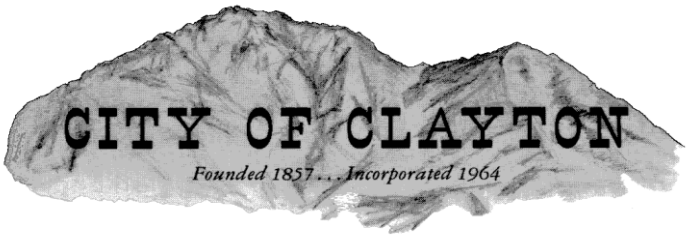


AGENDA

PLANNING COMMISSION
REGULAR MEETING
VIRTUAL PLANNING COMMISSION REGULAR MEETING

TUESDAY, OCTOBER 13, 2020
7:00 P.M.

To protect our residents, officials, and staff, and aligned with the Governor's executive order to Shelter-at-Home, this meeting is being conducted utilizing teleconferencing means consistent with State order that that allows the public to address the local legislative body electronically.

Location:
Instructions for Virtual Planning Commission Regular Meeting
To follow or participate in the meeting:

1. Videoconference:
   a. Follow the meeting on-line, click here to register: https://us02web.zoom.us/webinar/register/WN_ZjDNbzaqQfugZheJOpw2CA

   b. After clicking on the URL, please take a few seconds to submit your first name, last name, and e-mail address, then click "Register" which will approve your registration and a new URL to join the meeting will appear.
2. Phone-in:
   a. Once registered, you will receive an e-mail with instructions to join the meeting telephonically, and then dial 877-853-5257 (Toll Free) using the Webinar ID and Password found in the e-mail.
3. E-mail Public Comments:
   a. If preferred, please E-mail Public Comments to Community Development Director Matthew Feske at mfeske@ci.clayton.ca.us by 5:00 P.M. on the day of the Planning Commission meeting. All E-mailed Public Comments will be forwarded to the entire Planning Commission.

For those who choose to attend the meeting via videoconferencing or telephone shall have three minutes for public comments.

- A complete agenda packet is available for public review on the City's website at www.ci.clayton.ca.us
- Agendas are posted at: 1) City Hall, 6000 Heritage Trail, Clayton; 2) Library, 6125 Clayton Road, Clayton; 3) Ohm's Bulletin Board, 1028 Diablo Street, Clayton; and 4) City Website at www.ci.clayton.ca.us
- If you have special accommodation requirements to participate, please call the Community Development Department office at least 72 hours in advance of the meeting at 925-673-7300.

CALL TO ORDER

1. **PLEDGE OF ALLEGIANCE**

2. **ROLL CALL**

3. **PRESENTATION AND ANNOUNCEMENTS:**

   A. **PRESENTATIONS:**
   None.

   B. **ANNOUNCEMENTS:**
   None.

4. **ACCEPTANCE OF THE AGENDA:** The Planning Commission will discuss the order of the agenda, may amend the order, add urgency items, note abstentions or "no" votes on Consent Calendar items, and request Consent Calendar items be removed from the Consent Calendar for discussion. The Planning Commission may also remove items from the Consent Calendar prior to that portion of the Agenda.

5. **PUBLIC COMMENT (Non-Agenda Items):** This time has been set aside for members of the public to address the Planning Commission on items of general interest within the subject matter jurisdiction of the City. Although the Planning Commission values your comments, pursuant to the Brown Act, the Planning Commission generally cannot take any action on items not listed on the posted agenda. Three (3) minutes will be assigned to each speaker.

6. **CONSENT CALENDAR**
   The following routine matters may be acted upon by one motion. Individual items may be removed by the Planning Commission for separate discussion at this time or under Acceptance of the Agenda. The ordinance title is deemed to be read in its entirety and further reading waived on any ordinance listed on the Consent Calendar.

   A. **MINUTES:**
   RECOMMENDATION:
   Approve the Planning Commission Minutes of September 22, 2020.

7. **PUBLIC HEARINGS**

   A. **PUBLIC HEARING TO REVIEW AND CONSIDER THE SIX-LOT RESIDENTIAL PLANNED DEVELOPMENT PROJECT INITIAL STUDY/MITIGATED NEGATIVE DECLARATION ENV-02-16; GENERAL PLAN MAP AMENDMENT GPA-02-18; SPECIFIC PLAN MAP AMENDMENT SPA-01-18; ZONING MAP AMENDMENT ZOA-01-18; VESTING TENTATIVE RESIDENTIAL SUBDIVISION MAP MAP-01-16; DEVELOPMENT PLAN PERMIT DP-01-19; AND TREE REMOVAL PERMIT TRP-31-19.**
   RECOMMENDATION:
      1. Approve Planning Commission Resolution No. 02-2020 (Attachment A) recommending the City Council adopt the Oak Creek Canyon Residential Subdivision Initial Study/Mitigated Negative Declaration (IS/MND) and Mitigation Monitoring and Reporting Program (MMRP) (ENV-02-16); and

2. Approve Planning Commission Resolution No. 03-2020 (Attachment B) recommending City Council approval of a General Plan Map Amendment to eliminate the Public/Quasi Public (PQ) designation for the Oak Creek Canyon Residential Subdivision Planned Development Project (GPA-02-18); and

3. Approve Planning Commission Resolution No. 04-2020 (Attachment C) recommending City Council approval of a Marsh Creek Road Specific Plan (MCRSP) Map Amendment to change the open space designation to Public Open Space designation for the Oak Creek Canyon Residential Subdivision Planned Development Project (SPA-01-18); and

4. Approve Planning Commission Resolution No. 05-2020 (Attachment D) recommending City Council approval of Ordinance No. XXX (Attachment E) for a rezone of the project site from Single Family R-10 and Public Facility (PF) to Planned Development District (PD) for the Oak Creek Canyon Residential Subdivision Planned Development Project (ZOA-02-18); and

5. Approve Planning Commission Resolution No. 06-2020 (Attachment F) recommending City Council approval of the Oak Creek Canyon Residential Subdivision Planned Development Project Development Plan (DP-01-15), Tentative Subdivision Map (MAP-01-16), Development Review Permit (DP-01-19), and Tree Removal Permit (TRP-31-19) for a six-lot subdivision for six single-family homes.

Alternative Recommendation

1. Request staff draft a resolution recommending that the City Council deny the General Plan Amendment, Marsh Creek Road Specific Plan Amendment, Rezone, Development Plan, Tentative Tract Map, Development Review Permit, and Tree Removal Permit.

8. ACTION ITEMS

A. None

9. PLANNING COMMISSION REQUESTS AND UPCOMING AGENDA DEVELOPMENT

This time is set aside for the Planning Commission to make requests of staff, and/or issues of concern to Planning Commissioners are briefly presented, prioritized, and set for future meeting dates.

10. ADJOURNMENT

The next Planning Commission Regular Meeting is Tuesday, October 27, 2020.

MINUTES

PLANNING COMMISSION
REGULAR MEETING
VIRTUAL PLANNING COMMISSION REGULAR MEETING

TUESDAY, SEPTEMBER 22, 2020
7:00 P.M.

CALL TO ORDER
7:00 P.M.

1. **PLEDGE OF ALLEGIANCE**

2. **ROLL CALL**

   Community Development Director Matthew Feske conducted roll call:

   - Commissioner Bassam Altwal: Present
   - Commissioner Peter Cloven: Present
   - Commissioner Frank Gavidia: Present
   - Vice Chair Terri Denslow: Present
   - Chair A.J. Chippero: Present

3. **PRESENTATION AND ANNOUNCEMENTS:**

   A. **Presentations:**

      None.

   B. **Announcements:**

      None.

4. **ACCEPTANCE OF THE AGENDA:**
   Motion and Vote 5-0-0 the Planning Commission accepted the agenda.

5. **PUBLIC COMMENT (Non-Agenda Items):**
   None.

6. CONSENT CALENDAR

Motion and Vote 5-0-0 to approve the consent calendar

A. MINUTES:

Planning Commission Minutes of August 25, 2020.

B. PLANNING COMMISSION REPORT TO CITY COUNCIL:

Assign the Planning Commission Chair and the Planning Commission Vice Chair as alternative.

7. PUBLIC HEARINGS

A. None.

8. ACTION ITEMS

A. DISCUSS AND APPOINTMENTS TO THE LAND USE SUB COMMITTEE

Appoint by consensus two (2) appointees and one (1) alternative

Motion and vote 5-0-0 to appoint Chair and Vice Chair and bring back a vote for the alternative after the November 3, 2020 elections.

B. DISCUSS AND FILE LEAP GRANT AND PER CAPITA PROP 68 GRANT PROJECTS

File for future recommendation to the City Council.

Commissioners discussed and presented their ideas for the grant monies with direction to staff to bring back a report and action to forward to the City Council for consideration.

Motion and vote 5-0-0 to have staff bring back a report and action to forward to City Council.

