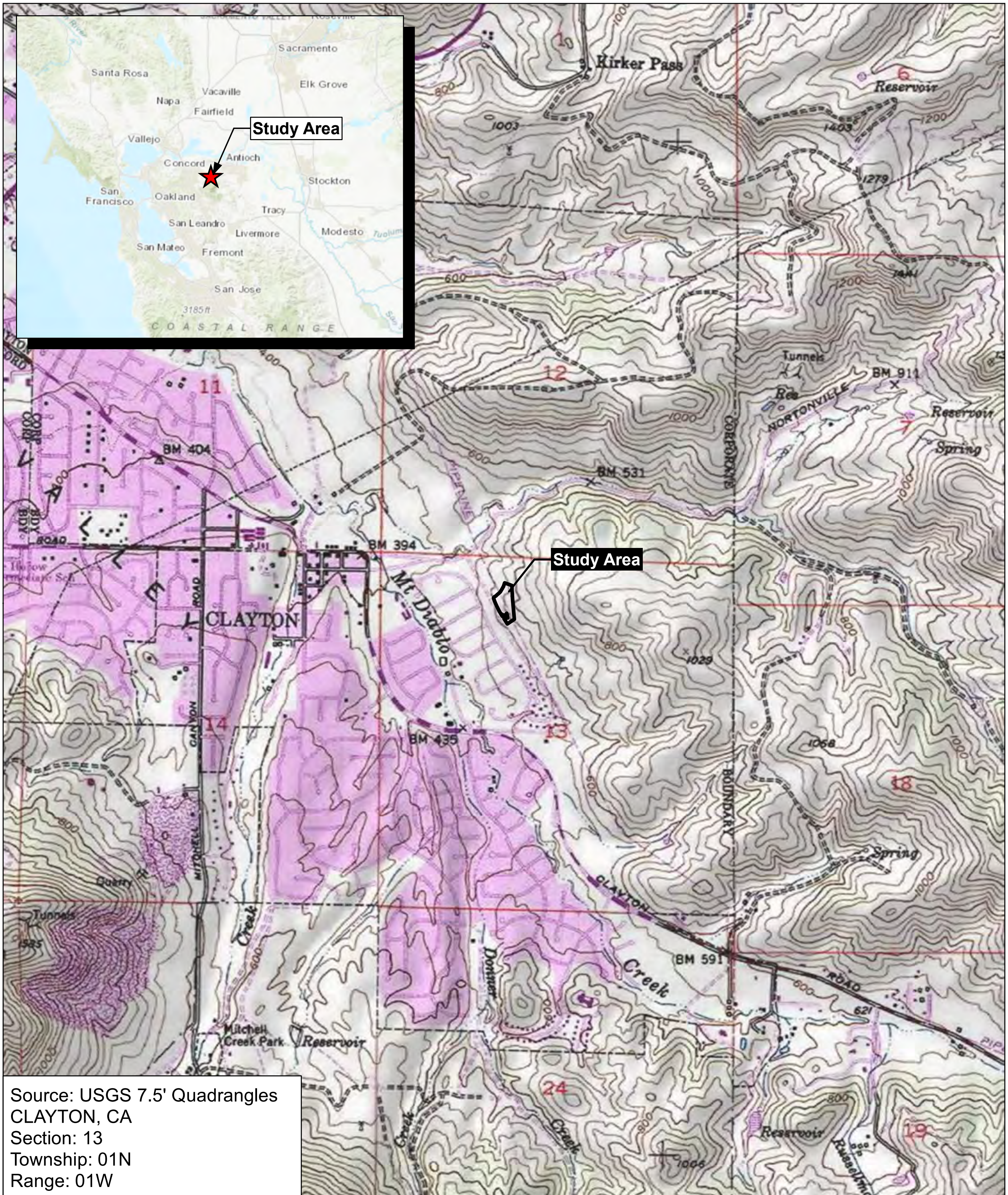
The site is primarily being used for a community "Park and Ride" at the present time and contains a large graveled parking lot. A portion of the overall 2.546+/- acre site will be developed as part of the project and the remaining portion will stay in open space (Figure 2A). The 1.460+/- acre "Townhome" portion of the site that will be developed primarily consists of the parking lot and landscaped strips along the roads. The 1.086+/- acre "Open Space" portion of the site is a very steep hill which will not be subject to project-related disturbance.

Empire Acres LLC proposes the development of 6 buildings consisting of 26-unit townhomes and associated parking areas (Figures 2B and 2C). The project will be constructed on approximately 0.157 acres of the Ruderal Grassland land cover type and 1.300 acres of the Urban/Developed land cover type.

Standard construction best management practices (BMPs) will be employed during construction to minimize the potential for erosion and off-site transport of fines. BMPs will include appropriate compaction of soil, installation of straw wattles, silt fences, or other technologies along the perimeter of the site during construction, and stabilization of bare soils as appropriate with seeding, straw, and/or hydro-mulch.

Construction will occur over 2 to 3 months and is expected to begin in late-2022 or early-2023.

ATTACHMENT B: FIGURES



Source: USGS 7.5' Quadrangles
CLAYTON, CA
Section: 13
Township: 01N
Range: 01W

Figure 1

0 1,000 2,000
Feet
1 inch = 2,000 feet

Site Map/USGS

Oakhurst Townhome Project

City of Clayton, Contra Costa County, CA

Moore Biological Consultants

Map Date: 05/09/2022

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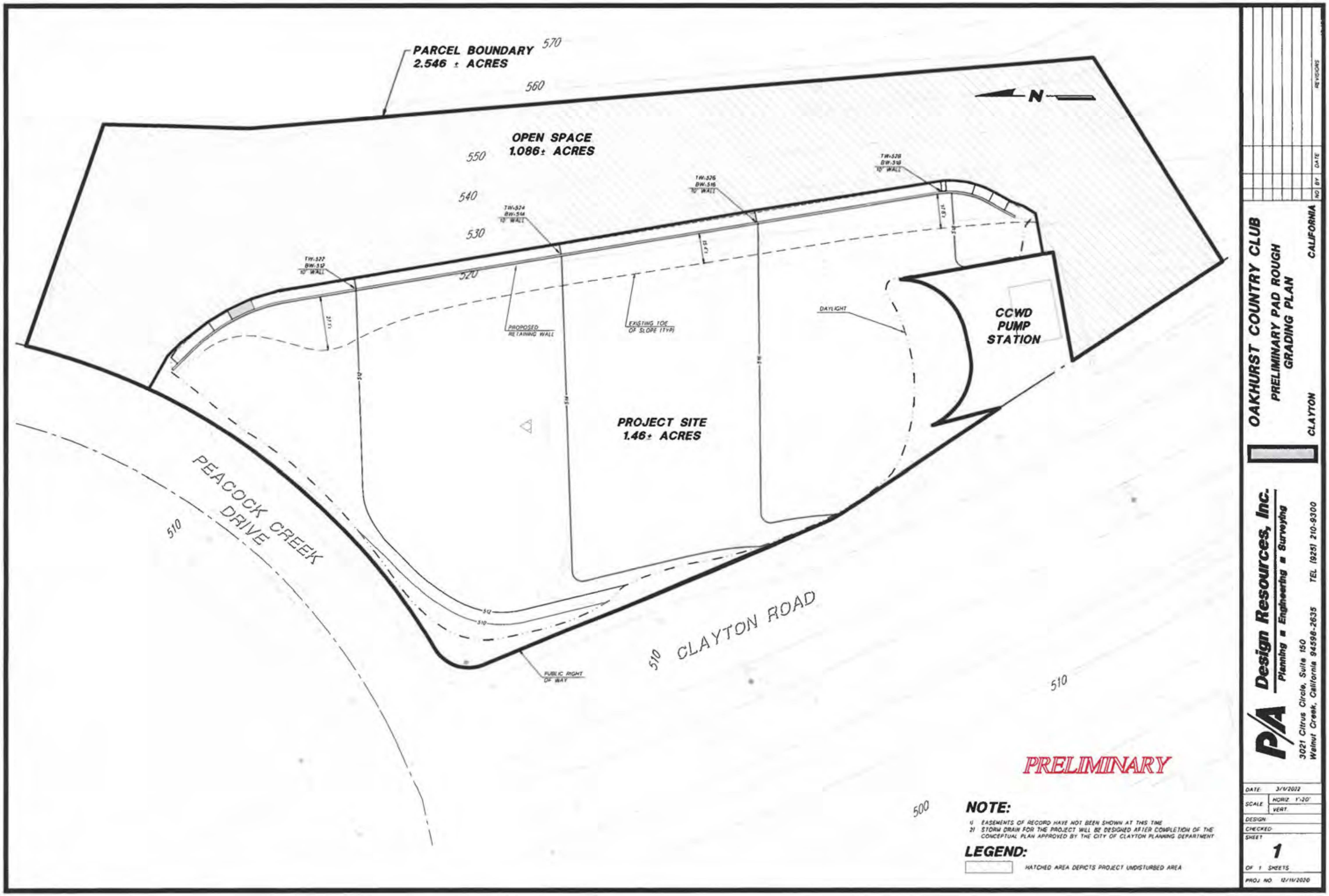

FIGURE 2A - Townhome Site and Open Space Exhibit

399.198 Alvernaz Properties
Clayton
March 2, 2022

ARCHITECTURAL SITE PLAN
A1

Grant Alvernaz

SDG Architects, Inc.
3361 Walnut Blvd. Suite 120
Brentwood, CA 94513
925.634.7000 | sdgarchitectsinc.com

FIGURE 2B - Conceptual Site Plan

FIGURE 2C -

Alvernaz Oakhurst
Clayton, CA
February 01, 2021

SAMPLE ELEVATIONS

SDG Architects, Inc.
3361 Walnut Blvd. Suite 120
Brentwood, CA 94513
925.634.7000 | sdgarchitectsinc.com

	Ruderal Grassland (ac.)	Urban/Developed (ac.)
Townhome Site	0.157	1.300
Open Space - No Improvements	0.927	0.159
Total	**1.084**	**1.459**

Figure 3

Moore Biological Consultants

Townhome Site (1.460 acres)
Open Space - No Improvements (1.086 acres)
Ruderal grassland
Urban/developed

Map Date: 05/09/2022
Aerial Source: Maxar (11/2020)

Field Verified Landcover Map

Oakhurst Townhome Project

City of Clayton, Contra Costa County, CA

Gravel in the body of the site, looking south from the north part of the site; 05/10/22.
The site is currently being used as a "Park and Ride".

Steep hill along the east edge of the site, looking east from the central part of the site; 05/10/22. This steep hillside will remain in open space.

FIGURE 4a

MOORE BIOLOGICAL

REPRESENTATIVE PHOTOGRAPHS

Ruderal grassland hillside along the east edge of the site, looking south from the northeast part of the site; 05/10/22.

Ruderal grassland hillside along the east edge of the site, looking north from the southeast part of the site; 05/10/22. This hillside will remain in open space and will not be disturbed.

FIGURE 4b

MOORE BIOLOGICAL

REPRESENTATIVE PHOTOGRAPHS

Landscape strip along the west edge of the site, looking south from the northwest corner of the site; 05/10/22.

Landscape strip along the west edge of the site, looking northwest from the south part of the site; 05/10/22. The landscape primarily consists of ornamental shrubs.

FIGURE 4c

MOORE BIOLOGICAL

REPRESENTATIVE PHOTOGRAPHS

Northwest edge of the site, looking southwest along Peacock Creek Drive from the north part of the site; 05/10/22.

East edge of the site, looking north from the southeast corner of the site; 05/10/22.

FIGURE 4d

MOORE BIOLOGICAL

REPRESENTATIVE PHOTOGRAPHS

Trees and shrubs within the landscape strip in the northwest part of the site, looking west; 05/10/22.

Trees and shrubs in the landscaped area in the north part of the site, looking northeast; 05/10/22.

FIGURE 4e

MOORE BIOLOGICAL

REPRESENTATIVE PHOTOGRAPHS

South part of the site, looking north from the south edge of the site; 05/10/22.

Southwest part of the site, looking north from the southwest corner of the site; 05/10/22.
The pump station is not within the project boundary.

FIGURE 4f

MOORE BIOLOGICAL **REPRESENTATIVE PHOTOGRAPHS**

Ground squirrel burrows in the grassland area in the northeast part of the site, looking south; 05/10/22. There were a few scattered ground squirrel burrows in this part of the site.

	Ruderal Grassland (ac.)	Urban/Developed (ac.)
Townhome Site	0.157	1.300
Open Space - No Improvements	0.927	0.159
Total	**1.084**	**1.459**

Figure 5a

Moore Biological Consultants

Townhome Site (1.460 acres)
Open Space - No Improvements (1.086 acres)
Ruderal grassland; assumed habitat for San Joaquin kit fox and western burrowing owl
Urban/developed
Tree; Potential nest site for white-tailed kite and golden eagle

0 50 100

Map Date: 05/09/2022
Aerial Source: Maxar (11/2020)

Planning Survey Species Habitat Map

Oakhurst Townhome Project

City of Clayton, Contra Costa County, CA

Figure 5b

Moore Biological Consultants

0 500 1,000

N W E S

Map Date: 05/09/2022
Aerial Source: Maxar (11/2020)

Regional Species Habitat Map

Oakhurst Townhome Project

City of Clayton, Contra Costa County, CA

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ATTACHMENT C: PROJECT COMPLIANCE TO HCP CONDITIONS

Oakhurst Townhome Project

Project Compliance to HCP Conditions

May 2022

<u>HCP/NCCP Conservation Measure 1.11. Avoid Direct Impacts on Extremely Rare Plants, Fully Protected Wildlife Species, or Covered Migratory Birds</u>:

The potential for special-status plants to occur within the site is considered extremely remote, as described in Section III (10).

Species-specific pre-construction surveys, and if needed, monitoring and avoidance requirements for burrowing owl, San Joaquin kit fox, and golden eagle will be conducted as described in Section IV (2). There is no suitable habitat in the site for ringtail (*Bassariscus astutus*), a “fully protected species,” per California Fish and Game Code Section 4700. Similarly, there is no suitable nesting habitat in the site for peregrine falcon (*Falco peregrinus*), a “fully protected species,” per California Fish and Game Code Section 3511.

White-tailed kite (*Elanus caeruleus*), another “fully protected species,” per California Fish and Game Code Section 3511 could potentially nest in trees in and near the site. Prior to any ground disturbance related to covered activities that occur during the nesting season (March 15-August 31), a qualified biologist will conduct a preconstruction survey no more than 1 month prior to construction to establish whether white-tailed kite is nesting in trees visible from the site. In the event active nests are found, the applicant shall notify the Implementing Entity and consult with CDFW for further guidance.

On-site grasslands could be used by other species of nesting birds protected by the Migratory Bird Treaty Act. If possible, vegetation removal will occur outside of the general bird nesting season (February 1 through August 31). Alternately, a qualified biologist will conduct a preconstruction survey no more than 2 weeks prior to vegetation removal. In the event active nests are found, the applicant shall notify the Implementing Entity and consult with CDFW for further guidance.

HCP/NCCP Conservation Measure 1.10. Maintain Hydrologic Conditions and Minimize Erosion:

The project has been designed to maintain hydrologic conditions and minimize erosion.

Standard construction best management practices (BMPs) will be employed during construction to minimize the potential for erosion and off-site transport of fines. BMPs will include appropriate compaction of soil, and installation of straw wattles, silt fences or other technologies along the perimeter of the site during construction, and stabilization of bare soils as appropriate with seeding, straw, and/or hydromulch.

ATTACHMENT D: FEE CALCULATOR

ECCC HCP/NCCP 2022 Fee Calculator Worksheet
Clayton, Oakley, Pittsburg, County, PSE[1]
Permanent Impacts

PROJECT APPLICANT: Empire Acres LLC

PROJECT NAME: Oakhurst Townhome Project

APN(s): 118-370-073

JURISDICTION: Clayton

DATE: May 2022

DEVELOPMENT FEE

See appropriate ordinance or HCP/NCCP Figure 9-1 to determine Fee Zone

	PERMANENT IMPACTS (ACRES)		2022 FEE/ACRE *subject to change* [2]		
Fee Zone 1		x	$18,937.95	=	$0.00
Fee Zone 2	0.16	x	$37,875.90	=	$6,060.14
Fee Zone 3		x	$9,468.98	=	$0.00
Fee Zone 4[3]		x	$28,406.93	=	$0.00
			Development Fee Total	=	**$6,060.14**

WETLAND MITIGATION FEE

Impacts to riparian/scrub, wetlands, ponds, aquatic, and slough/channel are charged both a wetland mitigation fee and a development fee. Please also include these impact acres to development fee above.[4]

	PERMANENT IMPACTS (ACRES)		2022 FEE/ACRE *subject to change* [2]		
Riparian woodland / scrub		x	$105,515.99	=	$0.00
Perennial Wetland		x	$159,911.71	=	$0.00
Seasonal Wetland		x	$374,220.31	=	$0.00
Alkali Wetland		x	$378,310.21	=	$0.00
Ponds		x	$205,923.71	=	$0.00
Aquatic (open water)		x	$102,962.44	=	$0.00
Slough / Channel		x	$147,029.10	=	$0.00

STREAMS	PERMANENT IMPACTS (LINEAR FEET)		2022 FEE/LINEAR FT *subject to change* [2]		
Streams 25 feet wide or less		x	$542.59	=	$0.00
Streams greater than 25 feet wide		x	$814.47	=	$0.00
			Wetland Mitigation Fee Total	=	**$0.00**

FEE REDUCTION[5]

Development Fee reduction for land in lieu of fee	=	
Development Fee reduction (up to 33%) for permanent assessments	=	
Wetland Mitigation Fee reduction for wetland restoration/creation performed by applicant	=	
Reduction Total	=	**$0.00**

FINAL FEE CALCULATION

Development Fee Total		$6,060.14
Wetland Mitigation Fee Total	+	$0.00
Mitigation Fee Subtotal	=	**$6,060.14**
Contribution to Recovery[6]	+	
TOTAL AMOUNT TO BE PAID	=	**$6,060.14**

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[1] The City of Brentwood is on a separate fee schedule until the 2017 Fee Audit has been adopted by the city. For projects within Brentwood, please use the Brentwood fee calculator worksheets.

[2] Development fees are adjusted annually (no later than March 15 of each year) according to a formula that includes both a Home Price Index (HPI) and a Consumer Price Index (CPI). The Wetland Mitigation Fees are adjusted according to a CPI.

[3] Fee Zone 4 is not shown on Figure 9-1 of the HCP/NCCP but refers to the fee applicable to those few covered acitivities located in northeastern Antioch (p. 9-21).

[4] Per Chapter 9.3.1 of the HCP/NCCP, for every acre of impact on wetlands, streams, ponds, and riparian woodland/scrub, applicants will pay the appropriate development fee (according to fee zone) towards land acquisition and the conservation program as a whole, as well as a wetland mitigation fee to cover the costs of successful restoration or creation.

[5] Fee reductions must be reviewed and approved by the Conservancy.

[6] Participating Special Entities (PSEs) are required to pay fees over and above permanent and temporary impact mitigation fees to cover indirect costs of extending permit coverage, including a portion of the costs of the initial preparation of the Plan, and a portion of the costs of conservation actions designed to contribute to species recovery. This amount will be determined in accordance with the Contribution to Recovery Implementation Policy adopted by the Conservancy Governing Board on December 8, 2014.

APPENDIX D

GEOTECHNICAL REPORTS

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ALAN KROPP, CE, GE
JAMES R. LOTT, CE, GE
JEROEN VAN DEN BERG, CE
THOMAS M. BRENCIC, CE

ALAN KROPP
& ASSOCIATES, INC.
GEOTECHNICAL
CONSULTANTS

August 2, 2022
1413-5A, L-32800

Alvernaz Partners, LLC
Grant Alvernaz
1777 N. California Blvd., Suite 305
Walnut Creek, CA 94596

RE: Update of Geotechnical Investigation
Oakhurst Townhome Development
Clayton, California

Dear Mr. Alvernaz:

As authorized, this letter presents an update of our July 8, 2021 geotechnical investigation report titled "Geotechnical Investigation, Oakhurst 23-Unit Townhome Development, Clayton, California."

1.00 PROPOSED CONSTRUCTION

Since the issuance of our 2021 report, the proposed project has been re-configured and now consists of 30 Townhome Units. Similar to the originally anticipated project, the units will be constructed in the area of the relatively level park and drive lot at the southeastern corner of Clayton Road and Peacock Creek Drive, in Clayton, California. Again, similar to the originally anticipated project, it is proposed to excavate into the toe of the adjacent eastern slope and construct a retaining wall with a height on the order of 10 feet. As with the originally proposed project, the townhome buildings are anticipated to be wood-framed construction, two to three stories in height and slab-on-grade construction is preliminarily anticipated. An Architectural Site Plan showing the new 30-unit layout is attached in Appendix A.

2.00 SCOPE

The scope of our update included the following tasks:

- Review of information in our files from our 2021 geotechnical investigation of the site;
- Establishment of a new baseline reading (November 5, 2021) and a subsequent reading (May 13, 2022) in the inclinometer installation (C-1) that was identified during our 2021 site investigation on the hillside above the site (See Site Plan from our 2021 report in Appendix B for inclinometer location);
- An update site reconnaissance visit (July 21, 2022);
- Engineering analyses of the collected data; and

- Preparation of this update letter.

3.00 UPDATE SITE INVESTIGATION

3.01 Review of 2021 Geotechnical Investigation

The results of our 2021 site investigation, which included geologic map review, subsurface investigation, and an extensive review of past site development history was discussed in our July 8, 2021 geotechnical investigation report. The reader is referred to that report for details of our 2021site investigation.

3.02 Inclinometer Readings

In our 2021 report, we recommended that prior to final design and construction, an attempt be made to locate records (past readings) from the slope inclinometer (C-1) that was installed during mass grading in the early 1990's and identified during our site investigation. The inclinometer was reported to have been installed to a depth of approximately 100 feet, but was protected by a locked metal casing and not accessible at the time of preparation of our 2021 report. The inclinometer is located well off-site but was presumed to fall under the jurisdiction of the Oakhurst GHAD. We recommended that if no past readings could be found and/or if readings have not been taken in the past several years, that arrangements be made with the GHAD to access the inclinometer in order to confirm the current inclinometer depth and to take a new set of baseline readings for future monitoring.

A subsequent attempt to locate records from the inclinometer installation was unsuccessful. We therefore coordinated with the City of Clayton (GHAD administrator) and obtained permission to remove the old padlock on the protective casing and access the inclinometer for a new baseline and subsequent readings. A baseline reading was taken on November 5, 2021. The inclinometer casing was found to be open and un-obstructed to a depth of roughly 104 feet. A subsequent reading was taken on May 13, 2022. Cumulative and incremental displacement plots from these readings are included in the attached Appendix B. Beyond some minor movement in the upper few feet of the inclinometer, no clear indications of lateral displacement was noted with the readings taken.

3.03 Update Surface Reconnaissance

In order to evaluate current site conditions, an update surface reconnaissance visit was conducted on July 21, 2022. The site appeared to be largely unchanged from that documented in our 2021 report, except that in the southerly portion of the site a local near vertical cut has been made into the toe of the buttress slope, roughly along the alignment of the proposed upslope retaining wall. We understand that this temporary cut was made in order to develop fill material for use elsewhere in the Oakhurst subdivision. The excavation extends for a distance of roughly 60 feet and has resulted in a near vertical bank of roughly 5 to 10 foot in height in the southerly portion of the site, with some soil banked back in against the toe of the higher portions of the cut. The exposed material in the cut face is predominately a stiff silty to sandy clay, with abundant small rock fragments. The material is clearly fill, with obvious horizontal layering. This is consistent with the early 1990's buttress fill construction documented in this area.

During our site visit, we re-walked the concrete V-ditches on the lower and upper benches above the site. No lateral offsets that would be an indication of slide movement on the slope directly above the park and ride lot were noted. However, as noted in our 2021 report, there are multiple separations/pull-aparts along the axis of the ditches (typically occurring at cold joints in the ditches), which varied from 1 to 2+inches in width. These pull-apart separations did not appear to be substantially changed from the conditions that were observed at the time of preparation of our 2021 report. Similar to the condition documented in our 2021 investigation report, the two buttress subdrains that discharge to the ditch (near the southern end) on the lower bench above the park and ride lot were noted to be dry (no discharge) and partially blocked with loose dirt from apparent burrowing animal activity.

4.00 UPDATE EVALUATION AND CONCLUSIONS

With the exception of the local cut into the toe of the hillside (in the area where a cut and retaining wall is planned), the geotechnical site conditions documented during our update site reconnaissance in July 2022, appear to be essentially unchanged from those documented in our July 8, 2021 report. An updated site development layout with 30 townhome units (as opposed to the original layout of 23 townhome units) is currently proposed. However, from a geotechnical perspective, the new layout has similar characteristics as the original plan. As with the original plan, the units are to be constructed in the area of the relatively level park and drive lot, with a proposed excavation into the toe of the adjacent eastern slope that is supported with a new retaining wall with a height on the order of 10 feet, and with the townhome buildings that are anticipated to be wood-framed construction, two to three stories in height and with slab-on-grade construction preliminarily anticipated. Based on our update evaluation it is our opinion that the conclusions and recommendations as contained in our July 8, 2021 report are still valid and applicable to the revised development plan.

In our 2021 report, we recommended that an attempt be made to locate records from the inclinometer installation on hillside above the site and if records could not be located that a new baseline reading be established and the inclinometer monitored for indications of potential lateral movement that could aid in understanding of the nature of the multiple pull-aparts noted in portions of the concrete V-ditches on the slope above the site, which could in-turn result in some modifications of site development recommendations given in our 2021 report. No historic inclinometer readings have to date been identified. However, when accessed the inclinometer was found to be open and un-obstructed for what is believed to be the full depth of the original installation (just over 100 feet deep). This is an indication that any lateral movement that may have occurred over the last 30 years has been limited. Comparison of our November 2021 baseline readings with those taken in May of 2022 similarly show no significant lateral displacement with the exception of some minor movement in the upper few feet of the casing. Movement detected in the upper few feet of the casing is in our opinion likely attributable to seasonal shrink and swell of the moderately expansive near surface soils that are known to exist in the area. While no evidence of significant lateral displacement in the inclinometer has been detected to date, it is recommended that the installation continue to be periodically monitored up through the completion of the construction phase of the project.

As noted in our 2021 report, our opinions in relation to the performance of the engineered-fill slide buttress constructed during subdivision mass grading are based in part on the assumed continued functioning of the subdrain systems as were installed during site mass grading operations in the early 1990’s. Without clean-outs, it is difficult to directly access much of the subdrain system. It continues to be our recommendation that prior to final plan development and construction, that that an attempt be made to confirm the condition of the 3 on-site subdrain outfall pipes, as indicated on the UT Record Drawing documented in our 2021 report. Depending on the findings from this initial evaluation of the subdrain system, we may recommend additional steps be taken to enhance the performance of the 30-year-old subdrain system, such as the addition of horizontal drains to tap existing subdrain blankets in order to provide a secondary outlet to potentially clogged subdrain discharge pipes.

As noted, a local near vertical cut has been made into the toe of the buttress fill slope. While this cut appears relatively stable under current dry weather conditions, it is likely that this cut will deteriorate with winter rains and could trigger local upslope instability. Therefore, assuming that the planned retaining wall is not be constructed in the next few months, it is recommended that the cut area be re-buttressed with the placement of compacted fill in order to re-establish the approximate pre-existing slope configuration, prior to the up-coming rainy season.

5.00 LIMITATIONS AND CLOSURE

This update letter has been prepared for the exclusive use of you and your consultants for specific application to the proposed townhome project in accordance with generally accepted geotechnical engineering practices. No other warranty, either expressed or implied, is made. In the event that the nature, design, or location of the project differs significantly from what has been noted above, or if any future additions are proposed, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing.

The findings of this update letter are valid as of the present date. However, the passing of time will likely change the conditions of the existing property due to natural processes or the works of man. In addition, due to legislation or the broadening of knowledge, changes in applicable or appropriate standards may occur. Accordingly, the findings of this update letter may be invalidated, wholly or partly, by changes beyond our control. Therefore, this update letter should not be relied upon after three years without being reviewed by this office.

We are pleased to have been of service to you on this project. If you have any questions concerning this report, please feel free to contact the undersigned.

Very truly yours,

REGISTERED PROFESSIONAL ENGINEER
JAMES R. LOTT
GE2137
EXP. 12/31/23
GEOTECHNICAL
STATE OF CALIFORNIA

James R. Lott, G.E.
Associate Engineer

JRL/jc

Copies: Addressee (PDF) – grant@apwest.com; ddolter@comcast.net
P/A Design Resources (PDF)
Attn: Ross Avedian - ravedian@padesignresources.com

APPENDIX A
ARCHITECTURAL SITE PLAN (30 UNITS)

Unit Name	Description	Garage SF (1,000 SF Max)	Garage Type	Quantity	%	Unit Net S.F.*	Unit Gross SF**	Total Net SF*	Total Unit Gross SF**
UNIT 1	3 Bedroom + 3 Bath	436	2-Car (2 Std.)	2	6.7%	1,362	1,798	2,724	3,596
UNIT 2	3 Bedroom + 3 Bath + Opt. Office	503	2-Car (Tandem)	12	40.0%	2,038	2,541	24,456	30,492
UNIT 3	3 Bedroom + 3 Bath + Den/Opt. Office	475	2-Car (2 Std.)	6	20.0%	1,692	2,167	10,152	13,002
UNIT 4	3 Bedroom + 3 Bath + Den/Opt. Office	475	2-Car (2 Std.)	6	20.0%	1,692	2,167	10,152	13,002
UNIT 5	4 Bedroom + 3.5 Bath	451	2-Car (2 Std.)	2	6.7%	1,715	2,166	3,430	4,332
UNIT 6	4 Bedroom + 3.5 Bath	510	2-Car (2 Std.)	2	6.7%	1,991	2,501	3,982	5,002
Subtotal				30	100.0%			54,896	69,426
Avg. Unit Square Footage								1,830	2,314
Overall Density									

*Net SF: Measured to outside face of stud, excludes garage area, deck and porches. Includes air gap per unit

**Gross SF: Measured to outside face of stud, includes garage area. Includes air gap per unit.

399.198 Alvernaz Properties
Clayton
July 13, 2022

0 4' 8' 12' 16' 20' 40'

NORTH

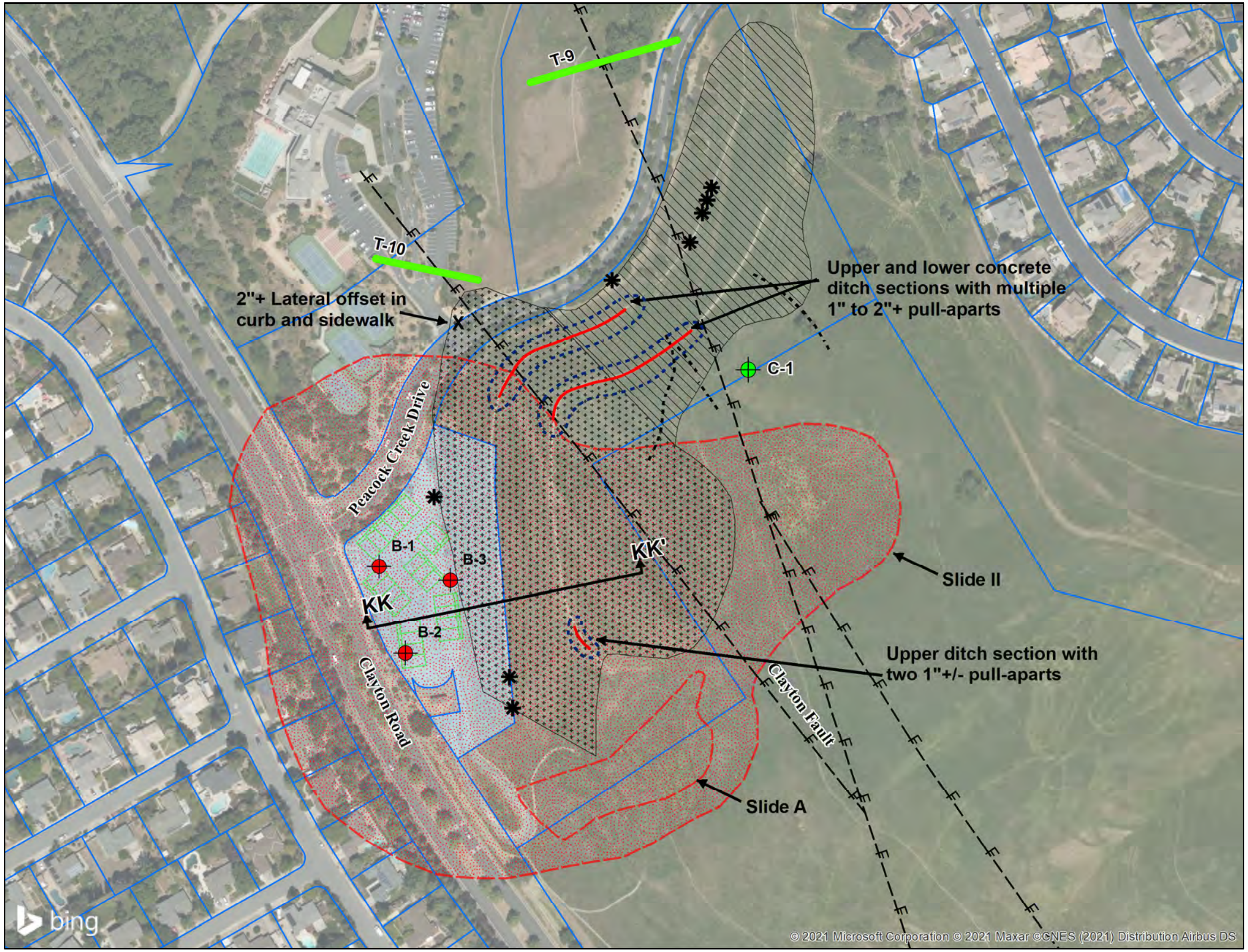
ARCHITECTURAL SITE PLAN_30
A1.01

Grant Alvernaz

SDG Architects, Inc.
3361 Walnut Blvd. Suite 120
Brentwood, CA 94513
925.634.7000 | sdgarchitectsinc.com

APPENDIX B

SITE PLAN WITH INCLINOMETER (C-1) LOCATION PLUS INCLINOMETER PLOTS



N

LEGEND (All locations approximate)

- B-1 — Location of exploratory boring (this study)
- C-1 — Location of inclinometer (UDI-Tetrad, 1992)
- T-10 — Fault trench location by Purcell-Rhoades Associates, 1974 as reported by Hallenbeck and Associates 1987
- Subject parcel
- Slide II and Slide A boundaries (Hallenbeck 1989/Joyce - Kropp 1999)
- Main Slide II as built buttress (Hallenbeck, 1991)
- North face Slide II as built buttress (Hallenbeck, 1991)
- Cross section location (See Appendix A for Section KK-KK)
- Proposed multi-unit buildings
- Parcel boundary
- Ground cracks observed during Slide II buttress grading (Hallenbeck, 1990)
- Clayton fault trace (Hallenbeck 1989)
- Buttress subdrain outfall from UDI-Tetrad Record Drawing

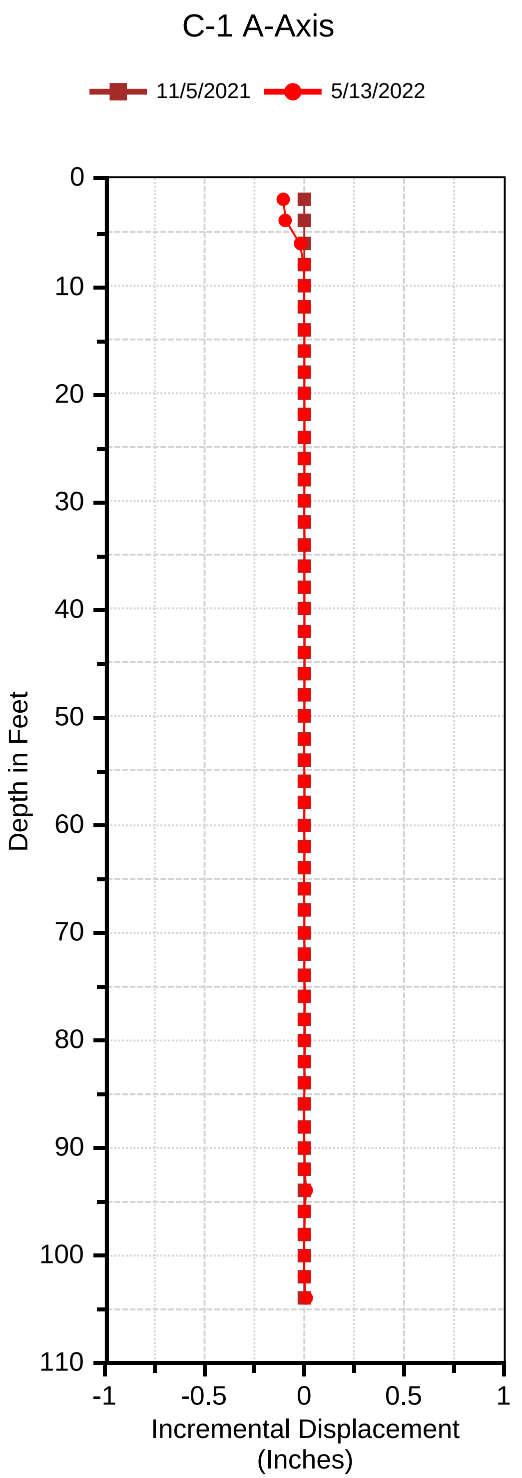
Source: Bing and Contra Costa County parcels, 2010.

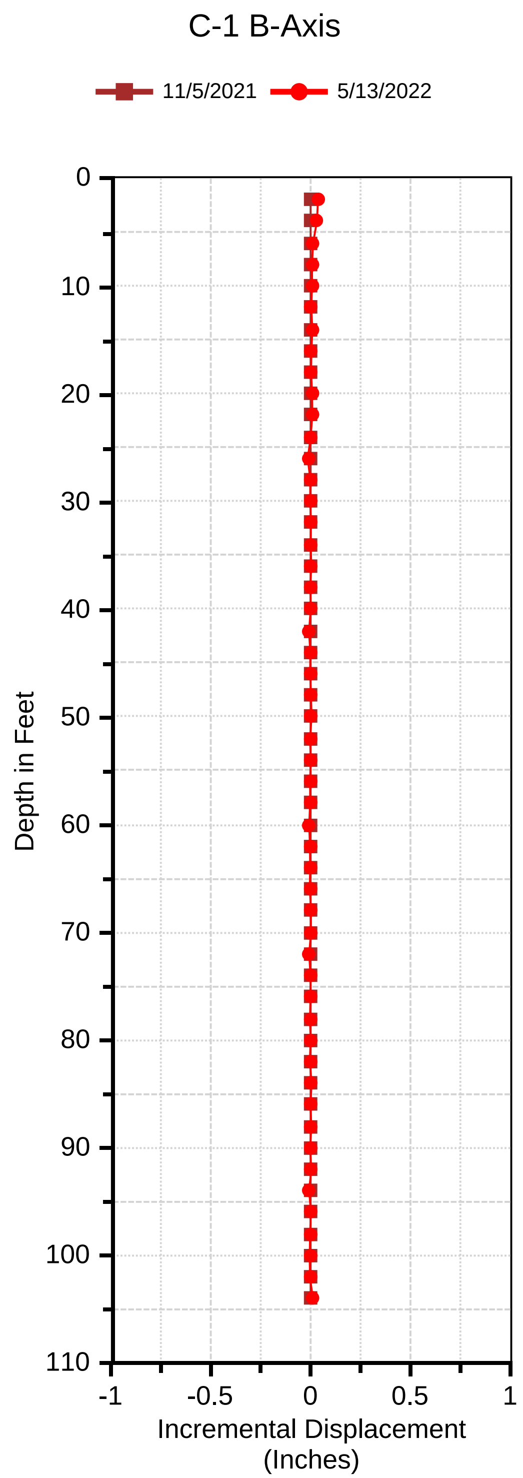
0 100 200 400 Feet

Original figure produced in color.

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

AREA SITE PLAN		
OAKHURST TOWNHOMES Clayton, California		
PROJECT NO.	DATE	FIGURE 2
1413-5	July 2021	

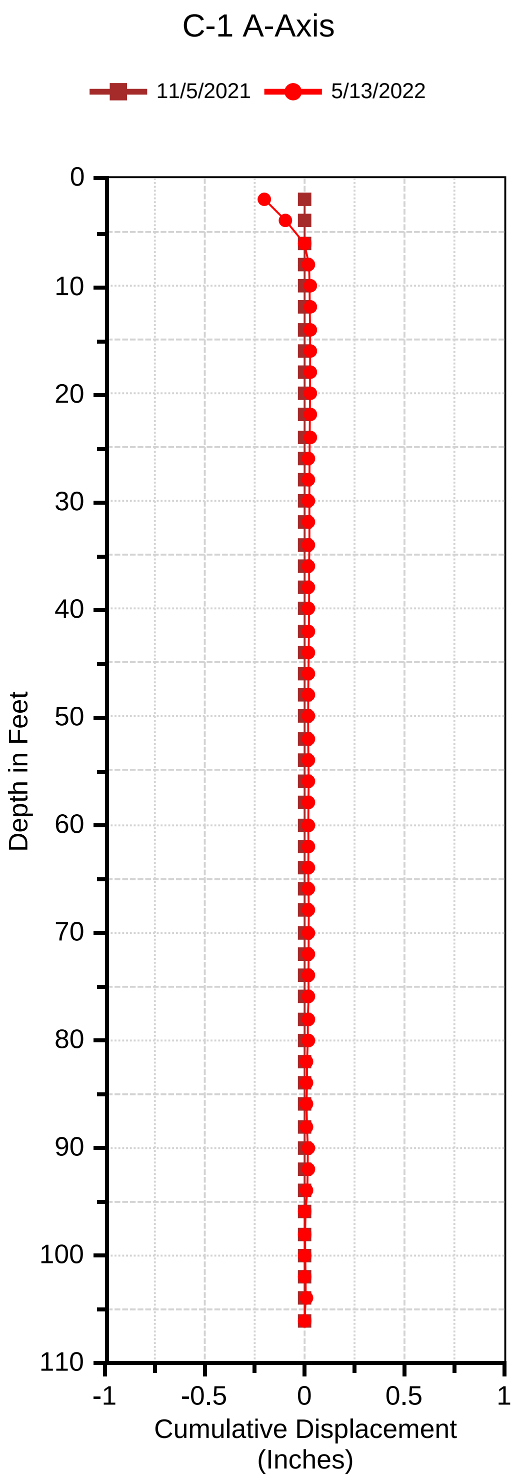


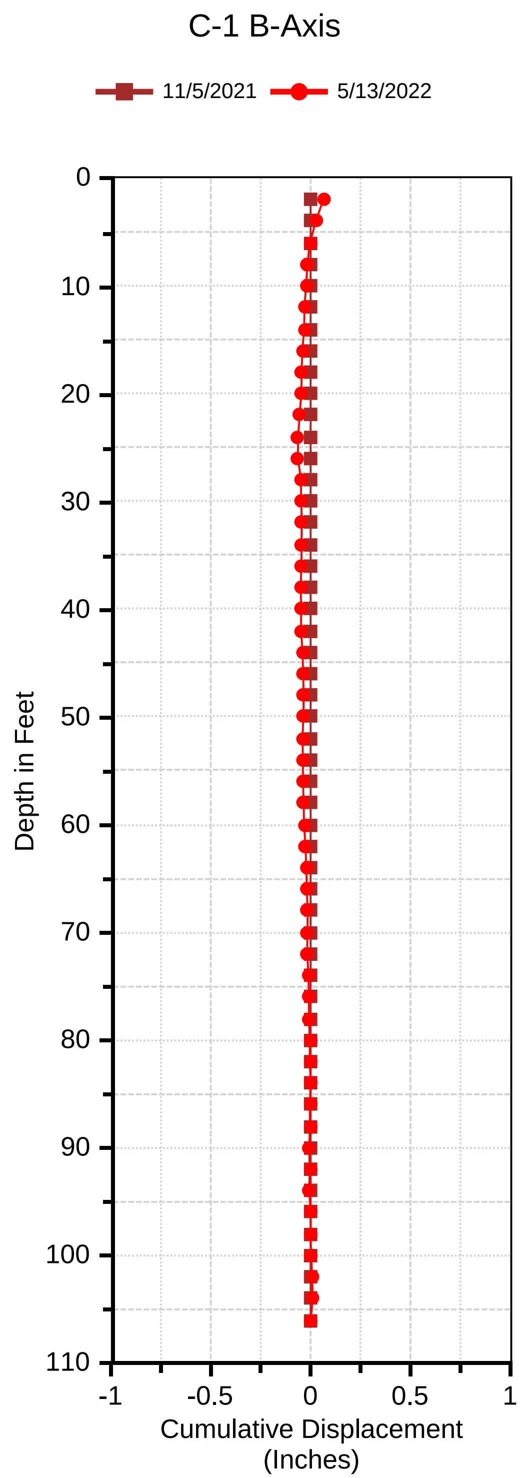


ALAN KROPP & ASSOCIATES
Geotechnical Consultants

OAKHURST SUBDIVISION
Clayton, California

Slope Inclinometer C-1
A+ N84W, B+ N6E





ALAN KROPP & ASSOCIATES
Geotechnical Consultants

OAKHURST SUBDIVISION
Clayton, California

Slope Inclinometer C-1
A+ N84W, B+ N6E

GEOTECHNICAL INVESTIGATION
OAKHURST 23-UNIT TOWNHOME DEVELOPMENT
CLAYTON, CALIFORNIA

ALAN KROPP
& ASSOCIATES, INC.
GEOTECHNICAL
CONSULTANTS

ALAN KROPP, CE, GE
JAMES R. LOTT, CE, GE
JEROEN VAN DEN BERG, GE
THOMAS M. BRENCIC, GE

July 8, 2021
1413-5, L-32432

Alvernaz Partners LLC
Grant Alvernaz
1777 N. California Blvd., Suite 305
Walnut Creek, CA. 94596

RE: Geotechnical Investigation
Oakhurst 23-Unit Townhome Development
Clayton, California

Dear Mr. Alvernaz:

We are pleased to present this geotechnical investigation for the proposed Oakhurst 23-unit townhome development in Clayton, California. The project site is located at the southeastern corner of Clayton Road and Peacock Creek Drive, within the Oakhurst residential development (Vicinity Map, Figure 1).

1.00 PROPOSED CONSTRUCTION

Based on our review of a preliminary (conceptual level) project layout prepared by the project designer (P/A Design-Resources), it is our understanding that the proposed development will consist of six multi-unit townhome buildings (23 units total) constructed on the existing relatively level park-and-drive lot at the southeastern corner Clayton Road and Peacock Creek Drive. In order to expand the available building pad area of the site, it is proposed to excavate into the toe of the adjacent eastern slope and construct a retaining wall with a height on the order of 10 feet. The townhome buildings are anticipated to be wood-framed construction and two to possibly three stories in height. Slab on grade construction is preliminarily anticipated.

2.00 PURPOSE

The purpose of our geotechnical investigation was to evaluate the general geotechnical suitability of the site for the proposed development and provide geotechnical engineering recommendations for the proposed improvements.

3.00 SCOPE

The scope of our work to accomplish the stated purpose included:

- Existing geotechnical data review;
- Review of previous data from other geotechnical consultants;
- Site reconnaissance visits;
- Subsurface exploration;
- Laboratory testing;
- Engineering analyses of the collected data; and
- Report preparation.

We would like to point out items that are <u>not</u> included in our scope of work. Should you desire more study in one or more of the excluded areas, we would be glad to provide names of qualified professionals with expertise in that area. The scope of our services did not include an environmental assessment or investigation for the presence of hazardous or toxic materials in the soil, groundwater, or air on, below, or around this site. An evaluation of the potential presence of sulfates in the soil or other possibly corrosive, naturally occurring elements was beyond our scope.

We should note that an asphalt pavement design for the proposed driveway was not within our scope of services at the time of our agreement. We would be pleased to provide such a design in the future if you request it, although an additional fee would be charged.

4.00 SITE INVESTIGATION

4.01 Existing Geotechnical Data Review

A variety of published sources were reviewed to evaluate geotechnical data relevant to the subject site. These sources included geotechnical literature, reports, and maps published by various public agencies. Maps that were reviewed included topographic, geologic, and preliminary photointerpretive landslide maps prepared by the United States Geological Survey, as well as geologic, landslide, and fault maps prepared by the California Geological Survey (formerly the California Division of Mines and Geology).

The subject site is located on the eastern side Clayton Road at the base of a generally northwest-southeast-trending ridge line, adjacent to the alluvial valley floor. The site elevation is roughly 560 feet (NAVD 88).

A widely used geologic map of the area (Dibblee, 1980) indicates the surficial soils at the site are underlain by bedrock designated as Panoche Formation clay shale with minor sandstone. Dibblee shows a trace of the Clayton fault a few hundred feet to the east (upslope) of the site. East of the fault, bedrock is mapped as Panoche Formation sandstone. A more recent geologic map by Graymer, et al. (1994) similarly maps the site as underlain by an early Cretaceous age shale with minor sandstone, with the area immediately upslope of the site mapped as underlain by early Cretaceous age sandstone and shale.

A preliminary photointerpretive landslide map of the area (Nilsen, 1975) shows the entire west-facing side of the ridge in the area (including the subject site) as within a massive possible landslide deposit, which is queried for uncertainty of identification.

The site is located approximately 4 miles northeast of the nearest active trace of the Concord fault. The site is also located about 36 miles, 17 miles, and 9 miles northeast of the active San Andreas, Hayward, and Calaveras faults, respectively (USGS, 2006). The site is not located within an Alquist-Priolo (A-P) Earthquake Fault Zone designated by the State of California.

As noted previously, Dibblee (1980) maps the Clayton fault a few hundred feet to the east (upslope) of the site. While the Clayton fault is not a designated special studies zone (A-P) fault, some previous investigators (including the geotechnical investigator for the master Oakhurst development, Hallenbeck and Associates), have suggested that the Clayton fault should be considered as potentially active. A more detailed discussion of the evaluation of the Clayton fault location in the area of the subject site is provided in a subsequent section of this report.

4.02 Review of Data from Other Consultants

We reviewed a number of documents by others from the original Oakhurst subdivision development in our files from past studies in the area and also as supplied by your consultant, P/A Design Resources, from their research of City of Clayton building department files. It is noted that many of the documents are partial or incomplete (missing key oversized maps and/or referencing other letters or documents that we have not been able to locate, including the large-scale As-Built Geologic Map sheets that were prepared for the Peacock Creek Subdivision area by Hallenbeck and Associates). However, a summary of project-relevant site information, as obtained from our review of documents that we were able to locate, is provided below. This summary also includes observations from a 1999 joint landslide study by Joyce Associates and Alan Kropp and Associates (Joyce-Kropp) of a landslide and subsequent buttress repair immediately to the south of the subject site.

As noted above, the geotechnical investigator for the master (Oakhurst) development was Hallenbeck and Associates (HA), a firm no longer in operation. Key pre-construction site studies were conducted by HA in 1987 and 1989. Mass grading for the Peacock Creek subdivision portion of the Oakhurst site (with engineering observation and testing provided by HA) took place in in 1990 and 1991. During mass grading operations, HA issued a number of supplemental letters documenting conditions as exposed and providing recommendations related to buttress back-cut failures and other issues as encountered during construction. We also reviewed a number of HA field-technician daily reports from the mass grading time period. The project civil engineer was UDI-Tetrad (UT), who provided Rough Grading Plans in 1989 and, in 1996, provided post-construction Record Plans (with As-Built subdrain lines indicated). Key project-relevant observations as obtained from our review of these documents are outlined below. A number of the features as discussed below (mapped fault location, landslide, and landslide buttress limits, etc.) taken from the documents reviewed are also illustrated relative to the current project site location on the attached Area Site Plan (Figure 2) and Site Plan (Figure 3).

- As part of their pre-construction studies in 1987 and 1989, HA conducted an extensive review of fault location data, as shown on published maps and as determined from previous site investigations (including trenching investigations) in the area by others (including Woodward-Lundgren and Associates, 1974 and Purcell, Rhoads and Associates, 1979). HA also excavated a number of additional fault trenches in an attempt to more accurately locate potential splays of the Clayton fault in the improvement areas. The HA pre-construction documentation maps splays of the Clayton fault in the open hillside area, to the east (uphill) of the subject site (fault extends roughly in a north-south orientation), with the closest fault splay mapped more than 100 feet to the east of the closest location to the upper site (parcel) boundary and more than 250 feet east of the nearest planned townhome building footprint.

- According to the HA pre-construction mapping, the original alignment for the oil pipeline through the area extended through the upper portion of the subject site (parcel). However, apparently during project development, the pipeline(s) were relocated. The former location of the oil pipeline(s) as mapped by HA is illustrated on the Attached Figure 3. The current approximate location of oil pipelines (based on the Alta Utility Map of the area) is along the western edge of the site (see Figure 3).

- The subject site is encompassed within a large, mapped landslide feature identified in the HA 1989 site study as Landslide No. 11. The mapped slide feature is "pear shaped," wider at the bottom than at the top, has maximum plan dimensions of roughly 1,300 feet long by 1,000 feet wide, and extends from the toe of the rear-yard slope of the houses along the west (downhill) side of Clayton Road up to a few hundred feet short of the back of the uphill Peacock Creek Subdivision lots. The approximate mapped limits of Landslide No. 11, as taken from the HA plans, are illustrated on the Area Site Plan, Figure 2. Subdivision mass grading involved making a large cut into the toe of the slope to create the park-and-drive lot, and the slope east of the lot was rebuilt as a buttress fill slope. Cross Section KK-KK (approximate location shown on Figures 2 and 3) from the UT 1989 Rough Grading plan through the proposed Slide No. 11 buttress (Section KK-KK attached in Appendix A) illustrates this cut, which is roughly 50 to 60 foot in depth at the toe of slope at the rear of the park-and-drive lot and roughly 10 to 15 feet in depth near Clayton Road. Cross-Section KK-KK shows a buttress keyway at the toe of the rebuilt slope of 60 feet in width with a 1.5 to 1 (horizontal to vertical) backcut. As previously indicated, we have only partial construction documentation; but from what we have, it is clear that there was significant movement of the backcut during grading operations, and in the end, the buttress width dimensions increased by a factor of several fold. During buttress excavation, movement/ground cracking in the area to the north of the mapped Landslide No. 11 limits was observed, and an approximately 100-foot depth inclinometer was installed in the ridge area north of the Slide No. 11 limits to monitor movement in this area. The approximate mapped locations of ground cracks observed by HA during mass grading and the approximate location of the inclinometer are shown on Area Site Plan, Figure 2. HA attributed the backcut failures/ground cracking in the area to the north of the Slide No. 11 limits to temporary removal of lateral support with the deep downslope buttress excavation and weak/sheared rock conditions related to the Clayton fault traces that pass through the area. Stability concerns in the area resulted in the expansion of remedial grading to include extensive buttressing of an originally planned cutslope along the north-facing slope of Peacock Creek Drive. The approximate as-built limits of the main Slide No. 11 buttress and of the north face (Peacock Creek Drive) buttress, as documented by HA, are illustrated on the attached Area Site Plan, Figure 2.

- An extensive amount of subdrainage was incorporated within the north-facing slope buttress, as well within the main Slide No. 11 slope buttress. The UT Record Drawing in Appendix B provides documentation of the subdrainage lines and outfall locations. Based on our review of the Record Drawing, it appears that there are 3 outfalls for the subdrain system in the main Slide No. 11 buttress that are on (or immediately adjacent to) the subject site/parcel (two outfalls at the southern end of the mid slope V-ditch and one at the base of slope near the entrance to the park-and-drive lot). Several other outfalls for the Slide No. 11 buttress and the north-facing slope buttress above Peacock Creek Drive are located off site to the northeast of the subject site/parcel. The approximate outfall locations are illustrated on the Area Site Plan, Figure 2. Clean-outs are not indicated on the Record Drawing, and none were observed in the field.

- The construction records reviewed indicate that as a result of the ground cracking and back cut failure issues during Slide No. 11 buttress grading, HA conducted supplemental analysis of the area and of the expanded buttress. They also interfaced and exchanged correspondence with Geomatrix (presumably the peer reviewer for the project). We have been unsuccessful in locating the specifics of this supplemental analysis/correspondence. However, in the final summary of engineering observation and testing during grading for the Peacock Creek subdivision improvements, HA does conclude that the “repaired landslide, and buttressed cutslopes, have been satisfactorily stabilized.”

- As illustrated on the Area Site Plan, Figure 2, the Peacock Creek subdivision buttress grading in 1990/1991 did not extend to the southern limits of mapped Slide No. 11 (area to the south of the subject site). In the late 1990s, a landslide (Landslide A, See Figure 2) developed in this area and was subsequently investigated by Joyce-Kropp, with a buttress repair observed by Joyce-Kropp in the latter part of 1999. Based on observations from buttress construction, it is our opinion that Slide A—although contained within the original HA mapped limits of Slide No. 11—was a separate slide feature, separated from the Slide No. 11 area by a ridge of moderately competent Panoche Formation bedrock along the northern flank of Slide A. During buttress grading for Slide A, no indications of the Clayton fault passing through the buttress area (consisting of approximately the lower half to two-thirds of the mapped Slide A limits) were observed.

4.03 Surface Reconnaissance Visits

Surface reconnaissance visits were conducted at various times in May and June 2021 during the course of our investigation. These visits were intended to make observations of the surficial conditions present and to note whether any obvious geotechnical concerns were exposed.

The site/parcel has maximum plan dimensions of roughly 280 feet by 600 feet. The northwestern part of the site (where the townhome structures are proposed) is occupied by the park-and-drive lot, a partially paved but primarily gravel parking lot. At the eastern boundary of the park-and-ride lot, the ground slopes up to the east at an inclination of approximately 2:1 (horizontal to vertical) for a vertical height of roughly 90 feet, with concrete V-ditches roughly at mid slope and at the upper limits of the 2:1 slope. Beyond the upper V-ditch, the ground continues to slope up to the east at a more irregular inclination up to the rear of the houses that are part of the Peacock Creek Subdivision. The eastern site/parcel boundary approximately coincides with the alignment of the mid-slope V-ditch.

The slope is covered with a low growth of wild grass. It appears that the lower portion of the grass-covered slope (at least up to the mid-slope V-ditch) burned in the last year or so, leaving a relatively sparse growth of grass on this portion of the slope. Some evidence of shallow surface raveling of materials on the 2:1 slope was observed (particularly on the sparsely vegetated lower slope portion). However, no indications of sliding and/or mass slope instability was observed on and/or directly upslope of the subject parcel.

With the low growth of grass, the ground surface was generally visible. The two subdrain outfalls at the south end of the mid-slope V-ditch (upslope of the park-and-drive lot), as shown on the UT Record Drawing, were identified during our site reconnaissance, with pipes noted discharging through the side wall of the mid-slope ditch. Both pipes were dry (no discharge) when observed in May/June, 2021, and both pipes were partially blocked by loose soil from apparent burrowing rodent activity. We were unsuccessful in locating the third on-site subdrain discharge point at the toe of the slope near the entrance to the park-and-drive lot, where the UT Record Drawing shows an additional Slide No. 11 buttress subdrain discharge point. Several off-site subdrain discharge points into the mid-slope V-ditch to the northeast of the subject site/parcel were also identified, with some seepage noted discharging from the northeastern-most outfalls. We did not observe any evidence of subdrain clean-outs on the slope in the buttress areas. As previously noted, clean-outs were not indicated on the UT Record Drawing of the subdrain system, and it is unknow if subdrain clean-outs were established as part of the buttress grading for Slide No. 11 and/or the north-facing (Peacock Creek Drive) slope buttress. During our site reconnaissance, we were also able to confirm the location of the inclinometer (C-1, as shown on the Area Site Plan, Figure 2) installed during buttress grading in the early 1990s. The inclinometer pipe is protected by a relatively robust steel well cover, which is secured with a padlock that has a tamper-proof sheath cover (preventing simply cutting the lock off). Access to the inclinometer pipe will require either a key to the pad lock (assuming that the lock is still functional) and/or significant effort to break open (destroy) the protective well cover.

The two terraced V-ditches directly upslope of the subject parcel were in relatively good condition for their age (roughly 30 years old) and did not show any signs of significant lateral offsets that would be an indication of slide movement on the slope directly above the park-and-ride lot. However, multiple separations/pull-aparts along the axis of ditches (typically occurring at cold joints in the ditches), which varied in width from 1 to 2+ inches (some but not all of which have been previously patched), were noted in both the upper and lower ditches starting roughly at the point where the ditches bend around to the east (extending parallel to Peacock Creek Drive) and occurring intermittently for several hundred feet of the ditch sections extending to the east (see Area Site Plan, Figure 2). A couple of similar pull-aparts were noted at the southern end of the upper V-ditch, upslope of the park-and-ride lot (see Figure 2). During our area reconnaissance, we also noted a lateral offset in the sidewalk and street curb (along with some bulging of the asphalt at the edge of the curb) on the north side of Peacock Creek Drive, just east of the driveway entrance to the club house complex (see Figure 2). Some cracking was noted extending across the asphalt pavement in this area, but no similar lateral offset was observed in the median-strip curb or in the curb along the south side of Peacock Creek Drive.

There is a Contra Costa Water District (CCWD) pump station at the southern end of the park-and-ride lot. A CCWD map of line locations in the area show two water lines leading from the pump station and extending to the north across the park-and-ride lot, approximately as shown on the attached Site Plan, Figure 3. An Alta utility survey map for the area also shows two separate oil pipelines along (and possibly partially within) the western boundary of the subject site (see Site Plan, Figure 3). The park-and-ride lot is also traversed by a storm-drain system, which carries discharge from the two V-ditches upslope of the lot and from drop inlets located within the lot and connects to the area storm-drain system under Peacock Creek Drive and ultimately Clayton Road. The approximate configuration of the storm-drain system is shown on the UT Rough Grading Plan, which is included in Appendix B.

4.04 Subsurface Exploration

On May 24, 2021, our subsurface exploration program was performed to investigate and sample the subsurface materials in the area of the proposed townhome structures. Three borings were drilled at the approximate locations shown on Figures 2 and 3.

Truck-mounted continuous flight auger drilling equipment was employed to advance the borings. Samples of the materials encountered were obtained using a 140-pound hammer and conventional sampling equipment. Approximate measurements of the unconfined strength of selected soil samples recovered from the borings were performed during the drilling operations using a pocket penetrometer testing device.

Borings B-1 and B-2—both drilled along the western side of the site (towards Clayton Road)—encountered weathered siltstone bedrock at a depth of 1 foot or less directly below the gravel parking lot base layer, with the rock typically becoming slightly less weathered and harder with depth. B-3, drilled at the eastern side of the park-and-drive lot (near the toe of the buttress slope), encountered roughly 11 feet of fill soil, consisting of lean clay with some silt and fine-grained sand. The upper 8 feet of the fill material was stiff in consistence and contained abundant bedrock fragments. From roughly 8 to 11 feet in B-3, the clayey fill soil was firm to stiff, with only a trace of bedrock fragments. The fill soil from B-3 (in area of 50+ feet of cut from original grade) is apparently associated with the downslope edge of the Slide No. 11 buttress.

Free groundwater was encountered in exploratory borings B-1 and B-3 at the time of drilling at depths of approximately 16 feet and 10.5 feet, respectively. Groundwater levels in B-1 and B-3 were remeasured at 15 feet approximately 4.5 hours after drilling and at 12 feet approximately 1.5 hours after drilling, respectively. No groundwater was encountered in B-2. In accordance with drilling requirements for Contra Costa County, all 3 exploratory borings were grouted with lean concrete upon completion of the day’s drilling activities. It should be noted that groundwater measurements in the borings may have been made prior to allowing a sufficient period of time for the equilibrium groundwater conditions to become established. In addition, fluctuations in the groundwater level may occur due to variations in rainfall, temperature, and other factors not evident at the time the measurements were made. Due to the sloping nature of the terrain, it is our opinion that seepage could occur in excavations and behind retaining walls, particularly after prolonged rains during a relatively heavy rainy season.

Detailed descriptions of the materials encountered in the borings are found on the boring logs presented in Appendix C. A Key to Exploratory Boring Logs, Figure C-1, and Physical Properties Criteria for Rock Descriptions, Figure C-2, are also presented in Appendix C. The attached logs and related information depict subsurface conditions only at the specific locations shown on the Site Plan and on the particular date designated on the logs. These logs may have been modified from the original logs recorded during drilling as a result of further study of the collected samples, laboratory tests, or other efforts. Also, the passage of time may result in changes in the subsurface conditions due to environmental changes. The locations of the borings were approximately determined by pacing, and the ground surface elevations at each boring location were approximately determined by interpolation of topographic map contours. The locations and elevations should be considered accurate only to the degree implied by the method used.

4.05 Laboratory Testing

Water content, Atterberg Limits, and dry density tests were performed on select samples obtained from the exploratory borings. The results of these tests are presented on the boring logs at the appropriate sample depths. Atterberg Limits tests on samples of the near-surface fill soil from B-3 and the near-surface weathered siltstone bedrock from B-2 both indicated a material with a moderate-to-high plasticity (Plasticity Index [PI]=22 to 23 and Liquid Limit [LL]=43 to 44). This is indicative of materials with a moderate-to-high potential for expansive (shrink/swell) behavior.

5.00 EVALUATIONS AND CONCLUSIONS

Based on our investigation, it is our preliminary opinion that the site is potentially suitable for the construction of the proposed townhome development from a geotechnical standpoint. However, prior to final design and construction of the project, we recommend some additional evaluation of the possible slope movement features as identified during this study and of the existing buttress subdrain system. In the following sections of this report, we provide preliminary site development recommendations based on our current understanding of the site conditions.

5.01 Recommended Areas of Additional Evaluation

As documented above, an extensive engineered fill buttress with subdrainage has been constructed immediately upslope of the proposed site improvements as part of the mass grading for the Peacock Creek/Oakhurst Subdivision improvements. The buttress has now been in place for roughly 30 years, and we did not observe any signs of mass instability on and/or immediately upslope of the subject site/parcel. While the buttress appears to be functioning generally as intended, as previously documented, we did note multiple pull-separations in the concrete V-ditches above and to the northeast of the site at various locations. A somewhat unusual lateral offset was also noted in the street curb and sidewalk on the north side of Peacock Creek Drive, just east of the driveway entrance to the clubhouse complex. These features could potentially be an indication of some slope movement and/or lateral fill extension. We recommend that prior to final design and construction, an attempt be made to locate records (past readings) from the slope inclinometer (C-1) that was installed during the mass grading in the early 1990s. This inclinometer is located well off-site but presumably falls under the jurisdiction of the Oakhurst GHAD, and it is therefore assumed that the Oakhurst GHAD would be the repository of this information. If no past readings can be found and/or if readings have not been taken in the past several years, it is recommended that arrangements be made with the GHAD to access the inclinometer (which may require destruction of the well cover if a padlock key cannot be located) in order to confirm the current inclinometer depth and to take a new set of baseline readings for future monitoring. Information from the inclinometer could potentially shed some light on the nature of the identified possible slope movement/lateral extension movement, which could, in turn, result in some modification of the preliminary site development recommendations as given in this report.

Our opinions in relation to the performance of the engineered-fill slide buttress constructed during subdivision mass grading are based in part on the assumed continued functioning of the subdrain systems as were installed during site mass grading operations. Without clean-outs, it is difficult to directly access much of the subdrain system. Prior to final plan development and construction, we are recommending that that an attempt be made to confirm the condition of the 3 on-site subdrain outfall pipes, as indicated on the UT Record Drawing. Depending on the findings from this initial evaluation of the subdrain system, we may recommend additional steps be taken to enhance the performance of the 30-year-old subdrain system, such as the addition of horizontal drains to tap existing subdrain blankets in order to provide a secondary outlet to potentially clogged subdrain discharge pipes.

5.02 Preliminary Conclusions

During strong earthquakes, various forms of ground failure can occur, such as liquefaction and the related hazard of lateral spreading. The proposed developed area of the site (park-and-ride lot) is underlain by shallow bedrock, and the immediate upslope area consists of a drained, engineered buttress fill. Liquefaction is therefore not considered a site hazard. Existing landslide deposits can also undergo renewed movements as the result of strong earthquake shaking. The landslide deposits that previously underlay the proposed developed area of the site (park-and-ride lot) have been largely (if not totally) removed by subdivision mass grading. In addition, the remaining slide debris, located upslope, has been extensively regraded with a drained engineered fill buttress that, in the end, was constructed several times wider than originally designed. It is our preliminary opinion that—with incorporation of the recommendations as given in this report in the design and construction of the proposed site improvements—the potential for significant damage from earthquake-induced landsliding to the proposed townhome buildings is relatively low and commensurate with generally accepted risk tolerance for hillside residential projects. However, given the relatively high and steep slope that will be located along the eastern side of the site, it is recommended that the planned retaining wall at the toe of slope along the eastern side of the site improvement area be designed for moderately high earth pressures (including a temporary seismic increment of earth pressure for walls in excess of 6 feet high). It is also recommended that proposed townhome building structures maintain a minimum 10-foot setback from the face of the wall.

With shallow bedrock encountered in both site borings drilled on the western side of the site, the area of the proposed townhome development (park-and-ride lot), which was developed with excavations on the order of 10 to 15 feet in depth near Clayton Road (west side) and 50+ feet in depth near the toe the upslope area, is believed to be primarily underlain by weathered bedrock at relatively shallow depth, with the remnants of slide debris beneath park-and-ride lot area removed by past site excavations. Some fill (up to 11 feet in depth) was encountered near the toe of the slope at the eastern edge of the park-and-ride lot. This fill appeared to be moderately well compacted and presumably is associated with the outside (downslope) edge of the keyway for the Slide No. 11 buttress fill. As previously documented, the buttress fill was placed with engineering observation and testing provided by HA. Other areas of localized fill in the proposed townhome building area are anticipated to be associated with the CCWD waterlines leading to/from the pump station, the storm-drain lines that cross the park-and-ride lot, and along the western edge of the site associated with the oil-pipeline(s). It is anticipated that both the CCWD waterlines and storm-drain lines will need to be relocated as part of the site development. Removal of the old lines that extend below improvement areas and backfill of excavations associated with their removal with compacted engineered fill will be required. The oil pipelines will presumably remain, and it will be critical to accurately locate the lines in relation to the proposed site improvements and also to coordinate with the pipeline owner(s) in regard to set back and/or other requirements associated with construction in their vicinity.

The near-surface fill soil, as well as the bedrock from which it was generated, was found to be moderately to highly expansive, with the potential for shrink/swell behavior with changes in moisture content. In order to account for the expansive soil conditions and the potential for transition from areas of shallow bedrock to areas of fill across the site, we will be recommending that the new townhome buildings be supported on relatively stiff mat slab foundations.

Preliminary project plans call for expansion of the building area by cutting into the toe of the slope along the eastern side of the park-and-ride lot and construction of a new, approximately 10-foot-high retaining wall. In order to limit the amount of excavation required into the slope and also to account for the possibility of a variable depth of fill along the wall alignment, it will be recommended that this new site wall be supported on a drilled pier foundation. A relatively steep and high slope (leading up to the mid-slope V-ditch bench) will remain behind the new wall. A concrete-lined drainage ditch with discharge connected to the site storm-drain system should be provided behind the new retaining wall. In addition, the wall should be constructed with a minimum of 12 inches of freeboard in order to retain shallow raveling of material from the slope. Regular maintenance/clearing of this ditch should be anticipated in order to maintain its intended function.

The project site is located in the general proximity of the Clayton fault. As previously discussed, the Clayton fault is not an A-P zoned fault. However, it is considered by some researchers as potentially active. The nearest identified fault trace is located more than 250 feet from the proposed developed area of the site. Given the uncertainty of fault activity and the distance from the proposed improvement area, it is our opinion that the likelihood of fault rupture directly below the proposed developed area of the site is low.

Finally, the proposed townhome buildings will very likely experience strong ground shaking during a major earthquake in the life of the project. The California Building Code has adopted provisions for incorporation of strong ground shaking into the design of all structures. Our recommendations for geotechnical parameters to be used in the structural seismic design of the townhome buildings are presented in “Section 6.06, California Building Code Seismic Design Parameters.”

6.00 PRELIMINARY RECOMMENDATIONS

It is the responsibility of you or your representative to confirm that the recommendations presented in this report are called to the attention of the contractor, subcontractors, and any governmental body that may have jurisdiction and that these recommendations are carried out in the field.

6.01 Evaluation of Existing Buttress Subdrain System and Maintenance of Existing Concrete Drainage Swales

Prior to site development, it is recommended that the three on-site subdrain outfall locations, as identified from the UT Record Drawings, be field verified and that video inspection of the outfall lines for as far upstream as possible be conducted. It is acknowledged that the extent of video inspection of the lines is likely to be limited by bends and/or intersections in the lines. However, given the critical nature of the continued function of the subdrain systems, it is our opinion that this effort is warranted. In the case of the outlet at the base of the slope in the park-and-ride lot area that we were unsuccessful in locating during our site reconnaissance visits, it is recommended that the surveyed location of the outfall pipe be field located and that shallow excavation to identify and—if necessary—repair the line be conducted. As previously indicated, depending on the findings from this initial evaluation of the subdrain system, we may recommend additional steps be taken to enhance the performance of the 30-year-old subdrain system, such as the addition of horizontal drains to tap existing subdrain blankets and provide a secondary outlet to potentially clogged subdrain discharge pipes.

It is noted that periodic inspection and maintenance of the surface and subsurface drainage systems installed during site development is part of the scope of work that should be carried out on a regular basis by the GHAD that maintains the open-space areas of the Oakhurst development. It is unknown the extent to which this may have been done in the past, but review of GHAD maintenance records and arrangements with the GHAD to regularly maintain the surface and subsurface drainage systems in the future is recommended. This would include patching gaps/pull-aparts in the open space V-ditch system, as identified in this report. It is also recommended that the lateral offset in the sidewalk and street curb identified adjacent to the clubhouse complex driveway be brought to the attention of the GHAD for their evaluation.

6.02 Building Setback from Upslope Retaining Wall

It is recommended that proposed townhome building structures maintain a minimum 10-foot setback from the face of the planned upslope site retaining wall.

6.03 Site Preparation and Earthwork

The site of the proposed site improvements should be stripped of surface pavement and any landscape vegetation. This material should be removed from the site. Existing underground improvements—including but not necessarily limited to the abandonment of the CCWD waterlines and the storm-drain lines and inlets that underlie proposed improvement areas—should be removed and the resulting excavation backfilled with compacted engineered fill material.

A cut into the toe of the existing toe of slope will be required for the construction of the proposed site wall along the eastern edge of the developed area. During this excavation, temporary shoring should be used as required to prevent the movement of materials exposed in the face of the excavation, or the cut slopes may be sloped back in accordance with Cal-OSHA requirements. The excavated materials can be selectively stockpiled for backfill behind the wall. However, all excess materials derived from the excavation should be removed from the site.

The cut will be made into the previously constructed engineered fill buttress. This material should be classified as a “Type B” material, according to the Cal-OSHA classification system. Therefore, according to Cal-OSHA regulations, it would be appropriate to slope these materials back at an inclination of 1:1 (horizontal to vertical) or temporarily shore the cut if it is made at steeper inclinations. However, since we have no control over the methods and timing employed by the contractor, the stability of the excavation slopes should remain the sole responsibility of the contractor.

Grading operations for the proposed site development are anticipated to be limited to the relatively level areas of the site. However, to the extent that any filling operations on slopes steeper than 6:1 (horizontal to vertical) are conducted, they should be keyed and benched into competent soils and/or the weathered bedrock materials. We should note that loose soils resulting from excavations or pier drilling should either be removed from the site or placed and compacted as engineered fill.

All on-site soils below the stripped layer having an organic content of less than 3 percent by volume are suitable for use as general fill. Any fill placed at the site should not contain rocks or lumps greater than 6 inches in greatest dimension, with not more than 15 percent larger than 2.5 inches. In addition, imported fill material used at the site should be a non-expansive material with a plasticity index of 12 or less. Fill should be placed on a firm, unyielding surface in lifts not exceeding 8 inches in uncompacted thickness. General fill material should be moisture conditioned, as necessary, to between 3 and 5 percent over optimum moisture content and compacted to at least 90-percent relative compaction, based on ASTM D1557-latest revision. Non-expansive fill, where specified beneath buildings, exterior flatwork, and other near-surface improvements, should be moisture conditioned as necessary to near optimum moisture content and compacted to at least 95 percent relative compaction, based on ASTM D1557-latest revision.

We recommend all new cut or fill slopes at the site have a maximum inclination of 2:1 (horizontal to vertical). At this inclination, the cut and fill slopes will probably be subjected to some minor erosion and/or sloughing, thus requiring periodic maintenance of the slopes. We recommend any new cut or fill slopes be planted with erosion-resistant vegetation and that an erosion-control netting system be installed. A landscape architect experienced in erosion-control planting should be consulted prior to selection of vegetation.

6.04 Surface Drainage

Positive surface drainage should be provided adjacent to the townhome buildings to direct surface water away from the foundations of the buildings and into closed pipes that discharge into the site storm-drain system. In addition, all roof water should be routed directly to the site storm-drain system and/or onto pavement areas that that direct runoff to the site storm-drain systems. Flexible drain pipe (flexline), 2000-pound crush pipe, leachfield, and ASTM F810 pipe are not recommended for use in these drainage systems because of the likelihood of damage to the pipe during installation, due to the weak strength of these pipes. In addition, these drainpipes are sometimes difficult to clean with mechanical equipment without damaging the pipe. We recommend the use of Schedule 40 PVC or SDR 35 PVC or ABS drainpipe, or equivalent, for the drain system. Ponding of surface water should not be allowed in any areas adjacent to the building structures.

Some nominal maintenance of the drainage facilities should be expected after the initial construction has been completed. To assist in maintaining proper drainage and erosion-control measures for the site, we have included a “Guide to the Maintenance of Hillside Home Sites,” Appendix D.

Should ownership of this property change hands, the new owner should be informed of the existence of this report, not adversely change the grading or drainage facilities, and understand the importance of maintaining proper surface drainage.

6.05 Building Foundations – Structural Mat

We recommend the proposed townhome buildings be supported on a reinforced-concrete mat foundation with a minimum thickness of 18 inches. The mat should be thickened at the edge to provide a minimum of 24 inches of embedment below the lowest adjacent grade. The mat should be designed assuming an allowable (factored) bearing capacity of 900 pounds per square foot (psf) for dead plus live loads (factor of safety ≈ 2). A one-third increase can be assumed for all loads including wind and seismic. These allowable bearing pressures are net values; therefore, the weight of the mat can be neglected for design purposes. The mat should be reinforced with top and bottom steel in both directions to allow the foundation to span local irregularities that may result from potential differential ground movement, and the mat should be integrally connected to all portions of the structure, so that the entire foundation system moves as a unit. In addition, the mat slab should be designed for an unsupported cantilever edge span of 5 feet and an interior unsupported clear span of 10 feet.

Lateral loads on the structure may be resisted by passive pressures acting against the sides of the mat. We recommend an allowable passive pressure equal to an equivalent fluid weighing 200 psf per foot of depth (factor of safety ≈ 2). Alternatively, an allowable friction coefficient of 0.25 (factor of safety ≈ 2) can be used between the bottom of the mat and the subgrade soils. If the perimeter of the mat is poured neat against the soils, the passive pressure and friction coefficient may be used in combination.

The mat slab should be supported on a minimum of 6 inches of imported, compacted, non-expansive fill (Plasticity Index, PI of 12 or less). In order to minimize volume change of the subgrade soils below the non-expansive fill, the subgrade soil should be scarified to a depth of 6 inches, moisture conditioned to slightly above optimum water content, and compacted to the requirements for structural fill (90% relative compaction, based on ASTM D1557-latest revision). The moisture-prepared subgrade should be kept in a moist condition until the time of non-expansive fill placement. The non-expansive fill beneath buildings, exterior flatwork, and other near-surface improvements should be moisture conditioned, as necessary, to near optimum moisture content and compacted to at least 95% relative compaction, based on ASTM D1557-latest revision.

A vapor-retardant membrane (Class A vapor retarder, ASTM E 1745-latest revision) should be placed over the compacted non-expansive fill layer, and the membrane should be covered with 2 inches of sand to protect it during construction. The 2-inch sand layer may be eliminated if the vapor retarder is upgraded to a more substantial material, such as Stegowrap 15mil (or equivalent). We also recommend that the specifications for slab-on-grade floors require that moisture-emission tests be performed on the slab prior to the installation of the flooring. No flooring should be installed until safe moisture-emission levels are recorded for the type of flooring to be used.

6.06 California Building Code Seismic Design Parameters

This section provides seismic design parameters based on the 2019 California Building Code (CBC) and ASCE 7-16. The reported seismic design parameters as presented in Table 1, below, were developed utilizing the ASCE 7 online hazard report tool and are based on the site coordinates, site class (geology), and assumed risk category of the building.

Table 1: Ground Motion Parameters Based on ASCE 7-16
(Site Coordinates: Latitude 37.93919°, Longitude -121.92647°)

Parameter	**Value**	**ASCE 7-16 Reference**
Risk Category (Assumed)	II	Table 1.5-1
Site Class	C	Table 20.3-1
S_s	2.188g	Figure 22-1
S_1	0.669g	Figure 22-2
F_a	1.2	Table 11.4-1
F_v	1.4	Table 11.4-2
S_{MS}	2.625g	Equation 11.4-1
S_{M1}	0.937g	Equation 11.4-2
S_{DS}	1.75g	Equation 11.4-3
S_{D1}	0.625g	Equation 11.4-4
Cv	1.3	Table 11.9-1
PGA	0.878	Figure 22-9
F_{PGA}	1.2	Table 11.8-1
PGA_M	1.054g	Equation 11.8-1
T_L	8 Seconds	Figure 22-14

*Value not provided by online tool but may be determined by structural designer based on building characteristics and/or structural design methodology, in accordance with exceptions given in Section 11.4.8.

6.07 Exterior Slabs and Flatwork

We recommend any exterior slabs-on-grade be supported on a minimum of 12 inches of imported, compacted, non-expansive fill. Non-expansive fill, where specified beneath buildings, exterior flatwork, and other near-surface improvements, should be moisture conditioned as necessary to near optimum moisture content and compacted to at least 95% relative compaction, based on ASTM D1557-latest revision.

In order to minimize volume change of the subgrade soils below the non-expansive fill layer, prior to placement of the non-expansive fill, these materials should be scarified to a depth of 6 inches, moisture conditioned to slightly above optimum water content, and compacted to the requirements for structural fill.

Prior to the construction of the slabs, the subgrade surface should be proof-rolled to provide a smooth, firm surface for slab support.

Score cuts or construction joints should be provided at a maximum spacing of 10 feet in both directions. The slabs should be appropriately reinforced according to structural requirements; concentrated loads may require additional reinforcing. Minor movement of the concrete slab with resulting cracking should be expected. The recommendations presented above, if properly implemented, should help minimize the magnitude of this cracking. It has been our experience that the installation of wire mesh for slab reinforcement has often not been performed properly during construction of the slab. As a result, we recommend that steel-bar reinforcement be used to reinforce any proposed slabs.

6.08 Site Retaining Walls

Site retaining walls should be designed to resist both ultimate (non-factored) lateral earth pressures and any additional lateral loads caused by surcharge loads on the adjoining ground surface. We recommend that site walls be designed for an equivalent fluid pressure of 60 pounds per cubic foot (pcf) for wall backfill inclinations of 4:1 (horizontal to vertical) or flatter, and 85 pcf for backfill inclinations of 2:1 (horizontal to vertical). Linear interpolation may be used to determine design values for retaining walls where the slope behind the wall is between 4:1 and 2:1. Site retaining walls are considered unrestrained walls, and unrestrained wall pressures should only be considered applicable where it would be structurally and architecturally acceptable for the wall to laterally deflect 2 percent of the wall height. With the relatively high and long site wall planned on the eastern side of the site, along with the significant wall pressures generated by the steep slope above, we anticipate that there will be some potential for differential lateral deflection along the length of the wall. Regular expansion and/or crack control joints (and/or possibly some type of masking of the wall face) should be considered in order to minimize the potential for unacceptable cosmetic cracking to develop. If building walls (where lateral deflection of the wall is not considered acceptable) are planned, our office should be consulted for supplemental wall pressure design recommendations. For surcharge loads, the ultimate (non-factored) design pressures behind the wall should be increased by an additional uniform pressure equivalent to one-third (for unrestrained condition) of the maximum anticipated surcharge load applied to the surface behind the wall.

In addition to the wall loads given above, walls in excess of 6 feet in height should also be designed for an additional temporary seismic load, taken as a uniform horizontal load applied over the design height of the wall of 12H psf, where H is the wall height in feet.

The above pressures assume that sufficient drainage will be provided behind the walls to prevent the build-up of hydrostatic pressures from surface and subsurface water infiltration. Adequate drainage may be provided by a subdrain system (see Typical Retaining Wall Subdrain Detail, Figure 4) consisting of a 4-inch, rigid, perforated pipe, bedded in ¾-inch, clean, open-graded rock. As shown on Figure 4, the recommended location of the subdrain pipe is behind the heel of the footing. Although we have observed that the subdrain pipe is often placed on top of the heel of the footing, it has been our experience that this may lead to moisture seeping through the wall, resulting in dampness and staining on the opposite wall face despite the application of waterproofing. However, if such seepage or dampness is acceptable (in front of landscape walls, for example), then the subdrain pipe may be placed on top of the heel of the footing. To prevent ponding of water on top of the heel of the footing, we recommend that the top of the heel be sloped to drain away from the wall with a minimum positive gradient of 5 percent. The perforated drainpipe should be sloped to drain with a minimum positive gradient of 1 percent. The entire rock/pipe unit should be wrapped in an approved, non-woven, polyester geotextile, such as Mirafi 140N or 140NL, or a 4-ounce equivalent. The rock and fabric placed behind the wall should be at least one foot in width and should extend to within one foot of finished grade. The upper one foot of backfill (6 inches for walls less than 5 feet in height) should consist of on-site, compacted, relatively impervious soils (an impermeable plug). We should note that flexible, perforated pipe (flexline), 2000-Pound Crush, Leachfield, and ASTM F810 pipe are not acceptable for use in the subdrain because of the likelihood of damage to the pipe during installation and the difficulty of future cleaning with mechanical equipment without damaging the pipe. We recommend the use of Schedule 40 PVC or SDR 35 PVC or ABS drainpipe, or equivalent, for the drain system. The subdrain pipe should be connected to a system of closed pipes (non-perforated) that lead to suitable discharge facilities. At the location where the perforated subdrain pipe connects with the solid discharge drainpipe, drainrock backfill should be discontinued. A “clay plug” should be constructed out of relatively impervious soils to direct collected water into the perforated pipe and minimize the potential for water collecting around the solid drainpipe and saturating the adjacent soils. We recommend waterproofing be applied to any proposed retaining walls, where applicable. The specification of the type of waterproofing and the observation of its installation should be performed by the architect and/or structural engineer.

In addition to the drainage details noted above, the “high” end and all 90-degree bends of the subdrain pipe should be connected to a riser, which extends to the surface and acts as a cleanout. The number of cleanouts can be reduced by installing “sweep” 90-degree bends or pairs of 45-degree bends in succession instead of using “tight” 90-degree bends. “Sweep” 90-degree bends are similar to those used in sanitary sewer pipe connections.

Lined surface ditches with a minimum width of 12 inches should be provided behind any walls that will have an exposed sloping surface steeper than 4:1 behind them. These ditches, which will collect runoff water from the slopes, should be sloped to drain (minimum 2-percent positive gradient) to suitable discharge facilities. If the lined surface ditches consist of reinforced concrete, expansion joints should be provided every 10 feet. All structural backfill placed behind retaining walls should be compacted in accordance with the requirements provided in “Section 6.03, Site Preparation and Earthwork.” Special care (such as the use of lightweight equipment) should be taken during wall backfill compaction operations to minimize overstressing of the wall. The planned site wall retaining the cut along the eastern side of the improvement area should be designed with a minimum 12-inch freeboard height, to temporarily retain shallow material that may be shed from the steep slope above.

Site retaining walls should be supported on drilled, cast-in-place, straight-shaft piers that are designed to develop their load-carrying capacity through friction between the sides of the piers and the surrounding subsurface materials. Friction piers should have a minimum diameter of 18 inches, and there should be a minimum center-to-center spacing of at least three pier diameters between adjacent piers.

Drilled piers may be design to resist vertical loads as required, with an assumed allowable (factored) friction values of 500 pounds per square foot (psf) for dead plus live loads (factor of safety $\approx$ 2) and 650 psf for all loads, including wind or seismic (factor of safety $\approx$ 1.5). These values can be used starting at a depth of 2 feet.

Lateral loads on the piers may be resisted by passive pressures acting against the sides of the piers. We recommend an allowable passive pressure equal to an equivalent fluid weighing 350 psf per foot of depth to a maximum value of 3500 psf (factor of safety $\approx$ 2). This value can be assumed to be acting against 1.5 times the diameter of the individual pier shafts, starting at a depth of 2 feet.

The depth to start of skin friction and passive resistance as given above assumes a relatively level ground surface in front of the wall. If the ground surface within 10 feet of the front of the wall slopes down at an inclination of greater than 4:1 (horizontal to vertical), our office should be contacted for consideration of additional recommendations.

The bottom of pier excavations should be reasonably free of loose cuttings and soil fall-in prior to installing reinforcing steel and placing concrete. It is our recommendation that the contractor be made aware of the subsurface conditions outlined in this report and obtain construction equipment appropriately sized to perform the recommended work Any accumulated water in pier excavations should be removed prior to placing reinforcing steel and concrete, or the concrete should be tremied from the bottom of the hole.

Due to the moderately high groundwater at the site and the significant potential for caving of the pier walls, special construction techniques are strongly recommended for pier installation. One common technique for pier drilling in caving soil consists of casing the hole as drilling proceeds, installing the reinforcing steel, and then pulling the casing out as the concrete is tremied from the bottom of the hole. Other techniques involve the use of drilling “mud” to hold the drilled shaft open during drilling and then tremying the concrete from the bottom of the hole. The procedures involved for pier installation under these conditions are not trivial. We strongly recommend a contractor experienced in pier-installation procedures for caving soils below the groundwater table be retained to perform this work.

The proper handling of spoils excavated during the pier drilling is very important. If these materials are left in a loose condition on a slope, they will have a tendency to creep downhill and/or erode during periods of heavy rainfall. Therefore, we recommend these materials be removed from the site, placed and compacted as engineered fill, or placed as wall backfill where settlement would not cause a problem.

Observations during pier drilling operations should be performed by a representative of our firm to confirm that anticipated conditions are being encountered. If drilling refusal is encountered, we can coordinate a review of the conditions and drilling equipment adequacy, as well as conduct discussions with the project structural engineer.

6.09 Plan Review

We recommend our firm be provided the opportunity for a general review of the geotechnical aspects of the final plans and specifications for this project in order that the geotechnical recommendations may be properly interpreted and implemented. If our firm is not accorded the privilege of making the recommended review, we can assume no responsibility for misinterpretation of our recommendations.

6.10 Construction Observation

The analyses and recommendations submitted in this report are based in part upon the data obtained from the soil borings that were drilled on the site. The nature and extent of variations across the site may not become evident until construction. If variations then become apparent, it will be necessary to re-examine the recommendations of this report.

We recommend our firm be retained to provide geotechnical engineering services during the earthwork, foundation construction, and drainage phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

It should be noted that earthwork and foundation observations by our firm, as the project geotechnical engineer of record, are required by most cities and counties. Drainage observations by our firm are not typically required, but in our experience, we have often discovered adverse drainage installations that otherwise would have created problems following construction, and this is why we recommend our services be utilized. Nonetheless, it is usually the owner’s prerogative whether they wish to engage our services or simply rely on the quality of their contractor’s work regarding drainage improvements.

In order to effectively accomplish our observations during the project construction, we recommend that a pre-construction meeting be held to develop a mechanism for proper communications throughout the project. We also request that the client or the client’s representative (the contractor) contact our firm at least two working days prior to the commencement of any of the items listed above.

6.11 Wet-Weather Construction

Although it is possible for construction to proceed during or immediately following the wet winter months, a number of geotechnical problems may occur that may increase costs and cause project delays. The water content of on-site soils may increase during the winter and rise significantly above optimum moisture content for compaction of subgrade or backfill materials. If this occurs, the contractor may be unable to achieve the recommended levels of compaction without using special measures and would likely have to:

- Wait until the materials are dry enough to become workable;
- Dispose of the wet soils and import dry soils; and
- Use lime or cement on the native materials to absorb water and achieve workability.

If utility trenches, pier holes, or footing excavations are open during winter rains, then caving of the trenches, pier walls, or footing excavations may occur. Also, if the pier holes or footing trenches fill with water during construction or if saturated materials are encountered at the anticipated bottom of the excavations, the piers or footings may need to be extended to greater depths to reach adequate support capacity than would be necessary if dry-weather construction took place.

We should also note that it has been our experience that increased clean-up costs will occur and greater safety hazards will exist if the work proceeds during the wet winter months. Furthermore, engineering costs to observe construction are increased because of project delays, modifications, and rework.

6.12 Future Performance

All owners or occupants of in hillside areas should realize that landslide movements are always a possibility, although generally the likelihood is very low that such an event will occur. The probability that landsliding will occur is substantially reduced by the proper maintenance of drainage measures at the site (see detailed discussion in Appendix D). Therefore, the homeowners (and/or homeowners association) should recognize their responsibility for performing such maintenance. Consequently, we recommend that a copy of our report be provided to any future homeowners of the property if the home is sold, so they will also be aware of their maintenance responsibilities.

7.00 REPORT LIMITATIONS AND CLOSURE

This report has been prepared for the exclusive use of you and your consultants for specific application to the proposed townhome project in accordance with generally accepted geotechnical engineering practices. No other warranty, either expressed or implied, is made. In the event that the nature, design, or location of the project differs significantly from what has been noted above, or if any future additions are proposed, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing.

The findings of this report are valid as of the present date. However, the passing of time will likely change the conditions of the existing property due to natural processes or the works of man. In addition, due to legislation or the broadening of knowledge, changes in applicable or appropriate standards may occur. Accordingly, the findings of this report may be invalidated, wholly or partly, by changes beyond our control. Therefore, this report should not be relied upon after three years without being reviewed by this office.

We are pleased to have been of service to you on this project. If you have any questions concerning this report, please feel free to contact the undersigned.

Very truly yours,

REGISTERED PROFESSIONAL ENGINEER JAMES R. LOTT GE 2137 EXP. 12/31/21 GEOTECHNICAL STATE OF CALIFORNIA

James R. Lott, G.E.
Associate Engineer

REGISTERED PROFESSIONAL ENGINEER ALAN LEE KROPP GE 487 EXP. 12/31/21 GEOTECHNICAL STATE OF CALIFORNIA

Alan Kropp, G.E.
Principal Engineer

JRL/AK/ab

Copies: Addressee (PDF) – grant@apwest.com
P/A Design Resources (PDF) – ravedian@padesignresources.com
Attn: Ross Avedian

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A. Published Documents

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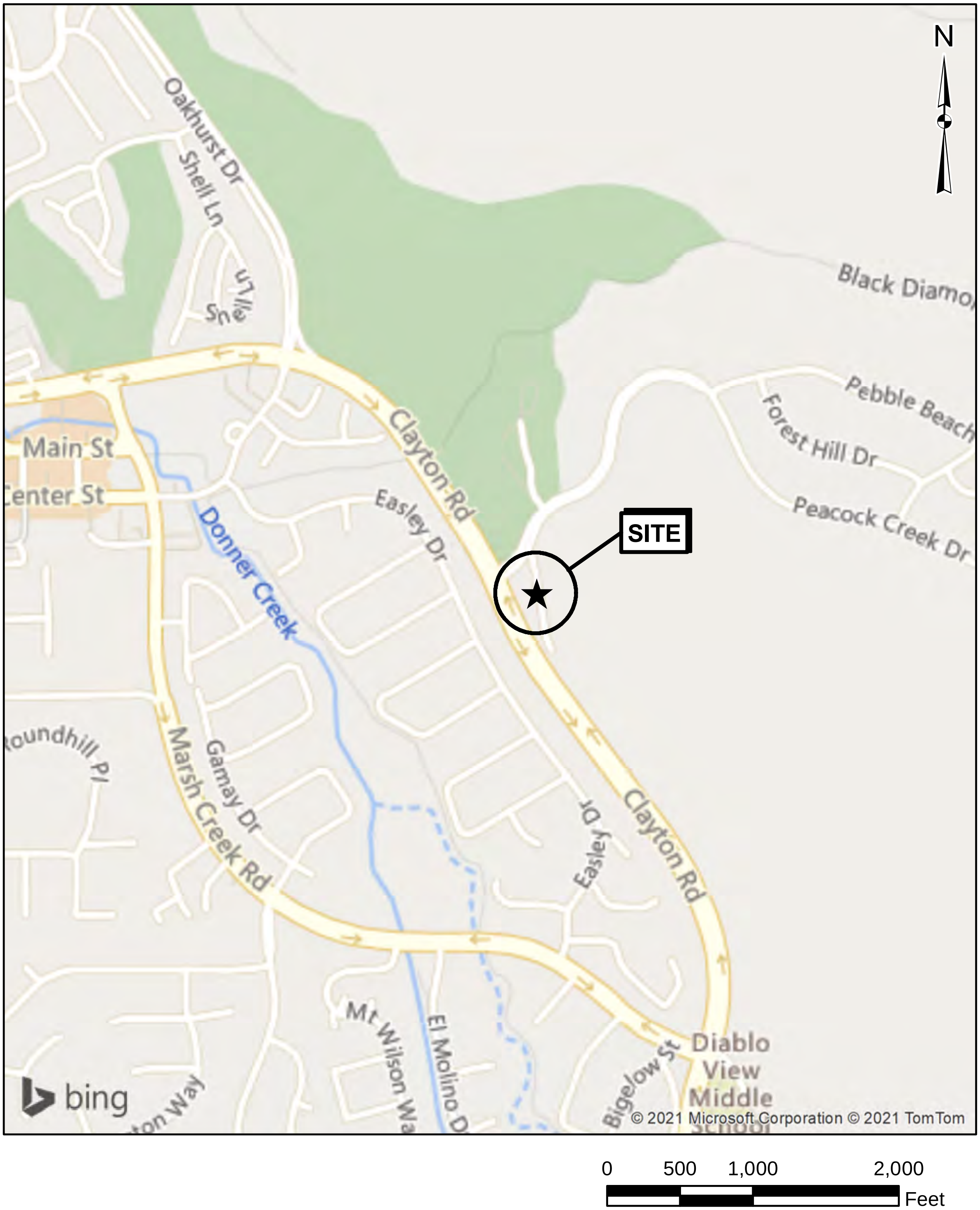
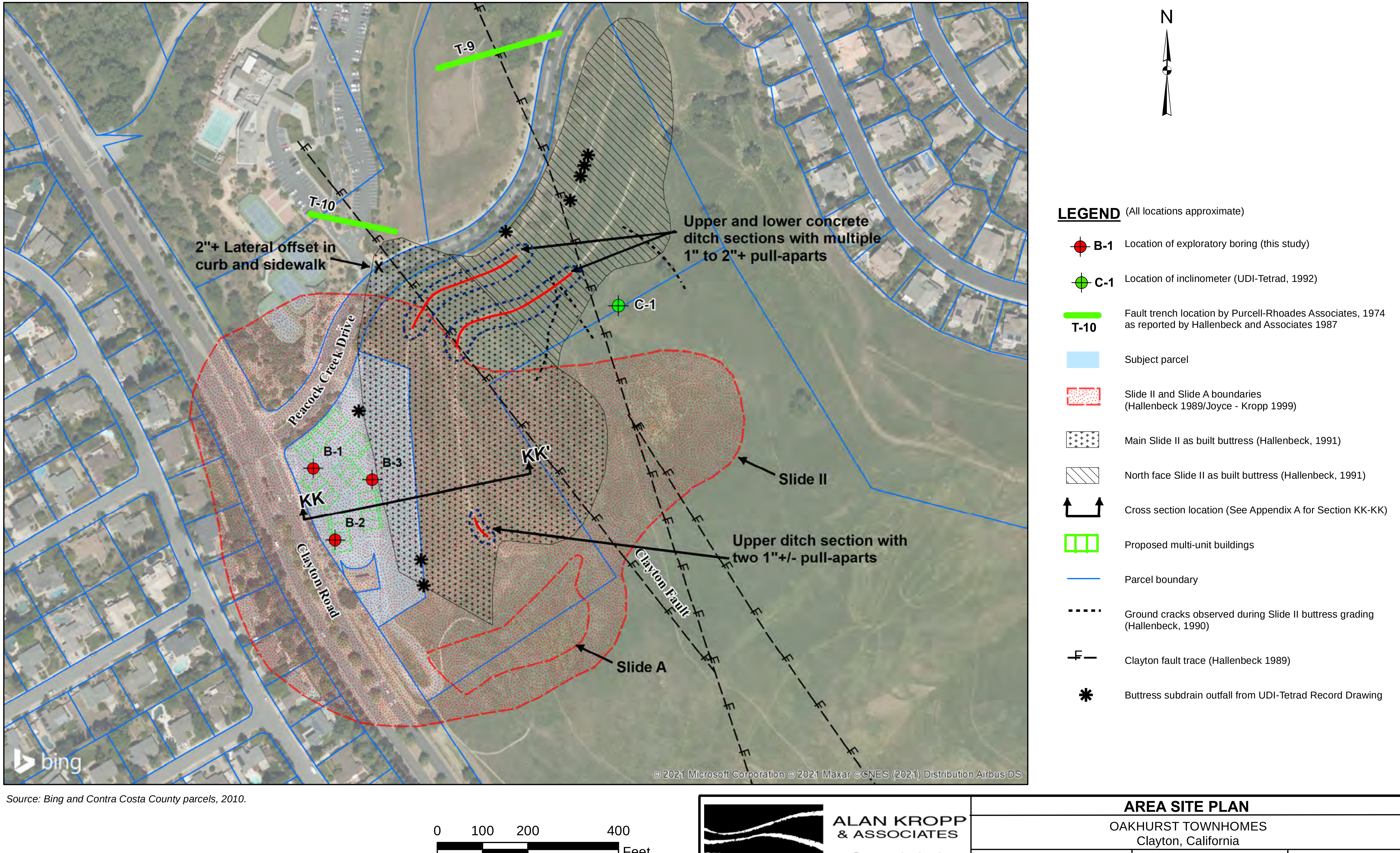


Original figure produced in color.

ALAN KROPP & ASSOCIATES *Geotechnical Consultants*	**VICINITY MAP**		
	OAKHURST TOWNHOMES Clayton, California		
	PROJECT NO.	DATE	FIGURE **1**
	1413-5	**July 2021**	



Source: Bing and Contra Costa County parcels, 2010.

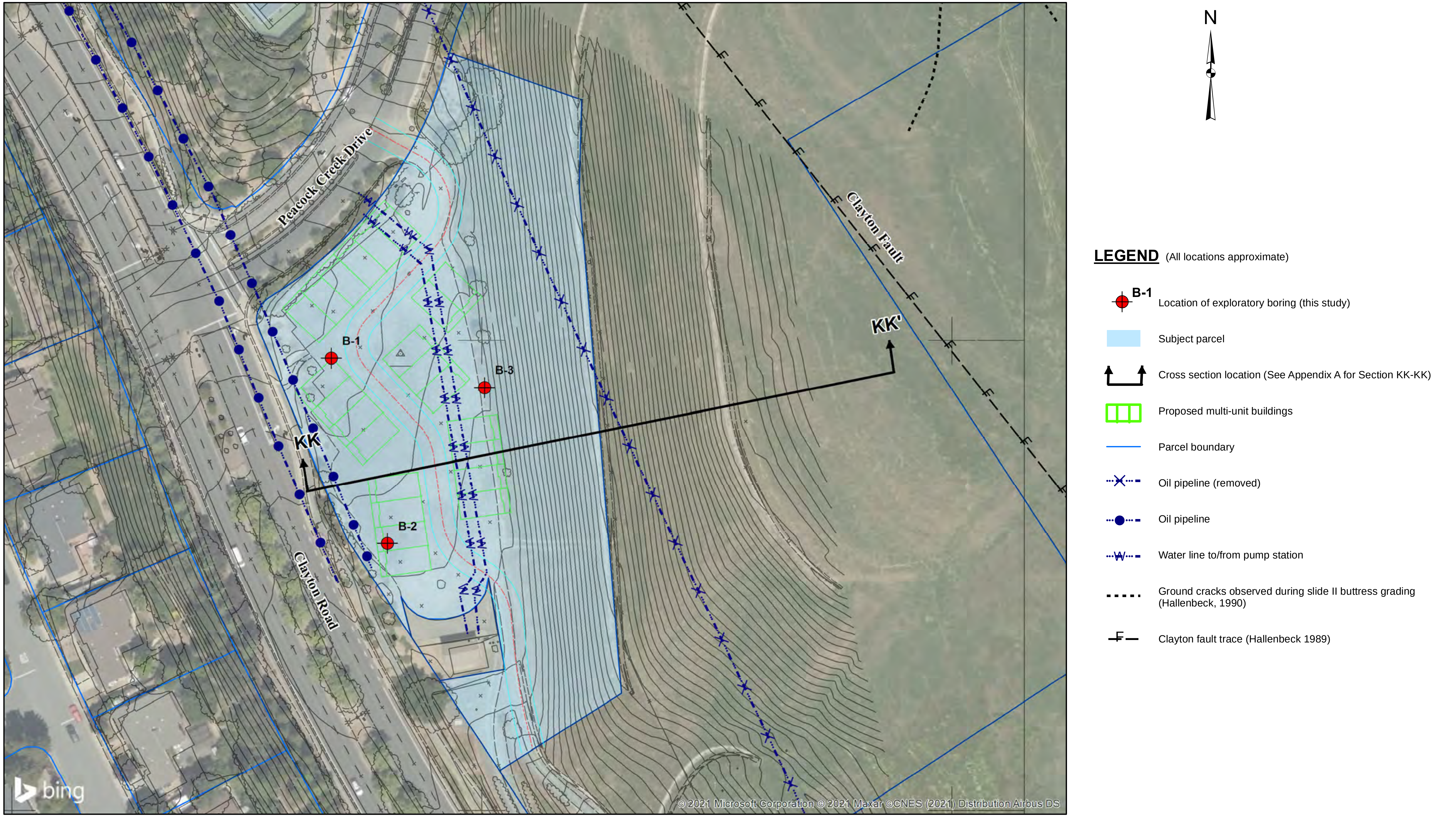
Original figure produced in color.

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

AREA SITE PLAN

OAKHURST TOWNHOMES
Clayton, California

PROJECT NO.	DATE	FIGURE 2
1413-5	July 2021	



Source: Bing, Contra Costa County parcels, 2010, and master plan.dwg received from P/A Design Resources.

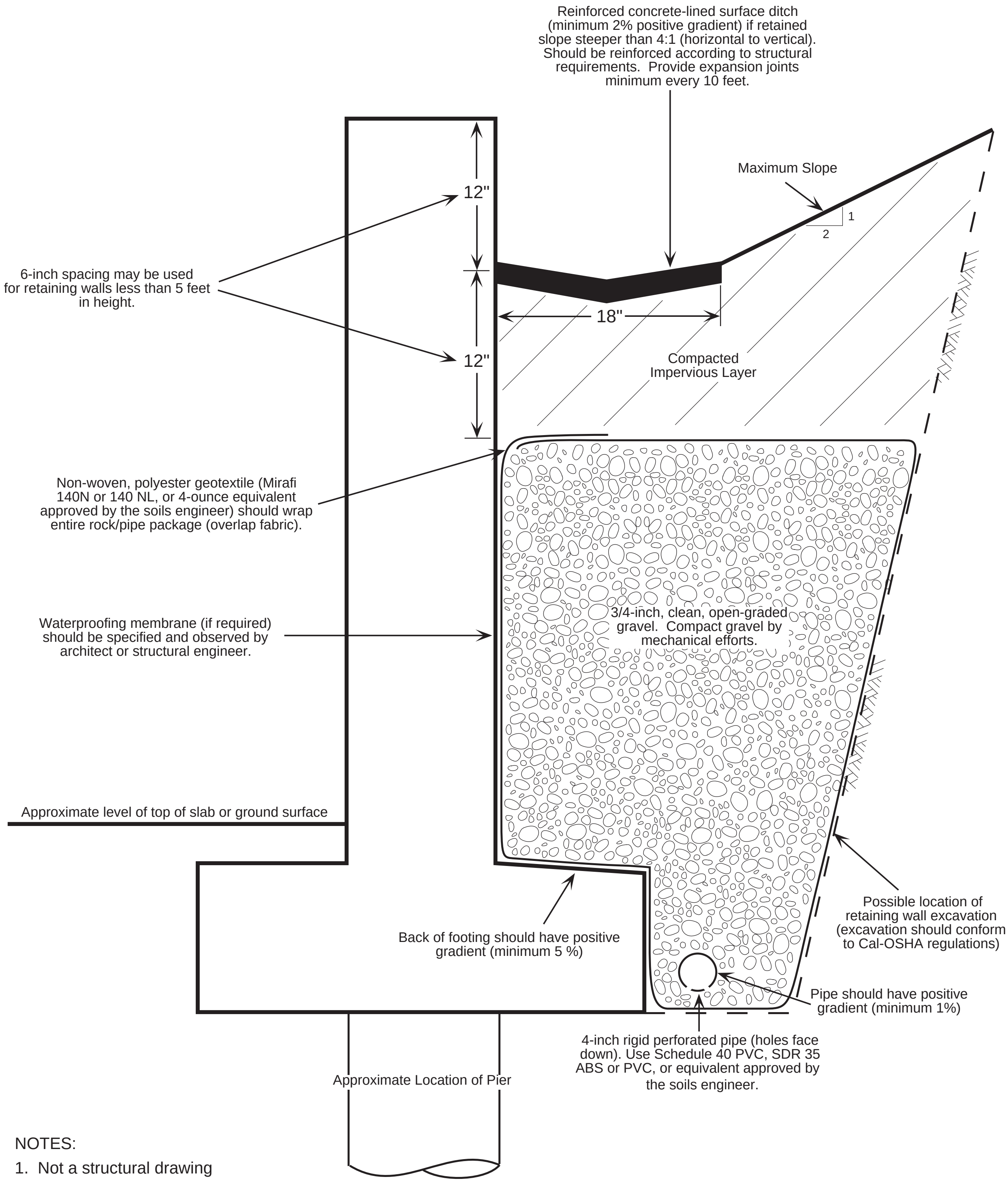
Original figure produced in color.

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

SITE PLAN

OAKHURST TOWNHOMES
Clayton, California

PROJECT NO.	DATE	FIGURE 3
1413-5	**July 2021**	



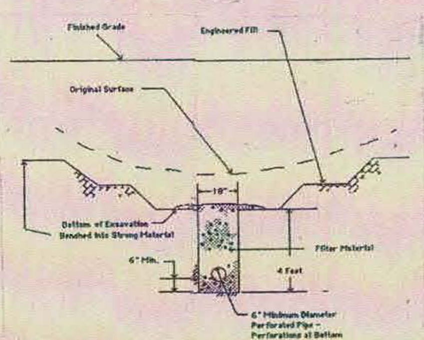
NOTES:

1. Not a structural drawing
2. All dimensions should be considered minimums
3. See text for further discussion of detail

NOT TO SCALE

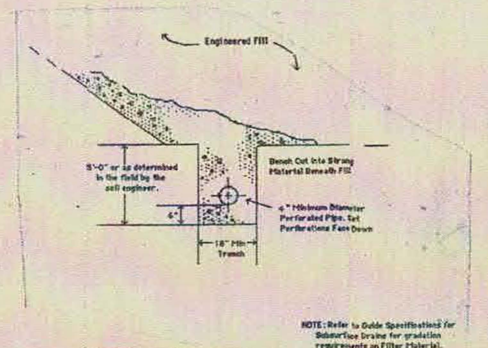
ALAN KROPP & ASSOCIATES *Geotechnical Consultants*	**TYPICAL RETAINING WALL SUBDRAIN DETAIL**		
	OAKHURST TOWNHOMES Clayton, California		
	PROJECT NO.	DATE	FIGURE **4**
	1413-5	**July 2021**	

APPENDIX A
(SECTION KK – KK)



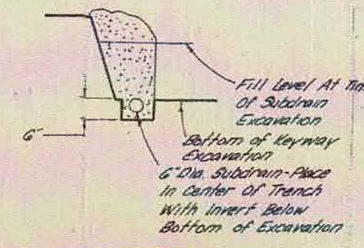
SUBDRAINS BENEATH FILLS LOCATED OVER RAVINES

N.T.S.



SUBDRAINS BENEATH SLIDE REPAIR

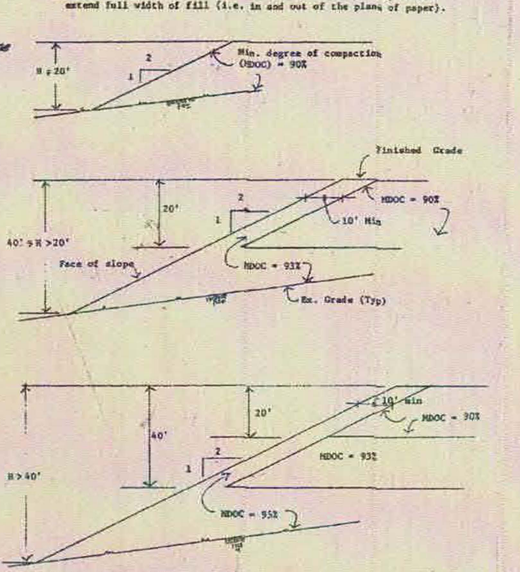
N.T.S.



ALTERNATE SUBSURFACE DRAIN DETAIL

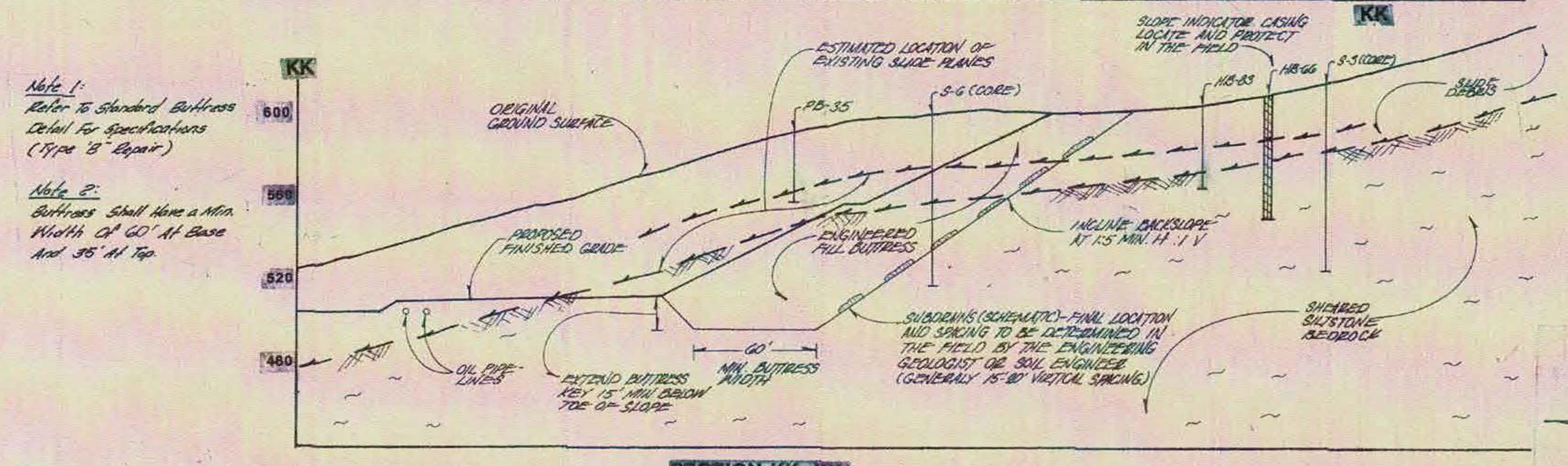
N.T.S

Notes: 1. "H" is the maximum vertical height of a given fill slope.
2. Change between the Minimum Degrees of Compaction (MDOC's) should extend full width of fill (i.e. in and out of the plane of paper).