9. PLANNING COMMISSION REQUESTS AND UPCOMING AGENDA DEVELOPMENT

None.

10. ADJOURNMENT

Chair Chippero adjourned the meeting at 7:30 p.m. to the next regular meeting of the Planning Commission on Tuesday, October 13, 2020.

AGENDA REPORT

TO: **HONORABLE CHAIR AND PLANNING COMMISSIONERS**

FROM: **MATTHEW FESKE, COMMUNITY DEVELOPMENT DIRECTOR**

DATE: **OCTOBER 13, 2020**

SUBJECT: **PUBLIC HEARING TO REVIEW AND CONSIDER THE SIX-LOT RESIDENTIAL PLANNED DEVELOPMENT PROJECT INITIAL STUDY/MITIGATED NEGATIVE DECLARATION ENV-02-16; GENERAL PLAN MAP AMENDMENT GPA-02-18; SPECIFIC PLAN MAP AMENDMENT SPA-01-18; ZONING MAP AMENDMENT ZOA-01-18; VESTING TENTATIVE RESIDENTIAL SUBDIVISION MAP MAP-01-16; DEVELOPMENT PLAN PERMIT DP-01-19; AND TREE REMOVAL PERMIT TRP-31-19.**

RECOMMENDATION

Staff recommends that the Planning Commission receive and consider the staff report and all information provided and submitted to date, receive and consider any public testimony, and if determined to be appropriate:

1) Approve Planning Commission Resolution No. 02-2020 (**Attachment A**) recommending the City Council adopt the Oak Creek Canyon Residential Subdivision Initial Study/Mitigated Negative Declaration (IS/MND) and Mitigation Monitoring and Reporting Program (MMRP) (ENV-02-16); and

2) Approve Planning Commission Resolution No. 03-2020 (**Attachment B**) recommending City Council approval of a General Plan Map Amendment to eliminate the Public/Quasi Public (PQ) designation for the Oak Creek Canyon Residential Subdivision Planned Development Project (GPA-02-18); and

3) Approve Planning Commission Resolution No. 04-2020 (**Attachment C**) recommending City Council approval of a Marsh Creek Road Specific Plan (MCRSP) Map Amendment to change the open space designation to Public Open Space designation for the Oak Creek Canyon Residential Subdivision Planned Development Project (SPA-01-18); and

4) Approve Planning Commission Resolution No. 05-2020 (**Attachment D**) recommending City Council approval of Ordinance No. XXX **(Attachment E)** for a rezone of the project site from Single Family R-10 and Public Facility (PF) to

Planned Development District (PD) for the Oak Creek Canyon Residential Subdivision Planned Development Project (ZOA-02-18); and

5) Approve Planning Commission Resolution No. 06-2020 (**Attachment F**) recommending City Council approval of the Oak Creek Canyon Residential Subdivision Planned Development Project Development Plan (DP-01-15), Tentative Subdivision Map (MAP-01-16), Development Review Permit (DP-01-19), and Tree Removal Permit (TRP-31-19) for a six-lot subdivision for six single-family homes.

Alternative Recommendation

1. Request staff draft a resolution recommending that the City Council deny the General Plan Amendment, Marsh Creek Road Specific Plan Amendment, Rezone, Development Plan, Tentative Tract Map, Development Review Permit, and Tree Removal Permit.

REQUEST

The applicant, Kevin English, West Coast Home Builders, Inc., requests approval of an Initial Study/Mitigated Negative Declaration, General Plan Map Amendment, Specific Plan Map Amendment, Zoning Map Amendment, Development Plan, Vesting Tentative Map, and Tree Removal Permit. The project is located on approximately nine acres of land in Clayton at the north side of Marsh Creek Road at its intersection with Diablo Parkway in Clayton, CA. (see Attachment F for Vicinity Map).

The proposal entails review of the following entitlements:

- Environmental Review (ENV-02-16)
  Review and consideration of the Oak Creek Canyon Residential Planned Development Project IS/MND and MMRP prepared in accordance with the California Environmental Quality Act (CEQA). This report analyzes the potential impacts caused by the project and identifies various measures to mitigate these impacts.

- General Plan Amendment (GPA-02-18)
  The project site is currently designated by the City of Clayton General Plan Land Use Element as Low- Density (LD), PQ, and Private Open Space (PR). Single-family dwellings are not consistent with the PQ and PR designation. Therefore, the proposed project includes a General Plan Map Amendment to eliminate the PQ designation, and shift areas of the PR and LD designations of the site to allow for the construction of six single-family residential lots.

- Zoning Map Amendment (ZOA-01-18)
  The project site is currently zoned R-10 and PF. R-10 allows the construction of residences for the owner or lessee, while PF is intended to provide areas for public facilities such as government offices, public safety facilities, and other public land

uses. The proposed project includes a request to rezone the entire site from R-10 and PF to PD in order to encompass the residential uses and bioretention basin.

- Marsh Creek Road Specific Plan Map Amendment (SPA-01-18)
  The project site is currently designated by the Marsh Creek Road Specific Plan Low Density Residential and Open Space. The MCRSP allows for alternative Open Space preservation. The project site proposes Private Open Space.

- Development Plan (DP-01-19)
  A Development Plan to review the architecture and design of the six proposed single-family residences measuring approximately 3,049 to 4,488 square feet in area and 23 to 32 feet in height as well as the project-related landscaping, drainage, fencing, lighting, and retaining walls.

- Vesting Tentative Map (MAP-01-16)
  A Vesting Tentative Map to subdivide the existing approximately 9-acre property into six proposed single-family residential lots with private open space.

- Tree Removal Permit (TRP-31-19)
  A Tree Removal Permit to allow the removal of nine of the 21 trees existing on the project site and replacement with newly planted trees, shrubs, and groundcover.

PROJECT INFORMATION

Applicant/owner:	West Coast Home Builders, Inc. 4061 Port Chicago Highway Concord, CA 94520 Contact: Kevin English (925) 682-6419
Acreage/Location:	9.03 acres Northwest of the intersection of Marsh Creek Road and Diablo Parkway APN: 119-070-008
General Plan Designation	
Existing	Private Open Space PR, Public/Quasi Public PQ, and Low-Density Residential LD (1.1 - 3 units per acre)
Proposed:	Private open Space PR, and Low-Density Residential LD (1.1 - 3 units per acre)
Zoning Classification	
Existing:	R-10 Residential and Public Facility PF
Proposed:	Planned Development PD
Marsh Creek Road Specific Plan	
Existing:	Open Space OS, and Low-Density Residential LD

Proposed:	Private Open Space PR, and Low-Density Residential LD
Surrounding General Plan Designations:	North: Public Park / Open Space / Open Space and Recreational South: Single-Family Low Density (1.1 – 3.0 units per acre) East: Vacant Grazing land West: Single-Family Low Density (1.1 – 3.0 units per acre)
Surrounding Zoning Classifications:	North: Planned District (PD) and Community Park South and West: Single-Family Residential R-10 District East: Marsh Creek Road Specific Plan
Environmental Review:	Oak Creek Canyon Planned Development Project Initial Study/Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program (ENV-02-16) prepared in accordance with the California Environmental Quality Act is discussed in further detail below.
Public Notice:	On August 19, 2020, a Notice of Intent to Adopt an Initial Study/Mitigated Negative Declaration and a Notice of a Public Hearing for the Oak Creek Canyon Planned Development Project was published in the Contra Costa Times, posted on the notice boards, and mailed to property owners within 300 feet of the project site. The 20-day public review period for the project's Initial Study/Mitigated Negative Declaration was from August 21, 2020, to September 9, 2020. The public hearing date was noticed for October 13, 2020.
Authority:	Section 65354 of the California Government Code requires the Planning Commission to provide the City Council with a written recommendation on general plan amendments. Sections 65354 and 65453 of the California Government Code requires the Planning Commission to provide the City Council with a written recommendation on specific plan amendments. Section 17.56.060 of the Zoning Ordinance requires any Planning Commission recommendations on zone changes to be made by Planning Commission resolution.

BACKGROUND/DISCUSSION

The 9.03-acre project site is located northwest of the intersection of Marsh Creek Road and Diablo Parkway and surrounded by existing single-family residential neighborhoods to the west and south. The subject property is vacant land. The applicant proposes to subdivide the existing property into six residential lots.

The Oak Canyon Creek Annexation and Residential Subdivision Project was approved by the City of Clayton on April 5, 2005, along with adoption of an Initial Study/Mitigated Negative Declaration; however, the project was never constructed. The previously-approved entitlements for the project included a property annexation, a General Plan Amendment, an amendment to the MCRSP, pre-zoning of the project site, a tentative subdivision map for five single-family lots and one lot for a bio-retention basin, a Development Plan review permit for home landscape and design, and a Use Permit for the stormwater basin. It should be noted that the General Plan Amendment pertained to a parcel that is not included in the current project proposal.