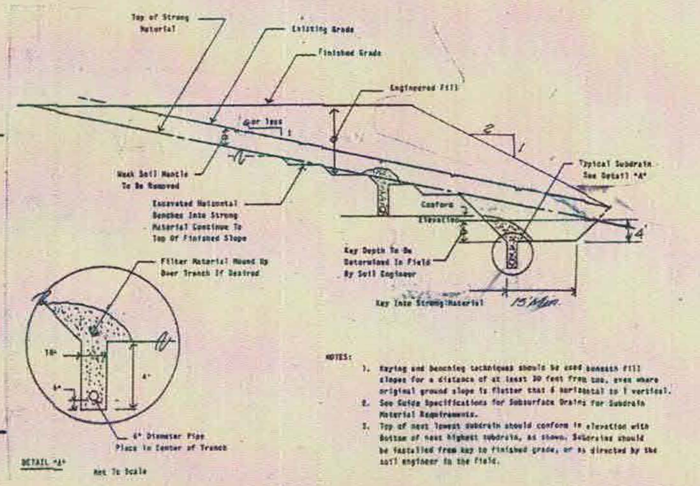
RECOMMENDED MINIMUM DEGREE OF COMPACTION @ FACE OF FILL SLOPES

N.T.S.



SECTION KK-KK
SLIDE 11
SCALE 1"=40'

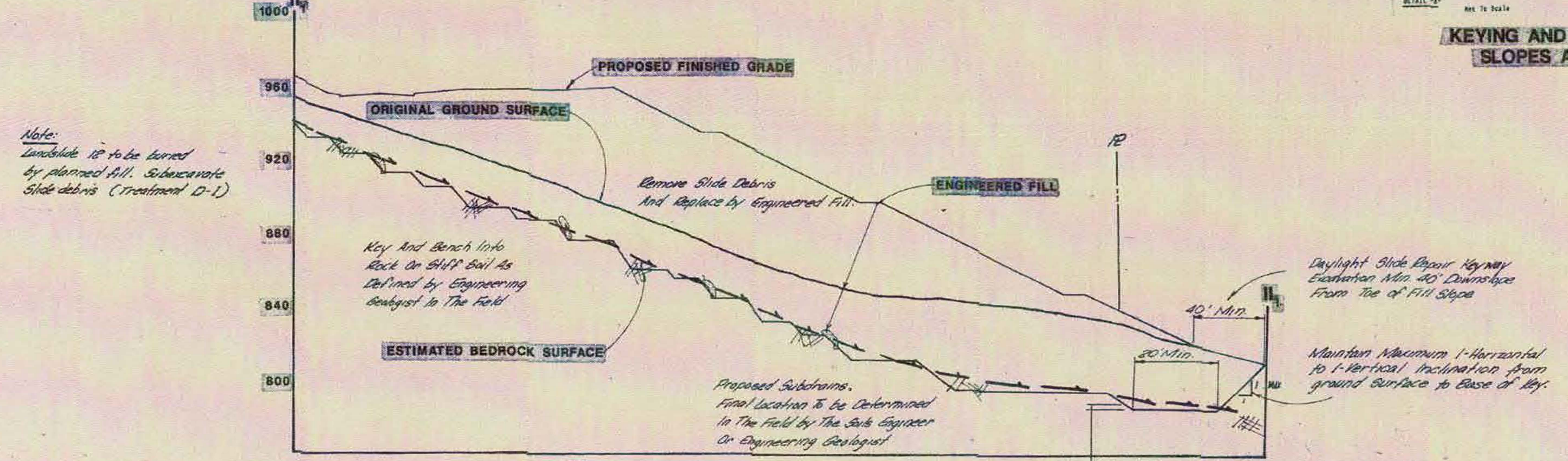
SEE SHEET 4



NOTES:
1. Keying and benching techniques should be used beneath fill slopes for a distance of at least 30 feet from toe, even where original ground slope is flatter than 4 horizontal to 1 vertical.
2. See Guide Specifications for Subsurface Drains for Subdrain Material Requirements.
3. Top of next lowest subdrain should conform in elevation with bottom of next highest subdrain, as shown. Subdrains should be installed from key to finished grade, or as directed by the soil engineer in the field.

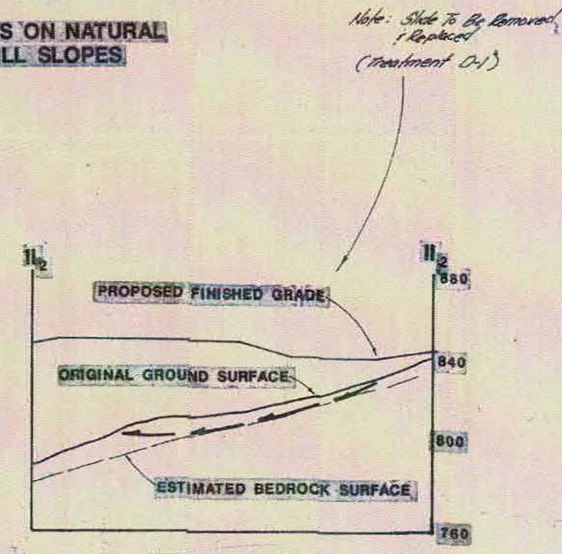
KEYING AND BENCHING FILLS ON NATURAL SLOPES AND BENEATH FILL SLOPES

N.T.S.



SECTION II-II1
SLIDE 12
SCALE 1"=40'

SEE SHEET 10



SECTION II-II2
SLIDE 13
SCALE 1"=40'

SEE SHEET 8

RECORD PLANS

These plans depict both Record and Design Information. Certain improvements have not been constructed as of Oct. 8, 1996 (e.g. walls, street improvements etc.) consequently, revisions to this plan set may be required to reflect future grading and improvements. This plan is not based on survey verification of all items shown hereon and cannot be deemed to be all inclusive or applicable to items beyond the Engineer's purview.

ROGER L. POYNTS
R.C.E. 35299 EXP. 9/30/99

DATE 10-9-96

REVISION	NO	BY	DATE

UDI-TETRAD
CONSULTING ENGINEERS, INC.
Engineers Planners Surveyors
Civil Power Communications
5528 PACHECO BLVD. PACHECO, CA 94553
(510) 674-3218
FAX (510) 674-0243

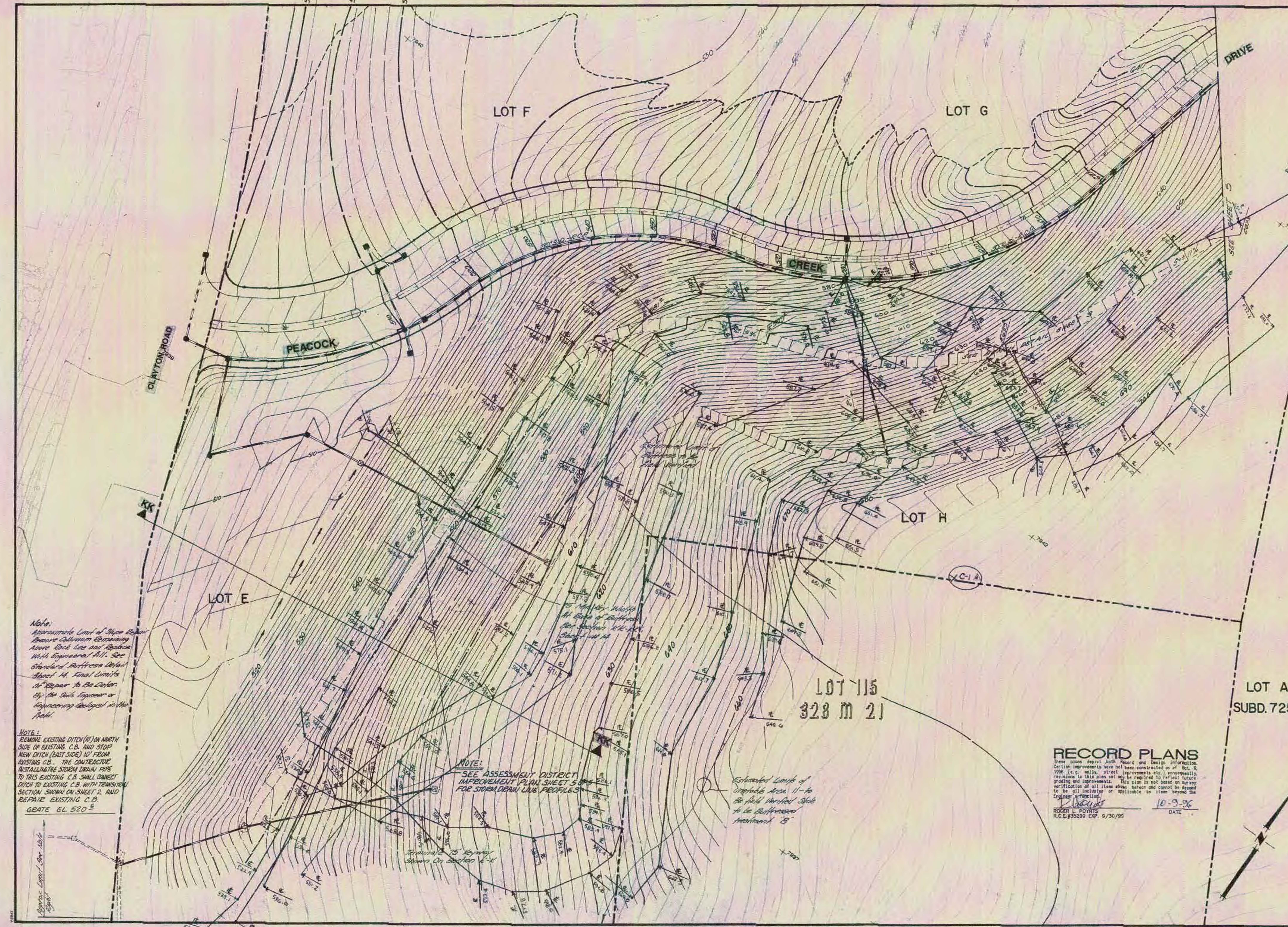
TRACT 7255 UNIT II — PEACOCK CREEK

ROUGH GRADING
SLIDE REPAIR DETAILS
PEACOCK CREEK

CITY OF CLAYTON — CONTRA COSTA COUNTY — CALIFORNIA

DESIGNED:	
DRAWN:	C.J.B.
CHECKED:	M.E.M.
SCALE:	AS SHOWN
DATE:	MAR.89
SHEET NO.	17
OF	20
JOB NO.	183

APPENDIX B
(RECORD DRAWING)



NO.	BY	DATE	REVISION
2		4-28-92	ADDED SETTLEMENT MARKERS AND INCLINOMETER
1			

UDI-TETRAD
CONSULTING ENGINEERS, INC.
Engineers Planners Surveyors
Civil – Power – Communications
5528 PACHECO BLVD. (510) 674-0218
PACHECO, CA 94553 FAX (510) 674-0243

TRACT 7249-7255 PEACOCK CREEK UNIT I-II

ROUGH GRADING

CITY OF CLAYTON CONTRA COSTA COUNTY CALIFORNIA

DESIGNED C.J.B. – G.R.A.
DRAWN C.J.B. – G.R.A.
CHECKED M.E.M.
SCALE 1"=40'
DATE FEB. 89
SHEET NO. 4 OF 20
JOB NO. 163

APPENDIX C
(BORING LOGS)

SOIL CLASSIFICATION CHART

PRIMARY DIVISIONS			SECONDARY DIVISIONS: CRITERIA *	GROUP SYMBOL	GROUP NAME
COARSE-GRAINED SOILS MORE THAN 50% RETAINED ON NO.200 SIEVE	GRAVELS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO.4 SIEVE	CLEAN GRAVELS LESS THAN 5% FINES	$Cu \geq 4$ AND $1 \leq Cc \leq 3$ ^{A}	GW	Well-graded gravel
			$Cu < 4$ AND/OR $1 > Cc > 3$	GP	Poorly-graded gravel
		GRAVELS WITH FINES - MORE THAN 12% FINES	FINES CLASSIFY AS ML OR MH	GM	Silty gravel
			FINES CLASSIFY AS CL OR CH	GC	Clayey gravel
	SANDS 50% OR MORE OF COARSE FRACTION PASSES NO. 4 SIEVE	CLEAN SANDS LESS THAN 5% FINES	$Cu \geq 6$ AND $1 \leq Cc \leq 3$	SW	Well-graded sand
			$Cu < 6$ AND/OR $1 > Cc > 3$	SP	Poorly-graded sand
		SANDS WITH FINES - MORE THAN 12% FINES	FINES CLASSIFY AS ML OR MH	SM	Silty sand
			FINES CLASSIFY AS CL OR CH	SC	Clayey sand
FINE-GRAINED SOILS 50% OR MORE PASSES THE NO.200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50%	INORGANIC	PI > 7 AND PLOTS ON OR ABOVE "A" LINE	CL	Lean clay
			PI < 4 OR PLOTS BELOW "A" LINE	ML	Silt
		ORGANIC	$\frac{\text{LIQUID LIMIT - OVEN DRIED}}{\text{LIQUID LIMIT - NOT DRIED}} < 0.75$	OL	Organic Clay & Organic Silt
	SILTS AND CLAYS LIQUID LIMIT 50% OR MORE	INORGANIC	PI PLOTS ON OR ABOVE "A" LINE	CH	Fat clay
			PI PLOTS BELOW "A" LINE	MH	Elastic silt
		ORGANIC	$\frac{\text{LIQUID LIMIT - OVEN DRIED}}{\text{LIQUID LIMIT - NOT DRIED}} < 0.75$	OH	Organic Clay & Organic Silt
	HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR	PT	Peat

REFERENCE: Unified Soil Classification System (ASTM D2487-11)

* Criteria may be done on visual basis, not necessarily based on lab testing

A – $C_u = D_{60}/D_{100}$ & $C_c = (D_{30})^2 / (D_{10} \times D_{60})$

GRAIN SIZES

U. S. STANDARD SERIES SIEVE — CLEAR SQUARE SIEVE OPENINGS

200	40	10	4	3/4"	3"	12"	
SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

ABBREVIATIONS

<u>INDEX TESTS</u>

LL - Liquid Limit (%) (ASTM D4318-17)

PI - Plasticity Index (%) (ASTM D4318-17)

-200 - Passing No. 200 Sieve (%) (ASTM D1140-17)

<u>STRENGTH TESTS</u>

PP - Field Pocket Penetrometer test of unconfined compressive strength (tsf)

TV - Field Torvane test of shear strength (psf)

UC - Laboratory unconfined compressive strength (psf) (ASTM D2166/2166M-16)

TXUU - Laboratory unconsolidated, undrained triaxial test of undrained shear strength (psf) (ASTM D2850-15)

<u>MISCELLANEOUS</u>

ATOD - At time of drilling

psf/tsf - pounds per square foot / tons per square foot

psi - pounds per square inch (indicates relative force required to advance Shelby tube sampler)

SYMBOLS

Standard Penetration Test Split Spoon (2-inch O.D.)

Modified California Sampler (3-inch O.D.)

Thin-walled Sampler Tube (either Pitcher or Shelby) (3-inch O.D.)

Rock Core

Bag Sample

Groundwater Level during drilling

Groundwater Level after drilling

ALAN KROPP & ASSOCIATES

Geotechnical Consultants

KEY TO EXPLORATORY BORING LOGS

OAKHURST TOWNHOMES
Clayton, California

PROJECT NO.	DATE	FIGURE C-1
1413-5	**July 2021**	

CONSOLIDATION OF SEDIMENTARY ROCKS; usually determined from unweathered samples. Largely dependent on cementation.

- **U** = unconsolidated
- **P** = poorly consolidated
- **M** = moderately consolidated
- **W** = well consolidated

BEDDING OF SEDIMENTARY ROCK

Splitting Property	Thickness	Stratification
Massive	Greater than 4.0 feet	Very thick-bedded
Blocky	2.0 to 4.0 feet	Thick-bedded
Slabby	0.2 to 2.0 feet	Thin-bedded
Flaggy	0.05 to 0.2 feet	Very thin-bedded
Shaly or platy	0.01 to 0.05 feet	Laminated
Papery	Less than 0.01 feet	Thinly laminated

FRACTURING

Intensity	Size of Pieces in Feet
Very little fractured	Greater than 4.0 feet
Occasionally fractured	1.0 to 4.0 feet
Moderately fractured	0.5 to 1.0 feet
Closely fractured	0.1 to 0.5 feet
Intensely fractured	0.05 to 0.1 feet
Crushed	Less than 0.05 feet

HARDNESS

1. **Soft** - Reserved for plastic material alone.
2. **Low Hardness** - Can be gouged deeply or carved easily by a knife blade.
3. **Moderately Hard** - Can be readily scratched by a knife blade; scratch leaves a heavy trace of dust and is readily visible after the powder has been blown away.
4. **Hard** - Can be scratched by a knife blade with difficulty; scratch produces little powder and is often faintly visible.
5. **Very Hard** - Cannot be scratched by a knife blade; leaves a metallic streak

STRENGTH

1. **Plastic -** Very low strength.
2. **Friable** - Crumbles easily by rubbing with fingers.
3. **Weak** - An unfractured specimen of such material will crumble under light hammer blows.
4. **Moderately Strong** - Specimen will withstand a few heavy hammer blows before breaking.
5. **Strong** -Specimen will withstand a few heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.
6. **Very Strong** -Specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.

WEATHERING - the physical and chemical disintegration and decomposition of rocks and minerals by natural processes such as oxidation, reduction, hydration, solution, carbonation, and freezing and thawing.

D. **Deep** - Moderate to complete mineral decomposition; extensive disintegration; deep and thorough discoloration; many fractures, all extensively coated or filled with oxides, carbonates and/or clay or silt.

M. **Moderate** - Slight change or partial decomposition of minerals; little disintegration; cementation little to unaffected. Moderate to occasionally intense discoloration. Moderately coated fractures.

L. **Little** - No megascopic decomposition of minerals; little or no effect on normal cementation. Slight and intermittent, or localized discoloration. Few stains on fracture surfaces.

F. **Fresh** - Unaffected by weathering agents. No disintegration or discoloration. Fractures usually less numerous than joints.

DRILL RIG: B-24, Solid Flight Auger	SURFACE ELEVATION: 511 feet	LOGGED BY: TB
DEPTH TO GROUNDWATER: (see note 1)	BORING DIAMETER: 4.5 inches	DATE DRILLED: 5/24/21

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (ft)	SAMPLER TYPE	SAMPLER BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL, Poorly Graded - aggregate base			GP						
SILTSTONE - trace fine grained sand, friable to weak, deeply to moderately weathered, dry to moist	Gray	Low Hardness	BR	1					
				2					
				3		[94/10"]	11	113	
-sandier, friable to weak, deeply to moderately weathered, some slickened sides, dry to moist	Gray with some Yellowish Brown Mottling			4		[50/5"]			
				5					
				6					
				7					
				8					
				9					
-some fine grained sand, friable to weak, deeply to moderately weathered, dry	Gray			10					
				11		[96/8.5"]	12	117	
				12					
				13					
				14					
-friable to weak, deeply weathered, moderately fractured, dry to moist	Gray with some Reddish Brown Mottling			15					▼
				16		48	11		▽
				17					
				18					
				19					
				20		50/4.5"	11		

Bottom of boring at 20.9 feet.

(Continued on Next Page)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG
OAKHURST TOWNHOMES
Clayton, California

PROJECT NO.	DATE	SHEET	BORING NO.
1413-5	July 2021	1 of 2	1

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (ft)	SAMPLER TYPE	SAMPLER BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS

(Continued from Previous Page)

NOTES:

1. Groundwater was encountered at approximately 16 feet at the time of drilling and was at a depth of about 15 feet 4.5 hours after drilling. (See report for discussion.)

2. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.

3. Penetration resistance values (blow counts) enclosed in brackets ([ ]) were recorded with a 3.0-inch O.D. Modified California sampler; these are not standard penetration resistance values.

4. Elevations were estimated from topographic base provided by P/A Design Resources.

5. Approximate unconfined compressive strength values were recorded in the field using a pocket penetrometer. These values are shown on the logs and are preceded by the symbol "PP".

DRILL RIG: B-24, Solid Flight Auger	**SURFACE ELEVATION:** 515 feet	**LOGGED BY:** TB	
DEPTH TO GROUNDWATER: Not Encountered	**BORING DIAMETER:** 4.5 inches	**DATE DRILLED:** 5/24/21	

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (ft)	SAMPLER TYPE	SAMPLER BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL, Poorly Graded - aggregate base			GP						
SILTSTONE - trace fine grained sand, friable to weak, deeply weathered, dry to moist	Gray with some Reddish Brown Mottling	Low Hardness	BR	1					
				2			11		LL = 43 PI = 22
				3			13	106	
-friable to weak, deeply weathered, dry to moist	Mottled Gray, Olive Gray, and White			4		[55]			
				5		[70]			
				6					
				7					
				8					
				9					
-some fine grained sand, friable to weak, deeply weathered, dry to moist	Mottled Olive Gray, Dark Gray, and Trace Reddish Brown			10					
				11			13	115	
				12		[90]			
				13					
				14					
-friable to weak, deeply to moderately weathered, dry to moist	Mottled Gray, Olive Gray, with some Yellowish Brown			15					
				16			11		
				17		72			
				18					
				19					
-friable to deeply weathered, dry to moist	Olive Gray with some Gray Mottling			20					
				21			11		
Bottom of boring at 21.5 feet.						81/11.5"			

(Continued on Next Page)

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (ft)	SAMPLER TYPE	SAMPLER BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS

(Continued from Previous Page)

NOTES:

1. No groundwater was encountered at the time of drilling and the boring was grouted following drilling in accordance with Contra Costa County permit requirements. (See report for discussion.)

2. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.

3. Penetration resistance values (blow counts) enclosed in brackets ([ ]) were recorded with a 3.0-inch O.D. Modified California sampler; these are not standard penetration resistance values.

4. Elevations were estimated from topographic base provided by P/A Design Resources.

5. Approximate unconfined compressive strength values were recorded in the field using a pocket penetrometer. These values are shown on the logs and are preceded by the symbol "PP".

DRILL RIG: B-24, Solid Flight Auger	SURFACE ELEVATION: 516 feet	LOGGED BY: TB
DEPTH TO GROUNDWATER: (see note 1)	BORING DIAMETER: 4.5 inches	DATE DRILLED: 5/24/21

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (ft)	SAMPLER TYPE	SAMPLER BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL, Poorly Graded - aggregate base			GP						
CLAY, Lean - with silt, some fine grained sand and abundant bedrock fragments, moist	Olive Gray with some Gray Mottling	Stiff	CL	1					
				2			14		LL = 44 PI = 23
				3			15	105	
						[24]			PP = 4.5+
				4			16	100	
				5		[17]			PP = 4.5+
				6					
				7					
CLAY, Lean - with trace fine grained sand and trace bedrock fragments, moist	Reddish Brown	Firm to Stiff	CL	8					
				9					
FILL	Reddish Brown with some Gray Mottling			10					PP = 0.75
SILTSTONE - some fine grained sand, friable, deeply weathered, moist	Dark Gray	Low Hardness	BR	11			19	100	
						[14]			
				12					
				13					
				14					
	Gray	Low to Moderately Hard		15			11		
						[58/6"]			
				16					
				17					
				18					
				19					
				20		50/4.5"	13		

Bottom of boring at 20.4 feet.

(Continued on Next Page)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG
OAKHURST TOWNHOMES
Clayton, California

PROJECT NO.	DATE	SHEET	BORING NO. 3
1413-5	**July 2021**	**1 of 2**	

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (ft)	SAMPLER TYPE	SAMPLER BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS

(Continued from Previous Page)

NOTES:

1. Groundwater was encountered at approximately 10.5 feet at the time of drilling and was at a depth of about 12 feet 1.5 hours after drilling. (See report for discussion.)
2. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
3. Penetration resistance values (blow counts) enclosed in brackets ([ ]) were recorded with a 3.0-inch O.D. Modified California sampler; these are not standard penetration resistance values.
4. Elevations were estimated from topographic base provided by P/A Design Resources.
5. Approximate unconfined compressive strength values were recorded in the field using a pocket penetrometer. These values are shown on the logs and are preceded by the symbol "PP".

APPENDIX D
(GUIDE TO THE MAINTENANCE OF HILLSIDE HOME SITES)

APPENDIX D

GUIDE TO THE MAINTENANCE OF HILLSIDE HOME SITES

During the wet winter season, homeowners, particularly those living in houses placed on fill (man-placed earth) or in the vicinity of excavated (cut) slopes, become concerned about the condition of their building site. In general, modern design and construction practice minimizes the probability of serious landsliding (slope failure). The grading codes of the local jurisdictions (cities and counties) in California concerning filled land, excavation, terracing, and slope construction are among the most stringent in the country and, if followed, are adequate to meet almost any natural occurrence. Therefore, the concern of the homeowner should be directed toward maintaining slopes, drainage provisions, and facilities so that they will perform as designed.

The following discussion, general recommendations, and simple precautions are presented to help the homeowner maintain their hillside building site.

The general public often regards the natural terrain as stable — "terra firma." This is, of course, an erroneous concept. Nature is always at work altering the landscape. Hills and mountains are worn down by mass wasting (erosion, sliding, creeping, etc.) and the valleys and lowlands collect these products. Thus the natural process is toward leveling the terrain. Periodically (over tens of millions of years), major land movements rebuild mountains and hills, and these processes begin again. In some areas these processes are very slow, and in others they are more rapid.

Development of hillsides for residential use is carried out, as far as possible, to enhance the natural stability of the site and to minimize the potential for instability resulting from the grading necessary to provide home sites, streets, yards, and other improvements. This has been done by the developer and designers on the basis of geologic and soil mechanics investigations. In order to be successful, the slope, drainage provisions, and facilities must be maintained by the homeowner.

Homeowners are accustomed to maintaining their homes. They expect to paint their houses periodically, replace wiring, clean out clogged plumbing, and repair roofs. Maintenance of the home site, particularly on hillsides, should be considered on the same basis, or even on a more serious basis because neglect can result in serious consequences. In most cases, lot and site maintenance can be taken care of along with landscaping, and can be carried out more economically than repair after neglect.

Most slope and hillside lot problems are associated with water. Uncontrolled water from a broken pipe, cesspool, or wet weather causes most damage. Wet weather is the largest cause of slope problems, particularly in California where rain is intermittent, but may be torrential. Therefore, drainage and erosion control are the most important aspects of home site stability; these provisions must not be altered without competent professional advice. Further, maintenance must be carried out to assure their continued operation.

As geotechnical engineers concerned with the problems of building sites in hillside developments, we offer the following list of recommended "Do's and Don'ts" as a guide to homeowners.

----- ----- -----

1. DO check roof drains, gutters and down spouts to be sure they are clear. Depending on your location, if you do not have roof gutters and down spouts, you may wish to install them because roofs, with their wide, flat area can shed tremendous quantities of water. Without gutters or other adequate drainage, water falling from the eaves collects against foundation and basement walls, which can be undesirable.

2. DO clear surface and terrace drainage ditches, and check them frequently during the rainy season. Use a shovel, if necessary. Ask your neighbors to do likewise.

3. DO be sure that all drainage ditches have outlet drains that are open. This should be tested during dry weather and can usually be done with a hose. If blockage is evident, you may have to clear the drain mechanically.

4. DO check all drains at top of slopes to be sure they are clear and that water will not overflow the slope itself, causing erosion.

5. DO keep subsurface drain openings (weep-holes) clear of debris and other material which could block them in a storm.

6. DO check for loose fill above and below your property if you live on a slope or terrace.

7. DO monitor hoses and sprinklers. During the rainy season, little, if any, irrigation is required. Over-saturation of the ground is unnecessary, increases watering costs, and can cause subsurface drainage.

8. DO watch for water backup of drains inside the house and toilets during the rainy season, as this may indicate drain or sewer blockage.

9. DO exercise ordinary precaution. Your house and building site were constructed to meet certain standards which should protect against any natural occurrence if you do your part in maintaining them.

----- ----- -----

1. DON'T block terrace drains and brow ditches on slopes or at the tops of cut or fill slopes. These are designed to carry away runoff to a place where it can be safely distributed. Generally, a little shovel work will remove any accumulation of dirt and other debris which may clog the drain. If several homes are located on the same terrace, it is a good idea to check with your neighbors. Water backed up on their property may eventually reach you. Water backed up in surface drains will tend to overflow and seep into the terraces, creating less stable slopes. Maintain the ground surface upslope of lined ditches to ensure that surface water is collected in the ditch and is not permitted to be trapped behind or under the lining.

2. DON'T permit water to collect or pond on your home site. Water gathering here will tend to either seep into the ground (loosening fill or natural ground), or will overflow into the slope and begin erosion. Once erosion is started, it is difficult to control and severe damage may result rather quickly.

3. DON'T connect roof drains, gutters, or down spouts to subsurface drains. Rather, arrange them so that water either flows off your property in a specially designed pipe or flows out into a paved driveway or street. The water then may be dissipated over a wide surface or, preferably, may be carried away in a paved gutter or storm drain. Subdrains are constructed to take care of ordinary subsurface water and cannot handle the overload from roofs during a heavy rain.

4. DON'T permit water to spill over slopes, even where this may seem to be a good way to prevent ponding. This tends to cause erosion and, in the case of fill slopes, can eat away carefully designed and constructed sites.

5. DON'T drop loose soil or debris over slopes. Loose soil soaks up water more readily than compacted fill. It is not compacted to the same strength as the slope itself and will tend to slide when laden with water; this may even affect the soil beneath the loose soil. The sliding may clog terrace drains below or may cause additional damage in weakening the slope. If you live below a slope, try to be sure that loose fill is not dumped above your property.

6. DON'T discharge water into subsurface blanket drains close to slopes. Trench drains are sometimes used to get rid of excess water when other means of disposing of water are not readily available. Overloading these drains saturates the ground and, if located close to slopes, may cause slope failure in their vicinity.

7. DON'T discharge surface water into septic tanks or leaching fields. Not only are septic tanks constructed for a different purpose, but they will tend, because of their construction, to naturally accumulate additional water from the ground during a heavy rain. Overloading them artificially during the rainy season is bad for the same reason as subsurface subdrains, and is doubly dangerous since their overflow can pose a serious health hazard. In many areas, the use of septic tanks should be discontinued as soon as sewers are made available.

8. DON'T over-irrigate slopes. Naturally, ground cover of ice plant and other vegetation will require some moisture during the hot summer months, but during the wet season, irrigation can cause ice plant and other heavy ground cover to pull loose. This not only destroys the cover, but also starts serious erosion. In some areas, ice plant and other heavy cover can cause surface sloughing when saturated due to the increase in weight and weakening of the near-surface soil. Planted slopes should be planned where possible to acquire sufficient moisture when it rains.

9. DON'T let water gather against foundations, retaining walls, and basement walls. These walls are built to withstand the ordinary moisture in the ground and are, where necessary, accompanied by subdrains to carry off the excess. If water is permitted to pond against them, it may seep through the wall, causing dampness and leakage inside the basement. Further, it may cause the foundation to swell up, or the water pressure could cause structural damage to walls.

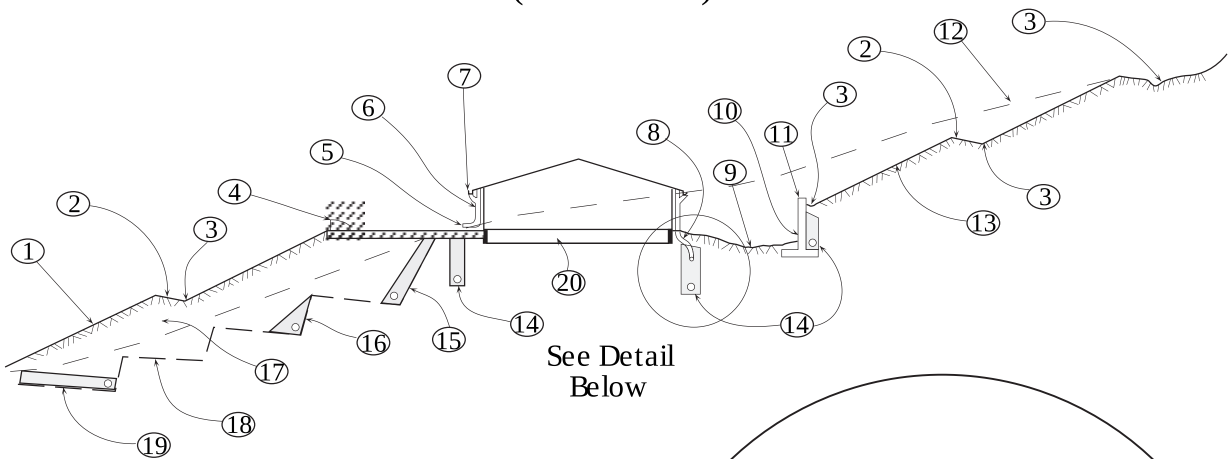
10. DON'T try to compact soil behind walls or in trenches by flooding with water. Not only is flooding the least efficient way of compacting fine-grained soil, but it could damage the wall foundation or saturate the subsoil.

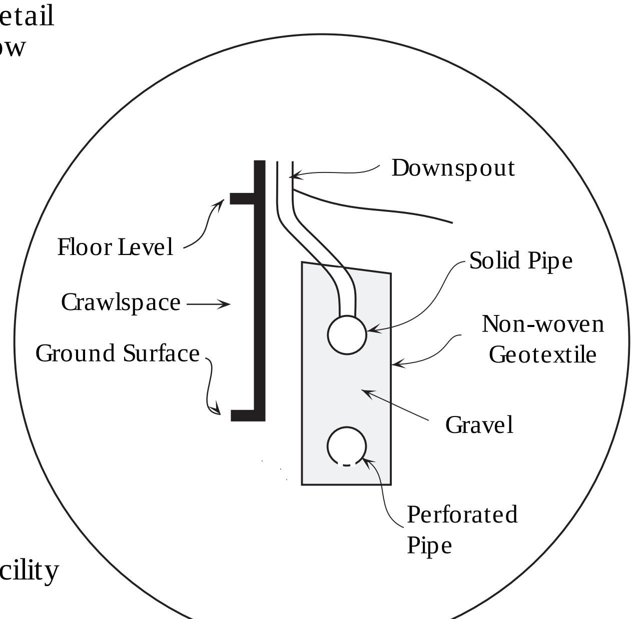
11. DON'T leave a hose and sprinkler running on or near a slope, particularly during the rainy season. This will enhance ground saturation which may cause damage.

12. DON'T block ditches which have been graded around your house or the lot pad. These shallow ditches have been put there for the purpose of quickly removing water toward the driveway, street or other positive outlet. By all means, do not let water become ponded above slopes by blocked ditches.

A typical slope section showing various grading and drainage requirements, as well as terms used for hillside developments, is attached.

TYPICAL SLOPE SECTION
(Not to Scale)





DETAIL
(Not to Scale)

CONDITIONS:

1. Fill Slope
2. Drainage Terrace
3. Lined Ditch
4. Curb to Prevent Slope Erosion
5. Drain Pipe Provided with Positive Outlet on Paved Surface
6. Downspout
7. Roof Gutter
8. Drain Pipe Connected to Solid Pipe and Discharged to an Approved Drainage Facility
9. Drainage Swale
10. Weep Holes Through Retaining Wall
11. Retaining Wall
12. Original Ground Surface
13. Cut Slope
14. Subdrain
15. Curtain Drain
16. Wedge Drain
17. Fill Compacted to Engineering Specifications and Benched into Competent Material
18. Bench
19. Blanket Drain
20. Crawlspace

Note: Acknowledgment is hereby made to the San Diego Chapter of the California Council of Civil Engineers and Land Surveyors

ALAN KROPP & ASSOCIATES Geotechnical Consultants	TYPICAL SLOPE DETAIL	FIGURE D-1

APPENDIX E

HYDROLOGY ANALYSIS

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HYDROLOGY ANALYSIS

for

Oakhurst Townhomes

March 10, 2023

Prepared by:

P/A Design Resources Inc.
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Walnut Creek, CA 94598
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NARRATIVE

Pre-Developed Site:

The Oakhurst Country Club project is located in the City of Clayton between Clayton Road and Peacock Creek Drive. The property is a 2.55 acre lot on a hillside that is currently being used as an asphalt parking lot. The site drainage is collected by a storm drain line that runs through the site and flows to the west of the property. This storm drain line also collects runoff from beyond the property from about 3.47 acres of the adjacent hillside to the east; the total existing watershed is 6.02 acres. The existing storm drain collects runoff from the site at Peacock Creek Road and flows to Clayton Road in the westward direction.

Hydrology:

The calculations for the stormwater runoff will be based on the proposed site layout shown in the Post-Developed Hydrology Exhibit. The City of Walnut Creek's current codes require that minor storm drainage facilities be designed to accommodate runoff from a storm with a probable frequency of once in 10 years. The peak flows were calculated using the Rational Method.

Calculations:

An analysis of the pre-developed conditions was done by quantifying the areas of the pre-developed surface types, then determining the time of concentration using the slopes and critical flow length of the watershed. The **Pre-Developed Hydrology Exhibit on pg. 3** illustrates how each of these variables was determined. Once this analysis was done, the pre-developed peak flow for the site was determined to be 5.843 cfs. These calculations are presented in the **10 Year Peak Flow Calculations on pg. 5.** This pre-developed peak flow of 5.843 cfs was then set as the target post-developed peak flow.

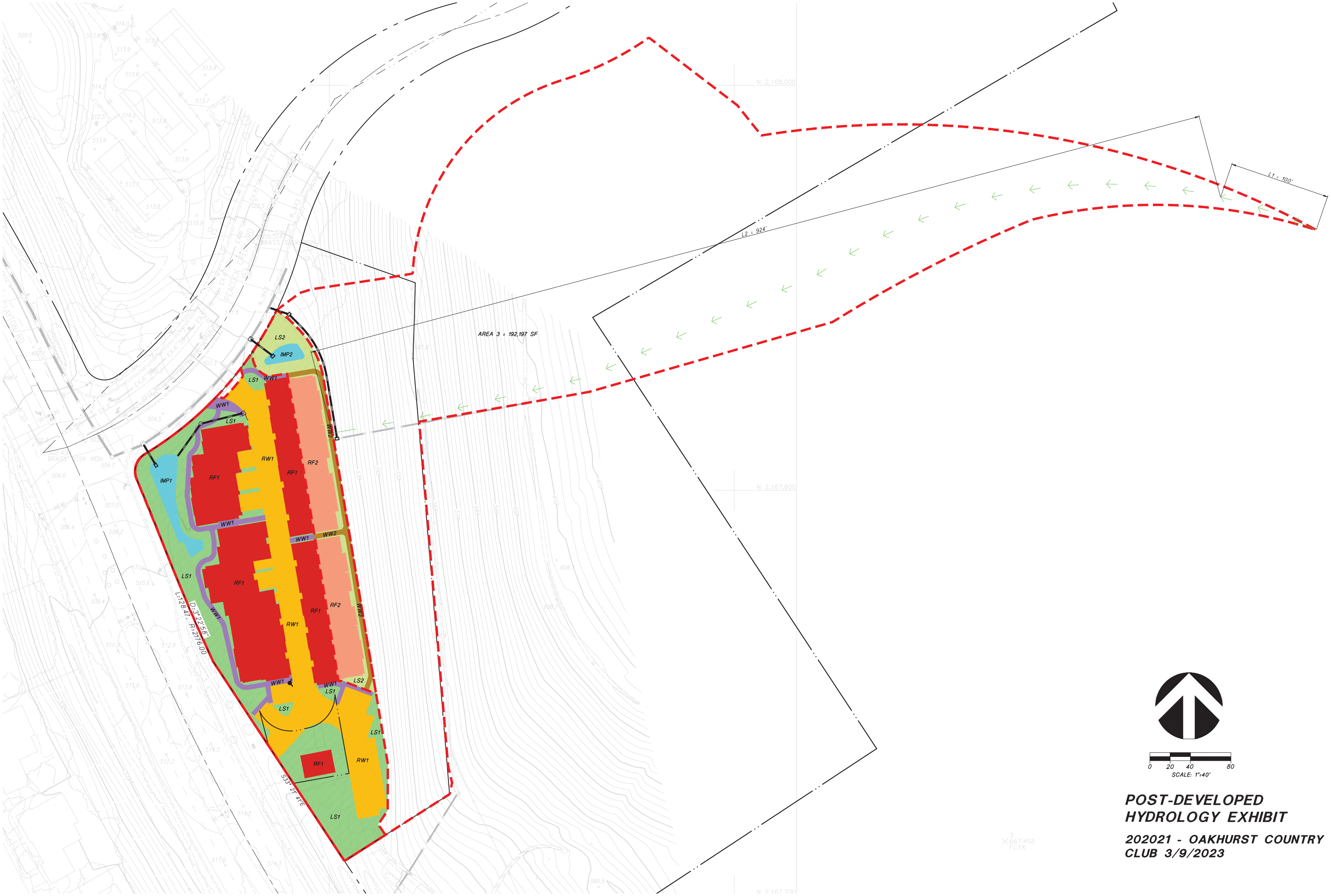
The post-developed site will consist of three (3) watersheds, Area 1, Area2 and Area 3 and are defined in the **Post-Developed Hydrology Exhibit on pg. 4**. The drainage design was prepared so that the sum of the peak flows from these watersheds would not exceed the pre-developed peak flow. Area 1 and Area 2 will encompass the proposed development and be treated and detained by bioretention basins IMP1 and IMP2 respectively. Area 1 consists of two townhouse buildings and half the roof of the two other townhouse buildings, the asphalt roadway through the site, walkways made of pervious pavers, and landscape (Q_1=2.829 cfs). Area 2 consists of half the roofs of two townhomes, walkways made of pervious pavers, and landscape (Q_2=0.654 cfs). Area 3 consists of an undisturbed portion of the offsite hillside (all landscape) that will be diverted with a ditch and conveyed directly offsite to Peacock Creek Road without detention. These calculations are presented in the **10 Year Peak Flow Calculations on pgs. 5-8.**

The undetained flow from Area 3 (Q_3=3.791 cfs) was subtracted from the total pre-developed peak flow (Q_{pre}=5.843 cfs) to obtain a target detained flow of Q_{det}=2.053 cfs. The sum of the flows from Area 1 and Area 2 would be detained so as to not exceed Q_{det}. The area percentage of Area 1 and Area 2 was found and multiplied by Q_{det} to set the target detained runoffs for these areas, Q_1'=1.657 cfs and Q_2'=0.396 cfs respectively (see **pg. 8**). IMP1 and IMP2 are both designed with an outflow structure to serve as the flow-control device for each watershed. IMP1 has a structure with a 24" wide weir and IMP2 has a structure with a 3" wide weir. The weirs were sized using modeling software by creating rational method hydrographs of each watershed, and routing them through each basin and outflow structure, where the size of each weir was adjusted until the trial flows did not exceed their targets (Q_1' and Q_2').

The flow control structures reduced the peak flows from Area 1 (Q_1) to 1.558 cfs and Area 2 (Q_2) to 0.395 cfs. These calculations are presented in the **Hydrology Studio Area 1 and Area 2 Modeling Report on pgs. 9-27**.

The overall post-developed peak flow was found to be 1.558+0.395+3.791=5.744 cfs, which is less than the pre-developed peak flow of 5.843 cfs.


LANDSCAPE ± 215,369 SF
LANDSCAPE ± 4,529 SF
PAVEMENT ± 46,172 SF
LANDSCAPE ± 3,584 SF
ROOF ± 663 SF
LANDSCAPE ± 3,278 SF
LANDSCAPE ± 542 SF
L2 ± 1,112'
L1 ± 100'
SCALE: 1"=40'
PRE-DEVELOPED
HYDROLOGY EXHIBIT
202021 - OAKHURST COUNTRY
CLUB 3/9/2023



POST-DEVELOPED HYDROLOGY EXHIBIT

202021 - OAKHURST COUNTRY CLUB 3/9/2023

10 YEAR PEAK FLOW CALCULATIONS

Project: 202021 - Oakhurst Country Club
City: Clayton, CA
MAP (in): 18 *From Figure B-166: Contra Costa County Mean Seasonal Isohyets*
Storm: 10 yr

I) PRE-DEVELOPED CONDITIONS

	Area Summary		Composite C	
	sq. ft.	acres	C	C*A
Roof	663	0.015	0.95	629.85
Pavement	46,172	1.060	0.95	43863.40
Landscape	215,370	4.944	0.45	96916.50
Total	262,205	6.019	∑C*A:	141409.75
			C:	0.539

Time of Concentration - T_c

T_{c1} [1]		T_{c2} [2]		
L_1 (ft):	100	L_2 (ft):	1112	*See Existing Hydrology Exhibit*
n[3]:	0.4	V (ft/s)[4]:	3.5	
H_1:	806	H_1:	785	*Elevation at start of flow length*
H_2:	785	H_2:	504	*Elevation at end of flow length*
ΔH (ft):	21	ΔH (ft):	281	*$\Delta H=H_1-H_2$*
S:	0.21	S:	0.253	*$S=\Delta H/L$*
T_{c1} (min):	6.69	T_{c2} (min):	5.30	
T_c (min)[5]:	11.98	(12 minutes)		

Notes:

1. T_{c1}: Time of concentration for the first 100 ft of flow calculated with the Kerby Equation: $T_c = [\frac{2Ln}{3\sqrt{S}}]^{0.467}$

2. T_{c2}: Time of concentration for the remaining flow length calculated with: T_c=L/60V

3. n: Manning's channel roughness coefficient

4. V: Velocity of flow from Figure 15-4 of National Engineering Handbook

5. T_c: Total time of concentration, the sum of T_{c1} and T_{c2} (rounded)

Rainfall Intensity - I

MAP (in):	18	*From Mean Seasonal Isohyet Map (Figure B-166)*
D (in):	0.36	*From 10-yr MSP Curve (Figure B-159)*
I (in/hr):	1.80	*$I=60*D/T_c$*

Runoff - Q=CIA

C:	0.539
I (in/hr):	1.80
A (acres):	6.019
Q (cfs):	**5.843**

II) POST-DEVELOPED CONDITIONS

Area 1

	Area Summary		Composite C		
Type	sq. ft.	acres	C	C*A	DMA Name
Roof	19,475	0.447	0.95	18501.25	RF1
Pavement	15,244	0.350	0.95	14481.80	RW1
Pervious Pavers	2,790	0.064	0.45	1255.50	WW1
Landscape	17,517	0.402	0.45	7882.65	LS1
IMP	1,480	0.034	0.45	666.00	IMP1
Total	56,506	1.297	∑C*A:	42787.20	
			C:	0.757	

Time of Concentration - T_c

T_c (min): 5.00 — *Minimum time of concentration*

Rainfall Intensity - I

MAP (in): 18 — *From Mean Seasonal Isohyet Map (Figure B-166)*

D (in): 0.24 — *From 10-yr MSP Curve (Figure B-159)*

I (in/hr): 2.88 — *$I=60*D/T_c$*

Runoff - Q=CIA

C: 0.757

I (in/hr): 2.88

A (acres): 1.297

Q_1 (cfs): 2.829

Area 2

	Area Summary		Composite C		
Type	sq. ft.	acres	C	C*A	DMA Name
Roof	7,638	0.175	0.95	7256.10	RF2
Pavement	0	0.000	0.95	0.00	-
Pervious Pavers	1,531	0.035	0.45	688.95	WW2
Landscape	3,863	0.089	0.45	1738.35	LS2
IMP	470	0.011	0.45	211.50	IMP2
Total	13,502	0.310	∑C*A:	9894.90	
			C:	0.733	

Time of Concentration - T_c

T_c (min): 5.00 — *Minimum time of concentration*

Rainfall Intensity - I

MAP (in): 18 — *From Mean Seasonal Isohyet Map (Figure B-166)*

D (in): 0.24 — *From 10-yr MSP Curve (Figure B-159)*

I (in/hr): 2.88 — *$I=60*D/T_c$*

Runoff - Q=CIA

C:	0.733
I (in/hr):	2.88
A (acres):	0.310
Q_2 (cfs):	**0.654**

Area 3 (undisturbed)

	Area Summary		Composite C		
Type	sq. ft.	acres	C	C*A	DMA Name
Roof	0	0.000	0.95	0.00	
Pavement	0	0.000	0.95	0.00	
Landscape	192,197	4.412	0.45	86488.65	
Total	192,197	4.412	∑C*A:	86488.65	
			C:	0.450	

Time of Concentration - T_c

T_{c1} [1]			T_{c2} [2]		
L_1 (ft):	100		L_2 (ft):	924	*See Existing Hydrology Exhibit*
n^3:	0.4		V (ft/s)[4]:	3.7	
H_1:	806		H_1:	785	*Elevation at start of flow length*
H_2:	785		H_2:	522	*Elevation at end of flow length*
ΔH (ft):	21		ΔH (ft):	263	*$\Delta H = H_1 - H_2$*
S:	0.21		S:	0.285	*$S = \Delta H/L$*
T_{c1} (min):	6.69		T_{c2} (min):	4.16	
T_c (min)[5]:	10.85	(11 minutes)			

Notes:

1. T_{c1} : Time of concentration for the first 100 ft of flow calculated with the Kerby Equation: $T_c = [\frac{2Ln}{3\sqrt{S}}]^{0.467}$

2. T_{c2} : Time of concentration for the remaining flow length calculated with: $T_c = L/60V$

3. n: Manning's channel roughness coefficient

4. V: Velocity of flow from Figure 15-4 of National Engineering Handbook

5. T_c : Total time of concentration, the sum of T_{c1} and T_{c2} (rounded)

Rainfall Intensity - I

MAP (in):	18	*From Mean Seasonal Isohyet Map (Figure B-166)*
D (in):	0.35	*From 10-yr MSP Curve (Figure B-159)*
I (in/hr):	1.91	*$I = 60 * D/T_c$*

Runoff - Q=CIA

C:	0.450
I (in/hr):	1.91
A (acres):	4.412
Q_3 (cfs):	**3.791**

Total Post-Developed Runoff before Detention

Q_1 (cfs): 2.829	
Q_2 (cfs): 0.654	
Q_3 (cfs): 3.791	
Q_{total} (cfs): 7.274	*Total post-developed runoff is the sum of Q_1, Q_2 and Q_3*

Total Post-Developed Runoff after Detention

Target Q's	
Q_{pre} (cfs): 5.843	*Pre-developed runoff*
Q_{post} (cfs): 7.274	*Total post-developed runoff before detention*
Q_3 (cfs): 3.791	*Runoff to be undetained from Area 3*
Q_{det} '(cfs): 2.053	*Target runoff from Areas 1 and 2 after detention*

Detained Area (sf): 70,008

Area 1	
Area (sf): 56,506	
% of Total Area: 80.71	
Q_1 '(cfs): 1.657	*Target flow*
Q_1 (cfs): 1.558	*Flow after detention (see Hydrology Studio Calculations)*

Area 2	
Area (sf): 13,502	
% of Total Area: 19.29	
Q_2 '(cfs): 0.396	*Target flow*
Q_2 (cfs): 0.395	*Flow after detention (see Hydrology Studio Calculations)*

Total Post-Developed Runoff after Detention	
Q (cfs): 5.744	*Total post-developed runoff is the sum of Q_1, Q_2 and Q_3 after detention*

5.744 cfs < 5.843 cfs

Hydrology Studio Area 1 and Area 2 Modeling Report

Basin Model

Hydrology Studio v 3.0.0.21

Hydrograph 10-yr Summary

Hydrology Studio v 3.0.0.21

Project Name: 202021 - Oakhurst

03-09-2023

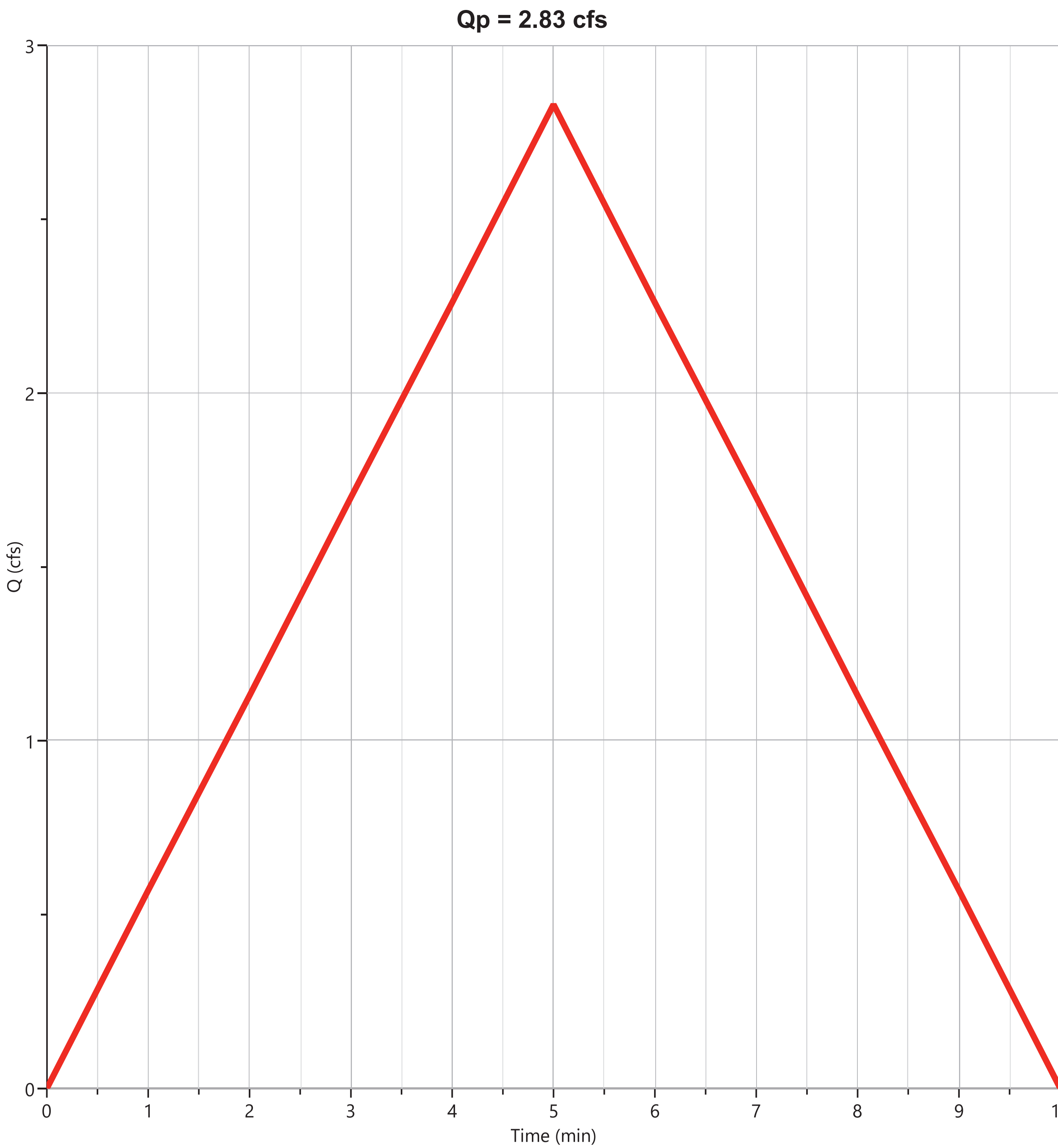
Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	Manual	Area 1	2.830	0.08	849	----		
2	Manual	Area 2	0.650	0.08	195	----		
3	Pond Route	IMP1	1.558	0.12	872	1	504.78	286
4	Pond Route	IMP2	0.395	0.12	205	2	504.67	35.0

Hydrograph Report

Area 1

Hyd. No. 1

Hydrograph Type	= Manual	Peak Flow	= 2.830 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Hydrograph Volume	= 849 cuft