Given that original project was never constructed, several project entitlements have since expired. In addition, the project applicant has modified the project to include six homes instead of the five homes included in the original proposal, and the size of the proposed bio-retention basin has been reduced. As discussed in greater detail below, the project entails review and consideration of an IS/MND (ENV-02-16), General Plan Map Amendment GPA-02-18; Specific Plan Map Amendment SPA-01-18; Rezone ZOA-02-18 (Map Amendment); Tentative Vesting Map MAP-01-16; Development Plan Permit DP-01-19; and Tree Removal Permit TRP-31-19.

PLANNING COMMISSION AND CITY COUNCIL ACTIONS

Due to the requested and proposed legislative actions, the General Plan Map Amendment, Zoning Map Amendment, Environmental Study, and Marsh Creek Specific Plan Amendment, the City Council will be the final hearing body for this project; therefore, the Planning Commission actions will consist of recommendations to the City Council. The Planning Commission will first review and make separate recommendations to the City Council on the first four entitlements: the IS/MND and MMRP (ENV-02-16); the General Plan Amendment (GPA-02-18); MCRSP Amendment (SPA-01-18) and the Rezone (ZOA-02-18), and then will make a recommendation to the City Council for the remaining entitlements: the Development Plan (DP-01-19); the Tentative Parcel Map (MAP-01-16); and the Tree Removal Permit (TRP-31-19) together under one recommendation.

Separate Resolutions have been drafted for the first four entitlements (ENV-02-16, GPA-02-18, ZOA-02-18, and SPA-01-18) and then the remaining three entitlements (DP-01-19, MAP-01-16, , and TRP-31-19) are bundled together in one Resolution. In total, the Planning Commission will review and render recommendations to the City Council on five individual Resolutions.

ENVIRONMENTAL REVIEW

In compliance with CEQA, the City has prepared an IS/MND and MMRP for the proposed project. The IS/MND was circulated for a 20-day public review period from August 21, 2020, to Sept 8, 2020. Due to the length of the IS/MND, the document was distributed to the Planning Commission electronically on October 2, 2020. The IS/MND and MMRP are available for review at the Community Development Department on the third floor of City Hall and can also be found on the City's website at: https://ci.clayton.ca.us/community-development/planning/development-activity/current-projects-oak-creek-canyon/.

The IS/MND evaluated the potential project-related environmental impacts: aesthetics, agriculture resources, air quality, biological resources, cultural resources, energy, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, transportation/circulation, tribal cultural resources, utilities and service systems, wildfire, and mandatory findings of significance. Of the 20 potential impacts evaluated, the IS/MND identified five environmental factors that are "potentially significant": biological resources, cultural resources, geology and soils, hazards and hazardous materials, and tribal cultural resources. Mitigation measures have been provided for the five potentially significant impacts, thereby reducing the project impacts on the environment to a "less-than-significant" level. The evaluations, impacts, and mitigation measures are described in detail in the IS/MND.

GENERAL PLAN MAP AMENDMENT

The project site is currently designated by the City of Clayton General Plan Land Use Element as LD, PQ, and PR. Single-family dwellings are not consistent with the PQ and PR designation. Therefore, the proposed project includes a General Plan Map Amendment to change the boundaries of the LD and PR areas and eliminate the PQ designation which would allow for the construction of six single-family residential lots (see Attachment H). Previous plans depicted a detention basin in the PQ-designated location. The basin has been changed to a private facility, thus no longer requiring the PQ designation.

In looking at the surrounding General Plan land use designations, directly adjacent to the project site are Single-Family Low-Density LD (1.1 to 3 units per acre), Public Park/Open Space/Open Space and Recreational PU, Private Open Space PR, and Rural Estate RD.

Housing Element

State law requires that the State Department of Housing and Community Development (HCD) forecast statewide housing needs and allocate the anticipated need to regions throughout the state. For the Bay Area, HCD provides the regional need to the Association of Bay Area Governments (ABAG), which then distributes the Regional Housing Needs Assessment (RHNA) to the cities and counties within the ABAG region. ABAG allocates housing production goals for cities and counties based on their projected share of the region's household growth, the state of the local housing market and vacancies, and the jurisdiction's housing replacement needs.

"For the 2014-2022 projection period, ABAG has allocated the City of Clayton a total of 141 housing units, which must be accommodated for and demonstrated within the City's Housing Element. The City's 2015-2023 Housing Element identifies a citywide capacity of 275 housing units, which provides for a housing surplus of 134 units above the City's assigned RHNA of 141 units. The Housing Element identifies the entire project site as an "approved site. "As the original Site Plan Review Permit expired, the City is conditioning the developer to provide 1 low-income housing unit off-site as part of the Affordable Housing Plan for the project.

ZONING MAP AMENDMENT

The proposed project includes a request to rezone the entire site from R-10 and PF to PD in order to encompass the residential uses, private open space, and bioretention basin (see Attachment J). R-10 allows the construction of residences for the owner or lessee, while PF is intended to provide areas for public facilities such as government offices, public safety facilities, and other public land uses. Previous (expired) plans for 5 residential lots included a public detention basin on the property in the PF zone.

MARSH CREEK ROAD SPECIFIC PLAN MAP AMENDMENT

The project site is currently designated by the Marsh Creek Road Specific Plan Low Density Residential and Open Space. The MCRSP allows for alternative Open Space preservation. The project site proposes Private Open Space, which is the General Plan designation for the parcels open space. (See Attachment I)

DEVELOPMENT PLAN PERMIT

A Planned Unit Development of five (5) lots or more requires a Development Plan Permit. The development plan review process reviews the proposed site plan, architecture, arrangement and spacing of structures to provide appropriate open spaces around them, landscaping, vehicular and pedestrian access, lighting, fences, and walls.

TENTATIVE PARCEL MAP

The Tentative Parcel Map proposes to create six new single-family residential lots on the undeveloped property along Marsh Creek Road. The proposed single-family residential lots are proposed to have a single-family residence placed on each lot that will be accessed by a driveway off Saltbrush Lane. A shared driveway is proposed for lots 1 and 2. Section 17.37.090.D.4 of the Clayton Municipal Code (CMC) states, in part, that the City Engineer may require driveway widths in excess of the minimum 16-foot requirement "where unusual traffic, grade, or site conditions prevail." Because the proposed driveway grade may be up to 20%, the Vesting Tentative map shall show a minimum 20-foot driveway width curb to curb, in accordance with CMC Section 17.37.090.D.4, for which a condition has been provided.

Three existing easement areas are located on the property: an existing 8-foot-wide Public Utility Easement parallels and is next to Marsh Creek Road; a 50-foot-wide easement between Contra Costa Water District (CCWD) parcel and Marsh Creek Road; and four pipeline easements along the east property line. The project has conditions addressing the safety of working near the easements, landscaping, and clearing title to non-existent or abandoned pipelines.

The MCRSP delineates a trail on the east side of the property line. A condition has been added that the project show dedication of a 10-foot-wide public access easement along the eastern edge of lots 5 and 6. A six-foot-wide pedestrian trail shall be installed in the easement as shown on the MCRSP.

Section 16.12 of the CMC requires all new subdivisions to dedicate land, pay a fee in-lieu thereof, or both for park and recreational purposes. For projects involving 50 parcels or less, the proposed subdivision is required to pay a fee equal to the land value of the

portion of the local park required to serve the needs of the residents of the proposed subdivision. A condition has been provided requiring payment of parkland dedication fees at the time of filing the final map.

Constraints Map

Section 17.22 of the CMC requires a residential density computation that does not include sensitive land areas for purposes of calculating the permitted subdivision capacity (density) on a parcel or parcels of land. Because of the constraints due to sensitive land areas, residential parcels with sensitive land areas shall fall within a not-to-exceed maximum density for developable acreage and shall not have a minimum density requirement. 3.52 acres of the 9.03-acre lot are on slopes greater than 26 percent. This leaves 5.51 acres. The general plan for the Single-Family Low-Density LD (1.1 to 3 units per acre), computes to 6 to 16 allowable residences. (See Attachment K)

Open Space

The proposed project is requesting a rezone of the entire project site to PD; therefore, the provisions of CMC Chapter 17.28 would also be applicable, including the open space requirements of CMC Section 17.28.100. This section requires provisions for active and passive open space comprising of at least 20 percent of the project site. As a result, the proposed project would be required to acquire and dedicate off-site land for open space or make an in-lieu contribution for the dedication of open space.

The total area of the six single-family home sites is 9 acres, and the developer is required to provide 20 percent of that square footage as open space with 10 percent active open space and 10 percent passive open space. The project shows 5 acres passive open space, and no active open space. Since on-site active open space is not being provided, the developer has three options and shall memorialize the selected option or a combination of options by entering into an agreement with the City: 1) acquire the equivalent amount of land for public open space and/or the construction of open space at an off-site location, 2) payment of an in-lieu financial contribution to the City for acquisition and/or maintenance of public open space, or 3) if the financial contributions are based upon maintenance costs, such contributions shall be based upon reasonable maintenance costs for a 10-year period and shall be proportional to the land area that would be required if open space area was provided on-site. The acquisition of open space or the in-lieu fee shall be paid at the time of filing the final map. Staff has provided a condition that the project shall comply with the open space requirements of the CMC.

Street Section

The Tentative Parcel Map shows two typical cross sections for Saltbrush Lane that do not conform to the MCRSP. The standard for a collector road in the MCSP shows a 4-foot sidewalk, a 6-foot landscape strip, 10-foot parking and bike lane, two 11-foot travel lanes, and 6 feet of landscaping. Conditions of Approval call for the dedication of the 48-foot right-of-way and grading of the entire right-of-way. The Developer is being required to build a 4-foot sidewalk, 6-foot landscape strip (including curb), and 24-foot roadway (including gutter) to accommodate two travel lanes and a 2-foot shoulder.

GRADING

The maximum elevation of the property is approximately 690 feet above sea level with a minimum elevation of approximately 587 feet above sea level. Geotechnical remediation reports depict an old slide on lots 1 through 3 which is proposed to be repaired as part of the grading work. Lots 1, 2, and 3 each have retaining walls that are a maximum of 3 feet high. Plans depict a balanced site.

A condition has been added that requires plans be modified to show full section grading of Saltbrush Lane.

East Contra Costa County Habitat Conservancy

According to the Plant Survey Report, the project site consists of approximately 6.57 acres of annual grassland land cover and 2.46 acres of ruderal land cover. The project site is located within the boundaries of the *East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan* (ECCCHCP/NCCP), which is intended to provide an effective framework to protect natural resources in the County. The project site is located within Zone 2 of the Fee Payment Zones designated in the ECCCHCP/NCCP. As per the Fee Payment Zones, the proposed project would be subject to payment of all applicable fees prior to construction of the project.

Prior to grading the project, the initial study requires mitigation measures to minimize effects of the project, which are included in the conditions of approval.

UTILITIES

Water, sewer, and stormwater infrastructure for the subdivision is shown on the project utility plan. A detention basin is planned for lot 6, while the smaller basins shown are conditioned to be eliminated and the lot 6 basin redesigned to accept the flows for ease of maintenance. All utilities are to be sized to accommodate buildout of the MCRSP.

Water

The CCWD will provide water to the residential project site. Currently, an existing CCWD water main is located along Marsh Creek Road that the applicant proposes to utilize in order to serve the six lots extending in a proposed line from the existing water main with two water laterals to each lot.

Sewer

Sewer service is currently provided in proximity to the residential project site by the City of Concord from an existing sewer line located on Marsh Creek Road that runs south along the road. The project would include the connection of the proposed residential units to sewer service by way of a new 8-inch sewer line extending from the existing sewer main, with six sewer laterals proposed to service the six residential parcels, one sewer lateral to each lot.

Stormwater

In order to comply with State's C.3 standards, the portion of the project site proposed for development has been separated into drainage management areas corresponding with the six residential units proposed as part of the project. Stormwater runoff from the

drainage management areas would be directed to separate bioretention areas, Per C.3 Guidebook instructions, and the proposed bioretention areas would be sized with adequate capacity to receive and treat all runoff from the impervious areas of the project. Runoff entering the bioretention areas would move through permeable soil layers, which would slow the stormwater while also removing pollutants that may be contained in the runoff. Stormwater that exceeds the bioretention facilities' infiltration capacity, such as in the case of heavy storm events, would be directed to existing stormwater infrastructure located on at the Saltbrush Road intersection with Marsh Creek Road.

Funding for the operation and maintenance of the stormwater detention basin is the responsibility of the Homeowners Association (HOA). A Community Facilities District (CFD) is being required to take on the operation and maintenance of the stormwater facilities (and landscape maintenance) should the HOA fail to meet their obligation.

Conditions have been provided addressing project-related stormwater, storm drain, and drainage issues, including the applicant submitting to the City Engineer for review and approval a stormwater operations and maintenance plan along with a final stormwater control plan.

The drainage area in the southern portion of the project site had been recently disked prior to visual reconnaissance surveys of the project area by biologist Leslie Koenig to evaluate biological resource conditions at the site in 2017 and 2018. However, several indicators were found suggesting considerable surface water flows across the site in the vicinity of the mapped drainage alignment, and that without the routine disturbance from disking, a natural drainage with a bed and bank could form within the site. Project plans propose a 48-inch storm drain, and mitigation measures require that prior to approval of grading plans for the proposed project, the project applicant shall complete a formal wetland delineation and submit the delineation to the U.S. Army Corps of Engineers (USACE) for verification. If the project site is determined to include jurisdictional wetlands that would be altered as part of the proposed development, a Section 404 permit for fill of jurisdictional wetlands would be required, and mitigation for impacts to jurisdictional waters that cannot be avoided shall conform with the USACE "no-net-loss" policy prior to approval of grading plans.

DEVELOPMENT PLAN PERMIT REVIEW

Development Standards

The Planned Development District designation allows for flexibility in regulations, limitations, and restrictions different than those specified elsewhere in the City, such as setbacks and height limitations, location of pedestrian and vehicular access, construction fences and walls, amongst others. The development standards for the six lots for the six single-family homes are proposed in the table below. Staff analyzed the development standards in the adjacent Single-Family Residential Districts and found the proposed development standards were identical to those within the Single-Family Residential R-10 District, which is the existing zoning district; therefore the proposed development standards conform to surrounding existing development standards, development patterns, and house orientations. Note, the lots are greater in size than those existing to the south and west of the project due to the sensitive lands of the slopes, however as a

gateway to Clayton (until future MCRSP development occurs), the project conforms to the topography by clustering the development in the flatter land area.

R-10 Standards

Setback Analysis

The Planned Development zoning proposed for the site allows the project to establish project-specific setbacks, at the discretion of the Planning Commission and City Council. Staff has provided a R-10 setback table. The proposed setbacks for the proposed homes are consistent with surrounding existing interior lot setbacks and provide a greater amount of setback area than surrounding lots in the R-10 District.

The proposed site plan shows that the proposed homes meet the minimum lot width at the front setback line of 80 feet, excepting the flag lot on lot 2 that shows adequate layout relationship to neighboring homes on lots 1 and 3. The project site plan demonstrates the six proposed homes have setbacks equal to or greater than those shown on the table below.

R-10 Setback Table

Front Setback	Interior Side Setback	Exterior Side Setback	Rear Setback	Building Height	Accessory structures	Lot area
20’	10’ minimum 20’ aggregate	20’	15’	35’	Per MC 17.16.130	10,000 S.F. Min.

The area and depth of each lot are greater than the R-10 10,000-square-feet-minimum lot size and the 90-foot-minimum lot depth.

As discussed under the Vesting Tentative Map Grading section above, a condition has been added that requires Saltbrush Lane modification to assure no future grading occurs on lot 6 once the MCRSP buildout is complete and Saltbrush Lane is constructed to full section.

Architecture and Design

As part of the project, each lot plans for one single-family residence. The site plan, floor plans, architectural elevations, colors, and roofing are provided as Attachment 0.

Policy 7c of the General Plan requires design plans to be coordinated with those of the Town Center and the current architecture. MCRSP Policy DD-8 indicates the architectural style should reflect traditional rural architecture. Architectural elevations were resubmitted that reflect a rural architecture by using vertical and horizontal siding, brick, fieldstone, ledgestone, timber materials, colors and roofing material that combine to create a country sense. Each residence features sufficient articulation with various projections, recesses, and undulations on all four facades. Visual interest is provided with the varying window sizes and to break up the various panes of window glass. The earth tones of the proposed

exterior colors and materials provide dynamic yet subtle color schemes that foster a unique curb appeal. The appearance of the residences from Marsh Creek Road is enhanced by the varied architectural elements, and minimal use of solid wall planes.

Residential Floor Area Analysis

Building Footprint

The purpose of the CMC 17.78.010 regulation is to implement the General Plan, which envisions maintaining the semi-rural character of the city and providing a variety of housing sizes. This regulation of the relationship of house size to lot size is intended to preserve and perpetuate the established relationship of buildings and spaces characteristic of Clayton's residential setting, where relatively modest residences are surrounded with generously sized areas of natural and landscaped open grounds; assure that the scale of residential development responds to the limitations created by constrained lot sizes; minimize the out-of-scale appearance of large residences relative to their lot size and to other residences in a neighborhood; minimize the environmental damage of tree removal and grading which may result from over-building; and expand the range of house sizes to accommodate housing needs and preserve and enhance diversity of housing.

The following demonstrates shows that the project conforms to the floor area analysis per the CMC, because the project square footage numbers are less than the maximum footages allowed in CMC 17.78.010.