Hydrograph Discharge Table

Area 1

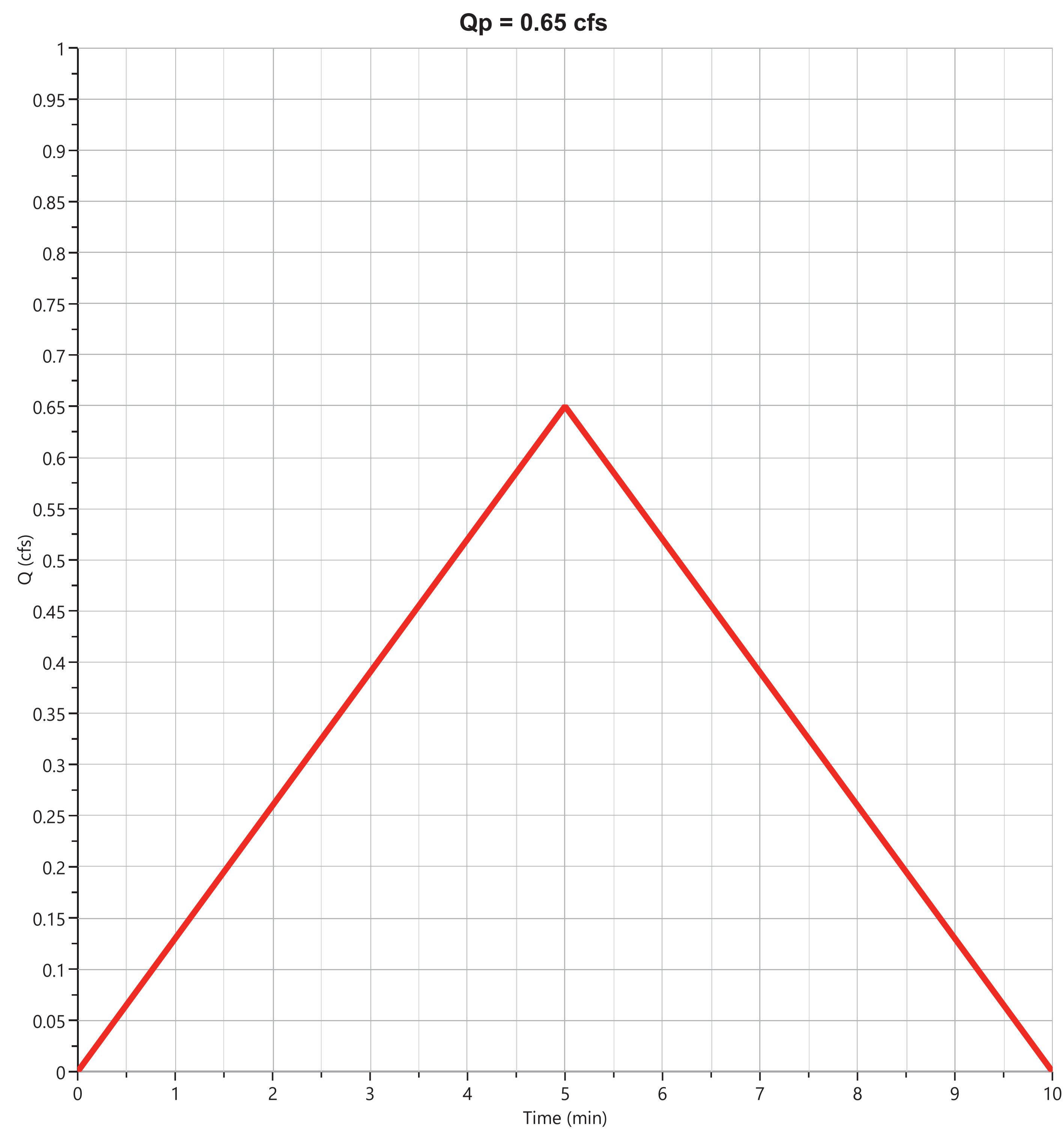
Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)
1	0.570								
2	1.130								
3	1.700								
4	2.260								
5	**2.830**								
6	2.260								
7	1.700								
8	1.130								
9	0.570								
10	0.000								
...end	*...end*								

Printed values > 1% of Qpeak. nth-point print interval = 1

Hydrograph Report

Area 2 — Hyd. No. 2

Hydrograph Type	= Manual	Peak Flow	= 0.650 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.08 hrs
Time Interval	= 1 min	Hydrograph Volume	= 195 cuft



Hydrograph Discharge Table

Area 2

Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)
1	0.130								
2	0.260								
3	0.390								
4	0.520								
5	**0.650**								
6	0.520								
7	0.390								
8	0.260								
9	0.130								
10	0.000								
...end	*...end*								

Printed values > 1% of Qpeak. nth-point print interval = 1

Hydrograph Report

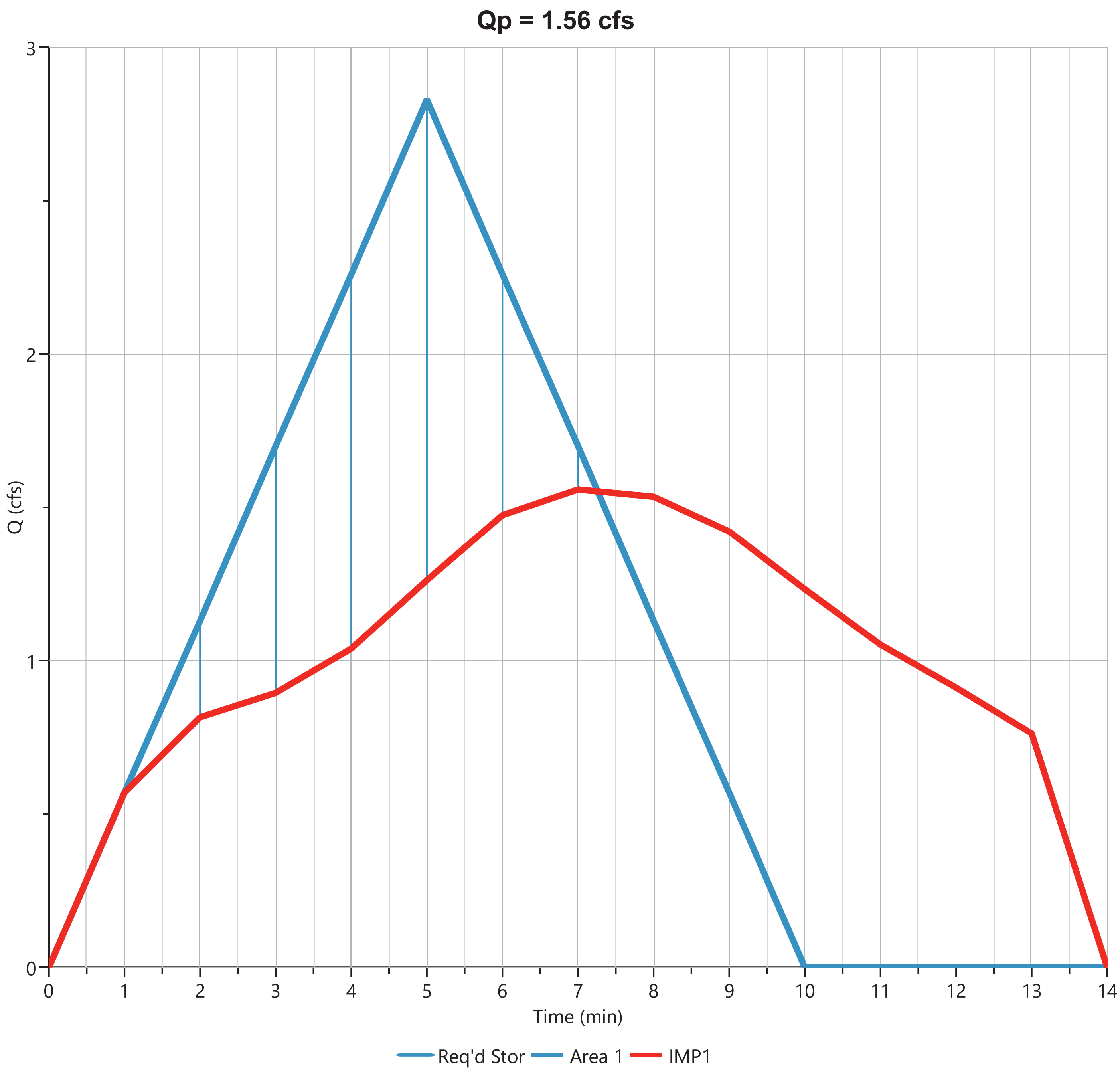
IMP1

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 1.558 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Hydrograph Volume	= 872 cuft
Inflow Hydrograph	= 1 - Area 1	Max. Elevation	= 504.78 ft
Pond Name	= IMP1	Max. Storage	= 286 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 2 min



Hydrograph Discharge Table

IMP1

Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)
1	0.570								
2	0.815								
3	0.895								
4	1.039								
5	1.263								
6	1.475								
7	**1.558**								
8	1.534								
9	1.421								
10	1.234								
11	1.052								
12	0.912								
13	0.763								
14	0.000								
...end	*...end*								

Printed values > 1% of Qpeak. nth-point print interval = 1

IMP1

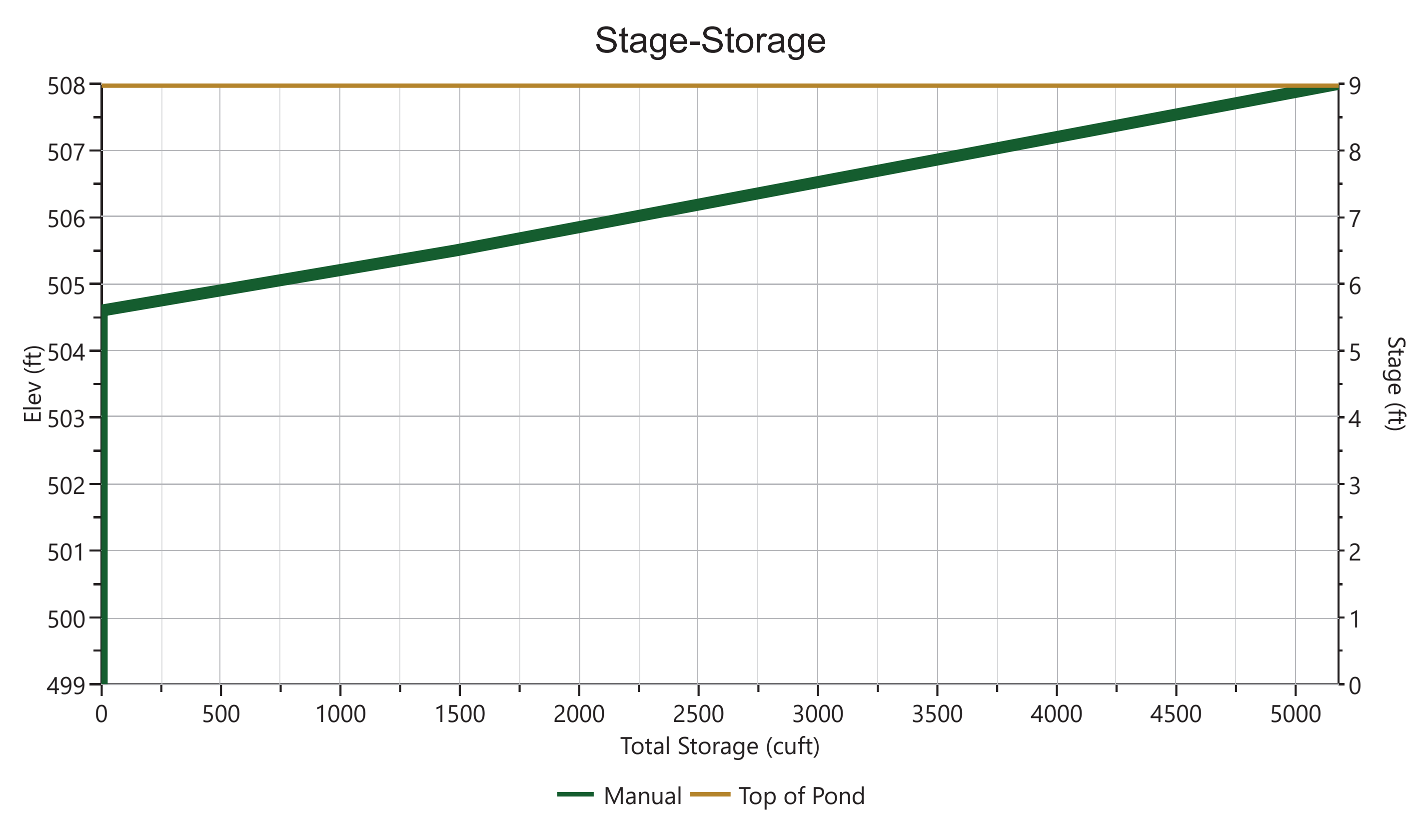
Stage-Storage

User Defined Storage

Description	Input
Bottom Elevation, ft	499.00

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	499.00	n/a	0.000	0.000
5.60	504.60	n/a	0.001	0.001
6.50	505.50	n/a	1,480	1,480
9.00	508.00	n/a	3,700	5,180

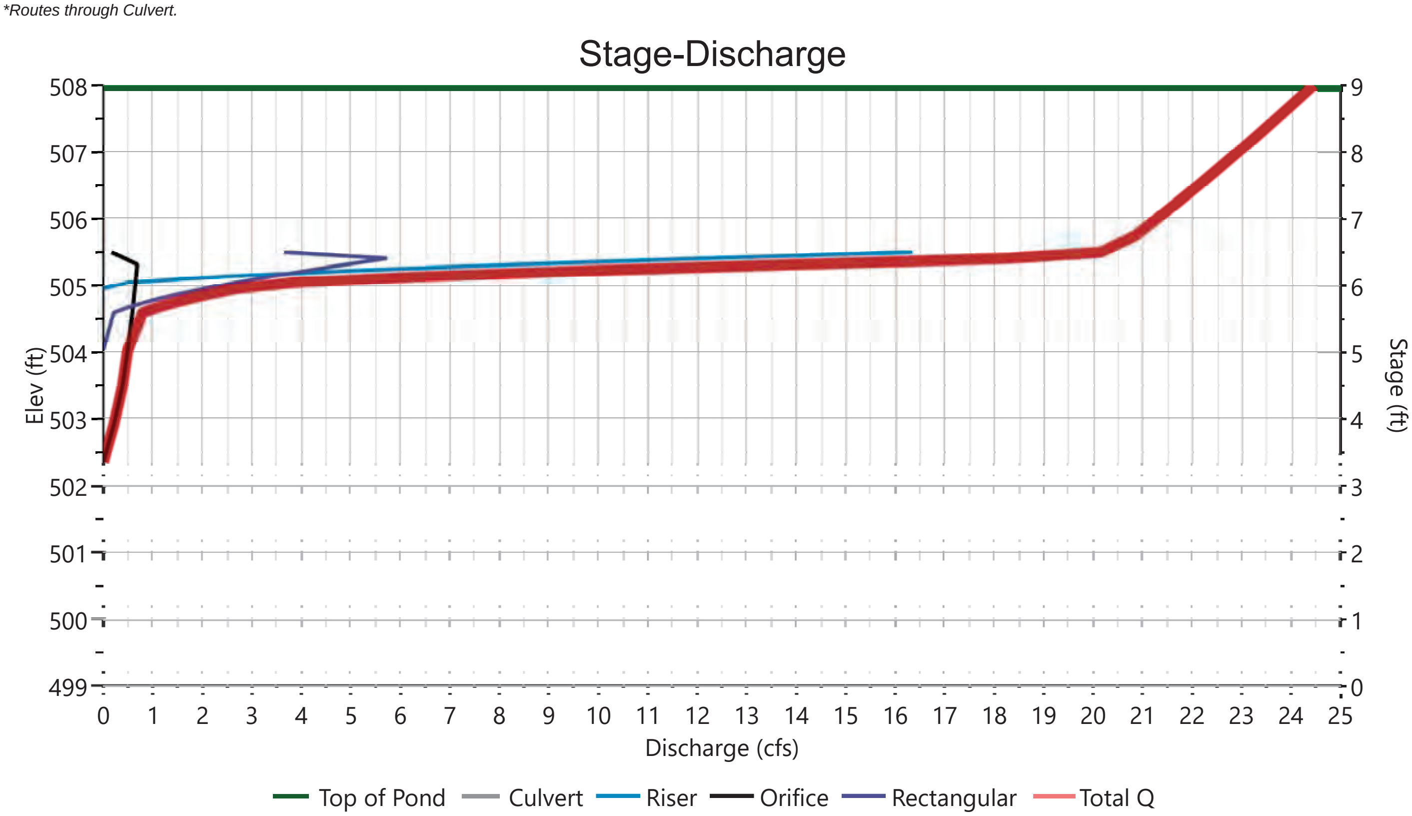


IMP1

Stage-Discharge

Culvert / Orifices	Culvert	Orifices 1*	Orifices 2	Orifices 3	Orifice Plate	
Rise, in	18	4			Orifice Dia, in	
Span, in	18	4			No. Orifices	
No. Barrels	1	1			Invert Elevation, ft	
Invert Elevation, ft	499.00	502.50			Height, ft	
Orifice Coefficient, Co	0.60	0.60			Orifice Coefficient, Co	
Length, ft	24					
Barrel Slope, %	4.1					
N-Value, n	0.013					
Weirs	**Riser***	**Weirs 1***	**Weirs 2**	**Weirs 3**	**Ancillary**	
Shape / Type	Box	Rectangular			Exfiltration, in/hr	
Crest Elevation, ft	505	504.5				
Crest Length, ft	14	2				
Angle, deg						
Weir Coefficient, Cw	3.3	3.3				

Routes through Culvert.



IMP1

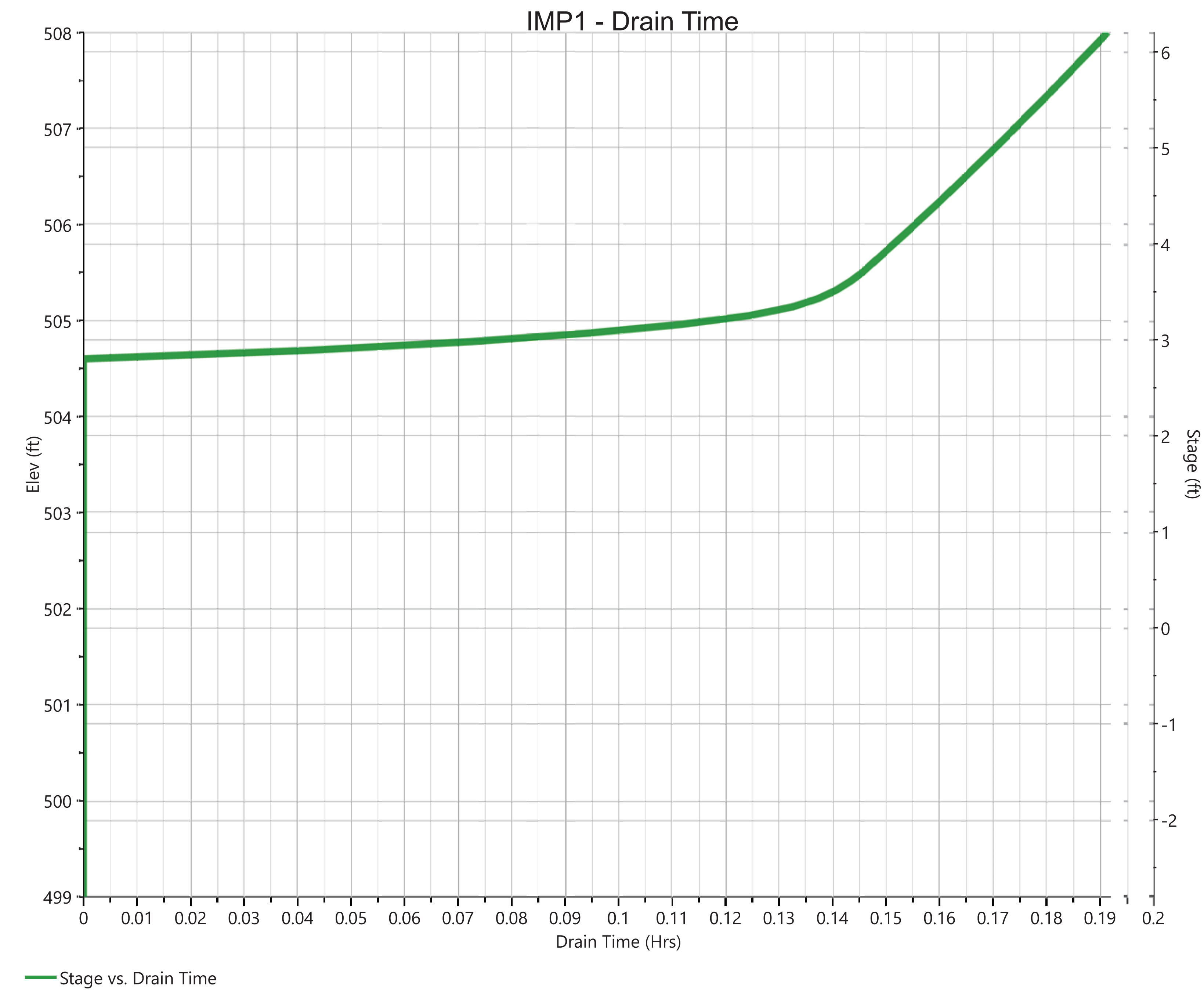
Stage-Storage-Discharge Summary

Stage (ft)	Elev. (ft)	Storage (cuft)	Culvert (cfs)	Orifices, cfs			Riser (cfs)	Weirs, cfs			Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Total (cfs)
				1	2	3		1	2	3				
0.00	499.00	0.000	0.000	0.000			0.000	0.000						0.000
5.60	504.60	0.001	0.793 ic	0.584			0.000	0.209						0.793
6.50	505.50	1,480	20.14 ic	0.162			16.33	3.641 s						20.14
9.00	508.00	5,180	24.44 ic	0.000			0.000	0.000						24.44

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

IMP1

Pond Drawdown



Hydrograph Report

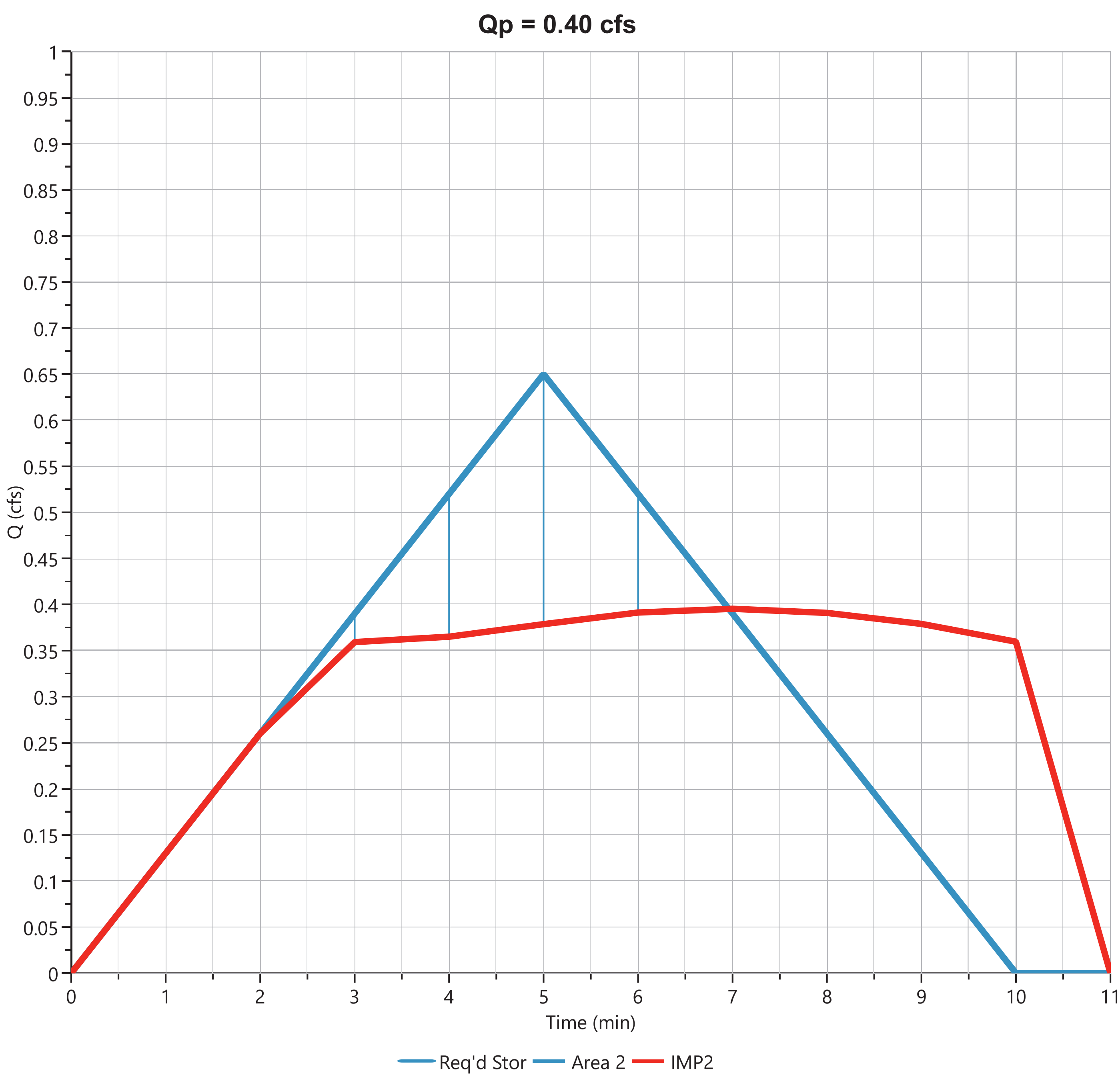
IMP2

Hyd. No. 4

Hydrograph Type	= Pond Route	Peak Flow	= 0.395 cfs
Storm Frequency	= 10-yr	Time to Peak	= 0.12 hrs
Time Interval	= 1 min	Hydrograph Volume	= 205 cuft
Inflow Hydrograph	= 2 - Area 2	Max. Elevation	= 504.67 ft
Pond Name	= IMP2	Max. Storage	= 35.0 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 1 min



Hydrograph Discharge Table

IMP2

Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)	Time (min)	Outflow (cfs)
1	0.130								
2	0.260								
3	0.359								
4	0.365								
5	0.379								
6	0.391								
7	**0.395**								
8	0.391								
9	0.379								
10	0.360								
11	0.000								
...end	*...end*								

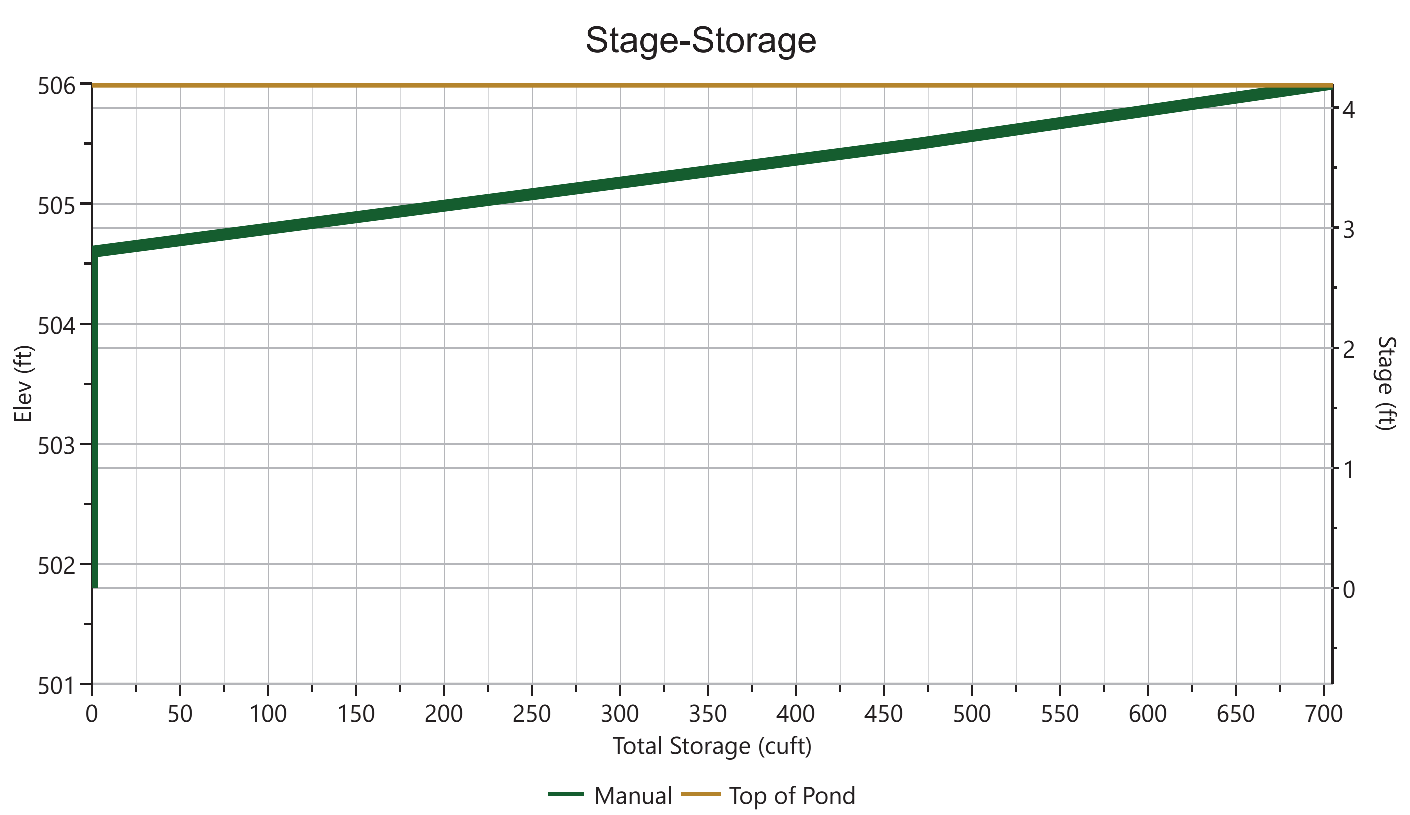
Printed values > 1% of Qpeak. nth-point print interval = 1

IMP2

Stage-Storage

User Defined Storage	
Description	**Input**
Bottom Elevation, ft	501.80

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	501.80	n/a	0.000	0.000
2.80	504.60	n/a	0.001	0.001
3.70	505.50	n/a	470	470
4.20	506.00	n/a	235	705

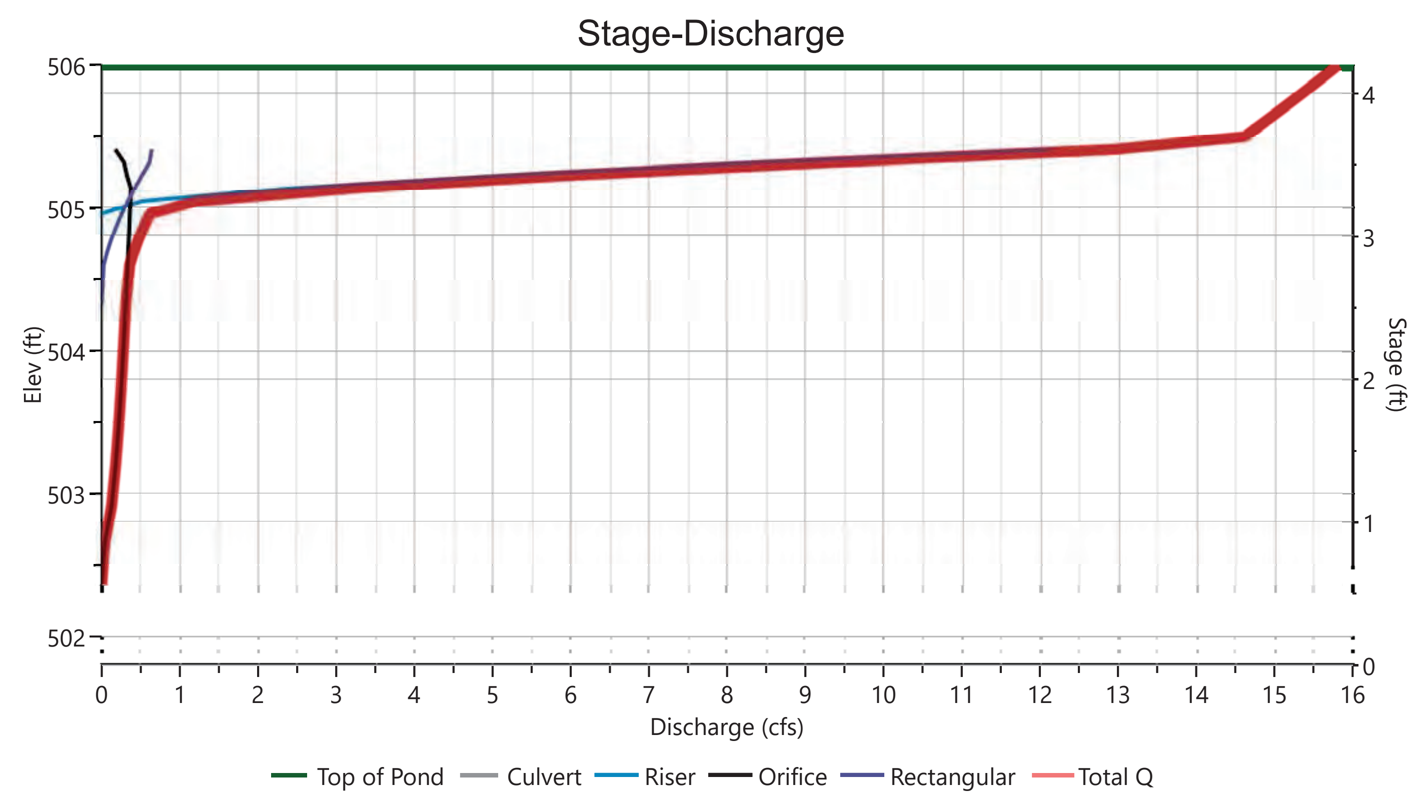


IMP2

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Orifice Plate	
		1*	2	3		
Rise, in	18	3			Orifice Dia, in	
Span, in	18	3			No. Orifices	
No. Barrels	1	1			Invert Elevation, ft	
Invert Elevation, ft	501.80	502.50			Height, ft	
Orifice Coefficient, Co	0.60	0.60			Orifice Coefficient, Co	
Length, ft	28					
Barrel Slope, %	1.07					
N-Value, n	0.013					
Weirs	**Riser***	**Weirs**			**Ancillary**	
		1*	**2**	**3**		
Shape / Type	Box	Rectangular			Exfiltration, in/hr	
Crest Elevation, ft	505	504.5				
Crest Length, ft	14	.25				
Angle, deg						
Weir Coefficient, Cw	3.3	3.3				

**Routes through Culvert.*



IMP2

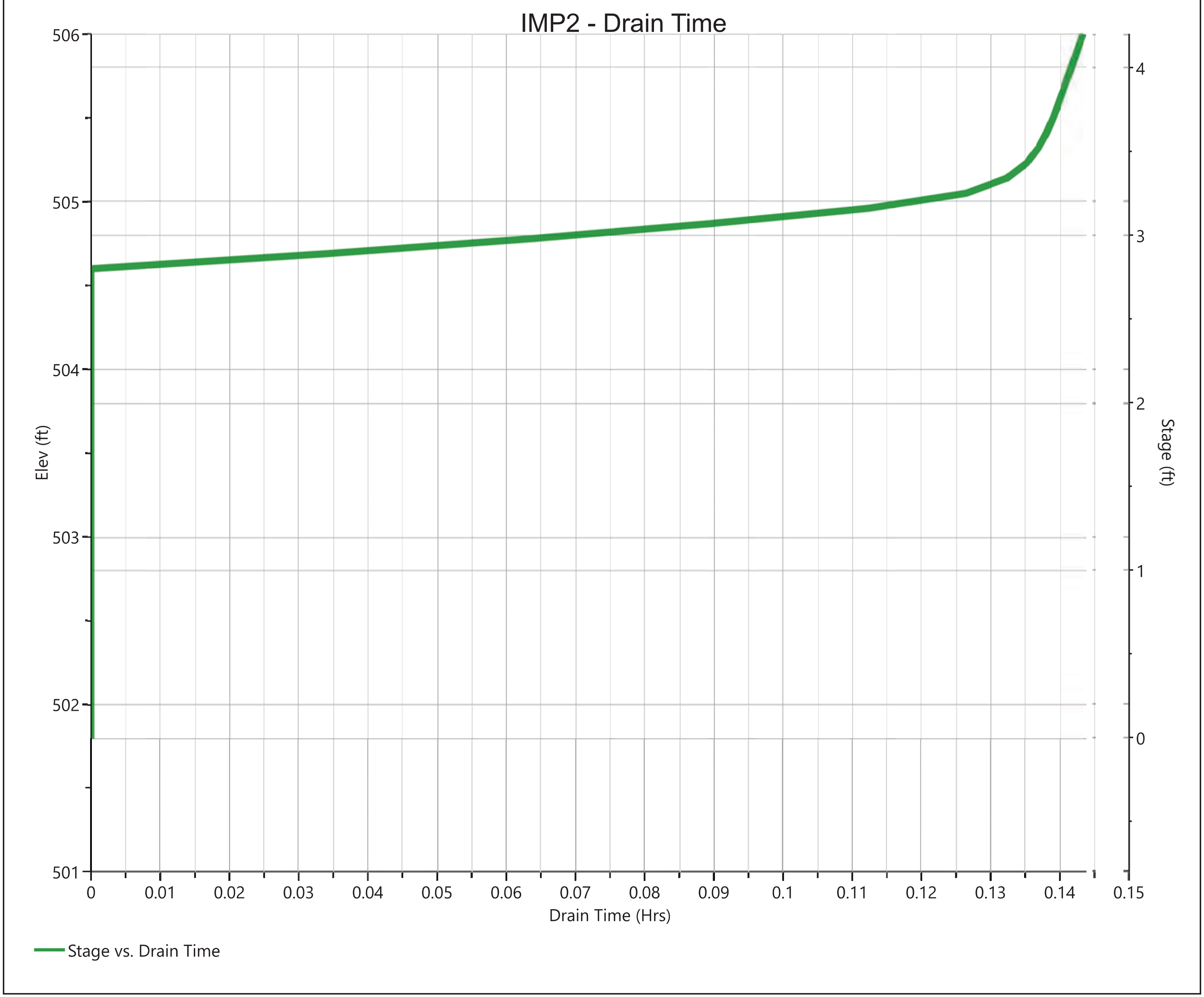
Stage-Storage-Discharge Summary

Stage (ft)	Elev. (ft)	Storage (cuft)	Culvert (cfs)	Orifices, cfs			Riser (cfs)	Weirs, cfs			Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Total (cfs)
				1	2	3		1	2	3				
0.00	501.80	0.000	0.000	0.000			0.000	0.000						0.000
2.80	504.60	0.001	0.358 ic	0.332			0.000	0.026						0.358
3.70	505.50	470	14.61 ic	0.000			0.000	0.000 s						14.61
4.20	506.00	705	15.80 ic	0.000			0.000	0.000						15.80

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

IMP2

Pond Drawdown



APPENDIX F

STORMWATER CONTROL PLAN

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STORMWATER CONTROL PLAN

for

Oakhurst Country Club

March 2023

Alvernaz Partners, LLC
Grant Alvernaz
1777 N. California Boulevard, Suite 305
Walnut Creek, CA 94596

prepared by:

P/A Design Resources, Inc.
3021 Citrus Circle, Suite 150
Walnut Creek, CA 94598
(925) 210-9300

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Tables

Figures

Attachments

Attachment 1 – Stormwater Control Plan Exhibit

Attachment 2 – IMP Sizing Calculator Output

References

1. Stormwater C.3 Guidebook Contra Costa Clean Water Program 7th Edition, May 17, 2017.

2. Geotechnical Investigation, Oakhurst 23-Unit Townhome Development, Clayton California prepared by Alan Kropp & Associates, Inc. July 8, 2021.

This Stormwater Control Plan was prepared using the template dated February 2018.

I. PROJECT DATA

Table 1. Project Data

Project Name/Number	Oakhurst Country Club (202021)
Application Submittal Date	
Project Location	APN: 118-370-073
Name of Developer	Alvernaz Partners LLC
Project Phase No.	Four phases
Project Type and Description	Four (4) townhouse buildings comprising a total of 30 townhomes, each 3-stories with 2-car garages. A private drive lane connecting to Peacock Creek Drive will provide vehicular access.
Project Watershed	Mount Diablo Creek
Total Project Site Area (acres)	2.55
Total Area of Land Disturbed (acres)	1.61
Total New Impervious Surface Area (sq. ft.)	7,939
Total Replaced Impervious Surface Area	34,418 sq. ft.
Total Pre-Project Impervious Surface Area	46,835 sq. ft.
Total Post-Project Impervious Surface Area	42,357 sq. ft.
50% Rule*	Applies
Project Density	11.76 DU/Acre
Applicable Special Project Categories	None
Percent LID and non-LID treatment	100%
HM Compliance †	Exempt: Post-project impervious area is less than the pre-project impervious area and is less than 1 acre.

*50% rule applies if:
Total Replaced Impervious Surface Area > 0.5 x Pre-Project Impervious Surface Area

†HM required (unless project meets one of the exemptions on *Guidebook* p. 9) if:
(Total New Impervious Surface Area + Total Replaced Impervious Surface Area) ≥ 1 acre

II. SETTING

II.A. Project Location and Description

The project is located in the City of Clayton on an irregular shaped parcel adjacent to Clayton Road and Peacock Creek Drive. There is also a small Contra Costa Water District (CCWD) pump station parcel towards the south end that the project property surrounds (See **Figure 1**).

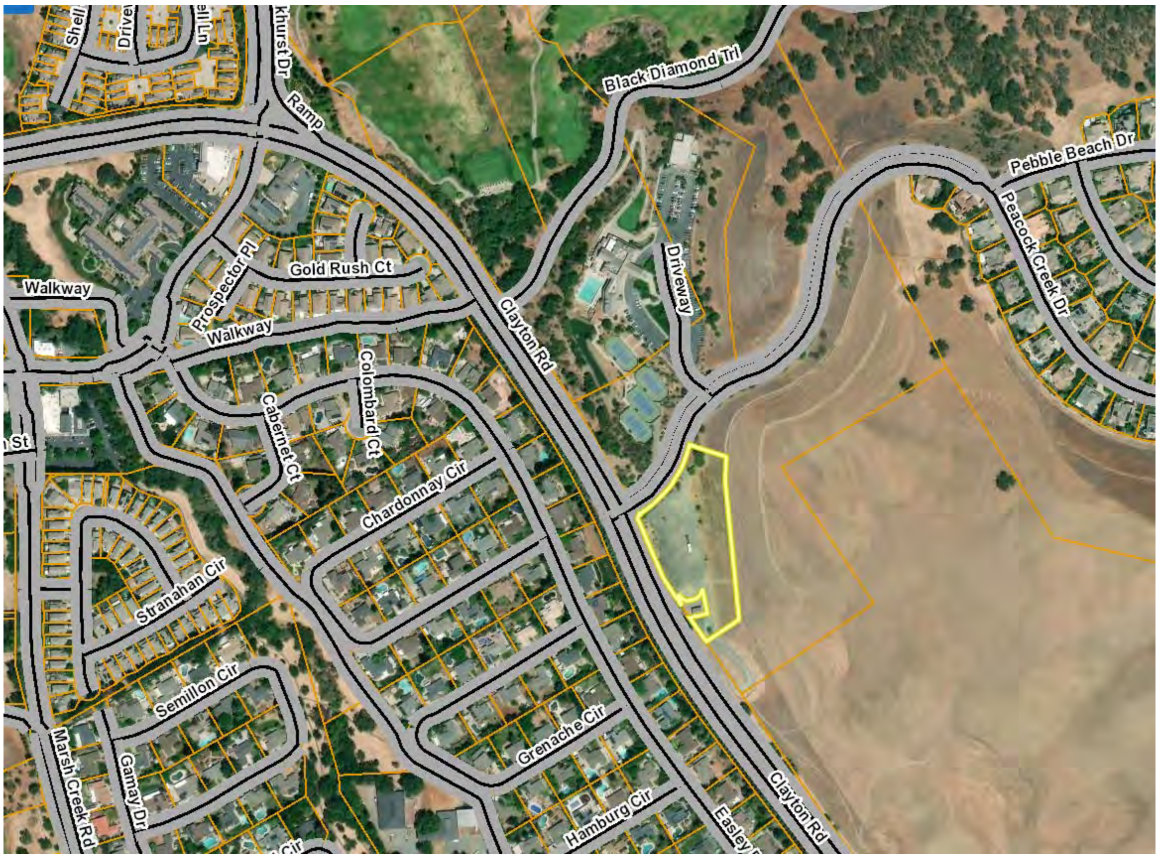


Figure 1: Vicinity Map

The proposed development consists of 30 townhomes in 4 buildings (one with 4 units, one with 8 units, and two with 9 units), a private drive lane from Peacock Creek Drive and a walkway for pedestrian traffic. The property is to be divided into 7 parcels.

II.B. Existing Site Features and Conditions

The property is an irregular-shaped 2.55 acre lot adjacent to a hillside. The site is currently vacant and mostly occupied by a parking lot. The paved area is relatively flat with slopes under 5% while the eastern side of the property has steep slopes of around 50%. There is a small wooden building on the CCWD parcel adjacent to the property that is to remain in place (See **Figure 2**).

A subsurface exploration done on the site found groundwater at depths of 10.5 ft to 16 ft via exploratory borings (See **Reference 2**).

Figure 2: Existing Conditions

II.C. Opportunities and Constraints for Stormwater Control

Constraints

Because of the existing steep slopes on the site, the area that can be used for development is limited. The existing soils have low permeability which renders deep infiltration of runoff unfeasible.

Opportunities

The proposed grading will follow the existing drainage pattern so the site will drain in the northwest direction. The planned development will contain a lot of open landscaped space which will reduce the amount of total impervious area on the property from existing.

III. LOW IMPACT DEVELOPMENT DESIGN STRATEGIES

III.A. Optimization of Site Layout

III.A.1. Preservation of natural drainage features

The proposed development will follow the existing flow pattern and drain in the northwest direction. A high-sloped portion of the site to the east will be undisturbed and routed to a ditch to drain directly offsite.

III.A.2. Minimization of imperviousness

The proposed development will have less total impervious area than existing.

III.A.3. Use of drainage as a design element

A bioretention basin, that will treat most of the site runoff, will be built in the northwest of the site conforming to the existing low point. A smaller basin northeast of the site will be used to treat the rest of the site.

III.B. Use of Permeable Pavements

Permeable pavers will be used for the walkways throughout the site.

III.C. Dispersal of Runoff to Pervious Areas

Roofs and roadway will drain to adjacent lawns and landscaped areas which will all be routed to two bioretention basins.

III.D. Bioretention or other Integrated Management Practices

Two bioretention facilities for stormwater treatment are proposed. These basins will receive runoff from roofs, driveways, road, pervious walkways and landscaped areas. See **Attachment 1**.

IV. DOCUMENTATION OF DRAINAGE DESIGN

IV.A. Descriptions of each Drainage Management Area

IV.A.1. Table of Drainage Management Areas

Table 2. Drainage Management Areas

DMA Name	*DMA ID*	*Area (SF)*	*Surface Type/Description*	*DMA Type/Drains to*
DMA1	*RF1*	*19,475*	*Conventional Roof*	*Drains to IMP1 = 1480 sf*
	RW1	*15,244*	*Asphalt Road*	*Drains to IMP1 = 1,480 sf*
	WW1	*2,790*	*Permeable Pavers*	*Drains to IMP1 = 1,480 sf*
	LS1	*17,517*	*Landscape*	*Drains to IMP1 = 1,480 sf*
DMA2	*RF2*	*7,638*	*Conventional Roof*	*Drains to IMP2 = 470 sf*
	WW2	*1,531*	*Permeable Pavers*	*Drains to IMP2 = 470 sf*
	LS2	*3,863*	*Landscape*	*Drains to IMP2 = 470 sf*

IV.A.2. Drainage Management Area Descriptions

DMA1, (DMAs RF1, RW1, WW1 and LS1 totaling 55,026 square feet), drains roof, asphalt, permeable pavers, and landscape areas. DMA1 drains to Bioretention IMP1 of 1,480 sq. ft. DMA1 is on the West side of the property and accounts for the majority of the impervious area on the site.

DMA2, (DMAs RF2, WW2, and LS2 totaling 13,032 square feet), drains roof, permeable pavers, and landscape areas. DMA2 drains to Bioretention IMP2 of 470 sq. ft. DMA2 is on the East side of the property and accounts for the impervious area that isn't captured by IMP1.

IV.B. Integrated Management Practice Descriptions

The site is divided into two watersheds/DMAs, each containing a bioretention facility for stormwater treatment. Each bioretention facility will be accessible for maintenance purposes and be designed and built to meet the criteria outlined in the Stormwater C.3 Guidebook, 7th Edition (See **Reference 1**):

- The basin will consist of two flat and level layers:

- 18" of sand/compost mix
- 12" of Class 2 permeable gravel

- Area of basin will meet or exceed minimum required
- 4-inch perforated pipe underdrains will be placed on top of the gravel layer
- A concrete overflow structure with a raised grate to allow ponding will be placed in the pond and tied to the existing storm drain downstream
- Suitable plants will be selected for planting

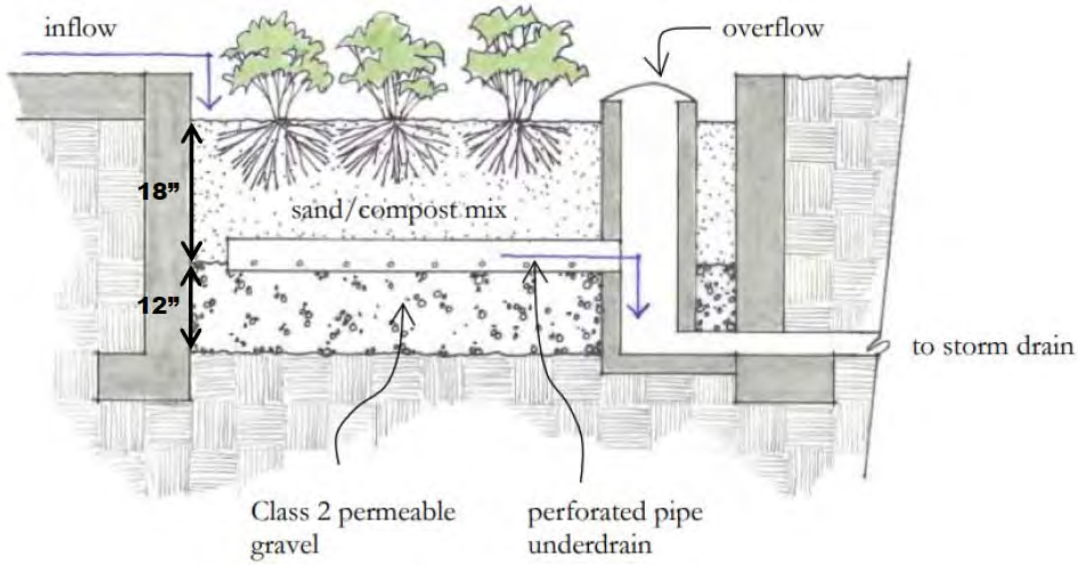


Figure 3: Bioretention Detail

IV.C. Tabulation and Sizing Calculations

See **Attachment 2**, IMP Sizing Calculator Output.

V. SOURCE CONTROL MEASURES

V.A. Site activities and potential sources of pollutants

V.B. Source Control Table

Table 3. Source Controls

Potential source of runoff pollutants	*Permanent source control BMPs*	*Operational source control BMPs*
On-site storm drain inlets	All inlets will have the words "No Dumping! Flows to Bay" stenciled on	Inlet markings will be maintained and periodically repainted or replaced. Stormwater pollution prevention information shall be provided to new site owners, lessees, or operators. The following will be included in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."

Interior floor drains and parking garages	Interior floor and parking garage drains will be plumbed to sanitary sewer	Drains will be inspected and maintained to prevent blockages and overflow.
Need for future indoor and structural pest control	Project Architect will provide letter regarding the type of pest control that will be required for the type of building construction on the site	IPM information will be given to owners, lessees, and operators.
Landscape and outdoor pesticides, herbicides, rodenticides, fungicides and fertilizers	Final Landscape Plans will: - Minimize irrigation and runoff and promote infiltration where appropriate - Minimize use of fertilizers and pesticides - Use pest-resistant plants, especially adjacent to hardscape when possible - Use plantings appropriate for the site soils, slopes, climate, sun, wind, land use, ecological consistency and plant interactions - Preserve existing trees to the maximum extent possible	Landscape will be maintained using minimum or no pesticides. Landscape will be maintained using minimum fertilizer application especially adjacent to hardscape. IPM information will be provided to homeowners.

VI. STORMWATER FACILITY MAINTENANCE

VI.A. Ownership and Responsibility for Maintenance in Perpetuity

The project owner agrees to provide the City of Clayton the necessary easements or rights of entry for the purpose of access and inspection of the stormwater IMPs.

The property owner will be responsible for maintenance of stormwater facilities, which will be performed by the owner's contractors and employees as part of routine maintenance of buildings, grounds, and landscaping. The applicant accepts responsibility for interim operation and maintenance of stormwater treatment facilities until that responsibility is formally transferred to a subsequent owner.

VI.B. Summary of Maintenance Requirements for Each Stormwater Facility

The detailed maintenance requirements for the project IMP's will be presented in an Operation and Maintenance Plan and Schedule which will be submitted to the City of Clayton with the project's application for building permits.

The general maintenance requirements for the proposed project IMP's are listed below. More specific requirements will be presented in the O&M Plan when it is submitted in the future.

Bioretention

These BMP/IMPs remove pollutants primarily by filtering runoff slowly through an active layer of soil. Routine maintenance is needed to ensure that flow is unobstructed, that erosion is prevented, and that plant roots hold soils together and are biologically active. Typical maintenance consists of the following:

- Inspect inlets for channels, exposure of soils, or other evidence of erosion. Clear any obstructions and remove any accumulation of sediment. Examine rock or other material used as a splash pad and replenish if necessary.
- Inspect outlets for erosion or plugging.
- Inspect side slopes for evidence of instability or erosion and correct as necessary.
- Observe soil at the bottom of the swale or filter for uniform percolation throughout. If portions of the swale or filter do not drain within 48 hours after the end of a storm, the soil should be tilled and replanted. Remove any debris or accumulations of sediment.
- Examine the vegetation to ensure that it is healthy and dense enough to provide filtering and to protect soils from erosion. Replenish mulch as necessary, remove fallen leaves and debris, prune large shrubs or trees, and mow turf areas. When mowing, remove no more than 1/3 height of grasses. Confirm that irrigation is adequate and not excessive. Replace dead plants and remove noxious and invasive vegetation.

Abate any potential vectors by filling holes in the ground in and around the swales and bioretention and by insuring that 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 should be applied only when absolutely necessary and then only by a licensed individual or contractor.

VII. CONSTRUCTION PLAN C.3 CHECKLIST

A construction plan checklist listed below will be added at the time of improvement plans for the project. The last column which is intentionally left blank will be filled in when the table is added to the improvement plans. The checklist will also include the following note: "The final grading plan shall conform to the delineation of the drainage areas in the Final SWCP."

Table 4. Construction Plan C.3 Checklist

Stormwater Control Plan Page #	*BMP Description*	*See Plan Sheet #s*
Pg. 4 and Exhibit	Roofs, driveways and walkways drain to bioretention areas.	
Pg. 4-5	Bioretention facility is constructed per criteria in the Stormwater C.3 Guidebook.	

VIII. CERTIFICATIONS

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 R2-2015-0049.

____

By

____

Print Name

OAKHURST TOWNHOMES

CITY of CLAYTON, CALIFORNIA

PRELIMINARY STORMWATER CONTROL PLAN

AND CALCULATIONS

DATE: MARCH 20, 2023

LEGEND

- DMA BOUNDARY
- IMPERVIOUS ROOF DRAINING TO IMP1 - RF1
- IMPERVIOUS PAVEMENT DRAINING TO IMP1 - RW1
- PERVIOUS PAVEMENT DRAINING TO IMP1 - WW1
- LANDSCAPE DRAINING TO IMP1 - LS1
- IMPERVIOUS ROOF DRAINING TO IMP2 - RF2
- PERVIOUS PAVEMENT DRAINING TO IMP2 - WW2
- LANDSCAPE DRAINING TO IMP2 - LS2
- BIORETENTION AREAS - IMP1 & IMP2 (BIORETENTION BASINS)

IMP SIZING CALCULATIONS

PROJECT TYPE: TREATMENT ONLY
DRAINAGE AREA: 69,935 SF
MEAN ANNUAL PRECIPITATION: 18 IN

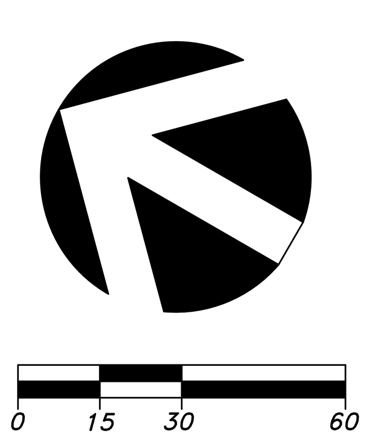
IV. AREAS DRAINING TO IMPS

IMP NAME: IMP1
IMP TYPE: BIORETENTION FACILITY
SOILS GROUP: D

DMA NAME	AREA SF	POST PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA x RUNOFF FACTOR	IMP SIZING			
					IMP SIZING FACTOR	RAIN ADJUSTMENT FACTOR	MINIMUM AREA OR VOLUME	PROPOSED AREA OR VOLUME
RF1	19,475	CONVENTIONAL ROOF	1.00	19,475				
RW1	15,244	CONCRETE OR ASPHALT	1.00	15,244				
WW1	2,790	PERMEABLE PAVERS	0.10	279				
LS1	17,517	LANDSCAPE	0.10	1,752				
			TOTAL	36,750				
				AREA	0.040	1.000	1,470	1,480

IMP NAME: IMP2
IMP TYPE: BIORETENTION FACILITY
SOILS GROUP: D

DMA NAME	AREA SF	POST PROJECT SURFACE TYPE	DMA RUNOFF FACTOR	DMA AREA x RUNOFF FACTOR	IMP SIZING			
					IMP SIZING FACTOR	RAIN ADJUSTMENT FACTOR	MINIMUM AREA OR VOLUME	PROPOSED AREA OR VOLUME
RF2	7,638	CONVENTIONAL ROOF	1.00	7,638				
WW2	1,531	PERMEABLE PAVERS	0.10	153				
LS2	3,863	LANDSCAPE	0.10	386				
			TOTAL	8,177				
				AREA	0.040	1.000	327	470



Design Resources, Inc.
Planning ■ Engineering ■ Surveying
3021 Citrus Circle, Suite 150
Walnut Creek, California 94598-2635 TEL (925) 210-9300

Project Name: Oakhurst Country Club
Project Type: Treatment Only
Location: Clayton, CA
APN: 118-370-073
Drainage Area: 70,008 sf
Mean Annual Precipitation: 18 in

IV. Areas Draining to IMPs

IMP Name: IMP1 (Soil Type: D)

IMP Type: Bioretention Facility
Soil Type: D

DMA Name	DMA Area (sq ft)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
RF1	19,475	Conventional Roof	1.00	19,475
RW1	15,244	Concrete or Asphalt	1.00	15,244
WW1	2,790	Pervious Concrete	0.10	279
LS1	17,517	Landscape	0.10	1,752
			Total	36,750

	IMP Sizing			
	IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
Area	0.040	1.000	1,470	1,480

IMP Name: IMP2 (Soil Type: D)

IMP Type: Bioretention Facility
Soil Type: D

DMA Name	DMA Area (sq ft)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
RF2	7,638	Conventional Roof	1.00	7,638
WW2	1,531	Pervious Concrete	0.10	153
LS2	3,863	Landscape	0.10	386
			Total	8,177

	IMP Sizing			
	IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
Area	0.040	1.000	327	470

APPENDIX G

NOISE MEASUREMENTS

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Noise Measurement Survey – 24 HR

Project Name: Oakhurst Townhomes

Equipment: NTi XL2 (A2A-20394-E0)

Site Number: LT-1 Date: 6/12/23

Time: From 12:00 p.m. To 12:00 p.m.

Site Location: Located east of Clayton Road and south of Peacock Creek Drive. In a tree.

Primary Noise Sources: Traffic on Clayton Road and Peacock Creek Drive.

Comments:

Photo:

Long-Term (24-Hour) Noise Level Measurement Results at LT-1

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
12:00 PM	6/12/2023	62.8	81.1	37.8
1:00 PM	6/12/2023	62.9	84.4	37.1
2:00 PM	6/12/2023	62.9	84.1	39.0
3:00 PM	6/12/2023	63.6	82.9	39.5
4:00 PM	6/12/2023	63.1	88.8	38.6
5:00 PM	6/12/2023	63.0	83.1	38.5
6:00 PM	6/12/2023	62.5	79.2	38.6
7:00 PM	6/12/2023	61.6	85.2	38.0
8:00 PM	6/12/2023	60.7	87.4	33.8
9:00 PM	6/12/2023	58.5	80.3	33.9
10:00 PM	6/12/2023	54.0	78.8	31.0
11:00 PM	6/12/2023	53.4	76.2	29.7
12:00 AM	6/13/2023	47.1	75.1	30.5
1:00 AM	6/13/2023	48.9	77.5	28.8
2:00 AM	6/13/2023	45.4	72.5	27.8
3:00 AM	6/13/2023	46.1	72.3	28.2
4:00 AM	6/13/2023	55.0	76.8	29.4
5:00 AM	6/13/2023	63.0	84.9	34.4
6:00 AM	6/13/2023	67.8	83.7	48.0
7:00 AM	6/13/2023	68.2	89.5	48.0
8:00 AM	6/13/2023	65.6	90.9	45.6
9:00 AM	6/13/2023	63.3	78.4	47.8
10:00 AM	6/13/2023	63.9	92.0	46.3
11:00 AM	6/13/2023	60.8	74.9	50.6

Source: Veneklasen.
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level

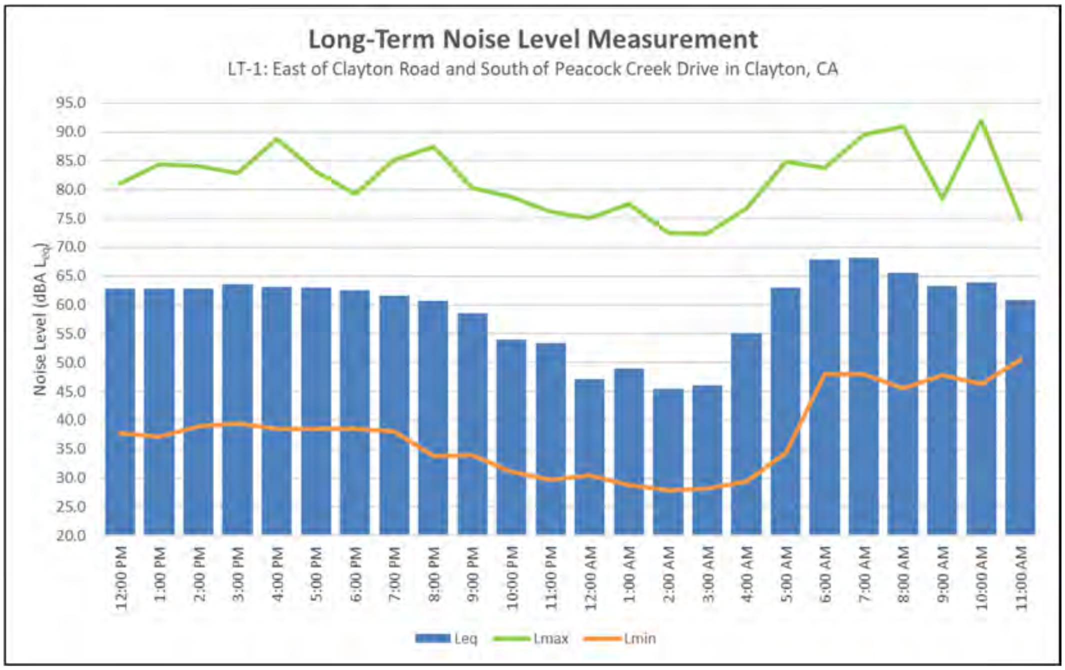


TABLE Existing-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road West of Oakhurst Drive
NOTES: Clayton Townhomes - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8800   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	69.3	139.3	295.3

TABLE Existing-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road East of Oakhurst Drive
NOTES: Clayton Townhomes - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8670   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.03

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	68.7	138.0	292.4

TABLE Existing-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road North of Peacock Creek Drive
NOTES: Clayton Townhomes - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8540   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.97

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	68.1	136.7	289.5

TABLE Existing-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road South of Peacock Creek Drive
NOTES: Clayton Townhomes - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7500   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.40

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	63.5	125.8	265.7

TABLE Existing-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Oakhurst Drive North of Clayton Road
NOTES: Clayton Townhomes - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5010   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	97.8	203.9

TABLE Existing-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Peacock Creek Drive East of Clayton Road
NOTES: Clayton Townhomes - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1220   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 22   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.25

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	56.8

TABLE Existing With Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road West of Oakhurst Drive
NOTES: Clayton Townhomes - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8890   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.14

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	69.7	140.2	297.2

TABLE Existing With Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road East of Oakhurst Drive
NOTES: Clayton Townhomes - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8770 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.08

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	69.1	139.0	294.6

TABLE Existing With Project-03

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road North of Peacock Creek Drive
NOTES: Clayton Townhomes - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8800   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	69.3	139.3	295.3

TABLE Existing With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road South of Peacock Creek Drive
NOTES: Clayton Townhomes - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7570   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	63.8	126.6	267.3

TABLE Existing With Project-05

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024

ROADWAY SEGMENT: Oakhurst Drive North of Clayton Road

NOTES: Clayton Townhomes - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5020   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	98.0	204.1

TABLE Existing With Project-06

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024

ROADWAY SEGMENT: Peacock Creek Drive East of Clayton Road

NOTES: Clayton Townhomes - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1550   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 22   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.29

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	65.2

TABLE Near-Term -01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024

ROADWAY SEGMENT: Clayton Road West of Oakhurst Drive

NOTES: Clayton Townhomes - Near-Term

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8850   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.12

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	69.5	139.8	296.4

TABLE Near-Term -02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road East of Oakhurst Drive
NOTES: Clayton Townhomes - Near-Term

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8720   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	68.9	138.5	293.5

TABLE Near-Term -03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road North of Peacock Creek Drive
NOTES: Clayton Townhomes - Near-Term

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8750   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.07

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	69.0	138.8	294.1

TABLE Near-Term -04

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road South of Peacock Creek Drive
NOTES: Clayton Townhomes - Near-Term

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7550   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.43

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	63.7	126.3	266.9

TABLE Near-Term -05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Oakhurst Drive North of Clayton Road
NOTES: Clayton Townhomes - Near-Term

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5010   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	97.8	203.9

TABLE Near-Term -06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Peacock Creek Drive East of Clayton Road
NOTES: Clayton Townhomes - Near-Term

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1380   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 22   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.78

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	60.9

TABLE Near-Term With Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road West of Oakhurst Drive
NOTES: Clayton Townhomes - Near-Term With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8940   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.16

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	69.9	140.7	298.4

TABLE Near-Term With Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road East of Oakhurst Drive
NOTES: Clayton Townhomes - Near-Term With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8820   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.11

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	69.3	139.5	295.7

TABLE Near-Term With Project-03

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road North of Peacock Creek Drive
NOTES: Clayton Townhomes - Near-Term With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8850   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.12

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	69.5	139.8	296.4

TABLE Near-Term With Project-04

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road South of Peacock Creek Drive
NOTES: Clayton Townhomes - Near-Term With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7570   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	63.8	126.6	267.3

TABLE Near-Term With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Oakhurst Drive North of Clayton Road
NOTES: Clayton Townhomes - Near-Term With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5020   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS		
	88.08	9.34
M-TRUCKS		
	1.65	0.19
H-TRUCKS		
	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	98.0	204.1

TABLE Near-Term With Project-06

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Peacock Creek Drive East of Clayton Road
NOTES: Clayton Townhomes - Near-Term With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1500   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 22   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.14

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	64.0

TABLE Cumulative-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road West of Oakhurst Drive
NOTES: Clayton Townhomes - Cumulative

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9420   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.39

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	72.0	145.5	308.8

TABLE Cumulative-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road East of Oakhurst Drive
NOTES: Clayton Townhomes - Cumulative

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9390   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.38

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	71.8	145.2	308.2

TABLE Cumulative-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road North of Peacock Creek Drive
NOTES: Clayton Townhomes - Cumulative

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9640   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.49

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	72.9	147.7	313.6

TABLE Cumulative-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road South of Peacock Creek Drive
NOTES: Clayton Townhomes - Cumulative

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8330   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.86

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	67.2	134.5	284.7

TABLE Cumulative-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Oakhurst Drive North of Clayton Road
NOTES: Clayton Townhomes - Cumulative

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6270   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	57.8	112.4	236.1

TABLE Cumulative-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Peacock Creek Drive East of Clayton Road
NOTES: Clayton Townhomes - Cumulative

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1490   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 22   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.11

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	63.7

TABLE Cumulative With Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road West of Oakhurst Drive
NOTES: Clayton Townhomes - Cumulative With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9510   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.43

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	72.3	146.4	310.8

TABLE Cumulative With Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road East of Oakhurst Drive
NOTES: Clayton Townhomes - Cumulative With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9490   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.42

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	72.3	146.2	310.4

TABLE Cumulative With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road North of Peacock Creek Drive
NOTES: Clayton Townhomes - Cumulative With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9740   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.54

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	73.3	148.7	315.7

TABLE Cumulative With Project-04

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Clayton Road South of Peacock Creek Drive
NOTES: Clayton Townhomes - Cumulative With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8350   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	67.3	134.7	285.2

TABLE Cumulative With Project-05

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Oakhurst Drive North of Clayton Road
NOTES: Clayton Townhomes - Cumulative With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6280   SPEED (MPH): 45   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 28   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.63

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	57.8	112.5	236.4

TABLE Cumulative With Project-06

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/23/2024
ROADWAY SEGMENT: Peacock Creek Drive East of Clayton Road
NOTES: Clayton Townhomes - Cumulative With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1610   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 22   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.45

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	66.7

The new degree of comfort.™

Rheem *Classic*® Series Air Conditioners

RA14 Series

Efficiencies up to 14 SEER/11.5 EER
Nominal Sizes 1 1/2 to 5 Ton [5.28 to 17.6 kW]
Cooling Capacities 17.3 to 60.5 kBTU
[5.7 to 17.7 kW]

"Proper sizing and installation of equipment is critical to achieve optimal performance. Split system air conditioners and heat pumps must be matched with appropriate coil components to meet Energy Star. Ask your Contractor for details or visit www.energystar.gov."

- Composite base pan – dampens sound, captures louver panels, eliminates corrosion and reduces number of fasteners needed
- Powder coat paint system – for a long lasting professional finish
- Scroll compressor – uses 70% fewer moving parts for higher efficiency and increased reliability
- Modern cabinet aesthetics – increased curb appeal with visually appealing design
- Curved louver panels – provide ultimate coil protection, enhance cabinet strength, and increased cabinet rigidity
- Optimized fan orifice – optimizes airflow and reduces unit sound
- Rust resistant screws – confirmed through 1500-hour salt spray testing
- PlusOne™ **Expanded Valve Space** – 3"-4"-5" service valve space – provides a minimum working area of 27-square inches for easier access
- PlusOne™ **Triple Service Access** – 15" wide, industry leading corner service access – makes repairs easier and faster. The two fastener removable corner allows optimal access to internal unit components. Individual louver panels come out once fastener is removed, for faster coil cleaning and easier cabinet reassembly
- Diagnostic service window with two-fastener opening – provides access to the high and low pressure.
- External gauge port access – allows easy connection of "low-loss" gauge ports
- Single-row condenser coil – makes unit lighter and allows thorough coil cleaning to maintain "out of the box" performance
- 35% fewer cabinet fasteners and fastener-free base – allow for faster access to internal components and hassle-free panel removal
- Service trays – hold fasteners or caps during service calls
- QR code – provides technical information on demand for faster service calls
- Fan motor harness with extra long wires allows unit top to be removed without disconnecting fan wire.

TABLE OF CONTENTS

Standard Feature Table

STANDARD FEATURES							
Feature	**18**	**24**	**30**	**36**	**42**	**48**	**60**
R-410a Refrigerant	√	√	√	√	√	√	√
Maximum SEER	15.5	15	15.5	15.5	15	15	14
Maximum EER	13	13	13	13	13	13	12
Scroll Compressor	√	√	√	√	√	√	√
Field Installed Filter Drier	√	√	√	√	√	√	√
Front Seating Service Valves	√	√	√	√	√	√	√
Internal Pressure Relief Valve	√	√	√	√	√	√	√
Internal Thermal Overload	√	√	√	√	√	√	√
Long Line capability	√	√	√	√	√	√	√
Low Ambient capability with Kit	√	√	√	√	√	√	√
3-4-5 Expanded Valve Space	√	√	√	√	√	√	√
Composite Basepan	√	√	√	√	√	√	√
2 Screw Control Box Access	√	√	√	√	√	√	√
15" Access to Internal Components	√	√	√	√	√	√	√
Quick release louver panel design	√	√	√	√	√	√	√
No fasteners to remove along bottom	√	√	√	√	√	√	√
Optimized Venturi Airflow	√	√	√	√	√	√	√
Single row condenser coil	√	√	√	√	√	√	√
Powder coated paint	√	√	√	√	√	√	√
Rust resistant screws	√	√	√	√	√	√	√
QR code	√	√	√	√	√	√	√
External gauge ports	√	√	√	√	√	√	√
Service trays	√	√	√	√	√	√	√

√ = Standard

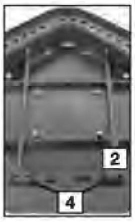
Available SKUs

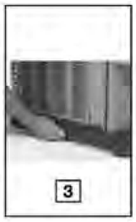
Available Models	Description
RA1418AJ1NA	*Classic*® Series 1 1/2 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1418AJ1NB	*Classic*® Series 1 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1424BJ1NA	*Classic*® Series 2 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1424BJ1NB	*Classic*® Series 2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1430AJ1NA	*Classic*® Series 2 1/2 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1430AJ1NB	*Classic*® Series 2 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1436AC1NB	*Classic*® Series 3 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1436AD1NB	*Classic*® Series 3 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1436AJ1NA	*Classic*® Series 3 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1436AJ1NB	*Classic*® Series 3 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1442AD1NB	*Classic*® Series 3 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1442CC1NB	*Classic*® Series 3 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1442CJ1NA	*Classic*® Series 3 1/2 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1442CJ1NB	*Classic*® Series 3 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1448AC1NB	*Classic*® Series 4 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1448AD1NB	*Classic*® Series 4 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1448AJ1NA	*Classic*® Series 4 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1448AJ1NB	*Classic*® Series 4 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1460AD1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1460BC1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1460BJ1NA	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1460BJ1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1460CC1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1460CD1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1460CJ1NA	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1460CJ1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60

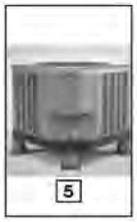
Introduction to RA14 Air Conditioner

The RA14 is our 14 SEER air conditioner and is part of the Rheem air conditioner product line that extends from 13 to 20 SEER. This highly featured and reliable air conditioner is designed for years of reliable, efficient operation when matched with Rheem indoor aluminum evaporator coils and furnaces or air handler units with aluminum evaporators.

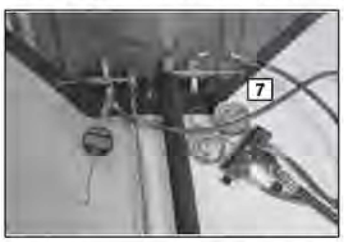
Our unique composite base (1) reduces sound emission, eliminates rattles, significantly reduces fasteners, eliminates corrosion and has integrated brass compressor attachment inserts (2). Furthermore it has incorporated into the design, water management features, means for hand placement (3) for unit maneuvering, screw trays (4) and inserts for lifting off unit pad. (5)



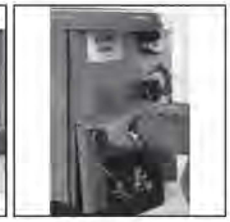
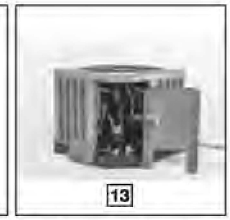




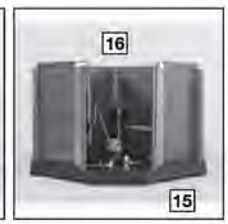
Service Valves (6) are rigidly mounted in the composite base with 3" between suction and discharge valves, 4" clearance below service valves and a minimum of 5" above the service valves, creating industry leading installation ease. The minimum 27 square-inches around the service valves allows ample room to remove service valve schrader prior to brazing, plenty of clearance for easy brazing of the suction and discharge lines to service valve outlets, easy access and hookup of low loss refrigerant gauges (7), and access to the service valve caps for opening. For applications with long-line lengths up to 250 feet total equivalent length, up to 200 feet condenser above evaporator, or up to 80 feet evaporator above condenser, the long-line instructions in the installation manual should be followed.

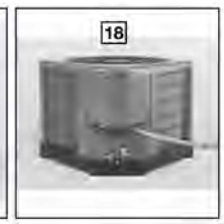


Controls are accessed from the corner of the unit by removing only two fasteners from the control access cover, revealing the industry's largest 15" wide and 14" tall control area (8). With all this room in the control area the high voltage electrical whip (9) can easily be inserted through the right size opening in the bottom of the control area. Routing it leads directly to contractor lugs for connection. The low voltage control wires (10) are easily connected to units low voltage wiring. If contactor or capacitor (11) needs to be replaced there is more than adequate space to make the repair. Furthermore, if high pressure and low pressure model was not purchased but is desired to be installed in the field, the service window (12) can be removed by removing two screws, to access the high and low side schrader fittings for easy field installation. The entire corner can be removed providing ultimate access to install the high and low pressure switch. (13)

If in the rare event, greater access is needed to internal components, such as the compressor, the entire corner of the unit can be removed along with the top cover assembly to have unprecedented access to interior of the unit (14). Extra wire length is incorporated into each outdoor fan and compressor so top cover and control panel can be positioned next to the unit. With minimal effort the plug can be removed from the compressor and the outdoor fan wires can be removed from the capacitor to allow even more uncluttered access to the interior of the unit (15). Outdoor coil heights range from as short as 22" to 32", aiding access to the compressor. Disassembly to this degree and complete reassembly only takes a first time service technician less than 10 minutes. (15)





All units utilize strong formed louver panels which provide industry leading coil protection. Louver removal for coil cleaning is accomplished by removing one screw and lifting the panel out of the composite base pan. (17) All RA14 units utilize single row coils (16) making cleaning easy and complete, restoring the performance of the air conditioner back to out of the box performance levels year after year.

The outdoor fan motor has sleeve bearings and is inherently protected. The motor is totally enclosed for maximum protection from weather, dust and corrosion. Access to the outdoor fan is made by removing four fasteners from the fan grille. The outdoor fan can be removed from the fan grille by removing 4 fasteners in the rare case outdoor fan motor fails.

Each cabinet has optimized composite (19) fan orifice assuring efficient and quiet airflow.

The entire cabinet has powder post paint ([20]) achieving 1000 hour salt spray rating, allowing the cabinet to retain its aesthetics throughout its life.

Scroll compressors with standard internal pressure relief and internal thermal overload are used on all capacities assuring longevity of high efficient and quiet operation for the life of the product.

Each unit is shipped with filter drier for field installation and will trap any moisture or dirt that could contaminate the refrigerant system.

All cabinets have industry leading structural strength due to the composite base pan ([21]), interlocking corner post ([22]), formed curved louver panels ([23]) and drawn top cover ([24]) making it the most durable cabinet on the market today.

Each RA14 capacity has undergone rigorous psychometric testing to assure performance ratings of capacity, SEER and EER per AHRI Standard 210/240 rating conditions. Also each unit bears the UL mark and each unit is certified to UL 1995 safety standards. c UL us LISTED

Each unit has undergone specific strain and modal testing to assure tubing ([25]) is outside the units natural frequency and that the suction and discharge lines connected to the compressor withstand any starting, steady state operation or shut down forces imposed by the compressor.

All units have been sound tested in sound chamber to AHRI 270 rating conditions, and A-weighted Sound Power Level tables produced, assuring units have acceptable noise qualities (see page 9). Each unit has been ran in cooling operation at 95°F and 82°F and sound ratings for the RA14 range from as low as 74 dBA to 77 dBA.

All units have been ship tested to assure units meet stringent "over the road" shipping conditions.

As manufactured all units in the RA14 family have cooling capability to 55 °F. Addition of low ambient control will allow the unit to operate down to 0°F. Factory testing is performed on each unit. All component parts meet well defined specification and continually go through receiving inspections. Each component installed on a unit is scanned, assuring correct component utilization for a given unit capacity and voltage. All condenser coils are leak tested with pressurization test to 550#'s and once installed and assembled, each units' complete refrigerant system is helium leak tested. All units are fully charged from the factory for up to 15 feet of piping. All units are factory run tested. The RA14 has a 10-year conditional compressor and parts warranty (registration required).

Optional Accessories

(Refer to accessory chart for model #)

Compressor Crankcase Heater

Protects against refrigerant migration that can occur during low ambient operation

Compressor Sound Cover

- Reinforced vinyl compressor cover containing a 1½ inch thick batt of fiberglass insulation
- Open edges are sealed with a one-inch wide hook and loop fastening tape

Compressor Hard Start Kit

- Single-phase units are equipped with a PSC compressor motor, this type of motor normally does not need a potential relay and start capacitor
- Kit may be required to increase the compressor starting torque, in conditions such as low voltage

Low Ambient Kit

- Air conditioners operate satisfactorily in the cooling mode down to 55°F outdoor air temperature without any additional controls
- This Kit can be added in the field enabling unit to operate properly down to 0° in the cooling mode
- Crankcase heater and freezestat should be installed on compressors equipped with a low ambient kit

3"/6"/12"

- Gray high density polyethylene feet are available to raise unit off of mounting surface away from moisture

Low Pressure

- Can be added in field enabling the unit to shut off compressor on loss of charge

NOTE: Unit can be purchased with high and low pressure installed at factory. (Refer to SKU list)

High Pressure

- Can be added in field enabling unit to shut off compressor if unit loses outdoor fan operation.

NOTE: Unit can be purchased with high and low pressure installed at factory. (Refer to SKU list)

Decorative Top

- Can be installed on fan grille

Air Conditioners*

R	A	14	24	A	J	1	N	A	*
Brand	**Product Category**	**SEER**	**Capacity BTU/HR**	**Major Series***	**Voltage**	**Type**	**Controls**	**Minor Series****	**Option Code**
Rheem	A - Air Conditioners	14 - 14 SEER	18 - 18,000 [5.28 kW] 24 - 24,000 [7.03 kW] 30 - 30,000 [8.79 kW] 36 - 36,000 [10.55 kW] 42 - 42,000 [12.31 kW] 48 - 48,000 [14.07 kW] 60 - 60,000 [17.58 kW]	A - 1st Design B - 2nd Design	J - 1ph, 208-230/60 C - 3ph, 208-230/60 D - 3ph, 460/60	1 - Single-stage	N - Non-Communicating	A - 1st Design B - 2nd Design	N/A

*See page 3 for available SKU's.

Heat Pumps (For Reference)**

R	P	14	24	A	J	1	N	A	*
Brand	**Product Category**	**SEER**	**Capacity BTU/HR**	**Major Series***	**Voltage**	**Type**	**Controls**	**Minor Series****	**Option Code**
Rheem	P - Heat Pump	13 - 13 SEER 14 - 14 SEER 16 - 16 SEER 17 - 17 SEER 20 - 20 SEER	18 - 18,000 [5.28 kW] 24 - 24,000 [7.03 kW] 30 - 30,000 [8.79 kW] 36 - 36,000 [10.55 kW] 42 - 42,000 [12.31 kW] 48 - 48,000 [14.07 kW] 60 - 60,000 [17.58 kW]	A - 1st Design	J - 1ph, 208-230/60 C - 3ph, 208-230/60 D - 3ph, 460/60	1 - Single-stage 2 - Two-stage V - Inverter P - Piston	C - Communicating N - Non-Communicating	A - 1st Design	N/A

Furnace Coils (For Reference)**

R	C	F	24	17	S	T	A	M	C	A	*
Brand	**Product Category**	**Type**	**Capacity BTU/HR**	**Width**	**Efficiency**	**Metering Device**	**Major Series***	**Orientation**	**Casing**	**Minor Series****	**Option Code**
Rheem	C - Evap Coil	F - Furn Coil H - Air-Handler Coil	24 - 24,000 [7.03 kW] 36 - 36,000 [10.55 kW] 48 - 48,000 [14.07 kW] 60 - 60,000 [17.58 kW]	14 - 14" 17 - 17.5" 21 - 21" 24 - 24.5"	S- Standard Eff. M- Mid Eff. H- High Eff.	T-TXV E-EEV P-Piston	A - 1st Design	M - Multipoise V - Vertical only/ convertible H - Ded. Horizontal only	C - Cased U - Uncased	A - 1st Design	N/A

**Model number ID's are for reference only. Available SKU's are listed on the standard features/available SKU page of model spec sheets.

[ ] Designates Metric Conversions

90%+ AFUE Gas Furnaces (For Reference)**

R	96	V	A	70	2	3	17	M	S	A
Brand	**Series**	**Motor**	**Major Rev**	**Input BTU/HR**	**Stages**	**Air Flow**	**Cabinet Width**	**Configuration**	**Nox**	**Minor Rev**
Rheem	90 - 90 AFUE 92 - 92 AFUE 95 - 95 AFUE 96 - 96 AFUE 97 - 97 AFUE	V - Variable speed T - Constant Torque (X-13) P - PSC	A - 1st Design	040 - 42,000 [12.31 kW] 060 - 56,000 [16.41 kW] 070 - 70,000 [20.51 kW] 085 - 84,000 [24.62 kW] 100 - 98,000 [28.72 kW] 115 - 112,000 [32.82 kW]	1 - Single-stage 2 - Two-stage M - Modulating	3 - up to 3 ton 5 - 3 1/2 up to 5 ton	14 - 14" 17 - 17.5" 21 - 21" 24 - 24.5"	M - Multi	X - Low Nox S - Standard	A - 1st Design

80% AFUE Gas Furnaces (For Reference)**

R	80	2	V	A	075	3	17	M	S	A
Brand	**Series**	**Stages**	**Motor**	**Major Rev**	**Input BTU/HR**	**Air Flow**	**Cabinet Width**	**Configuration**	**Nox**	**Minor Rev**
Rheem	80 - 80+ AFUE	1 - Single-stage 2 - Two-stage	V - Variable speed T - Constant Torque (X-13) P - PSC premium S - PSC standard	A - 1st Design	050 - 50,000 [15 kW] 075 - 75,000 [22 kW] 100 - 100,000 [29 kW] 125 - 125,000 [37 kW] 150 - 150,000 [44 kW]	3 - up to 3 ton 4 - 2 1/2 to 4 ton 5 - 3 1/2 up to 5 ton	14 - 14" 17 - 17.5" 21 - 21" 24 - 24.5"	M - Multi D - Down Z - Down & zero clearance down flow	X - Low Nox S - Standard	A - 1st Design

Air Handlers (For Reference)**

R	H	1	T	36	17	S	T	A	N	A	A	000	*
Brand	**Product Category**	**Stages of Airflow**	**Motor Type**	**Capacity BTU/HR**	**Width**	**Coil Size**	**Metering Device**	**Major Series***	**Controls**	**Voltage**	**Minor Series****	**Factory Heat Cap**	**Option Code**
Rheem	H - Air Handler	1 - Single-Stage 2 - Two-Stage M - Modulating	V - Variable Speed T - Constant Torque P - PSC	24 - 24,000 [7.03 kW] 36 - 36,000 [10.55 kW] 48 - 48,000 [14.07 kW] 60 - 60,000 [17.58 kW]	14 - 14" 17 - 17.5" 21 - 21" 24 - 24.5"	S - Standard Eff. M - Mid Eff. H - High Eff.	T - TEV E - EEV P - Piston	A - 1st Design	C - Communicating N - Non-comm	A - 1ph, 115/60 J - 1ph, 208-240/60 D - 3ph, 480/60	A - 1st Design	00 - no factory heat with option code	*TBD

**Model number ID's are for reference only. Available SKU's are listed on the standard features/available SKU page of model spec sheets.

[ ] Designates Metric Conversions

Physical Data

PHYSICAL DATA							
Model No.	**RA1418**	**RA1424**	**RA1430**	**RA1436**	**RA1442**	**RA1448**	**RA1460**
Nominal Tonnage	1.5	2.0	2.5	3.0	3.5	4.0	5.0
Valve Connections							
Liquid Line O.D. – in.	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Suction Line O.D. – in.	3/4	3/4	3/4	3/4	7/8	7/8	7/8
Refrigerant (R410A) furnished oz.[1]	68	80	87	106	134	129	201
Compressor Type	Scroll						
Outdoor Coil							
Net face area – Outer Coil	9.1	11.1	12.1	14.8	17.3	18.9	32.3
Net face area – Inner Coil	—	—	—	—	—	—	—
Tube diameter – in.	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Number of rows	1	1	1	1	1	1	1
Fins per inch	22	22	22	22	22	22	22
Outdoor Fan							
Diameter – in.	20	20	20	24	24	26	26
Number of blades	2	2	2	3	3	2	3
Motor hp	1/10	1/8	1/8	1/6	1/5	1/5	1/3
CFM	2225	2295	2605	3105	4105	4264	4775
RPM	1075	1121	1075	850	833	820	795
watts	130	138	142	173	236	236	239
Shipping weight – lbs.	143	148	158	178	207	232	247
Operating weight – lbs.	122	141	151	171	200	221	240

Electrical Data

Line Voltage Data (Volts-Phase-Hz)	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**
Maximum overcurrent protection (amps)[2]	20	25	25	30	35	45	50
Minimum circuit ampacity[3]	13	15	17	19	23	27	34
Compressor							
Rated load amps	9.7	10.9	12.8	14.1	16.7	19.9	23.7
Locked rotor amps	48	62.9	64	77	109	109	152.5
Condenser Fan Motor							
Full load amps	0.6	0.8	0.8	0.8	1.2	1.2	3.5
Locked rotor amps	1.1	1.5	1.4	1.5	2.0	2.3	-
Line Voltage Data (Volts-Phase-Hz)	—	—	—	**208/230-3-60**	**208/230-3-61**	**208/230-3-62**	**208/230-3-63**
Maximum overcurrent protection (amps)[2]	—	—	—	20	25	30	35
Minimum circuit ampacity[3]	—	—	—	13	16	18	24
Compressor							
Rated load amps	—	—	—	9	11.2	13.1	15.9
Locked rotor amps	—	—	—	71	84	83.1	110
Condenser Fan Motor							
Full load amps	—	—	—	0.8	1.2	1.2	3.5
Locked rotor amps	—	—	—	1.5	3.0	2.3	-
Line Voltage Data (Volts-Phase-Hz)	—	—	—	**480-3-60**	**480-3-60 RA1442AD**	**480-3-60**	**480-3-60 RA1460AD**
Maximum overcurrent protection (amps)[2]	—	—	—	15	—	15	15
[3]Minimum circuit ampacity	—	—	—	8	—	9	10
Compressor							
Rated load amps	—	—	—	5.6	—	6.1	7.1
Locked rotor amps	—	—	—	38	—	41	52
Condenser Fan Motor							
Full load amps	—	—	—	0.5	—	0.6	0.5
Locked rotor amps	—	—	—	1.1	—	1.6	1.4

[1]Refrigerant charge sufficient for 15 ft. length of refrigerant lines. For longer line set requirements see the installation instructions for information about set length and additional refrigerant charge required.
[2]HACR type circuit breaker of fuse.
[3]Refer to National Electrical Code manual to determine wire, fuse and disconnect size requirements.

Accessories

Model No.		RA1418	RA1424	RA1430	RA1436	RA1442	RA1448	RA1460
Compressor crankcase heater*		44-17402-44	44-17402-44	44-17402-44	44-17402-44	44-17402-45	44-17402-45	44-17402-45
Low ambient control		RXAD-A08	RXAD-A08	RXAD-A08	RXAD-A08	RXAD-A08	RXAD-A08	RXAD-A08
Compressor sound cover		68-23427-26	68-23427-26	68-23427-26	68-23427-26	68-23427-25	68-23427-25	68-23427-25
Compressor hard start kit		SK-A1	SK-A1	SK-A1	SK-A1	SK-A1	SK-A1	SK-A1
Compressor time delay		RXMD-B01	RXMD-B01	RXMD-B01	RXMD-B01	RXMD-B01	RXMD-B01	RXMD-B01
Low pressure control		RXAC-A07	RXAC-A07	RXAC-A07	RXAC-A07	RXAC-A07	RXAC-A07	RXAC-A07
High pressure control		RXAB-A07	RXAB-A07	RXAB-A07	RXAB-A07	RXAB-A07	RXAB-A07	RXAB-A07
Liquid Line Solenoid (24 VAC, 50/60 Hz)	Solenoid Valve	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD3T3TVLC	200RD3T3TVLC
	Solenoid Coil	61-AMG24V	61-AMG24V	61-AMG24V	61-AMG24V	61-AMG24V	61-AMG24V	61-AMG24V
Liquid Line Solenoid (120/240 VAC, 50/60 Hz)	Solenoid Valve	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD3T3TVLC	200RD3T3TVLC
	Solenoid Coil	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V
Classic Top Cap w/Label		91-101123-21	91-101123-21	91-101123-21	91-101123-21	91-101123-21	91-101123-21	91-101123-21

*Crankcase Heater recommended with Low Ambient Kit.

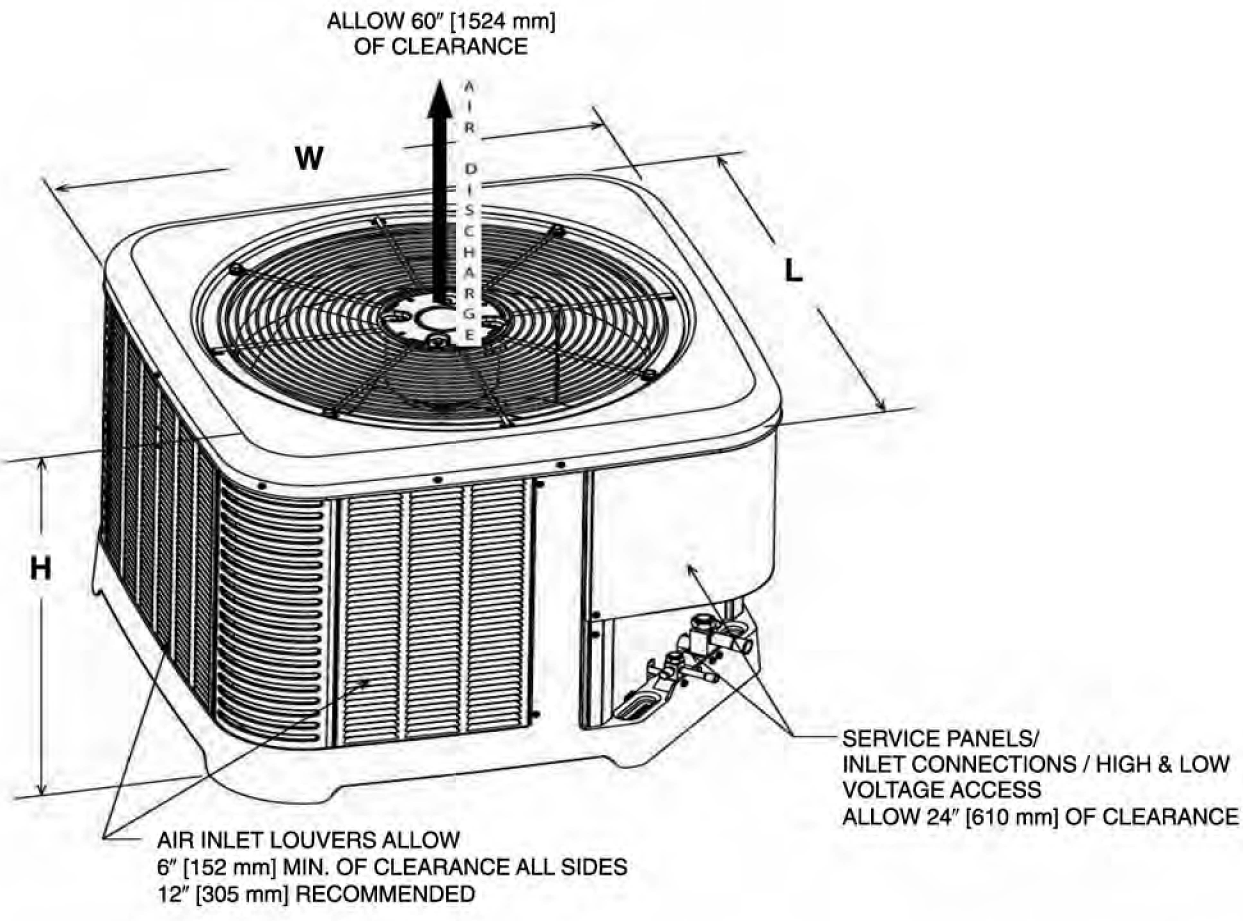
Weighted Sound Power Level (dBA)

A-WEIGHTED SOUND POWER LEVEL (dBA)								
Unit Size - Voltage, Series	Standard Rating (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)						
		125	250	500	1000	2000	4000	8000
RA1418	76.0	51.4	59.6	65.2	65.9	64.3	58.5	53.7
RA1424	75.0	50.0	59.5	63.2	64.4	61.4	56.8	52.6
RA1430	74.0	48.8	57.5	63.5	64	61.9	56.1	51
RA1436	76.0	52.2	61.3	65.4	65.3	62.4	57.3	53.1
RA1442	73.0	51.5	54.7	63.5	63.3	59.4	54.9	48.4
[illegible]	[illegible]	52.3	59.1	66.7	65.7	62.4	59.3	55.9
RA1460	74.6	50.1	55.1	65.6	64.8	63.2	57.4	56.4

NOTE: Tested in accordance with AHRI Standard 270-08 (not listed in AHRI)

Unit Dimensions

MODEL NO.	OPERATING						SHIPPING					
	H (Height)		L (Length)		W (Width)		H (Height)		L (Length)		W (Width)	
	INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm
RA1418	25	635	29.75	755	29.75	755	26.75	679	32.38	822	32.38	822
RA1424	25	635	29.75	755	29.75	755	26.75	679	32.38	822	32.38	822
RA1430	27	685	29.75	755	29.75	755	28.75	730	32.38	822	32.38	822
RA1436	27	685	33.75	857	33.75	857	28.75	730	36.38	924	36.38	924
RA1442	35	889	33.75	857	33.75	857	36.75	933	36.38	924	36.38	924
RA1448	31	787	35.75	908	35.75	908	32.75	832	38.38	975	38.38	975
RA1460	51	1295	35.75	908	35.75	908	51.38	1305	38.38	975	38.38	975



[ ] Designates Metric Conversions

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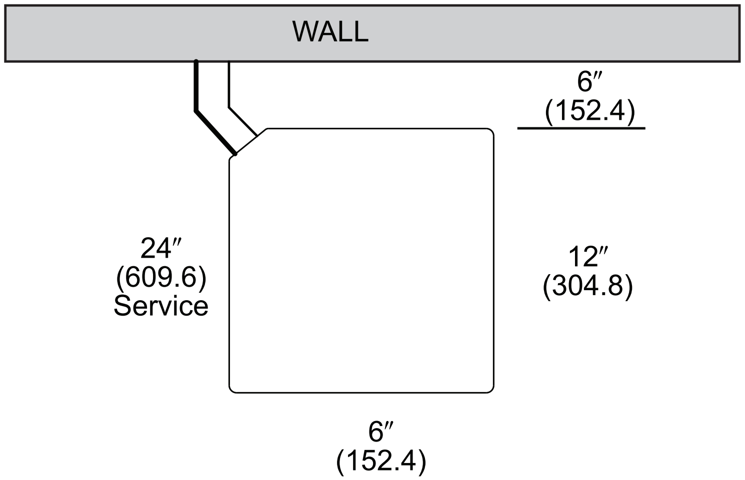
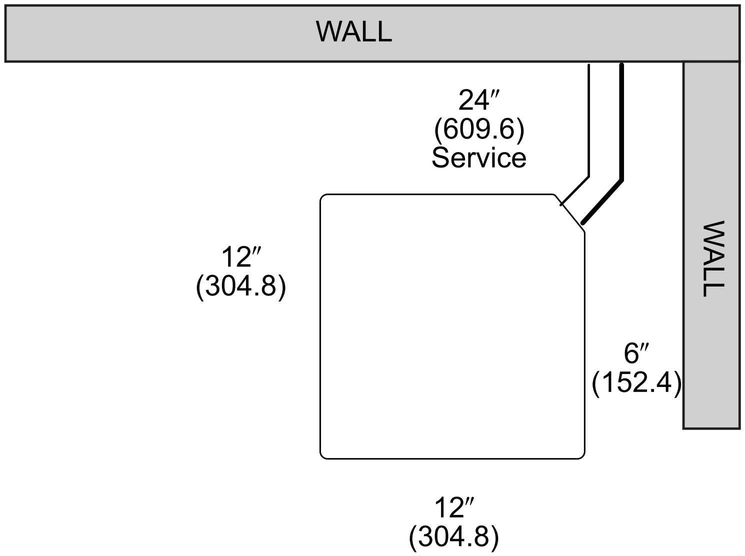
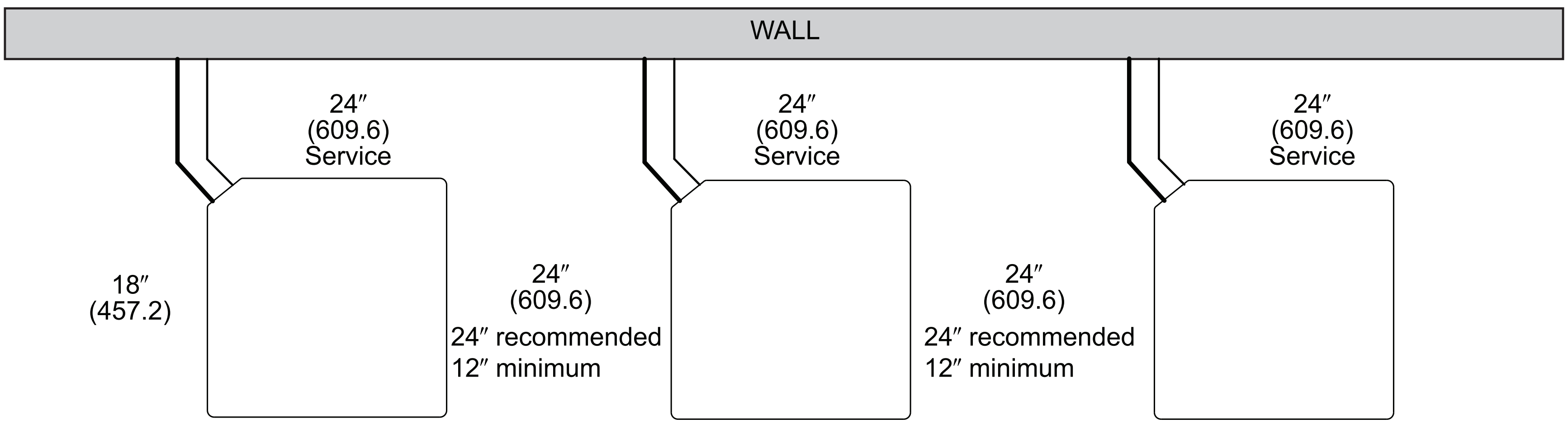
CLEARANCES







NOTE: NUMBERS IN () = mm

IMPORTANT: When installing multiple units in an alcove, roof well or partially enclosed area, ensure there is adequate ventilation to prevent re-circulation of discharge air.

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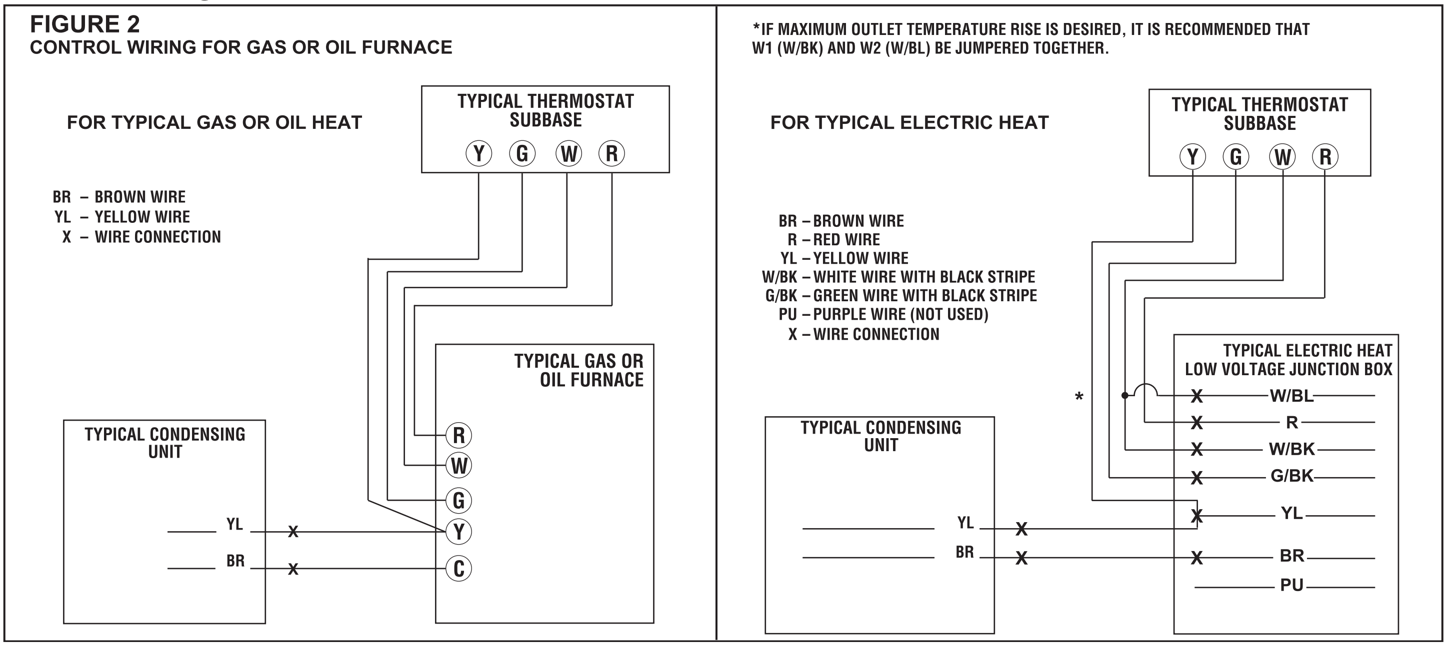
Control Wiring



Application Guidelines

1. Intended for outdoor installation with free air inlet and outlet. Outdoor fan external static pressure available is less than 0.01 -in. wc.
2. Minimum outdoor operation air temperature for cooling mode without low-ambient operation accessory is 55°F (12.8°C).
3. Maximum outdoor operating air temperature is 125°F (51.7°C).
4. For reliable operation, unit should be level in all horizontal planes.
5. Use only copper wire for electric connections at unit. Aluminum and clad aluminum are not acceptable for the type of connector provided.
6. Do not apply capillary tube indoor coils to these units.
7. Factory – supplied filter drier must be installed.

Refrigerant Line Size Information

13 - 16 SEER Single-Stage Air-Conditioners																
Unit Size	Allowable Liquid Line Size	Allowable Suction Line Size	Apply Long Line Guidelines if Linear Line Length Exceeds Those Shown Below (Feet)				Equivalent Length (Feet)									
							< 25	26-50	51-75	76-100	101-125	126-150	151-175	176-200	201-225	226-250
			(-)A13	(-)A14 A/B	(-)A14 W	(-)A16	Maximum Vertical Rise (Outdoor Unit Below Indoor Unit) * / Capacity Multiplier									
1.5 Ton **SEE NOTE 3	1/4"	5/8"	N/R	N/R	N/R	N/R	25 / 1.00	50 / 0.99	62 / 0.98	43 / 0.98	24 / 0.97	5 / 0.97	N/R	N/R	N/R	N/R
	5/16"	5/8"	N/R	223	198	188	25 / 1.00	50 / 0.99	75 / 0.98	98 / 0.98	93 / 0.97	88 / 0.97	83 / 0.96	78 / 0.96	73 / 0.95	68 / 0.94
	3/8"	5/8"	178	148	132	125	25 / 1.00	50 / 0.99	75 / 0.98	100 / 0.98	100 / 0.97	100 / 0.97	100 / 0.96	100 / 0.96	100 / 0.95	100 / 0.94
	1/4"	3/4"**	N/R	N/R	N/R	N/R	25 / 1.00	50 / 1.00	62 / 0.99	43 / 0.99	24 / 0.99	5 / 0.99	N/R	N/R	N/R	N/R
	5/16"	3/4"**	N/R	223	198	188	25 / 1.00	50 / 1.00	75 / 0.99	98 / 0.99	93 / 0.99	88 / 0.99	83 / 0.99	78 / 0.98	73 / 0.98	68 / 0.98
	3/8"	3/4"**	178	148	132	125	25 / 1.00	50 / 1.00	75 / 1.00	100 / 0.99	100 / 0.99	100 / 0.99	100 / 0.99	100 / 0.98	100 / 0.98	100 / 0.98
2 Ton	1/4"	5/8"	N/R	N/R	N/R	N/R	25 / 0.99	50 / 0.98	21 / 0.97	N/R	N/R	N/R	N/R	N/R	N/R	N/R
	5/16"	5/8"	243	193	175	175	25 / 0.99	50 / 0.98	75 / 0.97	87 / 0.96	77 / 0.95	69 / 0.94	61 / 0.93	53 / 0.92	45 / 0.91	37 / 0.90
	3/8"	5/8"	162	128	117	117	25 / 0.99	50 / 0.98	75 / 0.97	100 / 0.96	100 / 0.95	100 / 0.94	98 / 0.93	95 / 0.92	92 / 0.91	89 / 0.90
	1/4"	3/4"	N/R	N/R	N/R	N/R	25 /1.00	50 / 1.00	21 / 0.99	N/R	N/R	N/R	N/R	N/R	N/R	N/R
	5/16"	3/4"	243	193	175	175	25 /1.00	50 / 1.00	75 / 0.99	87 / 0.99	77 / 0.98	69 / 0.98	61 / 0.98	53 / 0.97	45 / 0.97	37 / 0.96
	3/8"	3/4"	162	128	117	117	25 / 1.00	50 / 1.00	75 / 0.99	100 / 0.99	100 / 0.98	100 / 0.98	98 / 0.98	95 / 0.97	93 / 0.97	90 / 0.96
2.5 Ton	5/16"	5/8"	N/R	N/R	110	110	25 / 0.99	50 / 0.98	75 / 0.96	70 / 0.94	59 / 0.93	48 / 0.91	36 / 0.90	N/R	N/R	N/R
	3/8"	5/8"	142	117	73	73	25 / 0.99	50 / 0.98	75 / 0.96	100 / 0.94	98 / 0.93	94 / 0.91	90 / 0.90	N/R	N/R	N/R
	5/16"	3/4"	213	175	110	110	25 / 1.00	50 / 0.99	75 / 0.99	70 / 0.98	59 / 0.98	48 / 0.97	36 / 0.96	25 / 0.96	13 / 0.95	N/R
	3/8"	3/4"	142	117	73	73	25 / 1.00	50 / 0.99	75 / 0.99	100 / 0.98	98 / 0.98	94 / 0.97	90 / 0.96	86 / 0.96	82 / 0.95	78 / 0.95
3 Ton	5/16"	5/8"	N/R	N/R	N/R	N/R	25 / 0.99	50 / 0.97	66 / 0.94	49 / 0.92	32 / 0.90	N/R	N/R	N/R	N/R	N/R
	3/8"	5/8"	108	85	90	82	25 / 0.99	50 / 0.97	75 / 0.94	95 / 0.92	89 / 0.90	N/R	N/R	N/R	N/R	N/R
	5/16"	3/4"	N/R	128	135	123	25 / 1.00	50 / 0.99	66 / 0.98	49 / 0.98	32 / 0.97	15 / 0.96	N/R	N/R	N/R	N/R
	3/8"	3/4"	108	85	90	82	25 / 1.00	50 / 0.99	75 / 0.98	95 / 0.98	89 / 0.97	84 / 0.96	78 / 0.95	72 / 0.94	67 / 0.93	61 / 0.93
	1/2"	3/4"	54	43	45	41	25 / 1.00	50 / 0.99	75 / 0.98	100 / 0.98	100 / 0.97	100 / 0.96	100 / 0.95	100 / 0.94	100 / 0.93	100 / 0.93
	5/16"	7/8"	N/R	128	135	123	25 / 1.00	50 / 1.00	66 / 1.00	49 / 0.99	32 / 0.99	15 / 0.99	N/R	N/R	N/R	N/R
	3/8"	7/8"	108	85	90	82	25 / 1.00	50 / 1.00	75 / 1.00	95 / 0.99	89 / 0.99	84 / 0.99	78 / 0.98	72 / 0.98	67 / 0.98	61 / 0.97
	1/2"	7/8"	54	43	45	41	25 / 1.00	50 / 1.00	75 / 1.00	100 / 0.99	100 / 0.99	100 / 0.99	100 / 0.98	100 / 0.98	100 / 0.98	100 / 0.97
3.5 Ton	3/8"	3/4"	150	102	75	75	25 / 0.99	50 / 0.98	75 / 0.97	88 / 0.96	80 / 0.95	72 / 0.94	65 / 0.92	57 / 0.91	49 / 0.90	N/R
	1/2"	3/4"	75	51	38	38	25 / 0.99	50 / 0.98	75 / 0.97	100 / 0.96	100 / 0.95	100 / 0.94	100 / 0.92	100 / 0.91	100 / 0.90	N/R
	3/8"	7/8"	150	102	75	75	25 / 1.00	50 / 1.00	75 / 0.99	88 / 0.99	80 / 0.99	72 / 0.98	65 / 0.97	57 / 0.97	49 / 0.96	42 / 0.96
	1/2"	7/8"	75	51	38	38	25 / 1.00	50 / 1.00	75 / 0.99	100 / 0.99	100 / 0.99	100 / 0.98	100 / 0.97	100 / 0.97	100 / 0.96	100 / 0.96

NOTES:

1. Do not exceed 200 ft linear line length.
2. *Do not exceed 100 ft vertical separation if outdoor unit is above indoor unit.
3. **3/4" suction line should only be used for 1.5 ton systems if outdoor unit is below or at same level as indoor to assure proper oil return.
4. Always use the smallest liquid line allowable to minimize refrigerant charge.
5. Applications shaded in light gray indicate capacity multipliers between 0.90 and 0.96 which are not recommended, but are allowed.
6. Applications shaded in dark gray are not recommended due to excessive liquid or suction pressure drop.

NOTE: Values based on 105°F liquid temperature and 45°F evaporator temperature in cooling mode depending on size

Refrigerant Line Size Information (con't.)

13 - 16 SEER Single-Stage Air-Conditioners																
Unit Size	Allowable Liquid Line Size	Allowable Suction Line Size	Apply Long Line Guidelines if Linear Line Length Exceeds Those Shown Below (Feet)				Equivalent Length (Feet)									
							< 25	26-50	51-75	76-100	101-125	126-150	151-175	176-200	201-225	226-250
			(-)A13	(-)A14 A/B	(-)A14 W	(-)A16	Maximum Vertical Rise (Outdoor Unit Below Indoor Unit) * / Capacity Multiplier									
4 Ton	3/8"	3/4"	148	110	N/R	35	25 / 0.99	50 / 0.98	75 / 0.96	77 / 0.95	67 / 0.93	57 / 0.92	46 / 0.91	N/R	N/R	N/R
	1/2"	3/4"	74	55	N/R	18	25 / 0.99	50 / 0.98	75 / 0.96	100 / 0.95	100 / 0.93	100 / 0.92	100 / 0.91	N/R	N/R	N/R
	3/8"	7/8"	148	110	N/R	35	25 / 1.00	50 / 0.99	75 / 0.99	77 / 0.98	67 / 0.97	57 / 0.97	46 / 0.96	36 / 0.96	26 / 0.95	15 / 0.95
	1/2"	7/8"	74	55	N/R	18	25 / 1.00	50 / 0.99	75 / 0.99	100 / 0.98	100 / 0.97	100 / 0.97	100 / 0.96	100 / 0.96	99 / 0.95	97 / 0.95
5 Ton	3/8"	3/4"	78	0	N/R	0	25 / 0.99	50 / 0.97	75 / 0.94	61 / 0.92	46 / 0.90	N/R	N/R	N/R	N/R	N/R
	1/2"	3/4"	39	0	N/R	0	25 / 0.99	50 / 0.97	75 / 0.94	100 / 0.92	100 / 0.90	N/R	N/R	N/R	N/R	N/R
	3/8"	7/8"	78	0	N/R	0	25 / 1.00	50 / 0.99	75 / 0.98	61 / 0.97	46 / 0.96	32 / 0.95	18 / 0.94	N/R	N/R	N/R
	1/2"	7/8"	39	0	N/R	0	25 / 1.00	50 / 0.99	75 / 0.98	100 / 0.97	100 /0.96	100 / 0.95	97 / 0.94	95 / 0.94	92 / 0.93	89 / 0.92
	3/8"	1-1/8"	78	0	N/R	0	25 / 1.01	50 / 1.01	75 / 1.00	61 / 1.00	46 / 0.99	32 / 0.99	18 / 0.99	N/R	N/R	N/R
	1/2"	1-1/8"	39	0	N/R	0	25 / 1.01	50 / 1.01	75 / 1.00	100 /1.00	100 / 0.99	100 / 0.99	97 / 0.99	95 / 0.99	92 / 0.99	89 / 0.98

NOTES:
1. Do not exceed 200 ft linear line length.
2. *Do not exceed 100 ft vertical separation if outdoor unit is above indoor unit.
3. **3/4" suction line should only be used for 1.5 ton systems if outdoor unit is below or at same level as indoor to assure proper oil return.
4. Always use the smallest liquid line allowable to minimize refrigerant charge.
5. Applications shaded in light gray indicate capacity multipliers between 0.90 and 0.96 which are not recommended, but are allowed.
6. Applications shaded in dark gray are not recommended due to excessive liquid or suction pressure drop.