Project Floor Area Analysis Table

Lot	NET Lot Area*	Building Footprint	Maximum Footprint Allowed (25%)	Floor Area	Maximum Floor Area (35%)
1	26,276	3,894	6,569	6,024	9,197
2	129,761	3,554	32,440	5,663	45,416
3	74,579	3,461	18,645	6,002	26,103
4	44,704	4,397	11,176	4,397	15,646
5	41,654	3,105	10,414	5,109	14,579
6	63,193	5,015	15,798	5,015	22,118

*Net lot area means the total horizontal area included within a lot, excluding areas within vehicular or pedestrian access easements.

Landscaping

The applicant has submitted a Landscape Plan for the project (see Attachment P). The applicant is providing a mixture of 7 types of trees including coast live oaks and valley oaks, yew, and crape myrtle trees as well as various shrubs, ornamental grasses, and groundcovers. Staff has provided a condition that, prior to a grading permit being issued for the project, a revised Landscape, Irrigation, Fencing, and Retaining Wall Plan shall be submitted along with construction plans for building permit issuance to the Community Development Director for review and approval. Landscaping is proposed in front of the residences and in the Saltbrush lane right-of-way. Landscape plans also show

landscaping along Marsh Creek Road and the proposed Saltbrush Lane.

Staff has provided a condition that the landscaping for the project comply with the City's landscape water conservation standards, as listed in Chapter 17.80 of the CMC. Landscape plans show the only water-thirsty landscape is a small grass area at each proposed home site. All other landscaping is low to moderate water use.

Fencing

The fencing plans in the landscape plan package show a split double rail, a split-view fence (solid lower, wire top), a privacy fence, and open space wire fencing. Due to traffic along Marsh Creek Road, a sound study a mitigation measure was added to provide sound protection and thus construct sound walls at locations near the roadway instead of fencing. For visual concerns, the project is conditioned to remove the metal open space fence and provide the wire open space fencing.

Retaining Walls

The proposed project includes construction of 3-foot high retaining walls on lots 1, 2, and 3. Lot 3 shows a double wall in the back yard to allow for a larger patio/yard area. Regrading on lot 6 to allow future full-section roadway for Saltbrush Lane may require additional 3-foot-high walls. The walls will be textured, colored block walls. All retaining walls visible from street or sidewalk areas are conditioned to be covered with a stone fascia.

Parking

The architectural plans show garage parking for three cars, and the site plan shows parking for a minimum of two additional cars in the driveway. Until buildout of the MCRSP, Saltbrush Lane's modified section does not provide parking for the homes, however each lot and garage provides adequate parking.

TREE REMOVAL PERMIT

None of the 21 trees surveyed are protected under the City of Clayton Tree Ordinance due to their size and species; however, as part of the project, the applicant is requesting approval of a Tree Removal Permit to remove nine trees, for which an Arborist Report has been submitted (see Attachment Q). Section 15.70.040.A of the CMC provides the options for tree replacement and the project landscape plans (see Attachment P) show abundant tree planting.

To minimize damage to public improvements (i.e. sidewalks), staff has provided a condition that trees planted less than 10 feet away from public improvements have root guards installed.

AGENCY COMMENTS

The project conditions of approval list agency comments from Contra Costa County Flood Control and Water Conservation District, Contra Costa County Fire Protection District, Contra Costa Water District, CRIMSON PIPELINE L.P., and Phillips 66 Pipeline, LLC.

FISCAL IMPACT

There are no immediate fiscal impacts associated with the application. Should the proposed project be approved, there would be an increase in property taxes, which would be a direct positive fiscal impact. In addition, after construction and occupancy of the homes, the residents could have an indirect positive fiscal impact by shopping and eating at the local businesses and increasing sales taxes.

ATTACHMENTS

A. Planning Commission Resolution No. 02-2020 IS/MND
B. Planning Commission Resolution No. 03-2020 General Plan Map Amendment
C. Planning Commission Resolution No. 04-2020 Marsh Creek Road Specific Plan Map Amendment
D. Planning Commission Resolution No. 05-2020 Zoning Map Amendment
E. Clayton Zoning Map Amendment Ordinance
F. Planning Commission Resolution No. 06-2020 Vesting Tentative Map, Development Plan, Tree Removal
G. Vicinity and Site Map
H. General Plan Map Amendment Exhibit
I. Marsh Creek Road Specific Plan Map Amendment Exhibit
J. Zoning Map Amendment Exhibit
K. Constraints Map
L. Vesting Tentative Map
M. Preliminary Grading Plan
N. Utility Plan
O. Site and Architectural Plans (Floor Plans and Architectural Elevations, Exterior Colors and Materials)
P. Landscape and Fencing Plan
Q. Arborist Report
R. Initial Study/Mitigated Negative Declaration

CONDITIONS OF APPROVAL FOR OAK CREEK CANYON

FILES
Environmental Review ENV-02-16; General Plan Map Amendment GPA-02-18; Specific Plan Map Amendment SPA-01-18; Zoning Map Amendment ZOA-02-18; Vesting Tentative Subdivision Map MAP-01-16; Development Plan Permit DP-01-19; and Tree Removal Permit TRP-31-19.

West Coast Home Builders, Inc. (Applicant and Owner)

Administrative

1. _____ This approval is based on the following exhibits/reports received by the Community Development Department for 6 residential lots on the approximately nine (9) acre site as follows:

PLAN	DATED	PREPARED BY	PAGES
Vesting Tentative Map (VTM)	2/03/20	Isakson & Assoc. Inc.	1
Zoning Exhibit		Isakson & Assoc. Inc.	1
General Plan Exhibit		Isakson & Assoc. Inc.	1
Marsh Creek Road Specific Plan Exhibit		Isakson & Assoc. Inc.	
Site Plan and Design Review Booklet	2/24/2020	Discovery Design Group	34
Prelim. Grading Plan	2/3/2020	Isakson & Assoc. Inc.	2
Geotech Slope Constraints	3/18/2020	Isakson & Assoc. Inc.	1
Geotechnical /Geologic Peer Review	2/25/2020	Alan Kropp and Assoc. Inc.	4
Geotechnical Earthwork Calcs	11/3/2019	A.D. Seeno Const. Co.	6
Response to Review 2/25/20 Comments by Alan Kropp & Assoc.	3/10/2020	ENGEO	23
Supplemental Geotechnical/Geological Peer Review	3/18/2020	Alan Kropp and Associates, Inc.	2
Review letter of Engeo Updated Geotechnical	3/19/2008	Joyce Associates	3
Engeo Updated Geotechnical Report	2/22/2008	Engeo	84
Preliminary Landscape Plan	3/10/2020	MD Fotheringham Landscape Architects	12
Arborist report	10/10/2019	Traverso Tree Service	8
Stormwater Control Plan	5/17/2015	Isakson & Assoc. Inc.	19
Constraints Map	8/23/2019	Isakson & Assoc. Inc.	1

Rare Plant Survey Report	12/21/2018	Swaim Biological Incorporated	32
Biological Resources Assessment & Attach. A photos	06/11/2018	Swaim Biological Incorporated	32
HCP Application and Planning Survey Report	May 2018	Swaim Biological Incorporated	35
Utility Plan	6/12/2020	Isakson & Assoc. Inc.	1
Initial Study		Raney	
Title Report Pre	1/21/2020	Old Republic	

2. _____ Approval of the tentative map shall not be construed as a guarantee of approvals of specific proposed improvements shown.

3. _____ The development shall comply with the City of Clayton Municipal Code, policies, and standards unless a specific exception is granted thereto, or is otherwise modified in these conditions or in the development agreement.

4. _____ Prior to the issuance of building permits architecture, sound walls, fencing, mailboxes, lighting, any accent paving, addressing, and landscaping for the entire project shall be subject to review and approval by the Planning Commission.

5. _____ Sound wall locations and elevations shall be included on the grading plan(s).

6. _____ A final and unchallenged approval of this project supersedes previous approvals that have been granted for this site.

7. _____ Permits or approvals, whether discretionary or ministerial, will not be considered if the applicant is not current on fees, reimbursement and/or other payments that are due the City.

8. _____ All required easements or rights-of-way for improvements shall be obtained by the applicant at no cost to the City of Clayton. Advance permission shall be obtained from any property or, if required from easement holders, for any work done within such property or easements.

9. _____ All easements of record that are no longer required and affect individual lots or parcels within this project shall be removed prior to or concurrently with the recordation of the final map or subsequent separate document as approved by City Engineer.

10. _____ All advertising signs shall be consistent with the Sign Ordinance or as approved by the Community Development Director.

11. _____ The approval is for a two-year period, which may be extended for an additional one year. Extension requests must be submitted prior to expiration of

the initial approval and must be accompanied by the appropriate filing fee. An extension request is subject to review and approval of the Community Development Director.