NOTE: Values based on 105°F liquid temperature and 45°F evaporator temperature in cooling mode depending on size

Refrigerant Line Size Information (con't.)

13 - 16 SEER Single-Stage Air-Conditioners																
Unit Size	Allowable Liquid Line Size mm [in.]	Allowable Suction Line Size mm [in.]	Apply Long Line Guidelines if Linear Line Length Exceeds Those Shown Below (Feet)				Equivalent Length (Meters)									
							< 8	8-15	16-23	24-30	31-38	39-46	47-53	54-61	62-69	70-76
			(-)A13	(-)A14 A/B	(-)A14 W	(-)A16	Maximum Vertical Rise (Outdoor Unit Below Indoor Unit) * / Capacity Multiplier									
5.3 KW [1.5 Ton] **SEE NOTE 3	6.35 [1/4]	15.88 [5/8]	N/R	N/R	N/R	N/R	8 / 1.00	15 / 0.99	19 / 0.98	13 / 0.98	7 / 0.97	2 / 0.97	N/R	N/R	N/R	N/R
	7.94 [5/16]	15.88 [5/8]	N/R	68	60	57	8 / 1.00	15 / 0.99	23 / 0.98	30 / 0.98	28 / 0.97	27 / 0.97	25 / 0.96	24 / 0.96	22 / 0.95	21 / 0.94
	9.53 [3/8]	15.88 [5/8]	54	45	40	38	8 / 1.00	15 / 0.99	23 / 0.98	30 / 0.98	30 / 0.97	30 / 0.97	30 / 0.96	30 / 0.96	30 / 0.95	30 / 0.94
	6.35 [1/4]	19.05 [3/4]**	N/R	N/R	N/R	N/R	8 / 1.00	15 / 1.00	19 / 0.99	13 / 0.99	7 / 0.99	2 / 0.99	N/R	N/R	N/R	N/R
	7.94 [5/16]	19.05 [3/4]**	N/R	68	60	57	8 / 1.00	15 / 1.00	23 / 0.99	30 / 0.99	28 / 0.99	27 / 0.99	25 / 0.99	24 / 0.98	22 / 0.98	21 / 0.98
	9.53 [3/8]	19.05 [3/4]**	54	45	40	38	8 / 1.00	15 / 1.00	23 / 0.99	30 / 0.99	30 / 0.99	30 / 0.99	30 / 0.99	30 / 0.98	30 / 0.98	30 / 0.98
7.0 KW [2 Ton]	6.35 [1/4]	15.88 [5/8]	N/R	N/R	N/R	N/R	8 / 0.99	15 / 0.98	6 / 0.97	N/R	N/R	N/R	N/R	N/R	N/R	N/R
	7.94 [5/16]	15.88 [5/8]	74	59	53	53	8 / 0.99	15 / 0.98	23 / 0.97	27 / 0.96	23 / 0.95	21 / 0.94	19 / 0.93	16 / 0.92	14 / 0.91	11 / 0.90
	9.53 [3/8]	15.88 [5/8]	49	39	36	36	8 / 0.99	15 / 0.98	23 / 0.97	30 / 0.96	30 / 0.95	30 / 0.94	30 / 0.93	29 / 0.92	28 / 0.91	27 / 0.90
	6.35 [1/4]	19.05 [3/4]	N/R	N/R	N/R	N/R	8 / 1.00	15 / 1.00	6 / 0.99	N/R	N/R	N/R	N/R	N/R	N/R	N/R
	7.94 [5/16]	19.05 [3/4]	74	59	53	53	8 / 1.00	15 / 1.00	23 / 0.99	27 / 0.99	23 / 0.98	21 / 0.98	19 / 0.98	16 / 0.97	14 / 0.97	11 / 0.96
	9.53 [3/8]	19.05 [3/4]	49	39	36	36	8 / 1.00	15 / 1.00	23 / 0.99	30 / 0.99	30 / 0.98	30 / 0.98	30 / 0.98	29 / 0.97	28 / 0.97	27 / 0.96
8.8 KW [2.5 Ton]	7.94 [5/16]	15.88 [5/8]	N/R	N/R	34	34	8 / 0.99	15 / 0.98	23 / 0.96	21 / 0.94	18 / 0.93	15 / 0.91	11 / 0.90	N/R	N/R	N/R
	9.53 [3/8]	15.88 [5/8]	43	36	22	22	8 / 0.99	15 / 0.98	23 / 0.96	30 / 0.94	30 / 0.93	29 / 0.91	27 / 0.90	N/R	N/R	N/R
	7.94 [5/16]	19.05 [3/4]	65	53	34	34	8 / 1.00	15 / 0.99	23 / 0.99	21 / 0.98	18 / 0.98	15 / 0.97	11 / 0.96	8 / 0.96	4 / 0.95	N/R
	9.53 [3/8]	19.05 [3/4]	43	36	22	22	8 / 1.00	15 / 0.99	23 / 0.99	30 / 0.98	30 / 0.98	29 / 0.97	27 / 0.96	26 / 0.96	25 / 0.95	24 / 0.95
10.6 KW [3 Ton]	7.94 [5/16]	15.88 [5/8]	N/R	N/R	N/R	N/R	8 / 0.99	15 / 0.97	20 / 0.94	15 / 0.92	10 / 0.90	N/R	N/R	N/R	N/R	N/R
	9.53 [3/8]	15.88 [5/8]	33	26	27	25	8 / 0.99	15 / 0.97	23 / 0.94	29 / 0.92	27 / 0.90	N/R	N/R	N/R	N/R	N/R
	7.94 [5/16]	19.05 [3/4]	N/R	39	41	37	8 / 1.00	15 / 0.99	20 / 0.98	15 / 0.98	10 / 0.97	5 / 0.96	N/R	N/R	N/R	N/R
	9.53 [3/8]	19.05 [3/4]	33	26	27	25	8 / 1.00	15 / 0.99	23 / 0.98	29 / 0.98	27 / 0.97	26 / 0.96	24 / 0.95	22 / 0.94	20 / 0.93	19 / 0.93
	12.70 [1/2]	19.05 [3/4]	17	13	14	12	8 / 1.00	15 / 0.99	23 / 0.98	30 / 0.98	30 / 0.97	30 / 0.96	30 / 0.95	30 / 0.94	30 / 0.93	30 / 0.93
	7.94 [5/16]	22.23 [7/8]	N/R	39	41	37	8 / 1.00	15 / 1.00	20 / 1.00	15 / 0.99	10 / 0.99	5 / 0.99	N/R	N/R	N/R	N/R
	9.53 [3/8]	22.23 [7/8]	33	26	27	25	8 / 1.00	15 / 1.00	23 / 1.00	29 / 0.99	27 / 0.99	26 / 0.99	24 / 0.98	22 / 0.98	20 / 0.98	19 / 0.97
	12.70 [1/2]	22.23 [7/8]	17	13	14	12	8 / 1.00	15 / 1.00	23 / 1.00	30 / 0.99	30 / 0.99	30 / 0.99	30 / 0.98	30 / 0.98	30 / 0.98	30 / 0.97
12.3 KW [3.5 Ton]	9.53 [3/8]	19.05 [3/4]	46	31	23	23	8 / 0.99	15 / 0.98	23 / 0.97	27 / 0.96	24 / 0.95	22 / 0.94	20 / 0.92	17 / 0.91	15 / 0.90	N/R
	12.70 [1/2]	19.05 [3/4]	23	15	11	11	8 / 0.99	15 / 0.98	23 / 0.97	30 / 0.96	30 / 0.95	30 / 0.94	30 / 0.92	30 / 0.91	30 / 0.90	N/R
	9.53 [3/8]	22.23 [7/8]	46	31	23	23	8 / 1.00	15 / 1.00	23 / 0.99	27 / 0.99	24 / 0.99	22 / 0.98	20 / 0.97	17 / 0.97	15 / 0.96	13 / 0.96
	12.70 [1/2]	22.23 [7/8]	23	15	11	11	8 / 1.00	15 / 1.00	23 / 0.99	30 / 0.99	30 / 0.99	30 / 0.98	30 / 0.97	30 / 0.97	30 / 0.96	30 / 0.96

NOTES:

1. Do not exceed 61 meters linear line length.
2. *Do not exceed 30 meters vertical separation if outdoor unit is above indoor unit.
3. **19.05 mm [3/4 in.] suction line should only be used for 1.5 ton systems if outdoor unit is below or at same level as indoor to assure proper oil return.
4. Always use the smallest liquid line allowable to minimize refrigerant charge.
5. Applications shaded in light gray indicate capacity multipliers between 0.90 and 0.96 which are not recommended, but are allowed.
6. Applications shaded in dark gray are not recommended due to excessive liquid or suction pressure drop.

[ ] Designates Metric Conversions

Refrigerant Line Size Information (con't.)

13 - 16 SEER Single-Stage Air-Conditioners																
Unit Size	Allowable Liquid Line Size	Allowable Suction Line Size	Apply Long Line Guidelines if Linear Line Length Exceeds Those Shown Below (Feet)				Equivalent Length (Meters)									
			(-)A13	(-)A14 A/B	(-)A14 W	(-)A16	< 8	8-15	16-23	24-30	31-38	39-46	47-53	54-61	62-69	70-76
							Maximum Vertical Rise (Outdoor Unit Below Indoor Unit) * / Capacity Multiplier									
14.1 KW [4 Ton]	9.53 [3/8]	19.05 [3/4]	45	**34**	**N/R**	11	8 / 0.99	15 / 0.98	23 / 0.96	24 / 0.95	20 / 0.93	17 / 0.92	14 / 0.91	**NR**	**NR**	**NR**
	12.7 [1/2]	19.05 [3/4]	23	**17**	**N/R**	5	8 / 0.99	15 / 0.98	23 / 0.96	30 / 0.95	30 / 0.93	30 / 0.92	30 / 0.91	**NR**	**NR**	**NR**
	9.53 [3/8]	22.23 [7/8]	45	**34**	**N/R**	11	8 / 1.00	15 / 0.99	23 / 0.99	24 / 0.98	20 / 0.97	17 / 0.97	14 / 0.96	11 / 0.96	8 / 0.95	5 / 0.95
	12.7 [1/2]	22.23 [7/8]	23	**17**	**N/R**	5	8 / 1.00	15 / 0.99	23 / 0.99	30 / 0.98	30 / 0.97	30 / 0.97	30 / 0.96	30 / 0.96	30 / 0.95	30 / 0.95
17.6 KW [5 Ton]	9.53 [3/8]	19.05 [3/4]	24	**17**	**N/R**	0	8 / 0.99	15 / 0.97	23 / 0.94	19 / 0.92	14 / 0.90	**NR**	**NR**	**NR**	**NR**	**NR**
	12.7 [1/2]	19.05 [3/4]	12	**8**	**N/R**	0	8 / 0.99	15 / 0.97	23 / 0.94	30 / 0.92	30 / 0.90	**NR**	**NR**	**NR**	**NR**	**NR**
	9.53 [3/8]	22.23 [7/8]	24	**17**	**N/R**	0	8 / 1.00	15 / 0.99	23 / 0.98	19 / 0.97	14 / 0.96	10 / 0.95	5 / 0.94	**NR**	**NR**	**NR**
	12.7 [1/2]	22.23 [7/8]	12	**8**	**N/R**	0	8 / 1.00	15 / 0.99	23 / 0.98	30 / 0.97	30 /0.96	30 / 0.95	30 / 0.94	29 / 0.94	28 / 0.93	27 / 0.92
	9.53 [3/8]	28.58 [1-1/8]	24	**17**	**N/R**	0	8 / 1.01	15 / 1.01	23 / 1.00	19 / 1.00	14 / 0.99	10 / 0.99	5 / 0.99	**NR**	**NR**	**NR**
	12.7 [1/2]	28.58 [1-1/8]	12	**8**	**N/R**	0	8 / 1.01	15 / 1.01	23 / 1.00	30 / 1.00	30 / 0.99	30 / 0.99	30 / 0.99	29 / 0.99	28 / 0.99	27 / 0.98

NOTES:

1. Do not exceed 61 meters linear line length.
2. *Do not exceed 30 meters vertical separation if outdoor unit is above indoor unit.
3. **19.05 mm [3/4 in.] suction line should only be used for 1.5 ton systems if outdoor unit is below or at same level as indoor to assure proper oil return.
4. Always use the smallest liquid line allowable to minimize refrigerant charge.
5. Applications shaded in light gray indicate capacity multipliers between 0.90 and 0.96 which are not recommended, but are allowed.
6. Applications shaded in dark gray are not recommended due to excessive liquid or suction pressure drop.

[ ] Designates Metric Conversions

Performance Data @ AHRI Standard Conditions – Cooling

Tested Combination							
Outdoor Unit	Indoor Coil	Total Capacity BTU/H [kW]	Net Sensible BTU/H [kW]	Net Latent BTU/H [kW]	SEER	EER	Indoor CFM [L/s]
RA1418AJ1	RCF2417STA+RXMD-C04	17800 [5.2]	12100 [3.5]	5700 [1.7]	14.00	11.50	600 [283.2]
RA1424BJ1	RCF2417STA+RXMD-C04	23200 [6.8]	17500 [5.2]	5700 [1.7]	14.00	11.50	800 [376.0]
RA1430AJ1	RCF3617STA+RXMD-C04	28800 [8.4]	19500 [5.7]	9300 [2.7]	14.00	11.50	1000 [471.9]
RA1436AJ1	RCF3617STA+RXMD-C04	34200 [10.0]	23200 [6.8]	11000 [3.2]	14.00	11.50	1050 [495.5]
RA1436AC1	RCF3617STA+RXMD-C04	34200 [10.0]	23200 [6.8]	11000 [3.2]	14.00	11.50	1050 [495.5]
RA1436AD1	RCF3617STA+RXMD-C04	34200 [10.0]	23200 [6.8]	11000 [3.2]	14.00	11.50	1050 [495.5]
RA1442CJ1	RCF4821STA+RXMD-C04	39500 [11.6]	28900 [8.5]	10600 [3.1]	14.00	11.50	1350 [634.5]
RA1442CC1	RCF4821STA+RXMD-C04	39500 [11.6]	28900 [8.5]	10600 [3.1]	14.00	11.50	1350 [634.5]
RA1448AJ1	RCF4821STA+RXMD-C04	46000 [13.5]	31200 [9.1]	14800 [4.3]	14.00	11.70	1450 [684.3]
RA1448AC1	RCF4821STA+RXMD-C04	46000 [13.5]	31200 [9.1]	14800 [4.3]	14.00	11.70	1450 [684.3]
RA1448AD1	RCF4821STA+RXMD-C04	46000 [13.5]	31200 [9.1]	14800 [4.3]	14.00	11.70	1450 [684.3]
RA1460BJ1	RCF6024STA+RXMD-C04	55500 [16.3]	38100 [11.2]	17400 [5.1]	14.00	11.70	1525 [716.8]
RA1460AD1	RCF6024STA+RXMD-C04	55500 [16.3]	38100 [11.2]	17400 [5.1]	14.00	11.70	1525 [716.8]
RA1460BC1	RCF6024STA+RXMD-C04	55500 [16.3]	38100 [11.2]	17400 [5.1]	14.00	11.70	1525 [716.8]

Note: Additional ratings and system match ups can be accessed on MyRheem.com at: https://my.rheem.com/static/private/ahriresidential.html
Additional ratings and system match ups and downloadable ratings certificates can be accessed from the AHRI website: www.ahridirectory.org

[ ] Designates Metric Conversions

GUIDE SPECIFICATIONS

General

System Description

Outdoor-mounted, air-cooled, split-system air conditioner composite base pan unit suitable for ground or rooftop installation. Unit consists of a hermetic compressor, an air-cooled coil, propeller-type condenser fan, suction and legend line service valve, and a control box. Unit will discharge supply air upward as shown on contract drawings. Unit will be used in a refrigeration circuit to match up to a coil unit.

Quality Assurance

— Unit will be rated in accordance with the latest edition of AHRI Standard 210.

— Unit will be certified for capacity and efficiency, and listed in the latest AHRI directory.

— Unit construction will comply with latest edition of ANSI/ASHRAE and with NEC.

— Unit will be constructed in accordance with UL standards and will carry the UL label of approval. Unit will have c-UL-us approval.

— Unit cabinet will be capable of withstanding ASTM B117 1000-hr salt spray test.

— Air-cooled condenser coils will be leak tested at 150 psig and pressure tested at 550 psig.

— Unit constructed in ISO9001 approved facility.

Delivery, Storage, and Handling

— Unit will be shipped as single package only and is stored and handled per unit manufacturer's recommendations.

Warranty (for inclusion by specifying engineer) — U.S. and Canada only.

Products

Equipment

Factory assembled, single piece, air-cooled air conditioner unit. Contained within the unit enclosure is all factory wiring, piping, controls, compressor, refrigerant charge R-410A, and special features required prior to field start-up.

<u>Unit Cabinet</u>

— Unit cabinet will be constructed of galvanized steel, bonderized, and coated with a powder coat paint.

— All units constructed with louver coil protection and corner post. Louver can be removed by removing one fastener per louver panel.

AIR-COOLED, SPLIT-SYSTEM AIR CONDITIONER
RA14
1-1/2 TO 5 NOMINAL TONS

<u>Fans</u>

— Condenser fan will be direct-drive propeller type, discharging air upward.

— Condenser fan motors will be totally enclosed, 1-phase type with class B insulation and permanently lubricated bearings. Shafts will be corrosion resistant.

— Fan blades will be statically and dynamically balanced.

— Condenser fan openings will be equipped with coated steel wire safety guards.

<u>Compressor</u>

— Compressor will be hermetically sealed.

— Compressor will be mounted on rubber vibration isolators.

<u>Condenser Coil</u>

— Condenser coil will be air cooled.

— Coil will be constructed of aluminum fins mechanically bonded to copper tubes.

<u>Refrigeration Components</u>

— Refrigeration circuit components will include liquid-line shutoff valve with sweat connections, vapor-line shutoff valve with sweat connections, system charge of R-410A refrigerant, and compressor oil.

— Unit will be equipped with filter drier for R-410A refrigerant for field installation.

Operating Characteristics

— The capacity of the unit will meet or exceed _____ Btuh at a suction temperature of _____ °F/°C. The power consumption at full load will not exceed _____ kW.

— Combination of the unit and the evaporator or fan coil unit will have a total net cooling capacity of _____ Btuh or greater at conditions of _____ CFM entering air temperature at the evaporator at _____ °F/°C wet bulb and _____ °F/°C dry bulb, and air entering the unit at _____ °F/°C.

— The system will have a SEER of _____ Btuh/watt or greater at DOE conditions.

Electrical Requirements

— Nominal unit electrical characteristics will be _____ v, single phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of _____ v to _____ v.

— Nominal unit electrical characteristics will be _____ v, three phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of _____ v to _____ v.

— Unit electrical power will be single point connection.

— Control circuit will be 24v.

Special Features

— Refer to section of this literature identifying accessories and descriptions for specific features and available enhancements.

GENERAL TERMS OF LIMITED WARRANTY*

Rheem will furnish a replacement for any part of this product which fails in normal use and service within the applicable period stated, in accordance with the terms of the limited warranty.

***For complete details of the Limited and Conditional Warranties, including applicable terms and conditions, contact your local contractor or the Manufacturer for a copy of the product warranty certificate.**

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INTEGRATED HOME COMFORT

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APPENDIX H

EXTERIOR NOISE ANALYSIS

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June 14, 2023

SDG Architects, Inc.
3361 Walnut Boulevard Suite 120
Brentwood, California 94513

Attention: Mark Thomas | Project Manager

Subject: **Clayton Road and Peacock Creek Drive**
Clayton, California
Exterior Noise and Exterior Façade Acoustical Analysis
Veneklasen Project No. 8397-001

Dear Mark:

Veneklasen Associates, Inc. (Veneklasen) has completed the review of the Clayton Road and Peacock Creek Drive project located in Clayton, California. This report predicts the exterior noise level at the site using measurements. Using this information, interior noise levels were calculated based on the exterior noise exposure and the construction types proposed. From this, the exterior façade design was determined. This report discusses the results of the analysis.

1.0 INTRODUCTION

This study was conducted to determine the impact of the exterior noise sources on the Clayton Road and Peacock Creek Drive project in Clayton, California. Veneklasen's scope of work included calculating the exterior noise levels impacting the site and determining the method, if any, required to reduce the interior and exterior sound levels to meet the applicable code requirements of the State of California and the City of Clayton.

The project consists of 30 3-level townhomes spread across 4 buildings. The project is bounded by Peacock Creek Drive to the north, Clayton Road to the west, a pump house for the Oakhurst Country Club clubhouse to the south, and vacant land to the east.

2.0 NOISE CRITERIA

DNL (Day-Night Level) is the 24-hour equivalent (average) sound pressure level in which the nighttime (10 pm – 7 am) noise is weighted by adding 10 dB to the hourly level. Since this is a 24-hour metric, short-duration noise events (truck pass-bys, buses, trains, etc.) are not as prominent in the analysis.

Leq (equivalent continuous sound level) is defined as the steady sound pressure level which, over a given period of time, has the same total energy as the actual fluctuating noise.

All reported noise levels are A-weighted.

2.1 Interior Noise Levels – Residential

The State of California Building Code (Title 24, Part 2, Section 1206 "Sound Transmission") and the City of Clayton Noise Element state that interior DNL for residential land uses are not to exceed 45 dB in any habitable room.

If the windows must be closed to meet an interior DNL of 45 dB, then a mechanical ventilating system or other means of natural ventilation may be required.

Although not a regulatory requirement, Veneklasen suggests that the maximum noise level from short-duration noise events during the night not exceed 55 dB. This criterion is based on sleep disturbance research and experience with similar projects.

3.0 EXTERIOR NOISE ENVIRONMENT

3.1 Noise Measurements

Traffic on Clayton Road was the primary source of noise affecting the site. Veneklasen visited the site on Monday, June 12, 2023 and placed meters on the site to capture the hourly sound levels on the site for a 24-hour period. Veneklasen also completed short-term noise measurements. Table 1 and Figure 1 show the location and summary of the noise measurements.

Table 1 – Measured Sound Levels

Location	Measured Level (dB)	DNL (dB)	Nighttime Event (dB)
L1	63	67	82
S1	62	---	---
S2	56	---	---
S3	51	---	---
S3 (Pump on)	59	---	---

Figure 1 – Aerial View of Project Site Showing Measurement Locations

3.2 Club House Pump Station

The Oakhurst Country Club to the north of the project site locates its pump house directly south of the project site. Veneklasen observed that the pump would turn on for a period longer than 30 minutes before turning off for a similar length of time. The measured sound level of the pump noise at S3 was approximately 59 dB. Veneklasen utilized DNL 64 as the noise level for Zone A near the pump.

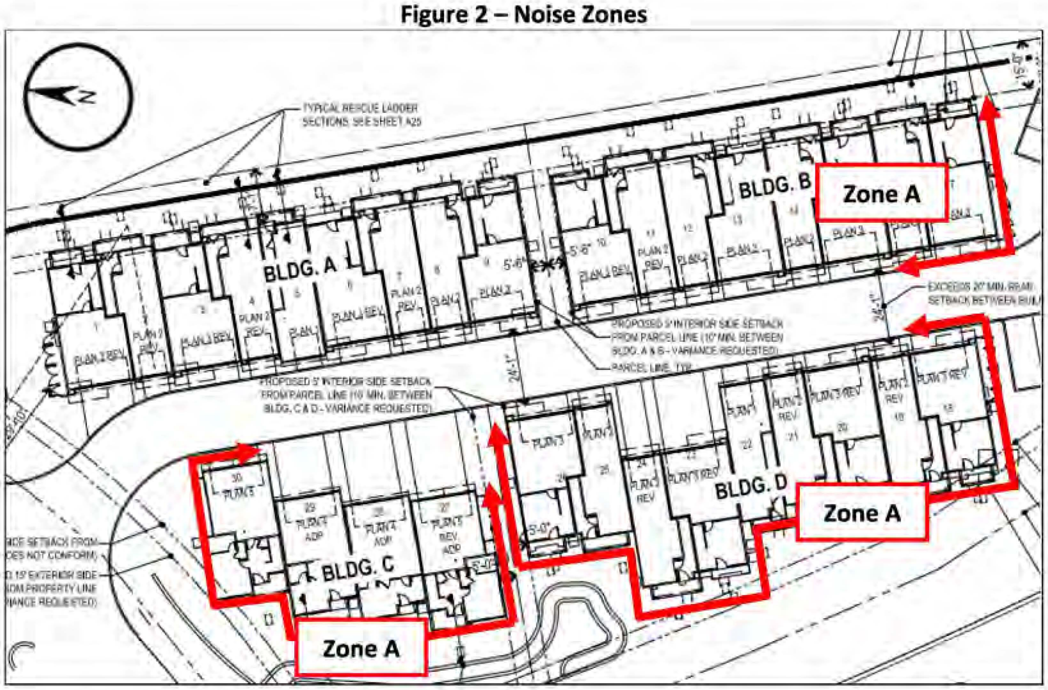
3.3 Overall Exterior Exposure

Based on the measurements, Veneklasen calculated the noise level at different locations across the project site. To simplify the presentation of the exterior noise levels, Veneklasen has separated the site into locations based on the sound exposure and required mitigation. The predicted sound levels at each zone, shown in Figure 2, are listed in Table 2 below.

Table 2 – Exterior Noise Levels

Location	Exterior DNL (dB)	Event Level (dB)
Zone A	61-67	82
Remaining Units	≤ 60	< 75

Figure 2 – Noise Zones



4.0 INTERIOR NOISE CALCULATION

4.1 Exterior Façade Construction

Calculations were based on the plans dated May 22, 2023. The plans do not show the exterior wall construction. Veneklasen has assumed that the exterior wall will consist of 3-coat stucco or vinyl siding on wood studs with a single layer of gypsum board on the interior and batt insulation in the cavity.

Veneklasen's analysis included the roof path, but this was insignificant in the interior noise level calculated.

Veneklasen utilized the glazing ratings (glass, frame, and seals) shown in Appendix I. Appendix I shall be the acoustical specification for exterior windows and doors.

4.2 Interior Average Noise Level (DNL) – Residential

Veneklasen calculated the interior level within the residential units given the measured noise environment and the exterior façade construction described above. Table 3 shows the predicted interior DNL based on the windows and doors with STC ratings as shown and glazing construction as described in Appendix I. In a similar manner Veneklasen calculated the interior noise levels from the single-event noise sources such as trains and heavy truck pass-bys. Veneklasen's recommended interior nighttime noise level criterion of 55 dB was met by the glazing required for interior DNL levels. Note that the STC ratings indicated in the table do not completely specify the building element performance, as the building element must also meet the octave band transmission loss across the frequency spectrum as specified in Appendix I.

Table 3 – Calculated Interior DNL

Location	Exterior DNL (dB)	Exterior Event Level (dB)	Window/ Door Rating[1]	Interior DNL (dB)	Interior Event Level (dB)
Zone A	61-67	82	STC 30	40-43	52-55
Remaining Units	≤ 60	≤ 75	No STC requirement. STC 28 recommended.		

Where the noise level does not exceed 60, sound-rated assemblies are not required. However, Veneklasen recommends specifying a window with a minimum rating of STC 28 to maintain a consistent level of acoustical quality.

4.3 Mechanical Ventilation – Residential

Because the windows and doors must be kept closed to meet the noise requirements, mechanical or other means of ventilation may be required for units in Zone A. The ventilation system shall not compromise the sound insulation capability of the exterior façade assembly.

5.0 SUMMARY

The following summarizes the acoustical items required to satisfy the noise criteria as described in this report.

Residential

- Exterior wall assembly is acceptable as described in Section 4.1.
- The roof assembly was included in the analysis and is not a significant path of sound and can remain as designed.
- Windows and glass doors as shown in Table 3 with Transmission Loss values and STC ratings specified in Appendix I are required. Appendix I shall be the acoustical specification for all exterior windows and doors.
- Residential mechanical ventilation, or other means of natural ventilation, may be required for units in Zone A.

Various noise mitigation methods may be utilized to satisfy the noise criteria described in this report. Alteration of mitigation methods that deviate from requirements should be reviewed by the acoustical consultant.

If you have any questions or comments regarding this report, please do not hesitate to contact the undersigned.

Sincerely,
Veneklasen Associates, Inc.

Adam Thompson
Associate

[1] STC rating does not fully specify the building element performance. Refer to Appendix I.

APPENDIX I – GLAZING REQUIREMENTS

In order to meet the predicted interior noise levels described in Section 4.0, the glazing shall meet the following requirements:

Table 4 – Acoustical Glazing Requirements: Minimum Octave Band Transmission Loss and STC Rating

Nominal Thickness	Minimum Transmission Loss Octave Band Center Frequency (Hz)						Min. STC Rating
	125	250	500	1000	2000	4000	
1” dual	21	18	24	32	36	31	**28**
1” dual	21	18	27	34	37	32	**30**

The transmission loss values in the table above can likely be met with the following glazing assemblies:

1. Up to STC 35: nominal 1” insulated glazing unit

An assembly’s frame and seals may limit the performance of the overall system. Therefore, the window and door systems selected for the project shall not be selected on the basis of the STC rating of the glass alone, but on the entire assembly including frame and seals. Additionally, the assemblies given above are provided as a basis of design, but regardless of construction, the octave band Transmission Loss (TL) and STC value of the system selected must meet the minimum values in Table 4 above.

Independent laboratory acoustical test reports should be submitted for review by the design team to ensure compliance with glazing acoustical performance requirements. Laboratories shall be accredited by the Department of Commerce National Voluntary Laboratory Accreditation Program (NVLAP). Labs shall be pre-approved by Veneklasen Associates. Tests shall be required to be performed in North America. Lab tests and lab reports shall be in compliance with ASTM standard E90 and be no more than 10 years old from the date of submission for this project.

If test reports are not available for a proposed assembly, the assembly, including frame, seals and hardware, shall be tested at an independent pre-approved NVLAP-accredited laboratory to demonstrate compliance with the requirements of this report. Veneklasen shall be invited to witness acoustical testing completed and reserves the right to exclude test reports from laboratories that are not pre-approved by Veneklasen.

APPENDIX I

TRAFFIC IMPACT STUDY

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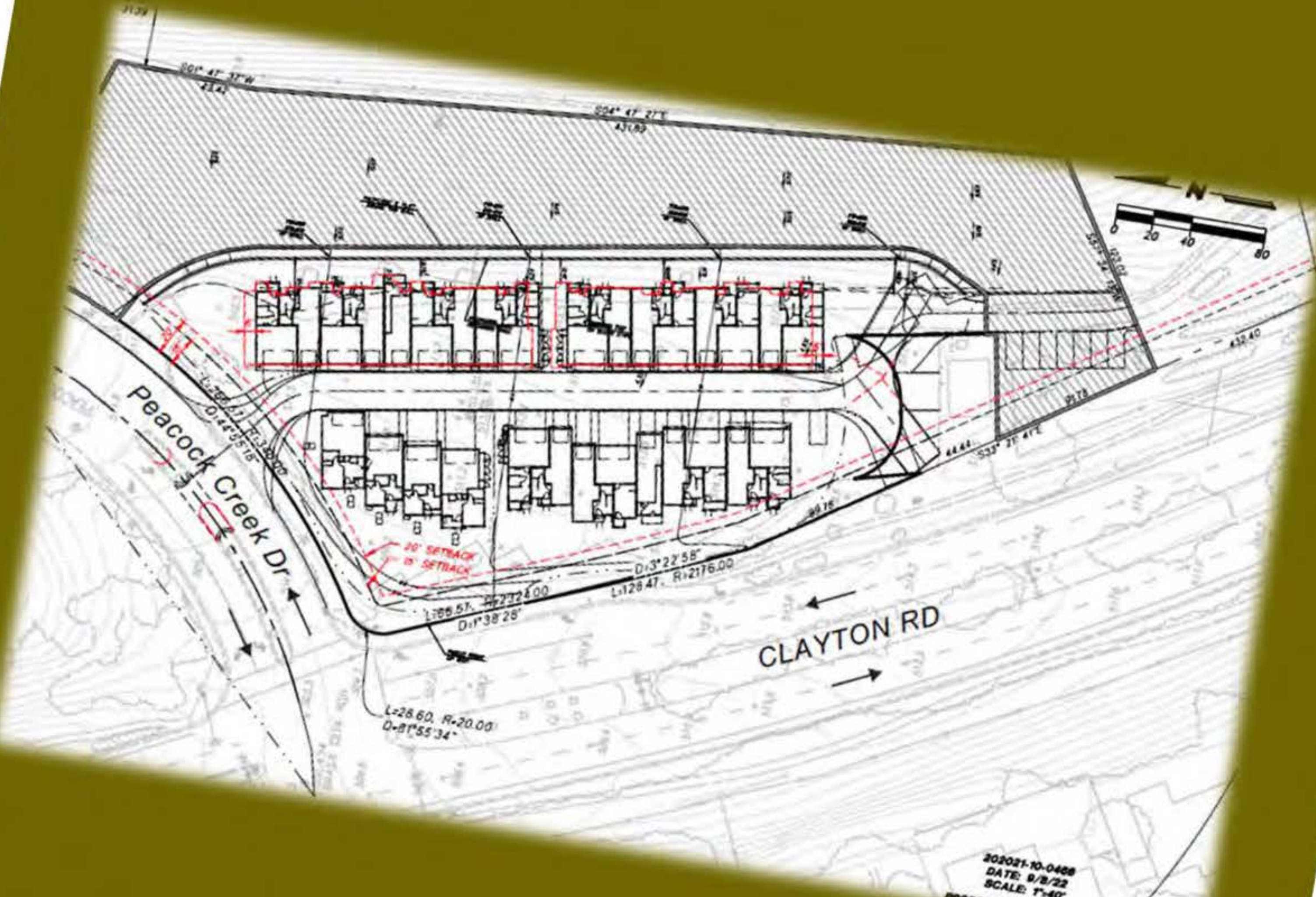
Traffic Impact Study for Proposed Peacock Creek Townhomes in Clayton, California

for the City of Clayton

May 30, 2025



AMG ADVANCED MOBILITY GROUP

Traffic Impact Study for Proposed Peacock Creek Townhomes in Clayton, California

Final Report

Prepared for:
The City of Clayton

Prepared by:
Advanced Mobility Group

May 30, 2025

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LIST OF FIGURES

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1.0 INTRODUCTION AND EXECUTIVE SUMMARY

INTRODUCTION

The purpose of this traffic impact study is to evaluate potential impacts of the proposed Peacock Creek Townhomes Project located at the southeast corner of the intersection of Clayton Road and Peacock Creek Drive in Clayton, California. The proposed project will consist of 30, 3-story town homes.

SUMMARY

Based on the results of the analysis, the following is a summary of our findings:

Proposed Project Trip Generation

- The project will generate approximately 12 total trips during both the AM and PM peak hours.

Existing Traffic Conditions

- Both study intersections are estimated to operate at an acceptable Level of Service (LOS) D or better.

Near-Term Traffic Conditions

- Similar to the Existing Conditions, both intersections would operate at an acceptable LOS D or better.

Existing plus Project Traffic Conditions

- It is estimated that both intersections will continue to operate at acceptable LOS D or better. There is a slight increase in delay during the PM peak hour at the intersection of Peacock Drive/Clayton Road, but the intersection will continue to operate at LOS B.

Near-Term plus Project Traffic Conditions

- Both intersections are estimated to operate at acceptable Level of Service (LOS) D or better. There is a slight increase in delay during the PM peak hour at the intersection of Peacock Drive/Clayton Road, but the intersection will continue to operate at LOS B.

Proposed Project Vehicle Miles Travelled (VMT)

- The proposed project results of 15.77 VMT/Capita would not contribute to a significant impact since it is less than the 15% below baseline threshold of 19.75 VMT/resident of the city.

Cumulative (No Project) Traffic Conditions

- It is estimated that there is a slight increase in delay at both intersections during the PM peak hour but both intersections will continue to operate at acceptable level LOS D or better.

Cumulative plus Project Traffic Conditions

- There is a slight increase in delay during the PM peak hour at the intersection of Peacock Drive/Clayton Road, but the intersection will continue to operate at LOS B. Both intersections will operate at acceptable level LOS D or better.

2.0 PURPOSE OF PROJECT AND STUDY APPROACH

PROJECT OBJECTIVES DESCRIPTION

The purpose of this traffic impact study is to evaluate potential traffic impacts of the proposed Peacock Creek Townhomes consist of 30, 3-story townhomes. The proposed project site and vicinity map are shown in **Figure 1**.

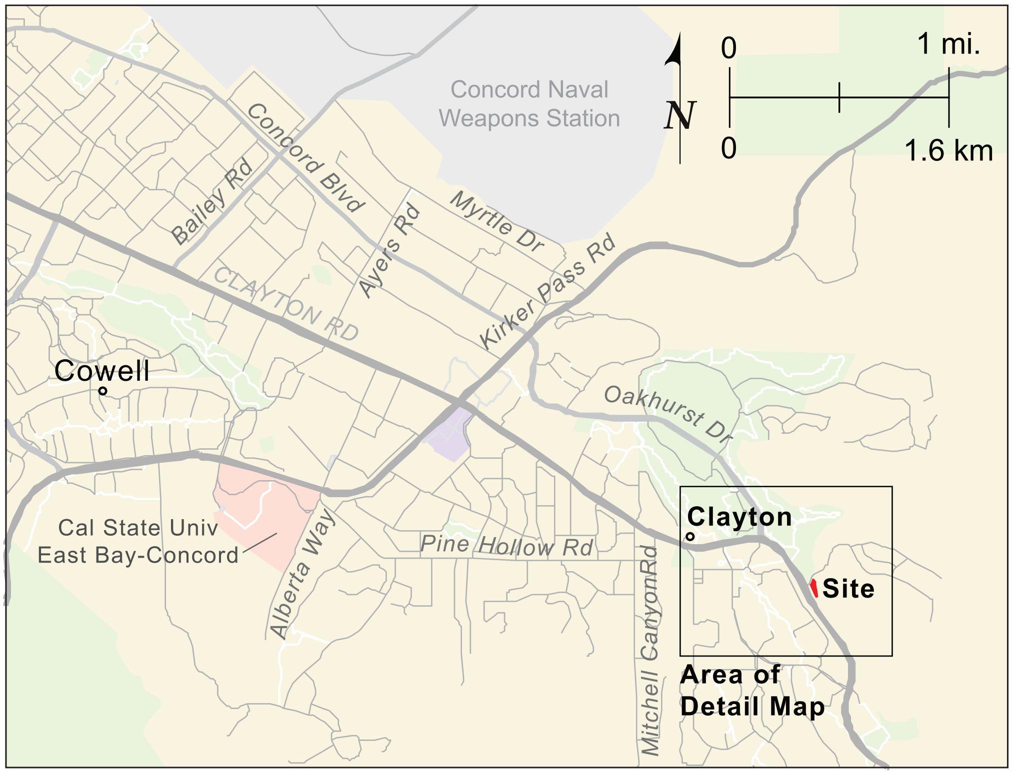
The proposed Peacock Creek townhomes project site is located within a vacant lot. A portion of the lot is designated as a "park and ride lot" and contains a Contra Costa Water District (CCWD) pump station.

STUDY APPROACH

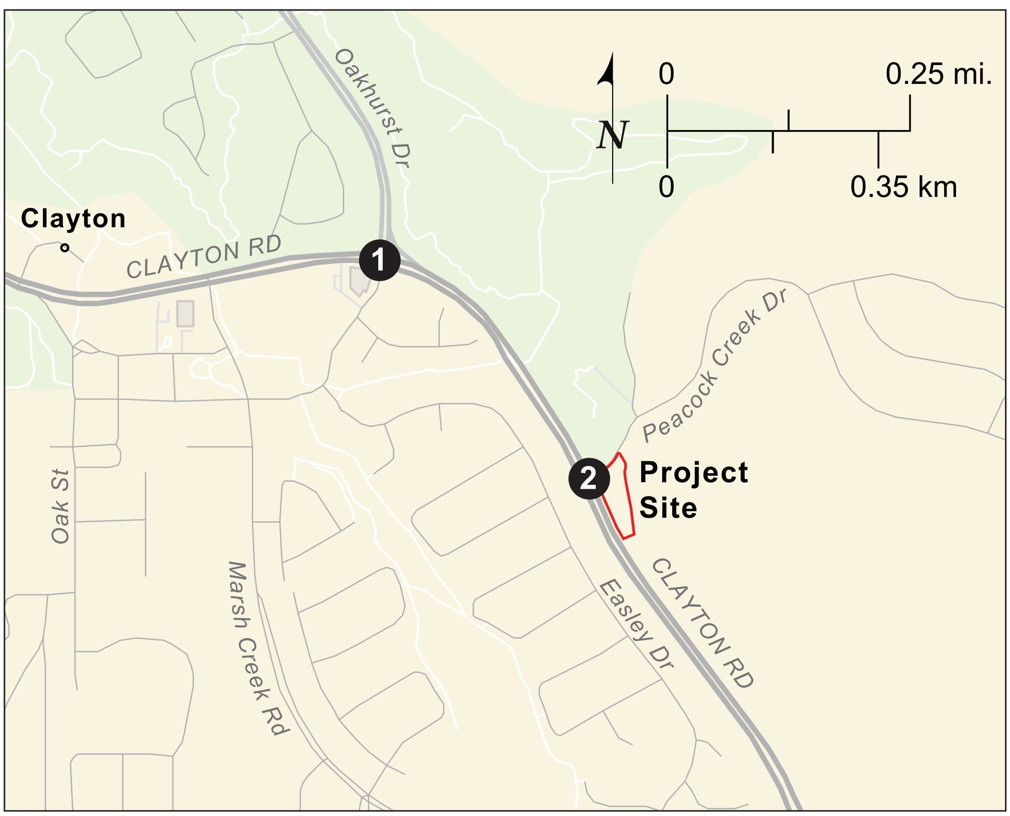
The following are key steps of the study approach:

- Conduct traffic counts to establish baseline traffic conditions
- Conduct trip generation and distribution of project trips
- Determine traffic condition for the following scenarios:
    - Existing Traffic Condition
    - Near-Term (No Project) Traffic Condition
    - Existing + Project Traffic Condition
    - Near-Term + Project Traffic Condition
    - Cumulative (No Project) Traffic Condition
    - Cumulative Plus Project Traffic Condition
- Determine LOS and VMT impact of project trips based on established Significance Criteria

Figure
1



Overview map



Base map: Esri

Detail map

Legend

Intersections

1 Clayton Rd & Oakhurst Dr/Center St

2 Clayton Rd & Peacock Creek Dr

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3.0 SETTING

The following section describes the existing transportation conditions in the vicinity of the study area, including descriptions of the existing street system and intersection operating conditions.

EXISTING STREET SYSTEM

Clayton Road is a major east-west arterial roadway serving Clayton, which provides connections to CA-242, Bay Area Rapid Transportation (BART) Transit Line, and the City of Concord. It is located to the west of the project site and serves as a major transit route (all Clayton Transit Routes travel on Clayton Road) in Clayton. Class II Bikeway facilities are available along this roadway from Clayton City Limits in the east to the Clayton Road and Peacock Drive intersection in the west. The corridor includes sidewalks on both sides along its length and provides an entrance to Black Diamond Trail, north of the project site. The Speed Limit is 45 mph approaching the project site.

Peacock Creek Drive is a two-lane north-south divided local street adjacent to the proposed Peacock Creek Townhomes Project. It extends from Clayton Road in the south and connects to the Peacock Creek residential neighborhood to the north. The roadway is adjacent to entrances to the City of Clayton Open Space Hiking Trail. Sidewalk is available on both sides of the street. The speed limit is 25 mph.

Oakhurst Drive is a four-lane east-west divided residential collector street that extends from Concord Boulevard to Clayton Road. The speed limit is 40 mph.

EXISTING PEDESTRIAN AND BICYCLE FACILITIES

This existing pedestrian and bicycle facilities near the project site are described below.

Existing Bicycle Facilities

Bicycle facilities are classified by Caltrans into four distinct types of bikeway facilities, as generally described below:

- Class I Bikeway (Bike Path). Provides a separate right-of-way and is designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian crossflow minimized.
- Class II Bikeway (Bike Lane). Provides a restricted right-of-way and is designated for the use of bicycles with a striped lane on a street or highway. Vehicle parking and vehicle/pedestrian crossflow are permitted.
- Class III Bikeway (Bike Route). Provides for a right-of-way designated by signs or pavement markings for shared use with pedestrians or motor vehicles.
- Class IV Bikeway (Separated Bikeway/Cycle Track). Provides a cycle track or protected bike lane, is for the exclusive use of bicycles, physically separated from motor traffic with a vertical feature.

Class II facilities are available near the project site on Clayton Road and at the intersection of Peacock Creek Drive and Clayton Road.

Pedestrian Facilities

Pedestrian facilities in the study area include sidewalks, crosswalks, and ADA curb ramps. Sidewalks along the perimeter of the project site are at least 5 feet wide. The crosswalk at Peacock Creek Drive and Clayton Road is adjacent to the project site at the east side of the intersection. This crossing also has ADA accessible curb ramps and pedestrian push-buttons. Entrances to the City of Clayton Open Space Hiking Trail are accessible along Peacock Creek Drive.

Clayton Road and Oakhurst Drive intersection has crosswalks at each intersection leg. ADA accessible curb ramps are available at the north leg of the intersection.

Black Diamond Hiking Trail is accessible along Clayton Road at two pedestrian entrances located between Clayton Road/Oakhurst Drive and Peacock Creek Drive/Clayton Road intersections.

EXISTING TRANSIT AND RAIL SERVICE

Transit service within the study area is provided by the Central Contra Costa Transit Authority through County Connection. The project site is located near the Peacock Creek/Clayton Road intersection which includes a bus stop for County Connection (Bus Service for Lines 10 and 310).

ROADWAY AND INTERSECTION OPERATING DOCUMENTS

Traffic Data Collection

Based on discussions with City staff[1], the following 2 study intersections as shown in **Exhibit I** were selected for analysis:

1. *Clayton Road and Peacock Creek Drive*
2. *Clayton Road and Oakhurst Drive*

AMG collected the AM and PM peak hour intersection turning movement counts on October 4, 2022, for the two study intersections. **Figure 2** shows the turning movement volumes and lane configuration at each study intersection. Intersection turning movement counts collected by AMG are included in **Appendix A.**

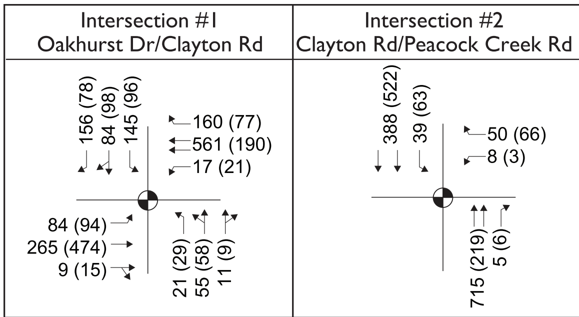
Exhibit I: Study Intersections

[1] *Discussions with City of Clayton Staff, September 7, 2022*

City of Clayton - Traffic Impact Study for Peacock Creek Townhomes

Existing Peak Hour Volumes, Lane Geometry and Controls

Figure 2



Base map: Esri

Legend

- ❶ Study Intersection
- Traffic Signal
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume

Intersections

- ❶ Clayton Rd & Oakhurst Dr/Center St
- ❷ Clayton Rd & Peacock Creek Dr

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LEVEL OF SERVICE METHODOLOGY

Level of Service is a qualitative index of the performance of an element of the transportation system. Level of Service (LOS) is a rating scale running from A to F, with A indicating no congestion of any kind, and F indicating intolerable congestion and delays.

The 2010 Highway Capacity Manual (HCM) is the standard reference published by the Transportation Research Board and contains the specific criteria and methods to be used in assessing LOS. There are several software packages that have been developed to implement HCM. In this study the Synchro software was used to calculate the LOS at the study intersections.

Signalized Intersections
The relationship between average control delay, driver's perception of traffic, and LOS for signalized intersections is summarized in **Table 1.**

Table 1: Signalized Intersection LOS Criteria

LOS	Driver's Perception and Traffic Operation Description	Delay in Seconds
A	Operations with very low delay occurring with favorable Progression and/or short cycle length.	< 10
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10 – 20
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20 - 35
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high volume-to-capacity (V/C) ratios. Many vehicles stop, and individual cycle failures are noticeable.	> 35 – 55
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	> 55 - 80
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80

Unsignalized Intersections
The method of unsignalized intersection capacity analysis used in this study is from Chapter 19, "Two-Way Stop-Controlled Intersections" of the Highway Capacity Manual. This method applies to two-way STOP sign or YIELD sign-controlled intersections (or one-way STOP sign or YIELD sign-controlled intersections at three-way intersections). At such intersections, drivers on the minor street are forced to use judgment when selecting gaps in the major flow through which to execute crossings or turning maneuvers. Thus, the capacity of the controlled legs of an intersection is based on three factors:

1. The distribution of gaps in the major street traffic stream.
2. Driver judgment in selecting gaps through which to execute their desired maneuvers.
3. Follow-up time required to move into the front-of-queue position.

The level of service criterion for two-way STOP controlled intersections is somewhat different from the criterion used for signalized intersections. The primary reason for this is the difference that drivers expect a signalized intersection to carry higher traffic volumes than unsignalized intersections. Additionally, several driver behavior conditions combine to make delays at signalized intersections less onerous than at unsignalized intersections.

The HCM provides procedures for calculating LOS on the minor street approached and individual movements. The LOS is reported for the minor approach. Depending on the availability of gaps, the minor approach might be operating at LOS D, E, or F while the overall intersection operates at LOS C or better. A minor approach that operates at LOS D, E, or F does not automatically translate into a need for a traffic signal. A signal warrant would still need to be met. There are many instances where only a few vehicles are experiencing LOS D, E, or F on the minor approach while the whole intersection operates at an acceptable LOS. A signal is usually not warranted under such conditions.

Table 2 summarizes the relationship between delay and LOS for unsignalized intersections. At side-street stop-controlled intersections, the delay is calculated for each stop-controlled movement, the left-turn movement from the major street, as well as the intersection average. The intersection average delay and highest movement/approach delay are reported for side street stop-controlled intersections.

Table 2: Unsignalized Intersection LOS Criteria

LOS	Driver's Perception and Traffic Operation Description	Delay in Seconds
A	Little or no delays	< 10
B	Short traffic delays	> 10 – 15
C	Average traffic delays	> 15 - 25
D	Long traffic delays	> 25 - 35
E	Very long traffic delays	> 35 – 50
F	Extreme traffic delays with intersection capacity exceeded	> 50

VEHICLE MILES TRAVELLED ANALYSIS

Consistent with the July 1, 2020 California State Legislature (Bill SB 743) and recent CCTA VMT guidelines for development projects, a quantitative analysis of the proposed project's VMT is provided.

SB743 VMT Guidelines

According to the City of Clayton's VMT Guidelines, the change in overall VMT should be used to assess the transportation impacts for residential developments. The city requires that mitigation measures in the form of Transportation Demand Management (TDM) plan reduce the overall VMT by 15%.

SIGNIFICANCE CRITERIA

City Standards

The following is the City's criteria of significance to determine the potential impacts associated with a proposed project or action:

The City's 2000 General Plan, states that "..measures are intended to maintain a level of service of D or better at all signalized intersections and mid-block roadway segments."

Caltrans Standards

Facilities under the jurisdiction of Caltrans include freeway segments, ramps, ramp terminals, and arterials. Although Caltrans has not designated a LOS standard, Caltrans' Guide for the Preparation of Traffic Impact Studies (December 2002) indicates attempts to maintain LOS of a State highway facility between the LOS "C/D" threshold. When existing State highway facilities are operating at higher levels of service than noted above, 20-year forecasts or general plan build-out analysis for the facility should be considered to establish equitable project contributions to local development impact fee programs that address cumulative traffic impacts.

Regional Plans and Policies

The Contra Costa Transportation Authority (CCTA) is the County's Congestion Management Agency. CCTA works with local jurisdictions to provide countywide transportation planning to help meet demands and improve Contra Costa County's transportation system. CCTA prepared the Travel Demand Forecast Model that was used to estimate cumulative volume forecasts, and VMT estimates for this study.

CEQA Significance Criteria

With the passage of Senate Bill 743, the City of Clayton has transitioned to a VMT metric to assess California Environmental Quality Act (CEQA) impacts. Historically, the City of Clayton has used level of service (LOS) methodology to assess traffic operations and analyze environmental impacts for projects in accordance with CEQA. In 2013, Senate Bill 743 established new legislation mandating a change to the CEQA Guidelines which replaces the LOS metric with a VMT metric. Briefly, the shift from LOS to VMT focuses on regional traffic patterns and reducing greenhouse gas (GHG) emissions, rather than vehicle delays on local roadway networks.

4.0 EXISTING TRAFFIC CONDITION

This section presents the assessment of traffic conditions without the proposed project.

INTERSECTION LEVEL OF SERVICE

To accurately model the traffic condition, AMG created a Synchro traffic analysis model to determine the intersection LOS. The Existing Conditions traffic operations were evaluated based on levels of service criteria using Synchro. The macroscopic simulation model, Synchro, was used to evaluate several measures (such as lane geometries, signal optimization, signal phasing and traffic control) at the study intersections.

The results of the LOS analysis for the existing intersections are shown in **Table 3**. Both intersections are currently signalized intersections and would operate at an acceptable LOS D or better.

Table 3: Existing LOS of Study Intersections

ID	Intersection	Existing Control	Existing			
			A.M.		P.M.	
			Delay	LOS	Delay	LOS
1	Clayton Rd/Oakhurst Dr	Signal	43.8	D	41.5	D
2	Clayton Rd/Peacock Dr	Signal	16.2	B	12.5	B

Detailed level of service worksheets are provided in **Appendix B.**

5.0 NEAR-TERM (NO PROJECT) CONDITION

This section presents the assessment of near-term traffic conditions without the proposed project. City staff provided a list of approved projects and projects under construction from the City for near-term analysis. [2] Four approved projects were provided. Only Oak Creek Canyon could have some influence on traffic projections for the Peacock Creek project as it is the only project located east of the golf course. The others are located to the west of the site. Oak Creek Canyon consists of six single-family units and estimated to generate approximately five and six trips respectively during the AM and PM peak hour. The trips generated from the Oak Creek Canyon project were used for the near-term analysis.

The list of list of approved projects are contained in **Appendix C.**

INTERSECTION LEVEL OF SERVICE

Figure 3 shows the Near-Term (No Project) Conditions peak hour turning movement volumes and lane geometry.

The results of the LOS analysis for the Near-Term (No Project) scenario are shown in **Table 4**. Similar to the Existing Conditions, both intersections would operate at an acceptable LOS D or better.

Table 4: Near-Term (No Project) LOS of Study Intersections

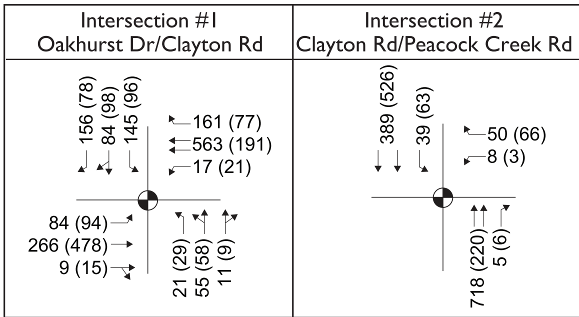
			Existing				Near-Term (No Project)			
ID	*Intersection*	*Existing Control*	*A.M.*		*P.M.*		*A.M.*		*P.M.*	
			Delay	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*
1	Clayton Rd/Oakhurst Dr	Signal	43.8	D	41.5	D	43.7	D	41.5	D
2	Clayton Rd/Peacock Dr	Signal	16.2	B	12.5	B	16.2	B	12.5	B

Detailed level of service worksheets are provided in **Appendix C.**

[2] *Email October 25, 2022*

Near Term (No Project) Peak Hour Volumes and Turning Movements

Figure 3



Base map: Esri

Legend

- ❶ Study Intersection
- Traffic Signal
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume

Intersections

- ❶ Clayton Rd & Oakhurst Dr/Center St
- ❷ Clayton Rd & Peacock Creek Dr

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6.0 TRIP GENERATION AND DISTRIBUTION METHODOLOGY

The proposed project will consist of 30 townhomes. It will consist of 3-story townhomes each with 2-car garages, in four buildings (one with 4 units, one with 8 units, two with 9 units), all fronting on an internal private drive with access from Peacock Creek Drive. **Figure 4** shows the proposed project site plan.

TRIP GENERATION

Trip generation is defined as the number of "vehicle trips" produced by a particular land use or project. A trip is defined as a one-direction vehicle movement. The total number of trips generated by each land use includes the inbound and outbound trips.

The trip generation estimates for the proposed land use (Multifamily Housing (Mid-Rise)) was calculated using the standard reference Trip Generation, 11th Edition, published by the Institute of Transportation Engineers (ITE).

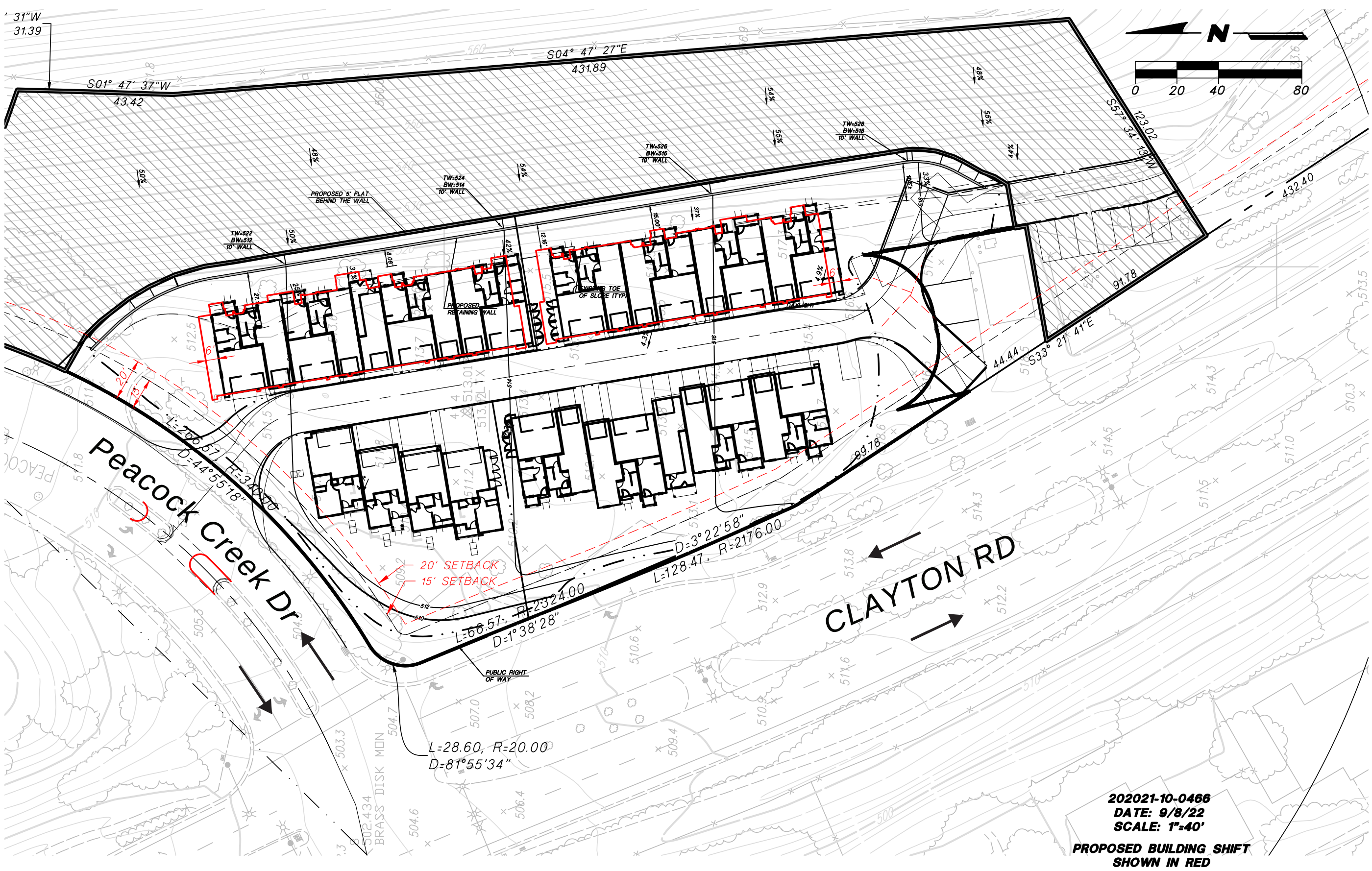
The estimated potential trip generation of the proposed project is shown in **Table 5.** It is estimated that the project will generate approximately 12 trips during both the AM and PM peak hours.

Table 5: Proposed Project Trip Generation

Land Use	*ITE Code*	*Size*	*Unit*	**Daily**		*A.M. Peak*				*P.M. Peak*			
				Rate	**Total**	*Rate*	*In*	*Out*	*Total*	*Rate*	*In*	*Out*	*Total*
Town Home	ITE 221	30	DU	4.54	136	0.37	3	9	12	0.39	7	5	12

Note:
Based on ITE Source: ITE Trip Generation Manual 11th Edition, 2022

Proposed Project Site Plan



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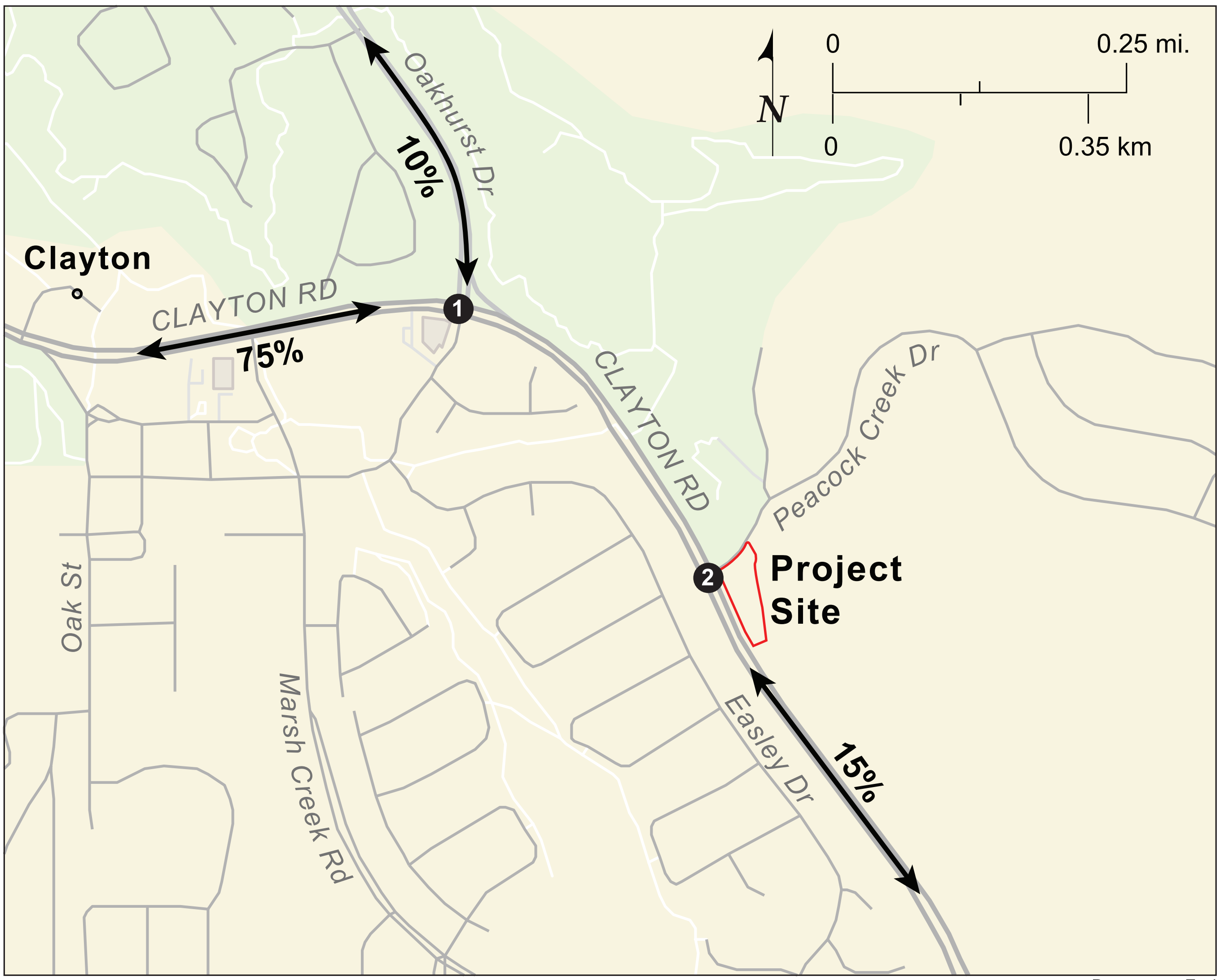
AMG ADVANCED MOBILITY GROUP

TRIP DISTRIBUTION

Trip distribution is a process that determines in what proportion vehicles would be expected to travel between a project site and various destinations outside the project study area. The process of trip assignment determines the various routes that vehicles would take from the project site to each destination using the estimated trip distribution.

The project is expected to "generate" and "attract" trips throughout the City and from other locations throughout the area. Directional trip distribution for project generated trips was estimated based on existing traffic flow patterns, geographic location of the project site, and location of other similar destinations. The estimated trip distribution patterns are shown on **Figure 5** and project only trips are shown on **Figure 6.**

Project Trip Distributions

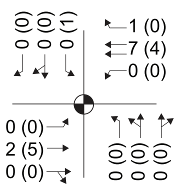
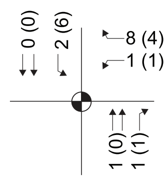


Base map: Esri

Legend

- Study intersection location
- Primary distribution

Project Only Peak Hour Volumes and Turning Movements

Intersection #1 Oakhurst Dr/Clayton Rd	Intersection #2 Clayton Rd/Peacock Creek Rd
	

Base map: Esri

Legend

- Study Intersection
- Traffic Signal
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume

Intersections

1. Clayton Rd & Oakhurst Dr/Center St
2. Clayton Rd & Peacock Creek Dr

7.0 EXISTING PLUS PROJECT TRAFFIC CONDITION

This section presents the assessment of potential transportation impacts of the proposed Peacock Creek Townhomes project.

INTERSECTION LEVEL OF SERVICE ANALYSIS

Figure 7 shows the Existing plus Project Conditions peak hour turning movement volumes and lane geometry. **Table 6** shows the LOS under Existing plus Project Conditions. It is estimated that both intersections will continue to operate at acceptable LOS D or better. There is a slight increase in delay during the PM peak hour at the intersection of Peacock Drive/Clayton Road, but the intersection will continue to operate at LOS B. Detailed level of service worksheets is provided in **Appendix D.**

Table 6: Existing plus Proposed Project Intersection LOS

			Existing				Existing+Project			
ID	Intersection	Existing Control	A.M.		P.M.		A.M.		P.M.	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Clayton Rd/Oakhurst Dr	Signal	43.8	D	41.5	D	44.4	D	41.5	D
2	Clayton Rd/Peacock Dr	Signal	16.2	B	12.5	B	16.2	B	12.9	B

Detailed level of service worksheets is provided in **Appendix D.**

VMT ESTIMATES & TRANSPORTATION DEMAND MANAGEMENT (TDM)

SB 743 guidelines recommend that VMT thresholds for residential and employment-based land use projects be set at fifteen percent below the existing baseline city residential VMT/capita or regional employment VMT/employee.

Based on the data contained in the Contra Costa Transportation Authority Travel Demand Model[3], it was shown that the City of Clayton has a home-based VMT per resident of 23.23 as shown is **Exhibit 2.** 15% below baseline threshold is 19.75 VMT/resident.

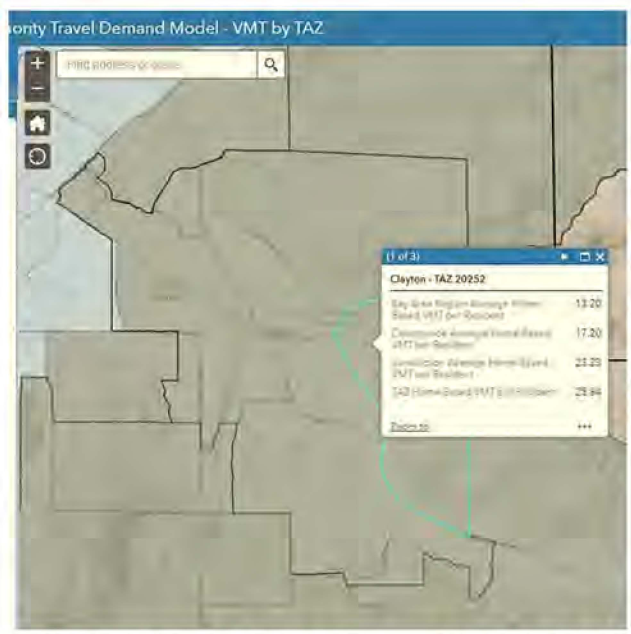


Exhibit 2: City of Clayton Average VMT/Resident

AMG reviewed big-data of trips and work data for census tract that contains the proposed project. Replica[4] was used to

[3] *VMT by Traffic Analysis Zone (TAZ) 20252*
[4] *Replica uses activity-based travel models that simulate the movements of residents, visitors, and commercial vehicles in a given area. Data outputs can be queried down to the network link level. Replica is a nationwide activity-based model updated each week with*

estimate the potential trip reductions since it is well known that many workers continue to work from home. The census data indicated that approximately 61.6% are employed and 55.6% work remotely as shown in **Table 7.** A copy of the Replica for the census tract is contained in **Appendix D.**

Table 7: Estimates of Remote Work (Replica Data)

	Project Description	
	DU	**Estimated Project Population** [A]
	30	83
		Total Population + Project
	VMT/Capita	From the CCTA model
	23.23	
Estimates of Project Remote Work (Replica Data)		
		Notes
Assumed Work Population (Pop)	51	61.6% Employed
Assumed Remote Work Pop	27	55.6% Remote Work
Reduced Remote VMT	618	VMT reduction for remote work
VMT of non-remote workers	563	
VMT others	742	
Estimated new VMT	1,306	VMT to reflect remote workers
New VMT per capita	**15.77**	
Source: Replica Data (2024)		
Employment %	*61.6*	
Remote work %	*55.6*	
Worked in person %	*44.4*	

Source:

[A] - *Average number of people per household = 2.76*
https://www.census.gov/quickfacts/fact/table/claytoncitycalifornia/PST045224

Based on the information, it was estimated that the potential reduction in VMT due to remote work is approximately 618 as shown in **Table 7.** The resulting total VMT due to the project is approximately 563 and 15.77 VMT/Capita. Under the assumption as indicated above, the proposed project VMT/Capita would not contribute to a significant impact since it is less than the 15% below baseline threshold of 19.75 VMT/resident as mentioned above.

Transportation Demand Management (TDM)

Project VMT impacts are expected to be minor because of its relatively small size.

The project supports and will promote transportation demand management (TDM) plan which will result in reduction of vehicle trips to/from the project site.

Based on the location of the project, and review of Technical Procedures of CCTA[5], the recommended TDM measures which are applicable to the and estimated effective percentage reductions for the project are shown in **Table 8.** It is estimated that the potential VMT reduction strategies could result in approximately 25% reduction.

Table 8: Potential VMT Reduction Strategies

CCTA Strategies	TDM Strategy	Maximum Potential VMT Reduction for Affected Trips	Percent Use Estimated	Comments
1	Increase residential density	30%	15%	Medium density housing on Clayton Road, convenience to downtown, and compatibility with city housing goals and state housing mandates.
18	Provide pedestrian network improvements	6.40%	3%	Project provides connection to sidewalk and new crosswalk on Clayton Road. Direct connection to downtown.
25	Extend transit network coverage/hours	4.60%	2%	Will work with County Connection to extend coverage
26	Increase transit service frequency	11.30%	5%	Will work with County Connection (Bus Service for Lines 10 and 310) to inxcrease frequency.
	Total Potential VMT Reduction		**25%**	

---

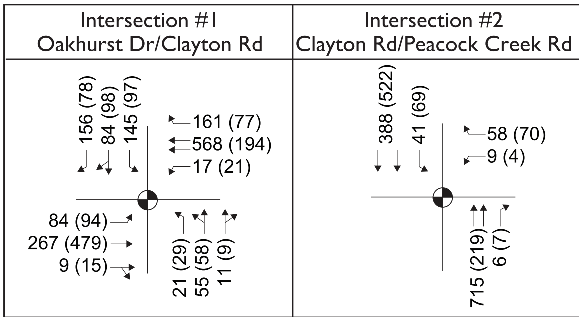
near-real-time data on mobility, travel patterns, VMT and land use at census-tract-level level. Replica Big Data available for Fall 2024 data for Census Tract 3553.08 was used.

[5] *CCTA Technical Procedures, November 2022, Appendix 1. Summary of Potential VMT Reduction Strategies*

City of Clayton - Traffic Impact Study for Peacock Creek Townhomes

Existing Plus Project Peak Hour Volumes

Figure 7



Base map: Esri

Legend

- ❶ Study Intersection
- Traffic Signal
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume

Intersections

- ❶ Clayton Rd & Oakhurst Dr/Center St
- ❷ Clayton Rd & Peacock Creek Dr

AMG ADVANCED MOBILITY GROUP

PROPOSED ACCESS, PARKING AND CIRCULATION

The proposed site plan shows a driveway on Peacock Creek Drive as shown in **Figure 3.** Currently there is a raised median on Peacock Creek Drive as shown in **Exhibit 3.** The raised median is approximately 145 feet from the intersection at Clayton Road.

The proposed project proposed to modify the median and provide an access for the proposed project. Project traffic would have full access at the median opening.

Currently the total northbound and southbound peak hour volumes on Peacock Creek Drive are approximately 60 and 79 respectively during the AM and PM peak hour. This would translate to approximately one car a minute traveling on Peacock Creek Drive during the peak hour.

It is estimated that exiting project traffic of approximately nine and five peak hour trips respectively during the AM and PM peak would have more than adequate gap to exit through the median opening.

Exhibit 3: Median on Peacock Creek Drive

8.0 NEAR-TERM PLUS PROJECT CONDITIONS

This section presents the assessment of potential transportation impacts of Near-Term plus Project conditions. **Figure 8** shows the Near-Term plus Project Conditions peak hour turning movement volumes and lane geometry.

INTERSECTION LEVEL OF SERVICE ANALYSIS

The results of the LOS analysis for the Near-Term plus Project scenario are shown in **Table 9.** It is estimated that both intersections will operate at acceptable LOS D or better. There is a slight increase in delay during the PM peak hour at the intersection of Peacock Drive/Clayton Road, but the intersection will continue to operate at LOS B.

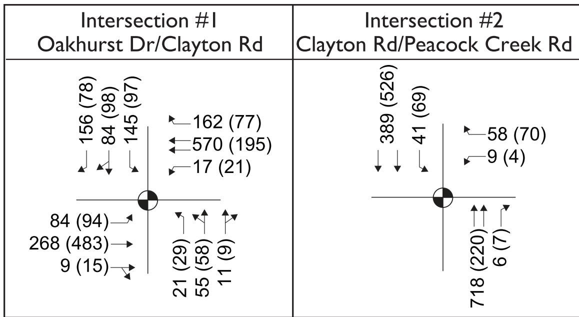
Table 9: Near-Term plus Proposed Project Intersection LOS

			Near-Term (NP)				Near-Term + Project			
ID	*Intersection*	*Existing Control*	*A.M.*		*P.M.*		*A.M.*		*P.M.*	
			Delay	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*
1	Clayton Rd/Oakhurst Dr	Signal	43.7	D	41.5	D	44.5	D	41.5	D
2	Clayton Rd/Peacock Dr	Signal	16.2	B	12.5	B	16.3	B	12.9	B

Detailed level of service worksheets is provided in **Appendix E.**

Near Term Plus Project Peak Hour Volumes

Figure 8



Base map: Esri

Legend

- ❶ Study Intersection
- Traffic Signal
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume

Intersections

- ❶ Clayton Rd & Oakhurst Dr/Center St
- ❷ Clayton Rd & Peacock Creek Dr

AMG ADVANCED MOBILITY GROUP

9.0 CUMULATIVE (NO PROJECT) CONDITIONS

Cumulative conditions represent conditions with planned transportation network changes and planned future land use development. AMG used the cumulative volumes based on the Contra Costa County model. The future Cumulative 2040 model volumes of roadways in the area were provided to AMG.[6]

The model plots showed 2018 and 2040 peak hour model volumes for the Clayton area. AMG derive an annual rate of growth for each intersection. The annual growth was used to estimate cumulative 20-year growth for each intersection. The model plot is contained in **Appendix F.**

INTERSECTION LEVEL OF SERVICE ANALYSIS

Figure 9 shows the Cumulative No Project Conditions peak hour turning movement volumes and lane geometry.

The results of the LOS Analysis for the Cumulative No Project scenario are shown in **Table 10.** It is estimated that there is a slight increase in delay at both intersections during the PM peak hour but both intersections will continue to operate at acceptable level LOS D or better.

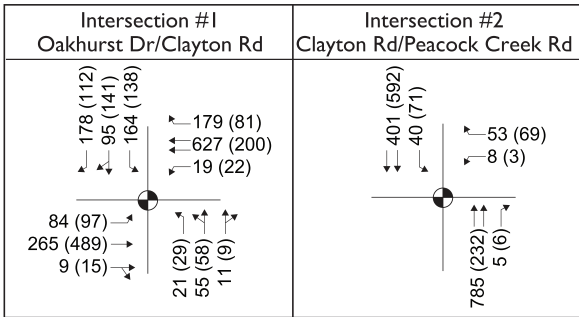
Table 10: Cumulative (No Project) Intersection LOS

ID	Intersection	Existing Control	Existing				Cumulative No Project			
			A.M.		P.M.		A.M.		P.M.	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Clayton Rd/Oakhurst Dr	Signal	43.8	D	41.5	D	51.6	D	42.4	D
2	Clayton Rd/Peacock Dr	Signal	16.2	B	12.5	B	18.0	B	12.9	B

Detailed level of service worksheets is provided in **Appendix F.**

[6] *Contra Costa Transportation Authority staff Matt Kelly, Senior Transportation Planner, Email of November 1, 2022*

Cumulative No Project Peak Hour Volumes



Base map: Esri

Legend

- ❶ Study Intersection
- Traffic Signal
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume

Intersections

- ❶ Clayton Rd & Oakhurst Dr/Center St
- ❷ Clayton Rd & Peacock Creek Dr

AMG ADVANCED MOBILITY GROUP

10.0 CUMULATIVE PLUS PROJECT CONDITIONS

This section presents the assessment of potential transportation impacts of the proposed project under Cumulative plus Project scenario.

INTERSECTION LEVEL OF SERVICE ANALYSIS

The results of the LOS Analysis for the Cumulative plus Project scenario are shown in **Table 11**. There is a slight increase in delay during the PM peak hour at the intersection of Peacock Drive/Clayton Road, but the intersection will continue to operate at LOS B. Both intersections will operate at acceptable level LOS D or better.

Figure 10 shows the Cumulative plus Project Conditions peak hour turning movement volumes and lane geometry.

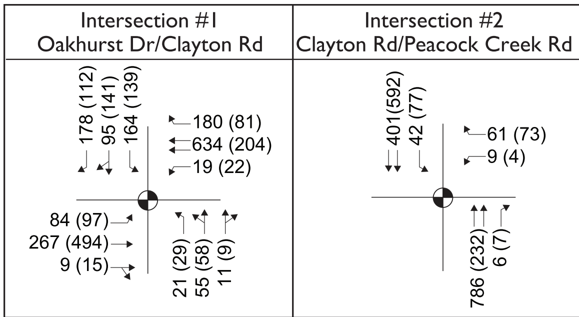
Table 11: Cumulative plus Project Intersection LOS

ID	Intersection	Control	Cumulative No Project				Cumulative + Project			
			A.M.		P.M.		A.M.		P.M.	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Clayton Rd/Oakhurst Dr	Signal	51.6	D	42.4	D	53.2	D	42.2	D
2	Clayton Rd/Peacock Dr	Signal	18.0	B	12.9	B	18.0	B	13.4	B

Detailed level of service worksheets is provided in **Appendix G.**

Cumulative Plus Project Peak Hour Volumes

Figure 10



Base map: Esri

Legend

- Study Intersection
- Traffic Signal
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume

Intersections

1. Clayton Rd & Oakhurst Dr/Center St
2. Clayton Rd & Peacock Creek Dr

AMG ADVANCED MOBILITY GROUP

11.0 CONCLUSION

Based on the results of the analysis, the following is a summary of our findings:

Proposed Project Trip Generation

- The project will generate approximately 12 total trips during both the AM and PM peak hours.

Existing Traffic Conditions

- Both study intersections are estimated to operate at an acceptable Level of Service (LOS) D or better.

Near-Term Traffic Conditions

- Similar to the Existing Conditions, both intersections would operate at an acceptable LOS D or better.

Existing plus Project Traffic Conditions

- It is estimated that both intersections will continue to operate at acceptable LOS D or better. There is a slight increase in delay during the PM peak hour at the intersection of Peacock Drive/Clayton Road, but the intersection will continue to operate at LOS B.

Near-Term plus Project Traffic Conditions

- Both intersections are estimated to operate at acceptable Level of Service (LOS) D or better. There is a slight increase in delay during the PM peak hour at the intersection of Peacock Drive/Clayton Road, but the intersection will continue to operate at LOS B.

Proposed Project Vehicle Miles Travelled (VMT)

- The proposed project results of 15.77 VMT/Capita would not contribute to a significant impact since it is less than the 15% below baseline threshold of 19.75 VMT/resident of the city.

Cumulative (No Project) Traffic Conditions

- It is estimated that there is a slight increase in delay at both intersections during the PM peak hour but both intersections will continue to operate at acceptable level LOS D or better.

Cumulative plus Project Traffic Conditions

- There is a slight increase in delay during the PM peak hour at the intersection of Peacock Drive/Clayton Road, but the intersection will continue to operate at LOS B. Both intersections will operate at acceptable level LOS D or better.

Due to the low number of project-generated trips, the project would not be expected to adversely impact operations at nearby signalized intersections or roadways. The proposed project is expected to result in a *less than-significant traffic* impact.

REFERENCES

1. *ITE Trip Generation Manual. 11th Edition, 2022.*

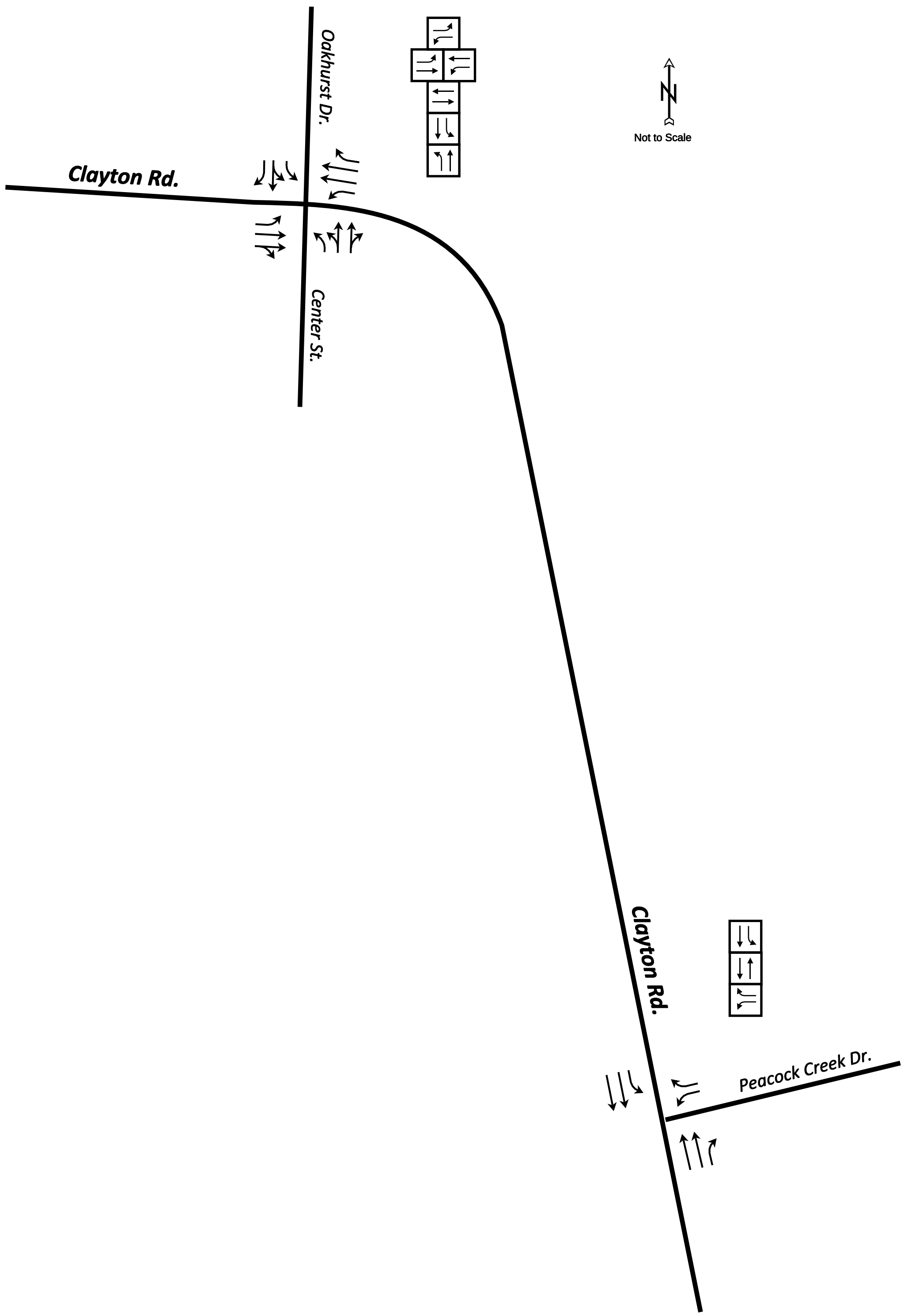
Advanced Mobility Group

Christopher Thnay, PE, AICP,	Project Manager
Andrea Flores, EIT,	Project Staff

Persons Consulted

Dana Ayers, AICP,	Community Development Director (Former)

Appendix A TRAFFIC VOLUME COUNTS



City of Clayton

Existing Lane Configuration
and Signal Phasing

October 2022	Prepared by: TCP

TRAFFIC COUNTS PLUS
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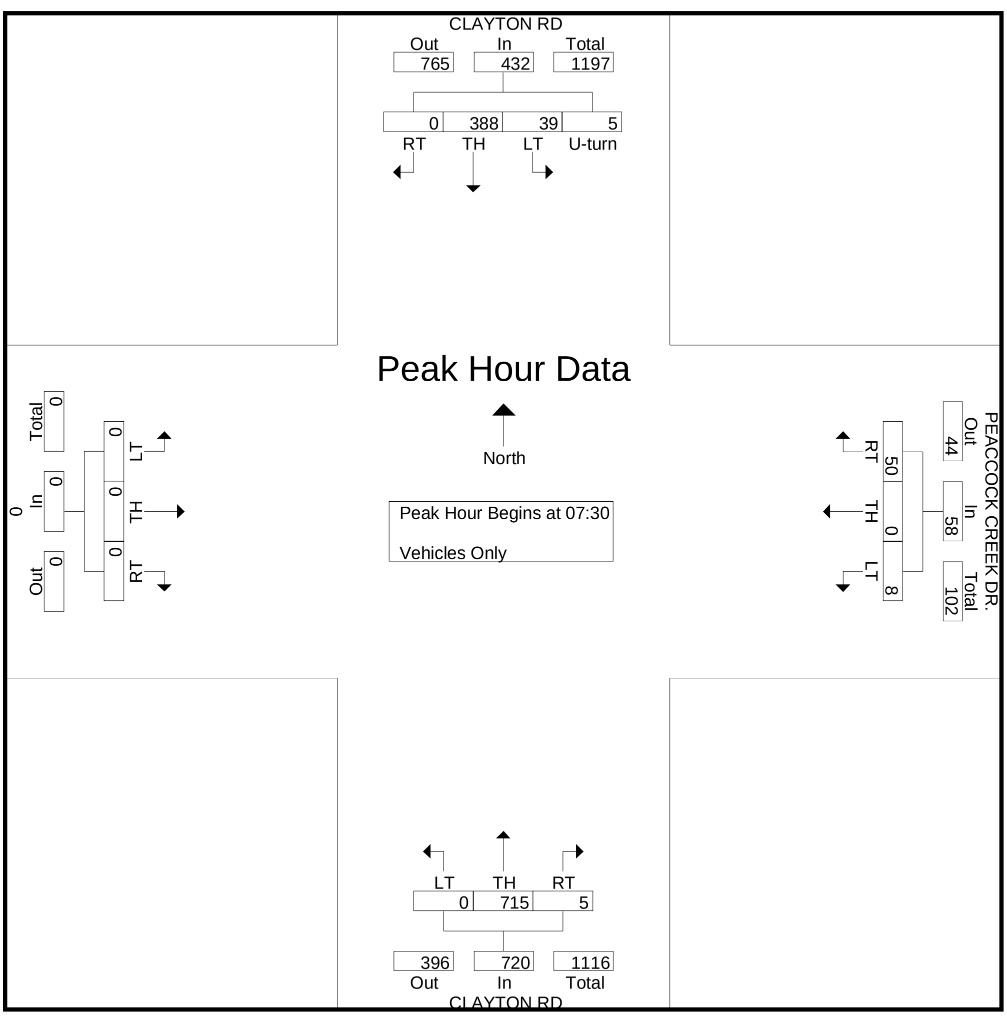
CITY OF CLAYTON
Clayton Rd. & Peackock Creek Dr.
Latitude: 37.939347
Longitude: -121.927069

File Name : clayton-peacock-a
Site Code : 2
Start Date : 10/4/2022
Page No : 1

Groups Printed- Vehicles Only

	CLAYTON RD Southbound					PEACCOCK CREEK DR. Westbound				CLAYTON RD Northbound				0 Eastbound				
Start Time	RT	TH	LT	U-turn	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
07:00	0	23	9	1	33	15	0	1	16	1	248	0	249	0	0	0	0	298
07:15	0	36	11	0	47	9	0	0	9	4	249	0	253	0	0	0	0	309
07:30	0	48	9	1	58	18	0	0	18	1	221	0	222	0	0	0	0	298
07:45	0	83	12	1	96	12	0	1	13	0	129	0	129	0	0	0	0	238
Total	0	190	41	3	234	54	0	2	56	6	847	0	853	0	0	0	0	1143
08:00	0	116	10	2	128	9	0	3	12	2	187	0	189	0	0	0	0	329
08:15	0	141	8	1	150	11	0	4	15	2	178	0	180	0	0	0	0	345
08:30	0	56	11	0	67	11	0	0	11	2	109	0	111	0	0	0	0	189
08:45	0	41	11	0	52	11	0	0	11	0	70	0	70	0	0	0	0	133
Total	0	354	40	3	397	42	0	7	49	6	544	0	550	0	0	0	0	996
Grand Total	0	544	81	6	631	96	0	9	105	12	1391	0	1403	0	0	0	0	2139
Apprch %	0	86.2	12.8	1		91.4	0	8.6		0.9	99.1	0		0	0	0		
Total %	0	25.4	3.8	0.3	29.5	4.5	0	0.4	4.9	0.6	65	0	65.6	0	0	0	0	

	CLAYTON RD Southbound					PEACCOCK CREEK DR. Westbound				CLAYTON RD Northbound				0 Eastbound				
Start Time	RT	TH	LT	U-turn	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:30 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 07:30																		
07:30	0	48	9	1	58	**18**	0	0	**18**	1	**221**	0	**222**	0	0	0	0	298
07:45	0	83	**12**	1	96	12	0	1	13	0	129	0	129	0	0	0	0	238
08:00	0	116	10	**2**	128	9	0	3	12	**2**	187	0	189	0	0	0	0	329
08:15	0	**141**	8	1	**150**	11	0	**4**	15	2	178	0	180	0	0	0	0	**345**
Total Volume	0	388	39	5	432	50	0	8	58	5	715	0	720	0	0	0	0	1210
% App. Total	0	89.8	9	1.2		86.2	0	13.8		0.7	99.3	0		0	0	0		
PHF	.000	.688	.813	.625	.720	.694	.000	.500	.806	.625	.809	.000	.811	.000	.000	.000	.000	.877



TRAFFIC COUNTS PLUS
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CITY OF CLAYTON
Clayton Rd. & Peackock Creek Dr.
Latitude: 37.939347
Longitude: -121.927069

File Name : clayton-peacock-p
Site Code : 2
Start Date : 10/4/2022
Page No : 1

Groups Printed- Vehicles Only

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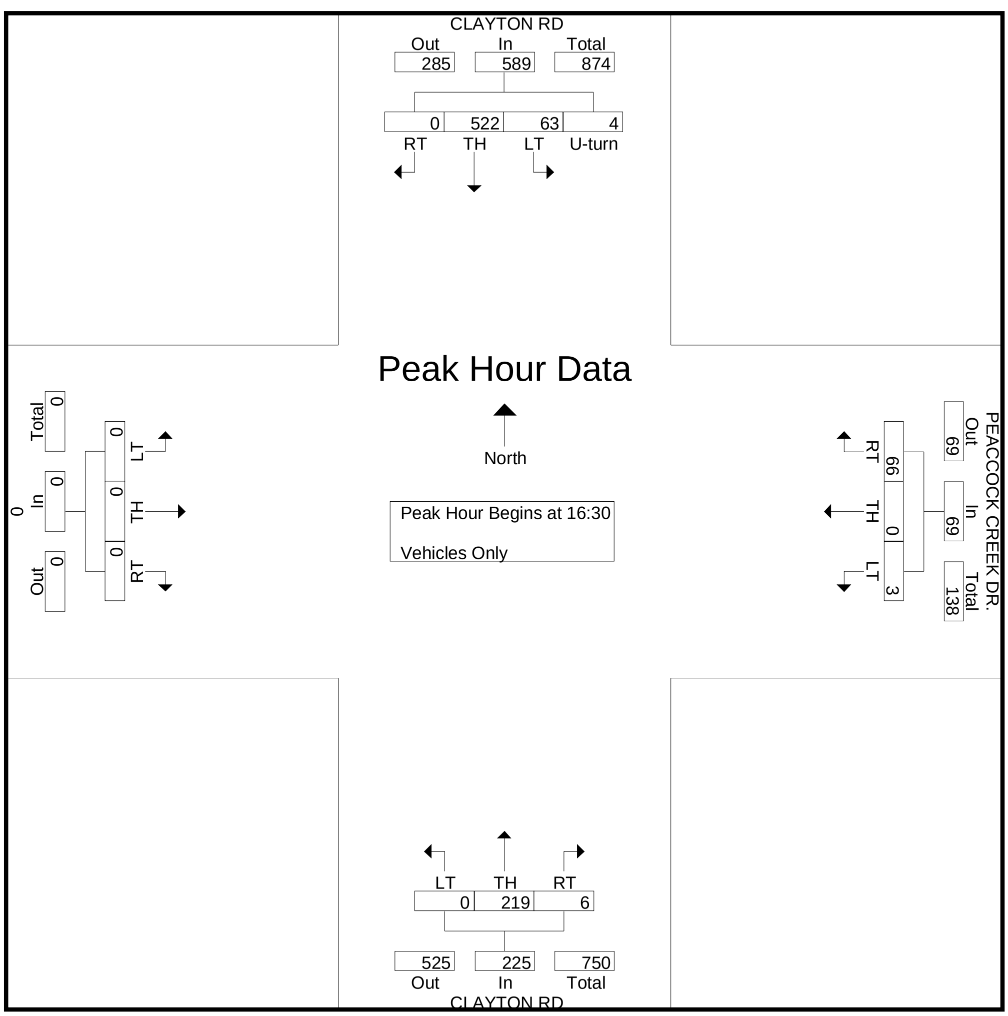
Start Time	RT	TH	LT	U-turn	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
16:00	0	98	13	0	111	16	0	0	16	0	46	0	46	0	0	0	0	173
16:15	0	113	10	2	125	14	0	1	15	2	39	0	41	0	0	0	0	181
16:30	0	114	21	2	137	19	0	1	20	2	36	0	38	0	0	0	0	195
16:45	0	124	12	1	137	16	0	1	17	2	53	0	55	0	0	0	0	209
Total	0	449	56	5	510	65	0	3	68	6	174	0	180	0	0	0	0	758
17:00	0	143	12	1	156	15	0	1	16	1	65	0	66	0	0	0	0	238
17:15	0	141	18	0	159	16	0	0	16	1	65	0	66	0	0	0	0	241
17:30	0	112	12	1	125	10	0	5	15	1	41	0	42	0	0	0	0	182
17:45	0	112	9	0	121	16	0	2	18	1	38	0	39	0	0	0	0	178
Total	0	508	51	2	561	57	0	8	65	4	209	0	213	0	0	0	0	839
Grand Total	0	957	107	7	1071	122	0	11	133	10	383	0	393	0	0	0	0	1597
Apprch %	0	89.4	10	0.7		91.7	0	8.3		2.5	97.5	0		0	0	0		
Total %	0	59.9	6.7	0.4	67.1	7.6	0	0.7	8.3	0.6	24	0	24.6	0	0	0	0	

	CLAYTON RD Southbound					PEACCOCK CREEK DR. Westbound				CLAYTON RD Northbound				0 Eastbound				
Start Time	RT	TH	LT	U-turn	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:30 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 16:30																		
16:30	0	114	**21**	**2**	137	**19**	0	**1**	**20**	**2**	36	0	38	0	0	0	0	195
16:45	0	124	12	1	137	16	0	1	17	2	53	0	55	0	0	0	0	209
17:00	0	**143**	12	1	156	15	0	1	16	1	**65**	0	**66**	0	0	0	0	238
17:15	0	141	18	0	**159**	16	0	0	16	1	65	0	66	0	0	0	0	**241**
Total Volume	0	522	63	4	589	66	0	3	69	6	219	0	225	0	0	0	0	883
% App. Total	0	88.6	10.7	0.7		95.7	0	4.3		2.7	97.3	0		0	0	0		
PHF	.000	.913	.750	.500	.926	.868	.000	.750	.863	.750	.842	.000	.852	.000	.000	.000	.000	.916



TRAFFIC COUNTS PLUS
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CITY OF CLAYTON
Oakhurst Dr. & Clayton Rd.
Latitude: 37.942590
Longitude: -121.930940

File Name : oakhurst-clayton-a
Site Code : 1
Start Date : 10/4/2022
Page No : 1

Groups Printed- Vehicles Only

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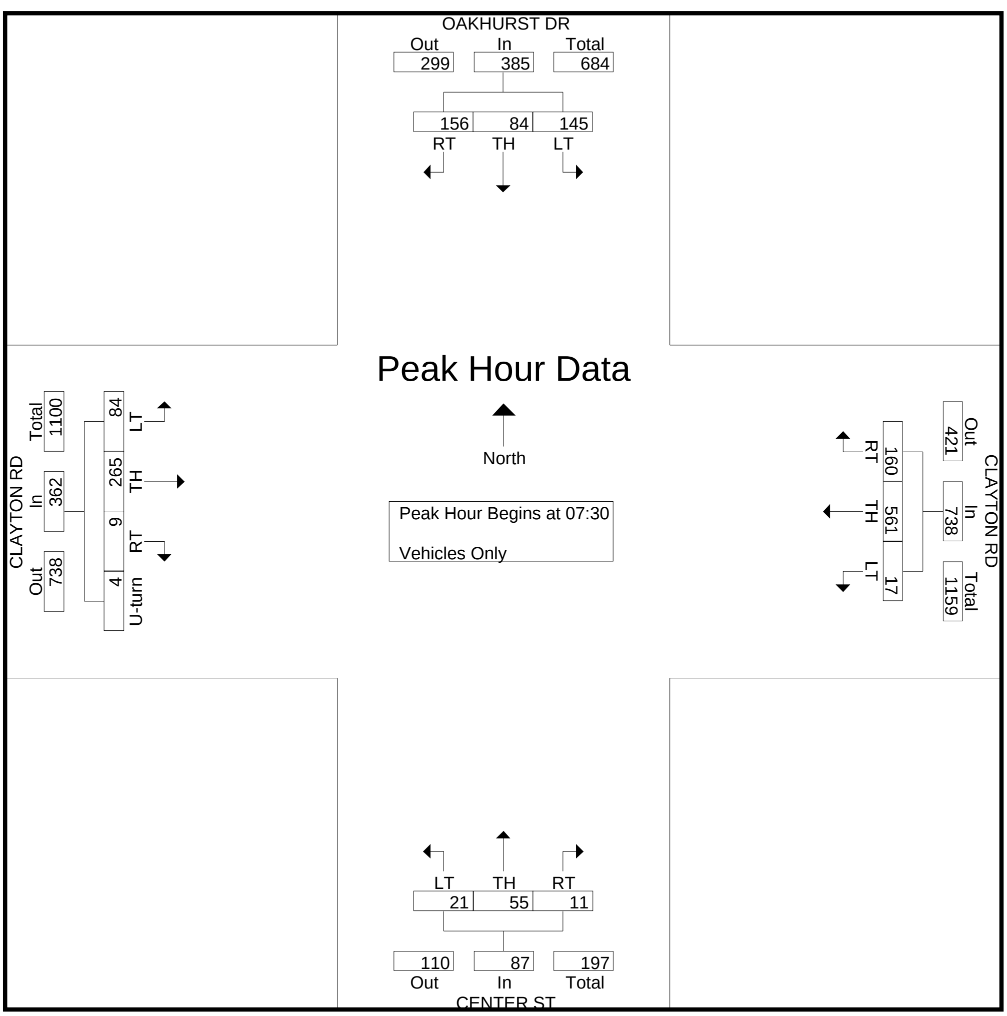
07:15	28	9	23	60	47	217	1	265	1	5	4	10	2	27	5	1	35	370
07:30	62	18	13	93	53	190	4	247	4	9	4	17	1	38	4	0	43	400
07:45	49	30	21	100	29	113	5	147	5	14	2	21	1	78	35	0	114	382
Total	158	60	72	290	178	715	10	903	11	43	13	67	5	158	49	1	213	1473
08:00	24	14	49	87	28	141	2	171	2	18	11	31	1	68	29	3	101	390
08:15	21	22	62	105	50	117	6	173	0	14	4	18	6	81	16	1	104	400
08:30	12	14	18	44	46	85	5	136	0	24	4	28	2	47	23	0	72	280
08:45	13	15	11	39	17	64	3	84	2	9	6	17	2	36	10	1	49	189
Total	70	65	140	275	141	407	16	564	4	65	25	94	11	232	78	5	326	1259
Grand Total	228	125	212	565	319	1122	26	1467	15	108	38	161	16	390	127	6	539	2732
Apprch %	40.4	22.1	37.5		21.7	76.5	1.8		9.3	67.1	23.6		3	72.4	23.6	1.1		
Total %	8.3	4.6	7.8	20.7	11.7	41.1	1	53.7	0.5	4	1.4	5.9	0.6	14.3	4.6	0.2	19.7	

	OAKHURST DR Southbound				CLAYTON RD Westbound				CENTER ST Northbound				CLAYTON RD Eastbound					
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	U-turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:30 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 07:30																		
07:30	**62**	18	13	93	**53**	**190**	4	**247**	4	9	4	17	1	38	4	0	43	**400**
07:45	49	**30**	21	100	29	113	5	147	**5**	14	2	21	1	78	**35**	0	**114**	382
08:00	24	14	49	87	28	141	2	171	2	**18**	**11**	**31**	1	68	29	**3**	101	390
08:15	21	22	**62**	**105**	50	117	**6**	173	0	14	4	18	**6**	**81**	16	1	104	400
Total Volume	156	84	145	385	160	561	17	738	11	55	21	87	9	265	84	4	362	1572
% App. Total	40.5	21.8	37.7		21.7	76	2.3		12.6	63.2	24.1		2.5	73.2	23.2	1.1		
PHF	.629	.700	.585	.917	.755	.738	.708	.747	.550	.764	.477	.702	.375	.818	.600	.333	.794	.983



TRAFFIC COUNTS PLUS
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CITY OF CLAYTON
Oakhurst Dr. & Clayton Rd.
Latitude: 37.942590
Longitude: -121.930940

File Name : oakhurst-clayton-p
Site Code : 1
Start Date : 10/4/2022
Page No : 1

Groups Printed- Vehicles Only

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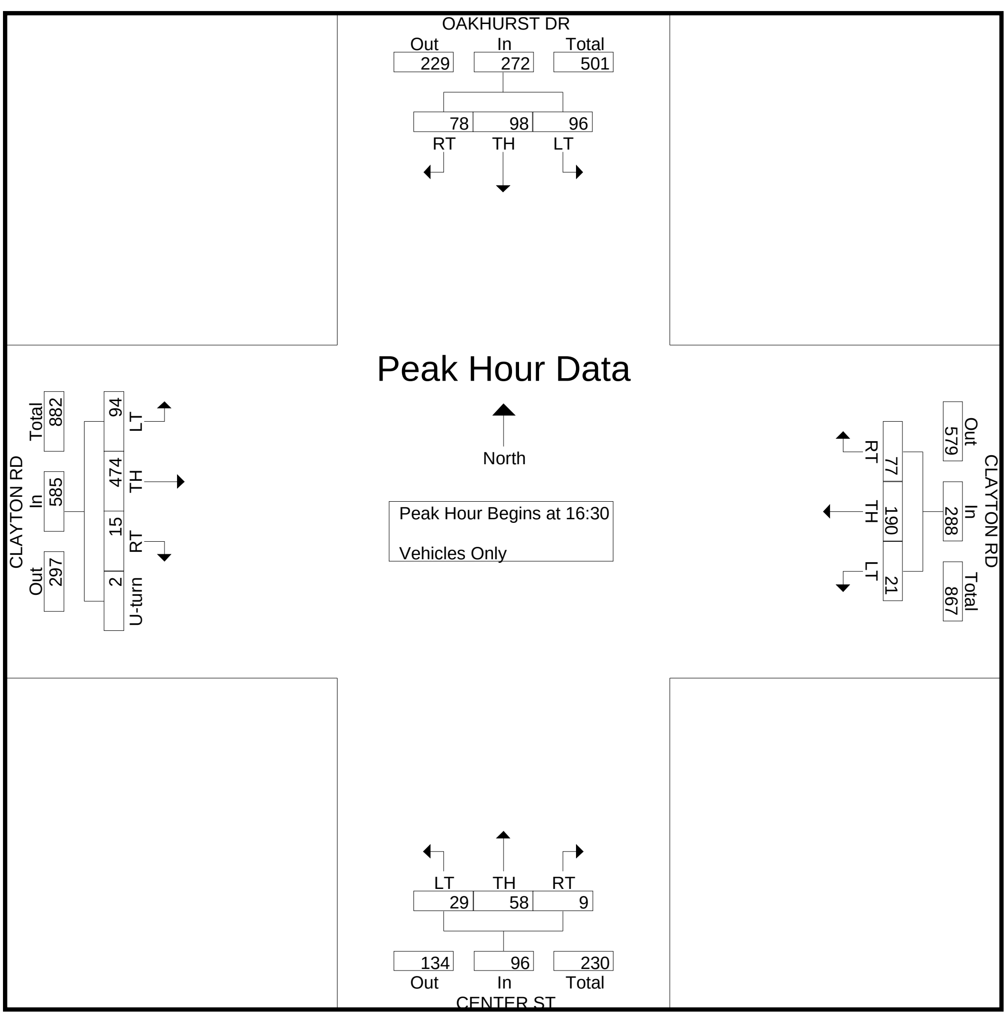
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	U-turn	App. Total	Int. Total
16:00	16	21	18	55	16	42	2	60	8	17	3	28	0	77	21	2	100	243
16:15	7	28	25	60	12	38	1	51	3	9	4	16	5	102	17	0	124	251
16:30	21	28	19	68	17	40	2	59	1	12	7	20	9	123	21	0	153	300
16:45	20	34	27	81	20	44	4	68	4	18	4	26	1	101	22	1	125	300
Total	64	111	89	264	65	164	9	238	16	56	18	90	15	403	81	3	502	1094
17:00	18	24	29	71	23	48	6	77	3	18	4	25	3	117	17	0	137	310
17:15	19	12	21	52	17	58	9	84	1	10	14	25	2	133	34	1	170	331
17:30	15	15	18	48	19	35	2	56	1	10	7	18	7	107	27	1	142	264
17:45	14	27	28	69	10	38	3	51	1	5	4	10	4	101	18	4	127	257
Total	66	78	96	240	69	179	20	268	6	43	29	78	16	458	96	6	576	1162
Grand Total	130	189	185	504	134	343	29	506	22	99	47	168	31	861	177	9	1078	2256
Apprch %	25.8	37.5	36.7		26.5	67.8	5.7		13.1	58.9	28		2.9	79.9	16.4	0.8		
Total %	5.8	8.4	8.2	22.3	5.9	15.2	1.3	22.4	1	4.4	2.1	7.4	1.4	38.2	7.8	0.4	47.8	

	OAKHURST DR Southbound				CLAYTON RD Westbound				CENTER ST Northbound				CLAYTON RD Eastbound					
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	U-turn	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:30 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 16:30																		
16:30	**21**	28	19	68	17	40	2	59	1	12	7	20	**9**	123	21	0	153	300
16:45	20	**34**	27	**81**	20	44	4	68	**4**	**18**	4	**26**	1	101	22	**1**	125	300
17:00	18	24	**29**	71	**23**	48	6	77	3	18	4	25	3	117	17	0	137	310
17:15	19	12	21	52	17	**58**	**9**	**84**	1	10	**14**	25	2	**133**	**34**	1	**170**	**331**
Total Volume	78	98	96	272	77	190	21	288	9	58	29	96	15	474	94	2	585	1241
% App. Total	28.7	36	35.3		26.7	66	7.3		9.4	60.4	30.2		2.6	81	16.1	0.3		
PHF	.929	.721	.828	.840	.837	.819	.583	.857	.563	.806	.518	.923	.417	.891	.691	.500	.860	.937



Appendix B INTERSECTION LOS ANALYSIS: EXISTING CONDITIONS LOS CALCULATION SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	265	9	17	561	160	21	55	11	145	84	156
Future Volume (vph)	84	265	9	17	561	160	21	55	11	145	84	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		0.95	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	1770	3502		1752	3504	1567	1610	3277		1681	1739	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3502		1752	3504	1567	1610	3284		1681	1770	1583
Peak-hour factor, PHF	0.60	0.82	0.38	0.71	0.74	0.76	0.48	0.76	0.55	0.59	0.70	0.63
Adj. Flow (vph)	140	323	24	24	758	211	44	72	20	246	120	248
RTOR Reduction (vph)	0	7	0	0	0	162	0	15	0	0	0	190
Lane Group Flow (vph)	140	340	0	24	758	49	40	81	0	180	186	58
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.23		0.06	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)	114	818		113	819	366	376	766		392	406	370
v/s Ratio Prot	c0.08	0.10		0.01	c0.22		c0.02	0.02		c0.11	0.11	
v/s Ratio Perm						0.03						0.04
v/c Ratio	1.23	0.42		0.21	0.93	0.13	0.11	0.11		0.46	0.46	0.16
Uniform Delay, d1	36.0	25.0		34.1	28.8	23.3	23.2	23.2		25.3	25.3	23.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	157.9	1.6		4.2	17.8	0.8	0.6	0.3		3.8	3.7	0.9
Delay (s)	193.9	26.6		38.4	46.7	24.1	23.7	23.5		29.2	29.0	24.4
Level of Service	F	C		D	D	C	C	C		C	C	C
Approach Delay (s)		74.7			41.7			23.5			27.2	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	50	715	5	39	388
Future Volume (veh/h)	8	50	715	5	39	388
Number	3	18	2	12	1	6
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	1863	1863	1863	1863	1844	1844
Adj Flow Rate, veh/h	16	72	883	8	48	562
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.50	0.69	0.81	0.63	0.81	0.69
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	586	523	1169	523	161	1768
Arrive On Green	0.33	0.33	0.33	0.33	0.09	0.50
Sat Flow, veh/h	1774	1583	3632	1583	1756	3596
Grp Volume(v), veh/h	16	72	883	8	48	562
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1756	1752
Q Serve(g_s), s	0.3	1.7	12.1	0.2	1.4	5.2
Cycle Q Clear(g_c), s	0.3	1.7	12.1	0.2	1.4	5.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	586	523	1169	523	161	1768
V/C Ratio(X)	0.03	0.14	0.76	0.02	0.30	0.32
Avail Cap(c_a), veh/h	586	523	1169	523	161	1768
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	12.3	12.8	16.3	12.3	23.1	8.0
Incr Delay (d2), s/veh	0.1	0.5	4.6	0.1	4.7	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.8	6.6	0.1	0.9	2.5
LnGrp Delay(d),s/veh	12.4	13.4	20.9	12.3	27.8	8.4
LnGrp LOS	B	B	C	B	C	A
Approach Vol, veh/h	88		891			610
Approach Delay, s/veh	13.2		20.8			10.0
Approach LOS	B		C			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	22.5				32.0		22.5
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	18.0				18.0		18.0
Max Q Clear Time (g_c+I1), s	3.4	14.1				7.2		3.7
Green Ext Time (p_c), s	0.0	2.1				2.5		0.2