12. _____ Pursuant to Government Code Section 66474.9, the applicant (including the subdivider or any agent thereof) shall defend, indemnify, and hold harmless the City of Clayton and its agents, officers, consultants, and employees from any claim, action, or proceeding against the City or its agents, officers, or employees to attack, set aside, void, or annul the City's approval concerning this subdivision map application, which action is brought within the time period provided for in Section 66499.37. The City will promptly notify the subdivider of any such claim, action, or proceeding and cooperate fully in the defense.

13. _____ The applicant agrees to indemnify, protect, defend, and hold harmless the City and its elected and appointed officials, officers, employees, consultants, and agents from and against any and all liabilities, claims, actions, causes, proceedings, suits, damages, judgements, liens, levies, costs, and expenses of whatever nature, including attorney's fees and disbursements arising out of or in any way relating to the issuance of this entitlement, any actions taken by the City relating to this entitlement, or the environmental review conducted under the California Environmental Quality Act for this entitlement and related actions.

14. _____ The project is subject to development impact fees and parkland dedication fees, as established in the Municipal Code at the time of payment.

15. _____ All mitigation measures set forth in the Oak Creek Canyon Subdivision Initial Study/Negative Declaration (ENV 02-16) are hereby incorporated into these Conditions of Approval, as if fully contained herein, except those found infeasible pursuant to Section 15091 of the California Environmental Quality Act Guidelines.

16. _____ The Developer shall be responsible for all fees and environmental review costs, including those charged by other governmental agencies including, but not limited to, the California Department of Fish and Wildlife (CDFW) and the U.S. Army Corps of Engineers (USACE).

17. _____ This application is subject to an initial application fee, which was paid with the application submittal, plus time and material costs if the application review expenses exceed 100% of the initial fee. Any additional fee due must be paid within 60 days of the permit effective date or prior to use of the permit, whichever occurs first. You may obtain current costs by contacting the project's assistant planner. If you owe additional fees, a bill will be sent to you shortly after permit issuance.

Rezoning/Amending

18. _____ This tentative map approval is not effective until the General Plan designation for the project site area has been amended to Private Open Space

(PR) and Low Density (LD) as shown on the General Plan exhibit [GPA 02-18]; the Zoning Map designation for the project site lots 1-6 have been rezoned From R-10 and Public Facility (PF) to Planned Development District (PD) [ZOA 02-18]; and the Specific Plan has been amended to adjust the areas of Open Space (OS) and LD to PR and LD [SPA 01-18].

Residential Lots

19. _____ The maximum number of units approved is six (6) single-family residential lots as shown on the tentative map, development package, and associated plan submittals noted above.

Development Plan/Design Review

20. _____ 60 days prior to the approval of the grading plan, the applicant shall submit for review and approval by the Community Development Director a revised development plan set that depicts the modifications requested herein.

Modifications

21. _____ All revisions of the internal circulation plan or lot layout shall be subject to review and approval of the Community Development Director and City Engineer at least 60 days prior to filing the Final Map or obtaining a Grading Permit.

22. _____ Saltbrush Lane shall be modified as shown in the Marsh Creek Road Specific Plan (MCRSP) right-of-way of 48 feet. The VTM, grading plans, landscape plans, and site/development plans shall be modified to depict grading of the full right-of-way section, including the area adjacent to lot 6.

23. _____ The Developer shall construct a 4-foot sidewalk on the west/north side of the right-of-way which shall connect to the 6-foot pathway on the eastern side of the property, 6-foot landscape strip (including curb) and 24-foot roadway (including gutter on the west/north side). Additional width shall be constructed if a berm is required on the east/south side of the right-of-way for drainage purposes.

24. _____ Adjust the proposed Marsh Creek Road path design to provide 2 feet of additional clearance from tree #43. [Mitigation Measure 5.b]

25. _____ The final map shall show an offer of dedication for a public utility easement over Saltbrush Lane in addition to an offer of dedication in fee title for the roadway right-of-way as approved by the City Engineer.

26. _____ Eliminate the two small storm drain detention basins and revise the main basin on lot 6 to accommodate the removal of the small basins.

27. _____ Shift the meandering 6-foot-wide path along Marsh Creek Road to stay in the public right-of-way (easterly of the Saltbrush Lane intersection).

28. _____ Eliminate trees on the Contra Costa Water District (CCWD) easements as noted in their advisory notes.

29. _____ Provide an all-weather access to the stormwater detention basin.

30. _____ Sound walls shall be added to construction plans as noted on the Acoustical Study and shown in the Project IS/MND.

31. _____ The Open Space Fencing shall be modified to reflect a rural mesh fence.

Homeowners Association

32. _____ A Homeowners Association (HOA) shall be formed for the maintenance of the project as shown on the Tentative Subdivision Map and development plans and noted below in the covenants, conditions and restrictions (CC&Rs).

Covenants, Conditions and Restrictions

33. _____ The CC&Rs for the single-family residential lots shall be submitted for the review and approval of the Zoning Administrator at least 60 days prior to filing the Final Map. This document shall provide for establishment, ownership, and maintenance of common space (including the area between Marsh Creek Road and the property line), parking, fire protection, tree protection, fencing, Saltbrush Lane, drainage maintenance, keeping of pets, and establishment of signs, and it will include conditions as noted:

    a. Setbacks for the home shall be as noted and shown on the approved project Site Plan. Deviations from that plan must be approved by the Community Development Director.
    b. The minimum dimension for any modification shall be consistent with the Clayton Municipal Code R-10 district.
    c. The building heights shall not exceed thirty-five (35) feet.
    d. Fencing is per the Project Fencing Plan as modified to show a rural mesh fence for the Open Space Fencing. Property owners are responsible for the repair and maintenance of the fences along their respective property lines. The fences shall be maintained in a style consistent with the design approved by the City, unless prior written approval is obtained from the Community Development Director.
    e. All fencing located on the Marsh Creek Road frontage portion of lots 1, 2, and 6 shall be set back at least fifty (50) feet from the edge of the right-of-way.
    f. All fencing located on the upslope portions of lots 2-5 behind the residences shall be open wire fencing. Solid fencing is prohibited in these areas.
    g. Property owners shall maintain any gates on their property needed for access to aboveground or underground drainage facilities.
    h. Gates to the private open space must accommodate fire apparatus per the Contra Costa County Fire Protection District (CCCFPD).

i. The property owners of lots 2, 3, 4, and 5 shall be responsible for the maintenance of the graded bench. Furthermore, property owners shall not modify the graded bench and drainage facilities without prior written approval from the City of Clayton. The property owners shall not place or store any materials or structures on the bench or on the slope above the bench.
j. The owner shall cut down and remove all weeds, grass, vines, or other growth that is capable of being ignited and endangering property. (304.1.2) California Fire Code (CFC).
k. No provision in the CC&Rs that is included as a result of these Conditions of Approval may be amended without the prior written approval of the City of Clayton.

34. _____ The CC&Rs document shall reference the approved drainage improvement maintenance plan and the fencing plan program.

35. _____ The CC&Rs shall state that all residential units constructed on the lots 1, 2, and 6 shall provide outdoor areas that are exposed to noise levels from Marsh Creek Road at levels no greater than 60 dB.

36. _____ The CC&Rs shall clearly note that all subdivision maintenance is to be done by the property owner, r the Homeowners Association or the community facilities district.

37. _____ The CC&Rs shall make an adequate provision for funding road maintenance and establishing a maintenance cycle standard.

38. _____ The CC&Rs shall make an adequate provision for funding the maintenance of the C.3 storm drainage facilities and establishing a maintenance cycle standard.

39. _____ In accordance with the County Child Care Ordinance, the CC&Rs shall indicate that a child care facility may be located at any residential unit or lot, consistent with the existing laws.

40. _____ The Developer shall provide homeowners with educational materials regarding proper storage and disposal of household hazardous wastes, including fuels, oils, paints, and solvents. The format and wording of the educational materials shall be approved in advance by the Community Development Director.

CC&R Deed Restrictions

41. _____ The Covenants, Conditions and Restrictions (CC&Rs developed for this project shall include the following deed restrictions. The wording of the following deed disclosures shall be approved by the Clayton Community Development Director and City Attorney. The following deeds are to be recorded concurrently with the final map, and a note on the final map shall be utilized:

A. The final map shall show private open space deed restrictions in the locations listed below. The restrictions are intended to preserve the open and attractive visual character of the subject area. The restrictions shall prohibit grading (except for remedial grading, drainage improvements, and disking for weed abatement); construction of all buildings and structures; and storage of any motor vehicles, trailers, recreational vehicles, graders, tractors, or similar equipment.

   1. The western portion of lot 2, beginning at the western edge of the 50-foot-wide roadway and pipeline easement serving the CCWD parcel.

   2. The northern portions of lots 3-5 above the V-ditch drainage bench generally located at elevation of 630 feet.

   3. The detention basin on lot 6 in the Storm Drain Management Easement.

B. Concurrent with recordation of the Final Map, and consistent with the provisions and intent of the Contra Costa County's "Right to Farm" Ordinance, the following statement shall be recorded at the County Recorder's Office for each parcel within the subdivision to notify owners of the lots that they own property in an agricultural/grazing area:

   "This document shall serve as notification that you have purchased land in an agricultural area where you may regularly find farm equipment using local roads; farm equipment causing dust; crop dusting and spraying occurring regularly; burning associated with agricultural activities; noise associated with farm equipment and aerial crop dusting, and certain animals and flies may exist on surrounding properties. This statement is, again, notification that this is part of the agricultural way of life in the open space areas of Contra Costa County and you should be fully aware of this at the time of purchase."

C. No alterations of Storm Drain Management Easement on lot 6 shall be allowed, except for activities approved as part of a maintenance, preservation, and/or enhancement plan. The deed restriction shall prohibit, in perpetuity, use and improvements within the Storm Drain Management Easement. Specifically, the deed restriction shall prohibit any physical alterations within the Storm Drain Management Easement, including vegetation removal, vegetation planting, landform alterations, or construction of structures or improvements. The deed restriction shall be recorded concurrently with the final map.

D. A deed restriction shall alert each property owner to the possible presence of buried human remains and/or artifacts. The deed restriction shall require that if any of these cultural remains are discovered during-ground disturbing activities, work shall be halted within 50 feet of the discovery until a qualified archaeologist is retained to inspect the discovery. If the archaeologist determines that the find is important, no additional construction shall take place until the find can be fully evaluated according to procedures outlined in Section 106 of the Historic Preservation Act. If human remains are uncovered, the Contra Costa County Coroner shall be notified immediately. If the remains are determined to be Native American, a qualified Native American representative shall be contacted, and the Native American Heritage Commission (NAHC) shall be notified within 24 hours. The most likely descendants (MLD) of the deceased shall be given the chance to make recommendations for the remains. If no recommendations are made within 24 hours, remains may be reinterred elsewhere. If recommendations are made and not accepted, the NAHC shall mediate the problem.

E. Applicant shall record a statement to run with deeds to property stating that no trees are to be removed on the property, excepting those approved to be removed on the project's tree preservation plan, without obtaining a tree permit from the Community Development Department.

F. Applicant shall record a statement to run with deeds to property acknowledging the approved geotechnical report by title, author (firm), and date, calling attention to approved recommendations, and noting that the report is available from the seller.

G. Prepare a deed disclosure to be recorded with each lot that they are in a Community Facilities District (CFD). Should the HOA become defunct for any reason, the CFD will require annual assessment installments, hereinafter collectively referred to as special liens. If special liens described above are not paid, foreclosure proceedings may be initiated at any time. After property taxes become delinquent, property may be sold for the delinquent amounts earlier than with regular property taxes.

H. Notification shall be provided on the deeds and California Department of Real Estate disclosure forms to future property owners regarding the presence of oil pipelines, the public trail north and east of the project site, and the planned extension of the project road to serve future residential development to the east.

I. The deeds for lots 1, 2, and 3 shall contain wording which notifies future owners of the potential serious risks to the respective owners and residents from failure of the CCWD Seminary Water Tank and subsequent inundation of the respective lots and property. The notification wording on the deed shall be subject to the review and approval by the Community Development Director.

J. The deed for lot 6 shall contain wording that notifies future owners that the Saltbrush Lane may be widened and no encroachments, including tree planting, are permitted in the right-of-way adjacent to the property. This deed restriction shall terminate with the construction of the roadway widening.

42._____ The deeds for all lots shall contain language that prohibits any future land division(s) to create additional home sites.

Community Facilities District

43._____ If not already a part of the City's existing landscape maintenance district, the Developer shall annex into the district prior to the issuance of the first certificate of occupancy or sale of any lot, whichever comes first. The annexation request shall include annual rate adjustments to account for cost-of-living increases. The landscaping and irrigation improvements required to be installed in the median islands in Marsh Creek Road shall be operated and maintained by the City as part of the duties of the City's existing landscape maintenance district.

44._____ The maintenance of all public and private landscaping and stormwater facilities on or adjacent to the development from the back of curb on Marsh Creek Road is the responsibility of the HOA. The developer shall form a CFD that will levy the assessments should the HOA fail to fulfill its requirements. Prior to approval of the final map, the Developer shall submit a written request for and consent to the formation of a CFD (consistent with the Mello-Roos Community Facilities Act of 1982). Prior to issuance of a certificate of occupancy for the first residence (including model homes) or the sale of any lot, whichever comes first, the Developer shall participate in the formation, including the holding of a ballot election and the levying of assessments, of the CFD. The CFD shall include the land area of lots 1-6. The CFD shall include annual rate adjustments to account for cost-of-living increases. (Note: This CFD is separate from the existing City-wide landscape district.) Assessments shall be levied to fund the cost of all operating, maintenance, and repair needs for all of the storm drainage facilities and basin improvements on lot 6; periodic inspections and testing; roadway maintenance; operating, maintenance, and repair needs for the irrigation and landscaping; periodic inspections costs; City administrative and reporting costs; County levy and collection costs; City overhead charges; and reserve funds for capital replacements and major repairs.

45._____ The Developer shall pay a fair share contribution, as determined by the City Engineer, to the City for impacts to city services (e.g., police, library,

administration, planning, maintenance, and engineering) directly related to impacts of the proposed project, including impact fees and the establishment of the CFD. The payment shall be made at the time of issuance of the building permit for the project's first unit and shall be based on the findings of the fiscal impact study prepared for the CFD.

Tree Retention and Landscaping

46. _____ Prior to occupancy of the first residence, the Developer shall install the landscaping and irrigation generally shown on the landscape plans (Figure 10 and 11 of the IS/MND), subject to City review and approval.

47. _____ A note shall be added to the grading plan that references the October 10, 2019, project's Arborist Report. All trees to be saved and removed shall be marked on the grading plan. The Community Development Department shall review and approve grading, landscape, and improvement plans to ensure adequate measures are taken to protect trees.

48. _____ All trees greater than 6 inches in diameter at 4.5 feet above ground level on lot 4 shall be retained. If, during construction, it is found that it is necessary to remove of these trees, construction shall be halted in the immediate area of the subject tree(s) until a revision to the tree retention actions shown on the grading plan is reviewed and approved by the Community Development Director.

49. _____ The applicant shall submit for the review and approval of the Community Development Director a tree protection plan to identify the location of the existing trees to be retained, as identified in the Arborist Report.

    a. Adjust the proposed Marsh Creek Road path design to provide 2 feet of additional clearance from tree #43.
    b. Prior to construction or grading, the project contractor shall install fencing to construct a temporary Tree Protection Zone (TPZ) around trees #43 and #60.
    c. TPZ fencing shall remain in an upright sturdy manner from the start of grading until the completion of construction. Fencing shall not be adjusted or removed without consulting the project arborist.
    d. If roots greater than 2 inches in diameter are encountered near tree #61 during construction of the proposed ditch, roots shall be cleanly pruned with a handsaw or sawzall.
    e. Pruning shall be performed by personnel certified by the International Society of Arboriculture (ISA). All pruning shall adhere to the ISA and American National Standards Institute standards and best management practices (BMPs).
    f. Should TPZ encroachment be necessary, the project contractor shall contact the project arborist for consultation and recommendations.

g. The project contractor shall keep TPZs free of all construction-related materials, debris, fill soil, equipment, etc. The only acceptable material is mulch spread out beneath the trees.
h. Should any damage to the trees occur, the contractor shall promptly notify the project arborist to appropriately mitigate the damage. **[Mitigation Measure 5]**

50. _____ Landscape and irrigation improvement plans shall be submitted for review and approval by the Community Development Department, Maintenance Department, and City Engineer that meet the requirements of Chapter 17.80 of the Zoning Ordinance and reference plan modifications noted in COA's 13-18 and include the following features and stipulations:

a. Landscaping and irrigation in the medians in Marsh Creek Road along the project's frontage, including light-colored pavers which match the existing pavers along Marsh Creek Road, low-profile rocks (which do not obstruct driver visibility) at the western and eastern ends of the median bulbs, and crepe myrtle trees.

b. A 24-foot (minimum) landscape corridor accommodating a meandering pedestrian/equestrian path and clustered planting of oaks in the project's frontage on Marsh Creek Road.

c. Landscaping in the area between the sound fences on lots 1 and 2 and the above-noted 24-foot wide-landscape corridor.

d. Perimeter landscaping on lot 6 along the project road in a 25-foot-wide strip extending from the back of the curb.

e. A wildflower mix (subject to the approval of the Community Development Director) shall be applied on all areas of lot 6 that are outside of the landscaped areas along Marsh Creek Road, the project road, and the stormwater detention basin.

f. Groundcover and landscaping at the project entry shall be on private property.

g. Landscaping shall utilize native trees, including oaks with genetics similar to native oaks in the Clayton area (if such oaks are reasonably available).

h. All trees installed pursuant to these conditions of approval shall not be removed or severely pruned without a tree removal permit.

i. Water meters and irrigation systems will include automatic rain controls.

j. All anti-siphon water valves shall be screened.

k. All newly-graded areas in or adjacent to the public right-of-way shall not exceed a 3:1 (horizontal:vertical) ratio,

l. A layer of mulch 2 to 4 inches thick shall be applied in all landscape areas.