Intersection Summary			
HCM 2010 Ctrl Delay			16.2
HCM 2010 LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	474	15	21	190	77	29	58	9	96	98	78
Future Volume (vph)	94	474	15	21	190	77	29	58	9	96	98	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		0.95	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3506		1752	3504	1567	1610	3292		1681	1762	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3506		1752	3504	1567	1610	3305		1681	1770	1583
Peak-hour factor, PHF	0.69	0.89	0.42	0.58	0.82	0.84	0.52	0.81	0.56	0.83	0.72	0.93
Adj. Flow (vph)	136	533	36	36	232	92	56	72	16	116	136	84
RTOR Reduction (vph)	0	6	0	0	0	70	0	12	0	0	0	64
Lane Group Flow (vph)	136	563	0	36	232	22	48	84	0	104	148	20
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.23		0.06	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)	114	819		113	819	366	376	769		392	411	370
v/s Ratio Prot	c0.08	c0.16		0.02	0.07		c0.03	0.03		0.06	c0.08	
v/s Ratio Perm						0.01						0.01
v/c Ratio	1.19	0.69		0.32	0.28	0.06	0.13	0.11		0.27	0.36	0.05
Uniform Delay, d1	36.0	26.9		34.4	24.2	22.9	23.3	23.2		24.1	24.7	22.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	145.2	4.7		7.3	0.9	0.3	0.7	0.3		1.6	2.4	0.3
Delay (s)	181.2	31.6		41.6	25.1	23.2	24.0	23.5		25.7	27.1	23.2
Level of Service	F	C		D	C	C	C	C		C	C	C
Approach Delay (s)		60.5			26.3			23.7			25.7	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	66	219	6	63	522
Future Volume (veh/h)	3	66	219	6	63	522
Number	3	18	2	12	1	6
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	1863	1863	1863	1863	1844	1844
Adj Flow Rate, veh/h	4	76	261	8	84	574
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.75	0.87	0.84	0.75	0.75	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	586	523	1169	523	161	1768
Arrive On Green	0.33	0.33	0.33	0.33	0.09	0.50
Sat Flow, veh/h	1774	1583	3632	1583	1756	3596
Grp Volume(v), veh/h	4	76	261	8	84	574
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1756	1752
Q Serve(g_s), s	0.1	1.8	2.9	0.2	2.5	5.3
Cycle Q Clear(g_c), s	0.1	1.8	2.9	0.2	2.5	5.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	586	523	1169	523	161	1768
V/C Ratio(X)	0.01	0.15	0.22	0.02	0.52	0.32
Avail Cap(c_a), veh/h	586	523	1169	523	161	1768
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	12.3	12.8	13.2	12.3	23.6	8.0
Incr Delay (d2), s/veh	0.0	0.6	0.4	0.1	11.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.9	1.5	0.1	1.7	2.7
LnGrp Delay(d),s/veh	12.3	13.4	13.6	12.3	35.2	8.5
LnGrp LOS	B	B	B	B	D	A
Approach Vol, veh/h	80		269			658
Approach Delay, s/veh	13.4		13.6			11.9
Approach LOS	B		B			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	22.5				32.0		22.5
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	18.0				18.0		18.0
Max Q Clear Time (g_c+I1), s	4.5	4.9				7.3		3.8
Green Ext Time (p_c), s	0.0	1.3				2.6		0.1

Intersection Summary		
HCM 2010 Ctrl Delay		12.5
HCM 2010 LOS		B

Appendix C INTERSECTION LOS ANALYSIS: NEAR-TERM (NO PROJECT) CALCULATION SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	266	9	17	563	161	21	55	11	145	84	156
Future Volume (vph)	84	266	9	17	563	161	21	55	11	145	84	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		0.95	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	1770	3486		1752	3504	1567	1610	3277		1681	1739	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	1770	3486		1752	3504	1567	1610	3277		1681	1739	1583
Peak-hour factor, PHF	0.60	0.82	0.25	0.71	0.74	0.76	0.48	0.76	0.55	0.59	0.70	0.56
Adj. Flow (vph)	140	324	36	24	761	212	44	72	20	246	120	279
RTOR Reduction (vph)	0	11	0	0	0	162	0	15	0	0	0	214
Lane Group Flow (vph)	140	349	0	24	761	50	40	81	0	180	186	65
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.23		0.06	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)	114	814		113	819	366	376	766		392	406	370
v/s Ratio Prot	c0.08	0.10		0.01	c0.22		c0.02	0.02		c0.11	0.11	
v/s Ratio Perm						0.03						0.04
v/c Ratio	1.23	0.43		0.21	0.93	0.14	0.11	0.11		0.46	0.46	0.18
Uniform Delay, d1	36.0	25.1		34.1	28.9	23.3	23.2	23.2		25.3	25.3	23.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	157.9	1.7		4.2	18.3	0.8	0.6	0.3		3.8	3.7	1.0
Delay (s)	193.9	26.8		38.4	47.2	24.1	23.7	23.5		29.2	29.0	24.6
Level of Service	F	C		D	D	C	C	C		C	C	C
Approach Delay (s)		73.6			42.1			23.5			27.1	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	43.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	50	718	5	39	389
Future Volume (veh/h)	8	50	718	5	39	389
Number	3	18	2	12	1	6
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	1863	1863	1863	1863	1844	1844
Adj Flow Rate, veh/h	16	72	886	8	48	564
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.50	0.69	0.81	0.63	0.81	0.69
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	586	523	1169	523	161	1768
Arrive On Green	0.33	0.33	0.33	0.33	0.09	0.50
Sat Flow, veh/h	1774	1583	3632	1583	1756	3596
Grp Volume(v), veh/h	16	72	886	8	48	564
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1756	1752
Q Serve(g_s), s	0.3	1.7	12.2	0.2	1.4	5.2
Cycle Q Clear(g_c), s	0.3	1.7	12.2	0.2	1.4	5.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	586	523	1169	523	161	1768
V/C Ratio(X)	0.03	0.14	0.76	0.02	0.30	0.32
Avail Cap(c_a), veh/h	586	523	1169	523	161	1768
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	12.3	12.8	16.3	12.3	23.1	8.0
Incr Delay (d2), s/veh	0.1	0.5	4.6	0.1	4.7	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.8	6.7	0.1	0.9	2.5
LnGrp Delay(d),s/veh	12.4	13.4	20.9	12.3	27.8	8.4
LnGrp LOS	B	B	C	B	C	A
Approach Vol, veh/h	88		894			612
Approach Delay, s/veh	13.2		20.9			10.0
Approach LOS	B		C			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	22.5				32.0		22.5
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	18.0				18.0		18.0
Max Q Clear Time (g_c+I1), s	3.4	14.2				7.2		3.7
Green Ext Time (p_c), s	0.0	2.1				2.5		0.2

Intersection Summary			
HCM 2010 Ctrl Delay			16.2
HCM 2010 LOS			B

HCM Signalized Intersection Capacity Analysis
1: Center St/Oakhurst Drive & Clayton Road

11/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	478	15	21	191	77	29	58	9	96	98	78
Future Volume (vph)	94	478	15	21	191	77	29	58	9	96	98	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		0.95	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3506		1752	3504	1567	1610	3292		1681	1764	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3506		1752	3504	1567	1610	3292		1681	1764	1583
Peak-hour factor, PHF	0.69	0.89	0.42	0.58	0.82	0.84	0.52	0.81	0.56	0.93	0.72	0.83
Adj. Flow (vph)	136	537	36	36	233	92	56	72	16	103	136	94
RTOR Reduction (vph)	0	6	0	0	0	70	0	12	0	0	0	72
Lane Group Flow (vph)	136	567	0	36	233	22	48	84	0	93	146	22
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.23		0.06	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)	114	819		113	819	366	376	769		392	412	370
v/s Ratio Prot	c0.08	c0.16		0.02	0.07		c0.03	0.03		0.06	c0.08	
v/s Ratio Perm						0.01						0.01
v/c Ratio	1.19	0.69		0.32	0.28	0.06	0.13	0.11		0.24	0.35	0.06
Uniform Delay, d1	36.0	27.0		34.4	24.2	22.9	23.3	23.2		23.9	24.6	22.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	145.2	4.8		7.3	0.9	0.3	0.7	0.3		1.4	2.4	0.3
Delay (s)	181.2	31.7		41.6	25.1	23.2	24.0	23.5		25.4	27.0	23.2
Level of Service	F	C		D	C	C	C	C		C	C	C
Approach Delay (s)		60.4			26.3			23.7			25.5	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	66	220	6	63	526
Future Volume (veh/h)	3	66	220	6	63	526
Number	3	18	2	12	1	6
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	1863	1863	1863	1863	1844	1844
Adj Flow Rate, veh/h	4	76	262	8	84	578
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.75	0.87	0.84	0.75	0.75	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	586	523	1169	523	161	1768
Arrive On Green	0.33	0.33	0.33	0.33	0.09	0.50
Sat Flow, veh/h	1774	1583	3632	1583	1756	3596
Grp Volume(v), veh/h	4	76	262	8	84	578
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1756	1752
Q Serve(g_s), s	0.1	1.8	2.9	0.2	2.5	5.3
Cycle Q Clear(g_c), s	0.1	1.8	2.9	0.2	2.5	5.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	586	523	1169	523	161	1768
V/C Ratio(X)	0.01	0.15	0.22	0.02	0.52	0.33
Avail Cap(c_a), veh/h	586	523	1169	523	161	1768
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	12.3	12.8	13.2	12.3	23.6	8.0
Incr Delay (d2), s/veh	0.0	0.6	0.4	0.1	11.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.9	1.5	0.1	1.7	2.7
LnGrp Delay(d),s/veh	12.3	13.4	13.6	12.3	35.2	8.5
LnGrp LOS	B	B	B	B	D	A
Approach Vol, veh/h	80		270			662
Approach Delay, s/veh	13.4		13.6			11.9
Approach LOS	B		B			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	22.5				32.0		22.5
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	18.0				18.0		18.0
Max Q Clear Time (g_c+I1), s	4.5	4.9				7.3		3.8
Green Ext Time (p_c), s	0.0	1.3				2.6		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.5
HCM 2010 LOS	B

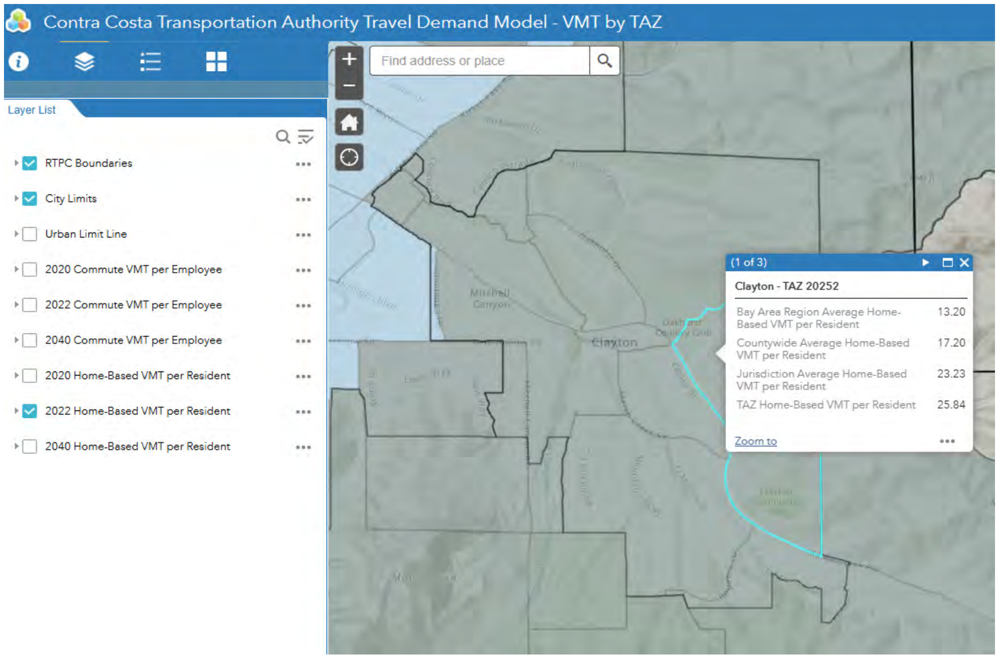
Clayton Approved Development Projects

Project Name	Location Assessor's Parcel Number (APN)	Development Type	Square Footage or Units	Status
Clayton Community Church	1027 Pine Hollow Court; APN 119-050-036	Institutional	13,823 square feet	Approved
Diablo Meadows	Mitchell Canyon Road, south of Mitchell Canyon Lane; APNs 121-090-022 through -045	Residential	18 single-family units 3 accessory dwelling units	Under Construction
Oak Creek Canyon	Marsh Creek Road at Diablo Parkway; APN 119-070-008	Residential	6 single-family units 1 accessory dwelling unit	Approved
The Olivia at Marsh Creek Senior Housing	6170 High Street, 6450 and 6490 Marsh Creek Road; APNs 119-021-063, 119-021-055, 119-021-013	Residential	81 multifamily units	Approved

Source: City of Clayton

Appendix D INTERSECTION LOS ANALYSIS: EXISTING PLUS PROJECT CONDITIONS LOS CALCULATION SHEETS

Contra Costa Transportation Authority Travel Demand Model - VMT by TAZ



[Contra Costa Transportation Authority Travel Demand Model - VMT by TAZ]

	VMT/Resident	85% Percent
Countywide Average Home-Based VMT per Resident	17.2	
Jurisdiction Average Home-Based VMT per Resident	23.23	19.75
TAZ Home-Based VMT per Resident	25.84	

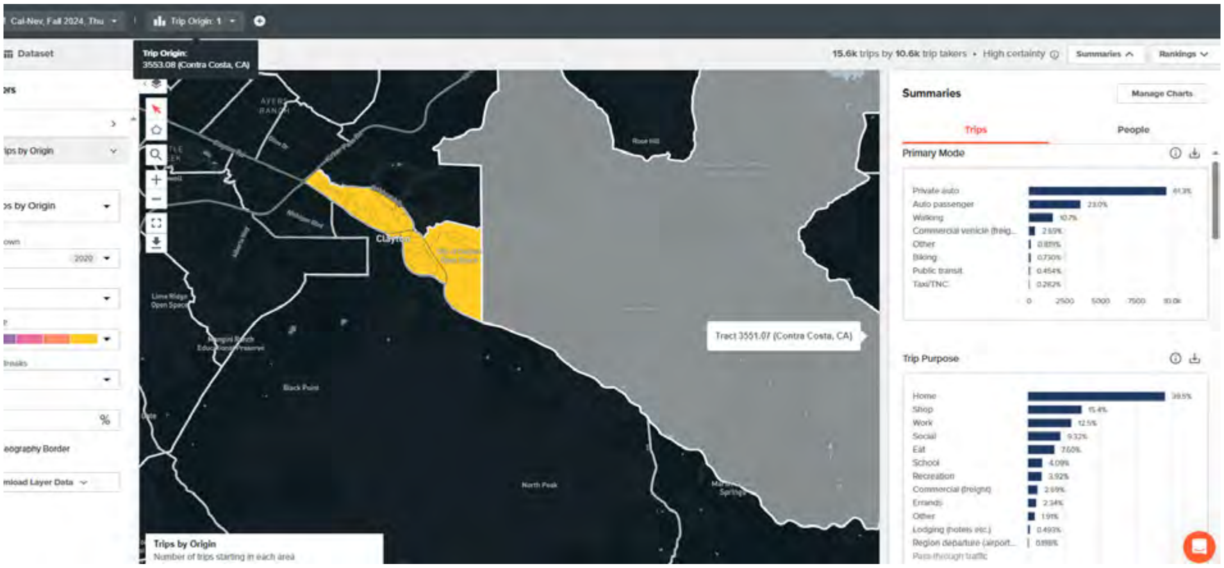
Section 5: VMT Analysis

THRESHOLDS OF SIGNIFICANCE

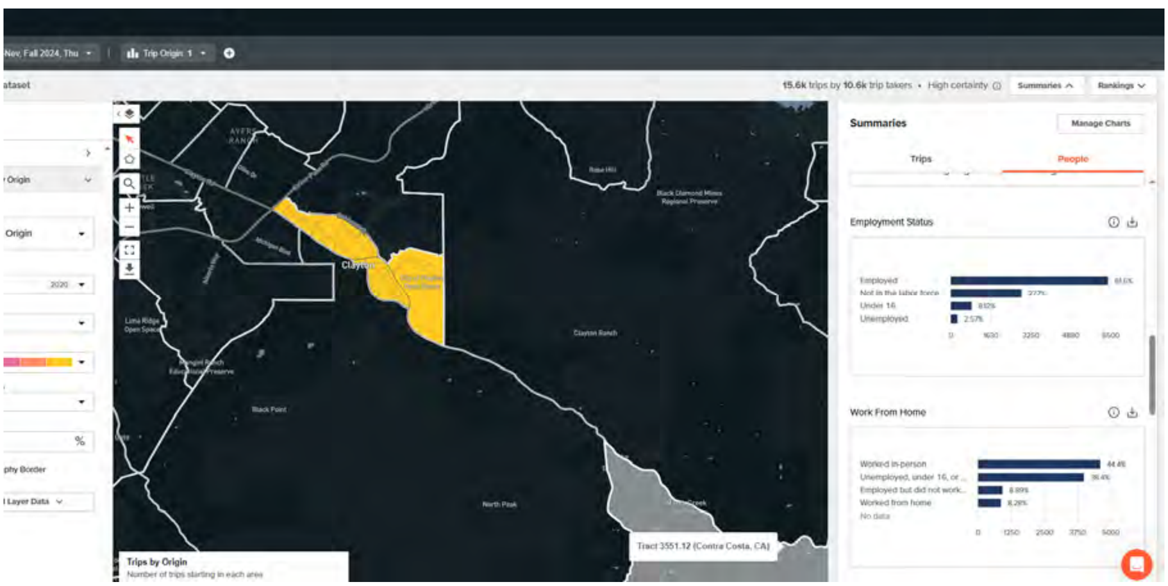
The following describes the specific VMT metrics and significance thresholds that should be used in evaluating different project types: [7]

Residential Projects should use the Home-Based VMT per capita metric to evaluate project generated VMT. The project generated Home-Based VMT per resident constitutes a significant impact if it is higher than 85% of the Home-Based VMT per resident in the subject municipality or unincorporated CCTA subregion (for areas outside of municipalities) or 85% of the existing countywide average Home-Based VMT per resident, whichever is less stringent.

Replica Data (Fall 2024) - City of Clayton



Replica Data (Fall 2024)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	267	9	17	568	161	21	55	11	145	84	156
Future Volume (vph)	84	267	9	17	568	161	21	55	11	145	84	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		0.95	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	1770	3503		1752	3504	1567	1610	3277		1681	1739	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	1770	3503		1752	3504	1567	1610	3277		1681	1739	1583
Peak-hour factor, PHF	0.60	0.82	0.38	0.71	0.74	0.76	0.48	0.76	0.55	0.59	0.70	0.63
Adj. Flow (vph)	140	326	24	24	768	212	44	72	20	246	120	248
RTOR Reduction (vph)	0	7	0	0	0	162	0	15	0	0	0	190
Lane Group Flow (vph)	140	343	0	24	768	50	40	81	0	180	186	58
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.23		0.06	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)	114	818		113	819	366	376	766		392	406	370
v/s Ratio Prot	c0.08	0.10		0.01	c0.22		c0.02	0.02		c0.11	0.11	
v/s Ratio Perm						0.03						0.04
v/c Ratio	1.23	0.42		0.21	0.94	0.14	0.11	0.11		0.46	0.46	0.16
Uniform Delay, d1	36.0	25.1		34.1	29.0	23.3	23.2	23.2		25.3	25.3	23.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	157.9	1.6		4.2	19.5	0.8	0.6	0.3		3.8	3.7	0.9
Delay (s)	193.9	26.6		38.4	48.5	24.1	23.7	23.5		29.2	29.0	24.4
Level of Service	F	C		D	D	C	C	C		C	C	C
Approach Delay (s)		74.4			43.1			23.5			27.2	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	44.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	58	715	6	41	388
Future Volume (veh/h)	9	58	715	6	41	388
Number	3	18	2	12	1	6
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	1863	1863	1863	1863	1844	1844
Adj Flow Rate, veh/h	18	84	883	10	51	562
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.50	0.69	0.81	0.63	0.81	0.69
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	586	523	1169	523	161	1768
Arrive On Green	0.33	0.33	0.33	0.33	0.09	0.50
Sat Flow, veh/h	1774	1583	3632	1583	1756	3596
Grp Volume(v), veh/h	18	84	883	10	51	562
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1756	1752
Q Serve(g_s), s	0.4	2.0	12.1	0.2	1.5	5.2
Cycle Q Clear(g_c), s	0.4	2.0	12.1	0.2	1.5	5.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	586	523	1169	523	161	1768
V/C Ratio(X)	0.03	0.16	0.76	0.02	0.32	0.32
Avail Cap(c_a), veh/h	586	523	1169	523	161	1768
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	12.3	12.9	16.3	12.3	23.2	8.0
Incr Delay (d2), s/veh	0.1	0.7	4.6	0.1	5.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.0	6.6	0.1	0.9	2.5
LnGrp Delay(d),s/veh	12.4	13.6	20.9	12.4	28.2	8.4
LnGrp LOS	B	B	C	B	C	A
Approach Vol, veh/h	102		893			613
Approach Delay, s/veh	13.4		20.8			10.1
Approach LOS	B		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	22.5				32.0		22.5
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	18.0				18.0		18.0
Max Q Clear Time (g_c+I1), s	3.5	14.1				7.2		4.0
Green Ext Time (p_c), s	0.0	2.1				2.5		0.2

Intersection Summary			
HCM 2010 Ctrl Delay			16.2
HCM 2010 LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	479	15	21	194	77	29	58	9	97	98	78
Future Volume (vph)	94	479	15	21	194	77	29	58	9	97	98	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		0.95	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3506		1752	3504	1567	1610	3292		1681	1762	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3506		1752	3504	1567	1610	3292		1681	1762	1583
Peak-hour factor, PHF	0.69	0.89	0.42	0.58	0.82	0.84	0.52	0.81	0.56	0.83	0.72	0.93
Adj. Flow (vph)	136	538	36	36	237	92	56	72	16	117	136	84
RTOR Reduction (vph)	0	6	0	0	0	70	0	12	0	0	0	64
Lane Group Flow (vph)	136	568	0	36	237	22	48	84	0	105	148	20
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.23		0.06	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)	114	819		113	819	366	376	769		392	411	370
v/s Ratio Prot	c0.08	c0.16		0.02	0.07		c0.03	0.03		0.06	c0.08	
v/s Ratio Perm						0.01						0.01
v/c Ratio	1.19	0.69		0.32	0.29	0.06	0.13	0.11		0.27	0.36	0.05
Uniform Delay, d1	36.0	27.0		34.4	24.2	22.9	23.3	23.2		24.1	24.7	22.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	145.2	4.8		7.3	0.9	0.3	0.7	0.3		1.7	2.4	0.3
Delay (s)	181.2	31.8		41.6	25.1	23.2	24.0	23.5		25.8	27.1	23.2
Level of Service	F	C		D	C	C	C	C		C	C	C
Approach Delay (s)		60.4			26.3			23.7			25.7	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	4	70	219	7	69	522		
Future Volume (veh/h)	4	70	219	7	69	522		
Number	3	18	2	12	1	6		
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	1863	1863	1863	1863	1844	1844		
Adj Flow Rate, veh/h	5	80	261	9	92	574		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.75	0.87	0.84	0.75	0.75	0.91		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	586	523	1169	523	161	1768		
Arrive On Green	0.33	0.33	0.33	0.33	0.09	0.50		
Sat Flow, veh/h	1774	1583	3632	1583	1756	3596		
Grp Volume(v), veh/h	5	80	261	9	92	574		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1756	1752		
Q Serve(g_s), s	0.1	1.9	2.9	0.2	2.7	5.3		
Cycle Q Clear(g_c), s	0.1	1.9	2.9	0.2	2.7	5.3		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	586	523	1169	523	161	1768		
V/C Ratio(X)	0.01	0.15	0.22	0.02	0.57	0.32		
Avail Cap(c_a), veh/h	586	523	1169	523	161	1768		
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	12.3	12.9	13.2	12.3	23.7	8.0		
Incr Delay (d2), s/veh	0.0	0.6	0.4	0.1	13.9	0.5		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.1	0.9	1.5	0.1	1.9	2.7		
LnGrp Delay(d),s/veh	12.3	13.5	13.6	12.4	37.6	8.5		
LnGrp LOS	B	B	B	B	D	A		
Approach Vol, veh/h	85		270			666		
Approach Delay, s/veh	13.4		13.6			12.5		
Approach LOS	B		B			B		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	22.5				32.0		22.5
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	18.0				18.0		18.0
Max Q Clear Time (g_c+I1), s	4.7	4.9				7.3		3.9
Green Ext Time (p_c), s	0.0	1.3				2.6		0.2
Intersection Summary								
HCM 2010 Ctrl Delay			12.9					
HCM 2010 LOS			B					

Appendix E INTERSECTION LOS ANALYSIS: NEAR-TERM PLUS PROJECT CALCULATION SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	268	9	17	570	162	21	55	11	145	84	156
Future Volume (vph)	84	268	9	17	570	162	21	55	11	145	84	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		0.95	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	1770	3503		1752	3504	1567	1610	3277		1681	1739	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	1770	3503		1752	3504	1567	1610	3277		1681	1739	1583
Peak-hour factor, PHF	0.60	0.82	0.38	0.71	0.74	0.76	0.48	0.76	0.55	0.59	0.70	0.63
Adj. Flow (vph)	140	327	24	24	770	213	44	72	20	246	120	248
RTOR Reduction (vph)	0	7	0	0	0	163	0	15	0	0	0	190
Lane Group Flow (vph)	140	344	0	24	770	50	40	81	0	180	186	58
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.23		0.06	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)	114	818		113	819	366	376	766		392	406	370
v/s Ratio Prot	c0.08	0.10		0.01	c0.22		c0.02	0.02		c0.11	0.11	
v/s Ratio Perm						0.03						0.04
v/c Ratio	1.23	0.42		0.21	0.94	0.14	0.11	0.11		0.46	0.46	0.16
Uniform Delay, d1	36.0	25.1		34.1	29.0	23.3	23.2	23.2		25.3	25.3	23.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	157.9	1.6		4.2	19.9	0.8	0.6	0.3		3.8	3.7	0.9
Delay (s)	193.9	26.7		38.4	48.8	24.1	23.7	23.5		29.2	29.0	24.4
Level of Service	F	C		D	D	C	C	C		C	C	C
Approach Delay (s)		74.3			43.4			23.5			27.2	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	44.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	9	58	718	6	41	389		
Future Volume (veh/h)	9	58	718	6	41	389		
Number	3	18	2	12	1	6		
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	1863	1863	1863	1863	1844	1844		
Adj Flow Rate, veh/h	18	84	886	10	51	564		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.50	0.69	0.81	0.63	0.81	0.69		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	586	523	1169	523	161	1768		
Arrive On Green	0.33	0.33	0.33	0.33	0.09	0.50		
Sat Flow, veh/h	1774	1583	3632	1583	1756	3596		
Grp Volume(v), veh/h	18	84	886	10	51	564		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1756	1752		
Q Serve(g_s), s	0.4	2.0	12.2	0.2	1.5	5.2		
Cycle Q Clear(g_c), s	0.4	2.0	12.2	0.2	1.5	5.2		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	586	523	1169	523	161	1768		
V/C Ratio(X)	0.03	0.16	0.76	0.02	0.32	0.32		
Avail Cap(c_a), veh/h	586	523	1169	523	161	1768		
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	12.3	12.9	16.3	12.3	23.2	8.0		
Incr Delay (d2), s/veh	0.1	0.7	4.6	0.1	5.1	0.5		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.2	1.0	6.7	0.1	0.9	2.5		
LnGrp Delay(d),s/veh	12.4	13.6	20.9	12.4	28.2	8.4		
LnGrp LOS	B	B	C	B	C	A		
Approach Vol, veh/h	102		896			615		
Approach Delay, s/veh	13.4		20.8			10.1		
Approach LOS	B		C			B		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	22.5				32.0		22.5
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	18.0				18.0		18.0
Max Q Clear Time (g_c+I1), s	3.5	14.2				7.2		4.0
Green Ext Time (p_c), s	0.0	2.1				2.5		0.2

Intersection Summary		
HCM 2010 Ctrl Delay		16.3
HCM 2010 LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	483	15	21	195	77	29	58	9	97	98	78
Future Volume (vph)	94	483	15	21	195	77	29	58	9	97	98	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		0.95	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3506		1752	3504	1567	1610	3292		1681	1762	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3506		1752	3504	1567	1610	3292		1681	1762	1583
Peak-hour factor, PHF	0.69	0.89	0.42	0.58	0.82	0.84	0.52	0.81	0.56	0.83	0.72	0.93
Adj. Flow (vph)	136	543	36	36	238	92	56	72	16	117	136	84
RTOR Reduction (vph)	0	6	0	0	0	70	0	12	0	0	0	64
Lane Group Flow (vph)	136	573	0	36	238	22	48	84	0	105	148	20
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.23		0.06	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)	114	819		113	819	366	376	769		392	411	370
v/s Ratio Prot	c0.08	c0.16		0.02	0.07		c0.03	0.03		0.06	c0.08	
v/s Ratio Perm						0.01						0.01
v/c Ratio	1.19	0.70		0.32	0.29	0.06	0.13	0.11		0.27	0.36	0.05
Uniform Delay, d1	36.0	27.0		34.4	24.3	22.9	23.3	23.2		24.1	24.7	22.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	145.2	4.9		7.3	0.9	0.3	0.7	0.3		1.7	2.4	0.3
Delay (s)	181.2	32.0		41.6	25.1	23.2	24.0	23.5		25.8	27.1	23.2
Level of Service	F	C		D	C	C	C	C		C	C	C
Approach Delay (s)		60.3			26.3			23.7			25.7	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

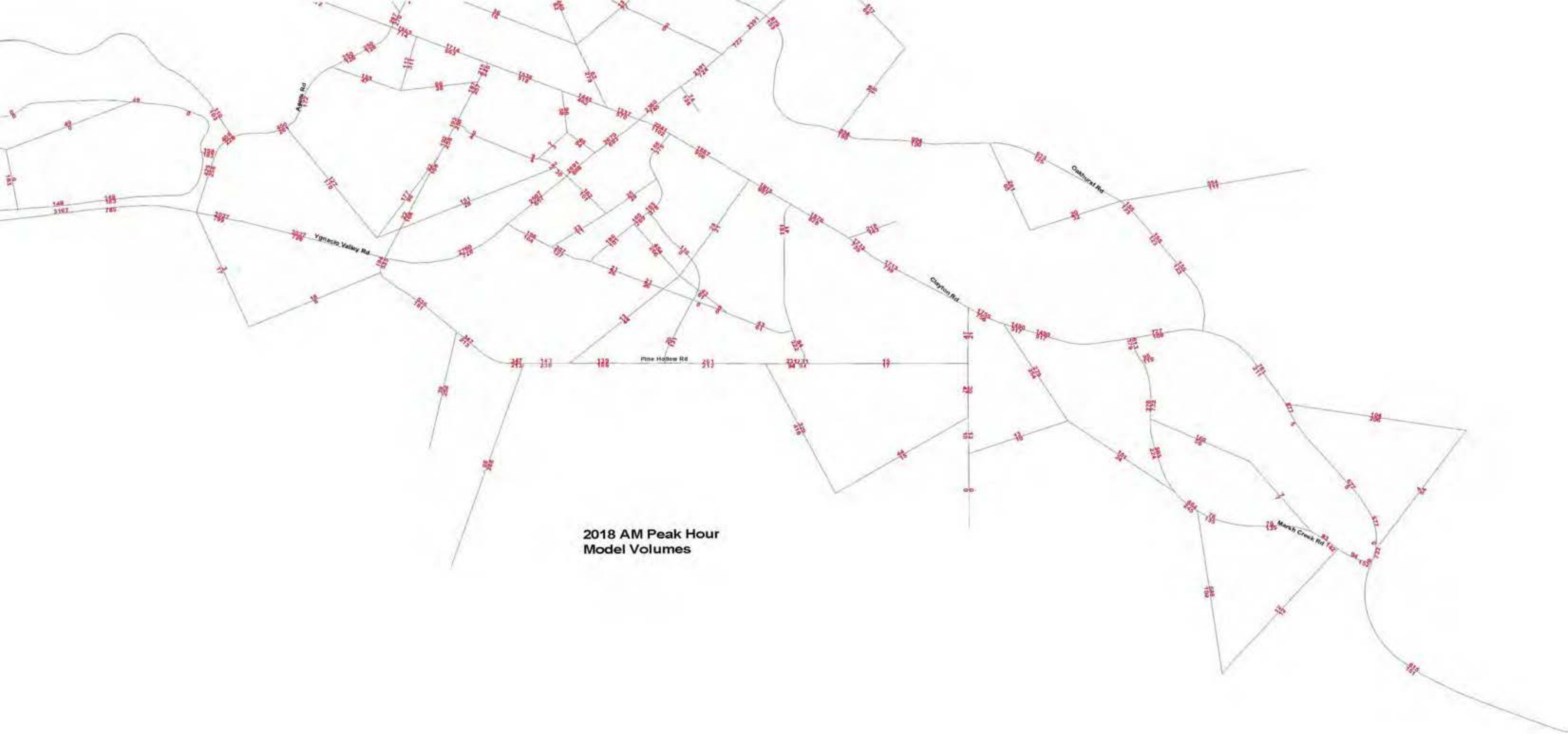
c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	70	220	7	69	526
Future Volume (veh/h)	4	70	220	7	69	526
Number	3	18	2	12	1	6
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	1863	1863	1863	1863	1844	1844
Adj Flow Rate, veh/h	5	80	262	9	92	578
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.75	0.87	0.84	0.75	0.75	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	586	523	1169	523	161	1768
Arrive On Green	0.33	0.33	0.33	0.33	0.09	0.50
Sat Flow, veh/h	1774	1583	3632	1583	1756	3596
Grp Volume(v), veh/h	5	80	262	9	92	578
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1756	1752
Q Serve(g_s), s	0.1	1.9	2.9	0.2	2.7	5.3
Cycle Q Clear(g_c), s	0.1	1.9	2.9	0.2	2.7	5.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	586	523	1169	523	161	1768
V/C Ratio(X)	0.01	0.15	0.22	0.02	0.57	0.33
Avail Cap(c_a), veh/h	586	523	1169	523	161	1768
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	12.3	12.9	13.2	12.3	23.7	8.0
Incr Delay (d2), s/veh	0.0	0.6	0.4	0.1	13.9	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.9	1.5	0.1	1.9	2.7
LnGrp Delay(d),s/veh	12.3	13.5	13.6	12.4	37.6	8.5
LnGrp LOS	B	B	B	B	D	A
Approach Vol, veh/h	85		271			670
Approach Delay, s/veh	13.4		13.6			12.5
Approach LOS	B		B			B

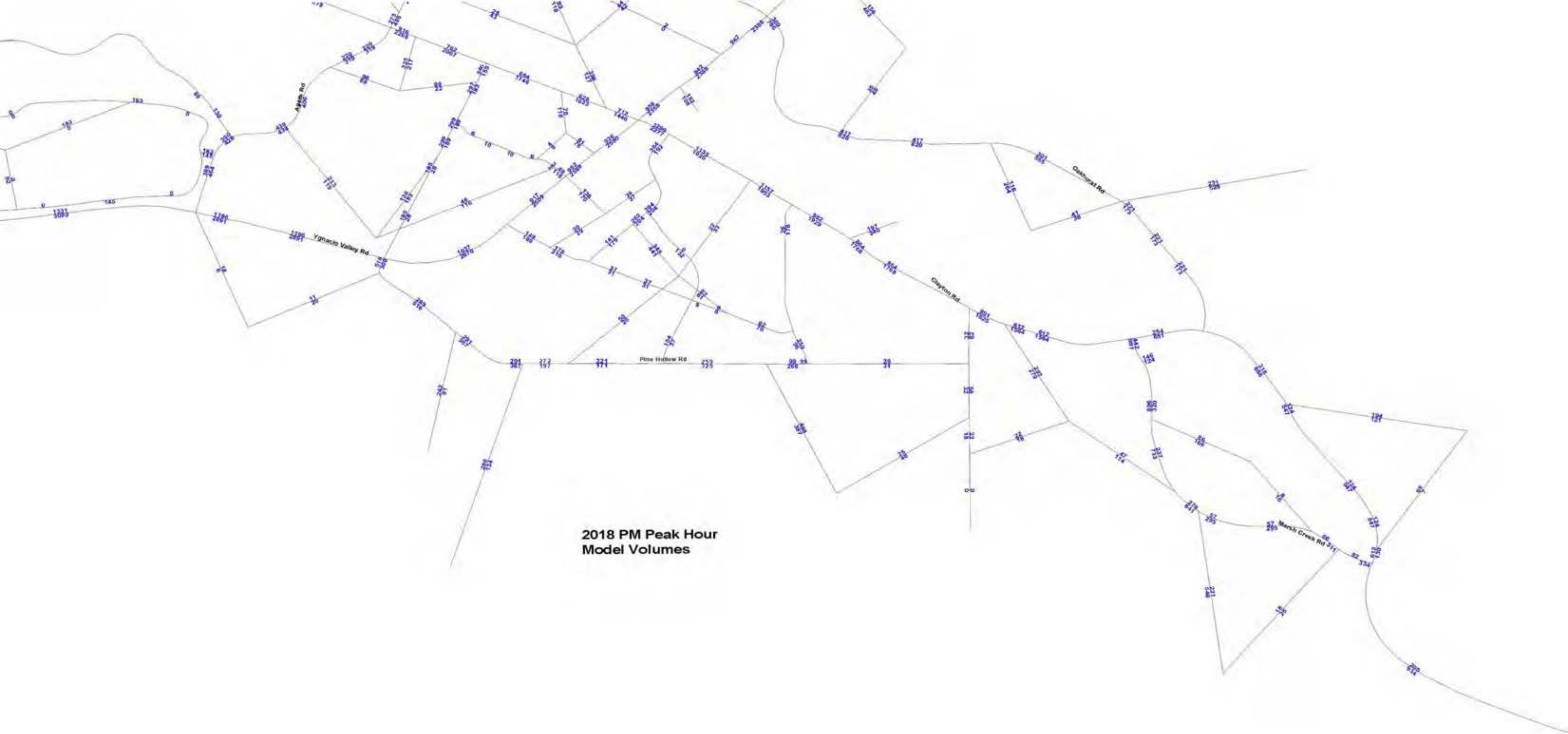
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	22.5				32.0		22.5
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	18.0				18.0		18.0
Max Q Clear Time (g_c+I1), s	4.7	4.9				7.3		3.9
Green Ext Time (p_c), s	0.0	1.3				2.6		0.2

Intersection Summary			
HCM 2010 Ctrl Delay			12.9
HCM 2010 LOS			B

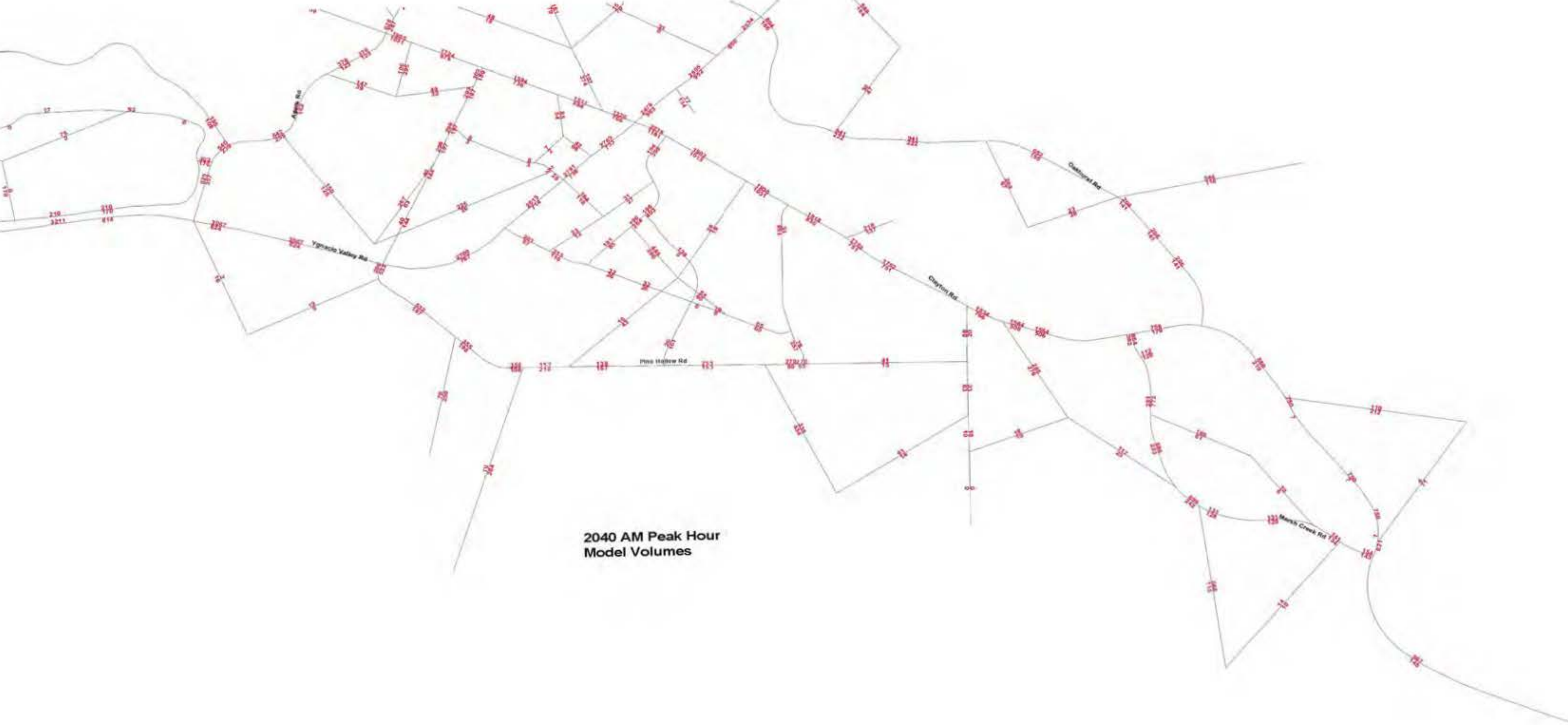
Appendix F INTERSECTION LOS ANALYSIS: CUMULATIVE (NO PROJECT) CALCULATION SHEETS



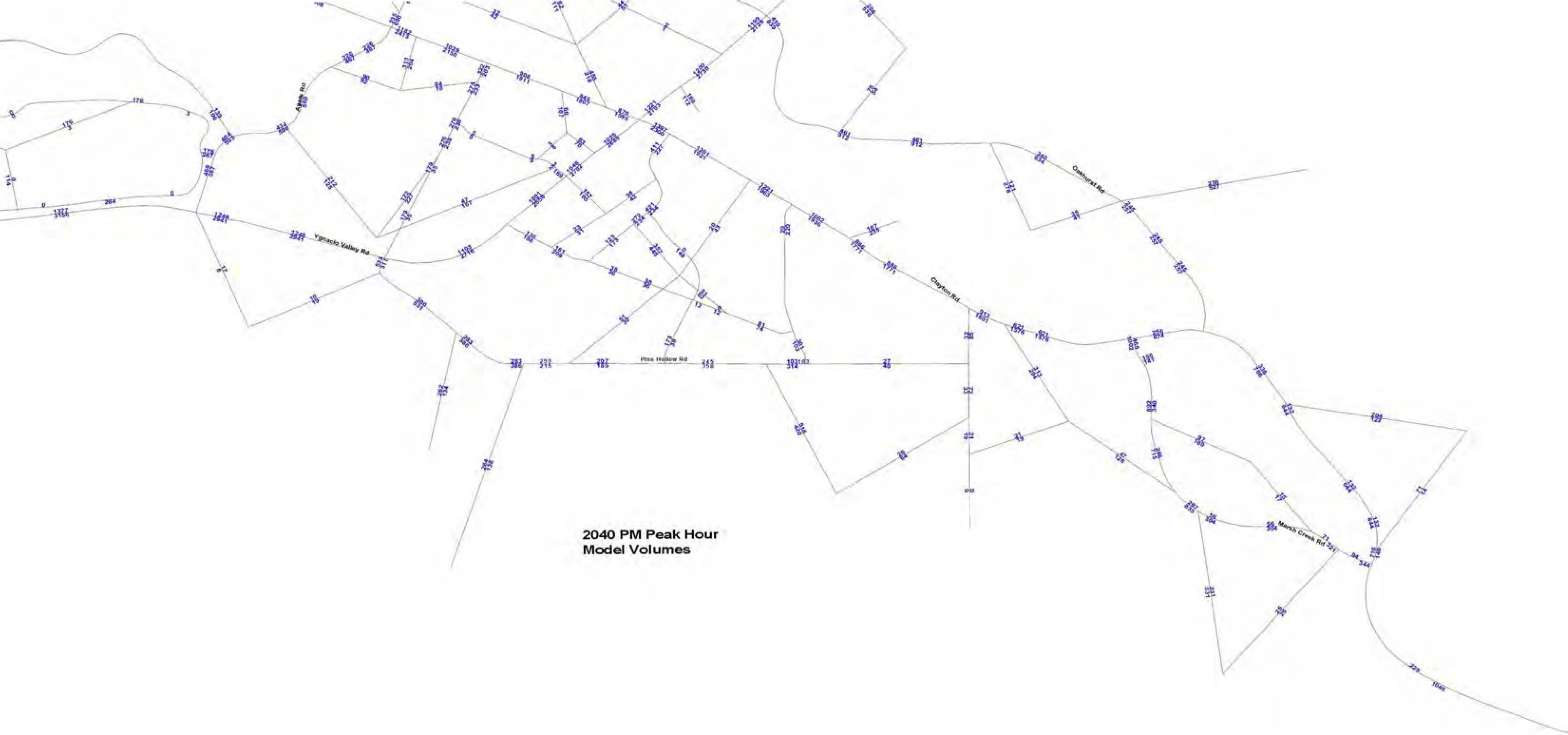
2018 AM Peak Hour
Model Volumes



2018 PM Peak Hour
Model Volumes



2040 AM Peak Hour
Model Volumes



2040 PM Peak Hour
Model Volumes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	265	9	19	627	179	21	55	11	164	95	178
Future Volume (vph)	84	265	9	19	627	179	21	55	11	164	95	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		0.95	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	1770	3502		1752	3504	1567	1610	3277		1681	1739	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	1770	3502		1752	3504	1567	1610	3277		1681	1739	1583
Peak-hour factor, PHF	0.60	0.82	0.38	0.71	0.74	0.76	0.48	0.76	0.55	0.59	0.70	0.63
Adj. Flow (vph)	140	323	24	27	847	236	44	72	20	278	136	283
RTOR Reduction (vph)	0	7	0	0	0	181	0	15	0	0	0	217
Lane Group Flow (vph)	140	340	0	27	847	55	40	81	0	203	211	66
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.23		0.06	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)	114	818		113	819	366	376	766		392	406	370
v/s Ratio Prot	c0.08	0.10		0.02	c0.24		c0.02	0.02		0.12	c0.12	
v/s Ratio Perm						0.04						0.04
v/c Ratio	1.23	0.42		0.24	1.03	0.15	0.11	0.11		0.52	0.52	0.18
Uniform Delay, d1	36.0	25.0		34.2	29.5	23.4	23.2	23.2		25.7	25.7	23.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	157.9	1.6		4.9	40.6	0.9	0.6	0.3		4.8	4.7	1.1
Delay (s)	193.9	26.6		39.1	70.1	24.3	23.7	23.5		30.5	30.4	24.6
Level of Service	F	C		D	E	C	C	C		C	C	C
Approach Delay (s)		74.7			59.6			23.5			28.1	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	51.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	53	785	5	40	401
Future Volume (veh/h)	8	53	785	5	40	401
Number	3	18	2	12	1	6
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	1863	1863	1863	1863	1844	1844
Adj Flow Rate, veh/h	16	77	969	8	49	581
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.50	0.69	0.81	0.63	0.81	0.69
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	586	523	1169	523	161	1768
Arrive On Green	0.33	0.33	0.33	0.33	0.09	0.50
Sat Flow, veh/h	1774	1583	3632	1583	1756	3596
Grp Volume(v), veh/h	16	77	969	8	49	581
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1756	1752
Q Serve(g_s), s	0.3	1.9	13.8	0.2	1.4	5.4
Cycle Q Clear(g_c), s	0.3	1.9	13.8	0.2	1.4	5.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	586	523	1169	523	161	1768
V/C Ratio(X)	0.03	0.15	0.83	0.02	0.30	0.33
Avail Cap(c_a), veh/h	586	523	1169	523	161	1768
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	12.3	12.8	16.8	12.3	23.1	8.0
Incr Delay (d2), s/veh	0.1	0.6	6.9	0.1	4.8	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.9	7.7	0.1	0.9	2.7
LnGrp Delay(d),s/veh	12.4	13.4	23.7	12.3	27.9	8.5
LnGrp LOS	B	B	C	B	C	A
Approach Vol, veh/h	93		977			630
Approach Delay, s/veh	13.3		23.6			10.0
Approach LOS	B		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	22.5				32.0		22.5
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	18.0				18.0		18.0
Max Q Clear Time (g_c+I1), s	3.4	15.8				7.4		3.9
Green Ext Time (p_c), s	0.0	1.4				2.6		0.2

Intersection Summary		
HCM 2010 Ctrl Delay		18.0
HCM 2010 LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	489	15	22	200	81	29	58	9	138	141	112
Future Volume (vph)	97	489	15	22	200	81	29	58	9	138	141	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		0.95	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3507		1752	3504	1567	1610	3292		1681	1763	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3507		1752	3504	1567	1610	3292		1681	1763	1583
Peak-hour factor, PHF	0.69	0.89	0.42	0.58	0.82	0.84	0.52	0.81	0.56	0.83	0.72	0.93
Adj. Flow (vph)	141	549	36	38	244	96	56	72	16	166	196	120
RTOR Reduction (vph)	0	6	0	0	0	74	0	12	0	0	0	92
Lane Group Flow (vph)	141	579	0	38	244	22	48	84	0	149	213	28
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.23		0.06	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)	114	819		113	819	366	376	769		392	412	370
v/s Ratio Prot	c0.08	c0.17		0.02	0.07		c0.03	0.03		0.09	c0.12	
v/s Ratio Perm						0.01						0.02
v/c Ratio	1.24	0.71		0.34	0.30	0.06	0.13	0.11		0.38	0.52	0.08
Uniform Delay, d1	36.0	27.1		34.4	24.3	22.9	23.3	23.2		24.8	25.7	23.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	161.1	5.1		7.9	0.9	0.3	0.7	0.3		2.8	4.6	0.4
Delay (s)	197.1	32.2		42.3	25.2	23.3	24.0	23.5		27.6	30.3	23.4
Level of Service	F	C		D	C	C	C	C		C	C	C
Approach Delay (s)		64.2			26.4			23.7			27.7	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	42.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	69	232	6	71	592
Future Volume (veh/h)	3	69	232	6	71	592
Number	3	18	2	12	1	6
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	1863	1863	1863	1863	1844	1844
Adj Flow Rate, veh/h	4	79	276	8	95	651
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.75	0.87	0.84	0.75	0.75	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	586	523	1169	523	161	1768
Arrive On Green	0.33	0.33	0.33	0.33	0.09	0.50
Sat Flow, veh/h	1774	1583	3632	1583	1756	3596
Grp Volume(v), veh/h	4	79	276	8	95	651
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1756	1752
Q Serve(g_s), s	0.1	1.9	3.1	0.2	2.8	6.2
Cycle Q Clear(g_c), s	0.1	1.9	3.1	0.2	2.8	6.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	586	523	1169	523	161	1768
V/C Ratio(X)	0.01	0.15	0.24	0.02	0.59	0.37
Avail Cap(c_a), veh/h	586	523	1169	523	161	1768
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	12.3	12.9	13.3	12.3	23.8	8.2
Incr Delay (d2), s/veh	0.0	0.6	0.5	0.1	14.9	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.9	1.6	0.1	2.0	3.0
LnGrp Delay(d),s/veh	12.3	13.5	13.7	12.3	38.6	8.8
LnGrp LOS	B	B	B	B	D	A
Approach Vol, veh/h	83		284			746
Approach Delay, s/veh	13.4		13.7			12.6
Approach LOS	B		B			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	22.5				32.0		22.5
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	18.0				18.0		18.0
Max Q Clear Time (g_c+I1), s	4.8	5.1				8.2		3.9
Green Ext Time (p_c), s	0.0	1.4				2.8		0.2

Intersection Summary		
HCM 2010 Ctrl Delay		12.9
HCM 2010 LOS		B

Appendix G INTERSECTION LOS ANALYSIS: CUMULATIVE PLUS PROJECT CALCULATION SHEETS

HCM Signalized Intersection Capacity Analysis
1: Center St/Oakhurst Drive & Clayton Road

11/07/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	267	9	19	634	180	21	55	11	164	95	178
Future Volume (vph)	84	267	9	19	634	180	21	55	11	164	95	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3503		1752	3504	1567	1770	3424		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3503		1752	3504	1567	1770	3424		1770	1863	1583
Peak-hour factor, PHF	0.60	0.82	0.38	0.71	0.74	0.76	0.48	0.76	0.55	0.59	0.70	0.63
Adj. Flow (vph)	140	326	24	27	857	237	44	72	20	278	136	283
RTOR Reduction (vph)	0	7	0	0	0	182	0	15	0	0	0	217
Lane Group Flow (vph)	140	343	0	27	857	55	44	77	0	278	136	66
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.23		0.06	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)	114	818		113	819	366	413	800		413	435	370
v/s Ratio Prot	c0.08	0.10		0.02	c0.24		c0.02	0.02		c0.16	0.07	
v/s Ratio Perm						0.04						0.04
v/c Ratio	1.23	0.42		0.24	1.05	0.15	0.11	0.10		0.67	0.31	0.18
Uniform Delay, d1	36.0	25.1		34.2	29.5	23.4	23.2	23.1		26.8	24.4	23.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	157.9	1.6		4.9	44.3	0.9	0.5	0.2		8.5	1.9	1.1
Delay (s)	193.9	26.6		39.1	73.8	24.3	23.7	23.4		35.3	26.3	24.6
Level of Service	F	C		D	E	C	C	C		D	C	C
Approach Delay (s)		74.4			62.5			23.5			29.2	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	53.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	9	61	786	6	42	401		
Future Volume (veh/h)	9	61	786	6	42	401		
Number	3	18	2	12	1	6		
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	1863	1863	1863	1863	1844	1844		
Adj Flow Rate, veh/h	18	88	970	10	52	581		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.50	0.69	0.81	0.63	0.81	0.69		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	586	523	1169	523	161	1768		
Arrive On Green	0.33	0.33	0.33	0.33	0.09	0.50		
Sat Flow, veh/h	1774	1583	3632	1583	1756	3596		
Grp Volume(v), veh/h	18	88	970	10	52	581		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1756	1752		
Q Serve(g_s), s	0.4	2.1	13.8	0.2	1.5	5.4		
Cycle Q Clear(g_c), s	0.4	2.1	13.8	0.2	1.5	5.4		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	586	523	1169	523	161	1768		
V/C Ratio(X)	0.03	0.17	0.83	0.02	0.32	0.33		
Avail Cap(c_a), veh/h	586	523	1169	523	161	1768		
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	12.3	12.9	16.8	12.3	23.2	8.0		
Incr Delay (d2), s/veh	0.1	0.7	6.9	0.1	5.2	0.5		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.2	1.0	7.7	0.1	1.0	2.7		
LnGrp Delay(d),s/veh	12.4	13.6	23.7	12.4	28.4	8.5		
LnGrp LOS	B	B	C	B	C	A		
Approach Vol, veh/h	106		980			633		
Approach Delay, s/veh	13.4		23.6			10.1		
Approach LOS	B		C			B		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	22.5				32.0		22.5
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	18.0				18.0		18.0
Max Q Clear Time (g_c+I1), s	3.5	15.8				7.4		4.1
Green Ext Time (p_c), s	0.0	1.4				2.6		0.2
Intersection Summary								
HCM 2010 Ctrl Delay			18.0					
HCM 2010 LOS			B					

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	494	15	22	204	81	29	58	9	139	141	112
Future Volume (vph)	97	494	15	22	204	81	29	58	9	139	141	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3507		1752	3504	1567	1770	3443		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3507		1752	3504	1567	1770	3443		1770	1863	1583
Peak-hour factor, PHF	0.69	0.89	0.42	0.58	0.82	0.84	0.52	0.81	0.56	0.83	0.72	0.93
Adj. Flow (vph)	141	555	36	38	249	96	56	72	16	167	196	120
RTOR Reduction (vph)	0	6	0	0	0	74	0	12	0	0	0	92
Lane Group Flow (vph)	141	585	0	38	249	22	56	76	0	167	196	28
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)	5.0	18.0		5.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.23		0.06	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)	114	819		113	819	366	413	804		413	435	370
v/s Ratio Prot	c0.08	c0.17		0.02	0.07		c0.03	0.02		0.09	c0.11	
v/s Ratio Perm						0.01						0.02
v/c Ratio	1.24	0.71		0.34	0.30	0.06	0.14	0.09		0.40	0.45	0.08
Uniform Delay, d1	36.0	27.1		34.4	24.3	22.9	23.3	23.1		25.0	25.3	23.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	161.1	5.3		7.9	1.0	0.3	0.7	0.2		2.9	3.3	0.4
Delay (s)	197.1	32.4		42.3	25.3	23.3	24.0	23.3		27.9	28.6	23.4
Level of Service	F	C		D	C	C	C	C		C	C	C
Approach Delay (s)		64.1			26.5			23.6			27.1	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	73	232	7	77	592
Future Volume (veh/h)	4	73	232	7	77	592
Number	3	18	2	12	1	6
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	1863	1863	1863	1863	1844	1844
Adj Flow Rate, veh/h	5	84	276	9	103	651
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.75	0.87	0.84	0.75	0.75	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	586	523	1169	523	161	1768
Arrive On Green	0.33	0.33	0.33	0.33	0.09	0.50
Sat Flow, veh/h	1774	1583	3632	1583	1756	3596
Grp Volume(v), veh/h	5	84	276	9	103	651
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1756	1752
Q Serve(g_s), s	0.1	2.0	3.1	0.2	3.1	6.2
Cycle Q Clear(g_c), s	0.1	2.0	3.1	0.2	3.1	6.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	586	523	1169	523	161	1768
V/C Ratio(X)	0.01	0.16	0.24	0.02	0.64	0.37
Avail Cap(c_a), veh/h	586	523	1169	523	161	1768
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	12.3	12.9	13.3	12.3	23.9	8.2
Incr Delay (d2), s/veh	0.0	0.7	0.5	0.1	17.8	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.0	1.6	0.1	2.3	3.0
LnGrp Delay(d),s/veh	12.3	13.6	13.7	12.4	41.7	8.8
LnGrp LOS	B	B	B	B	D	A
Approach Vol, veh/h	89		285			754
Approach Delay, s/veh	13.5		13.7			13.3
Approach LOS	B		B			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.5	22.5				32.0		22.5
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	18.0				18.0		18.0
Max Q Clear Time (g_c+I1), s	5.1	5.1				8.2		4.0
Green Ext Time (p_c), s	0.0	1.4				2.8		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	13.4
HCM 2010 LOS	B