51. _____ Three sets of the final landscape and irrigation plans shall be submitted with the grading and improvement plans for review and approval by the Community Development Department, Engineering Department, and the Maintenance Department. These plans shall be approved prior to issuance of grading or encroachment permits. The landscape and irrigation plans shall be prepared by a landscape architect; have overall dimensions of 24 inches by 36 inches; contain approval blocks for the Community Development Director, City Engineer, and Maintenance Department; and show all existing and proposed public utilities within the project limits.

52. _____ Landscaping is to be maintained by the individual property owner(s) and/or the HOA and/or CFD and shall be installed in conformance with the approved plans prior to occupancy of the individual residence(s).

53. _____ Landscaping is subject to inspection by the Maintenance Department and must be guaranteed for one year from the date of acceptance of the subdivision improvements by the City Council.

54. _____ Installation of all irrigation and landscaping shall be performed by a licensed contractor. Open trench inspection of the irrigation installation in City right-of-way is subject to approval of the City Maintenance Department. Prior to the final inspection by the Maintenance Department, the installation shall be approved by the landscape architect.

55. _____ All trees shall be planted at least 10 feet away from any public water, sewer, or storm drain lines, unless a closer location is approved by the City. All trees shall be planted at least 10 feet away from any oil pipeline, unless a closer location is approved by the pipeline easement holder and operator. All trees shall be installed with support staking. All nursery stakes must be removed from trees. All trees planted within 8 feet of a sidewalk, trail, or driveway shall be installed with root guards.

56. _____ Prior to issuance of a certificate of occupancy for the first residence (including model homes) the landscaping and irrigation improvements are required to be installed in the 24-foot-wide landscape corridor along the project's Marsh Creek Road frontage on lots 1 and 2; in the area between the sound fences on lots 1 and 2; the above-noted 24-foot-wide landscape corridor; and in the Marsh Creek Road median islands adjacent to the project.

57. _____ The developer shall maintain the Marsh Creek Road landscaped medians adjacent to the project for a period of 90 days after final approval of the subdivision improvements by the City Council. Prior to release of the Developer's

maintenance responsibilities, all landscaped areas shall be inspected by representatives of the City Engineer and Maintenance Departments. This inspection shall include a water audit of the landscaped areas to identify any irrigation problems. The water audit shall be performed by City staff or contracted for by City staff and paid for by the Developer, at the City's sole discretion. All corrective measures shall be made as called for in the water audit and the punch list prepared by City staff and as-built plans (on reproducible Mylar or in a format approved by the City Engineer) shall be submitted to the City Engineer prior to the release of the Developer's responsibilities.

58. _____ The Developer shall maintain all landscaping and other facilities that will become the responsibility of the HOA for one year after the HOA has been formed and a plan for the smooth transition of responsibility has been prepared by the developer and approved by the City Engineer. Prior to release of the Developer's maintenance responsibilities, all landscaped areas shall be inspected by representatives of the City Engineer and Maintenance Departments. This inspection shall include a water audit of the landscaped areas to identify any irrigation problems. The water audit shall be performed by City staff or contracted for by City staff and paid for by the Developer, at the City's sole discretion. All corrective measures shall be made as called for in the water audit and the punch list prepared by City staff and as-built plans (on reproducible Mylar or in a format approved by the City Engineer) shall be submitted to the City Engineer prior to the release of the Developer's responsibilities.

59. _____ Landscaping shall be installed in conformance with the approved plans prior to final inspection.

60. _____ Plans shall conform with the Water Conserving Landscape Guidelines in Chapter 17.80 of the Zoning Ordinance and applicable stormwater regulations.

Fencing Conditions

61. _____ The fencing plan shown on the Front Yard Landscape Plan L-3) shall be amended to show the items listed below and submitted for review and approval by the Community Development Department.

    a. Lot 1 - The "split view fence" shall be constructed as a sound fence (i.e., solid plywood core) along the eastern, southern, and western sides of the lot.
    b. Lot 2 - A " split view fence " constructed as a sound fence shall be installed along the southern side of the property to the graded daylight line, set back at least 50 feet from the edge of the right-of-way of Marsh Creek Road.
    c. Lot 6 - The "split view fence" shall be constructed as a sound fence (i.e., solid plywood core) along the eastern, southern, and western sides of the lot.
    d. Notation shall be maintained on final plans to indicate that all fencing located on the Marsh Creek Road frontage portion of lots 1, 2, and 6 shall be set back at least 50 feet from the edge of the right-of-way.
    e. Lot 5 - A 6-foot-high, tubular aluminum fence shall be installed with gates and a locking system as specified by the City Engineer.

62. _____ All fences and walls in proximity to Marsh Creek Road public right-of-way shall be located at least 1 foot inside the respective parcel.

63. _____ Any fences crossing easements for landscape or drainage facility maintenance shall have 9-foot-wide, lockable gates, which shall be maintained by the lots' respective property owners.

64. _____ The Open Space Fencing shall be modified to reflect a rural mesh fence.

Grading

65. _____ Prior to any ground disturbance related to covered activities, a U.S. Fish and Wildlife Service (USFWS)/CDFW-approved biologist shall conduct a preconstruction 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 (CDFW 1995).

    a. On the parcel where the activity is proposed, the biologist shall 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 shall not be surveyed. Surveys shall take place near sunrise or sunset in accordance with CDFW guidelines. All 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 to August 31), surveys shall document whether burrowing owls are nesting in or directly adjacent to disturbance areas. During the nonbreeding season (September 1 to January 31), surveys shall document whether burrowing owls are using habitat in or directly adjacent to any disturbance area. Survey results shall be valid only for the season (breeding or nonbreeding) during which the survey is conducted.

b. If burrowing owls are found during the breeding season (February 1 to 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 birds have not begun egg-laying and incubation or that the juveniles from the occupied burrows have fledged. During the nonbreeding season (September 1 to January 31), the project proponent should avoid the owls and the burrows they are using, if possible. Avoidance shall include the establishment of a buffer zone (described below).
c. During the breeding season, buffer zones of at least 250 feet in which no construction activities can occur shall be established around each occupied burrow (nest site). Buffer zones of 160 feet shall be established around each burrow being used during the nonbreeding season. The buffers shall be delineated by highly visible, temporary construction fencing.
d. If occupied burrows for burrowing owls are not avoided, passive relocation shall 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 one week to confirm that the owl has abandoned the burrow. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation (CDFW 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. **[Mitigation Measure 1]**

66._____ If work is scheduled to take place between February 1 and August 31, a pre-construction nesting bird survey shall be conducted by a qualified biologist within 14 days of construction, covering a radius of 250 feet for non-listed raptors and 100 feet for non-listed passerines at all locations. The findings of the survey shall be submitted to the Community Development Department. If an active bird nest is found within these buffers, species-specific measures shall be prepared by a qualified biologist and implemented to prevent abandonment of the active nest. At a minimum, grading in the vicinity of a nest shall be postponed until

the young birds have fledged. If an active nest is present, a minimum exclusion buffer of 100 feet shall be maintained during construction, depending on the species and location. The perimeter of the nest setback zone shall be fenced or adequately demarcated with stakes and flagging at 20-foot intervals, and construction personnel and activities restricted from the area. A survey report by a qualified biologist verifying that no active nests are present, or that the young have fledged, shall be submitted prior to initiation of grading in the nest-setback zone. The qualified biologist shall serve as a biological monitor during those periods when construction activities occur near active nest areas to ensure that no inadvertent impacts on these nests occur. **[Mitigation Measure 2]**

67. _____ Protocol-level special-status plant surveys were conducted within the project area in April, June, August, and October of 2018, and no special-status plant species were identified. Survey results are valid for three years. If construction does not commence before spring of 2021, then new focused plant surveys shall be performed according to CDFW and California Native Plant Society (CNPS) protocol, as generally described below. Surveys for rare plant species shall be conducted using approved CDFW/USFWS methods during the appropriate season for identification of large flowered fiddleneck, big tarplant, round-leaved filaree, Mt. Diablo fairy lantern, diamond-petaled poppy, and showy golden madia. The blooming periods for each species is described in the Biological Resources Assessment prepared for the proposed project by Swaim Biological, Inc.

    a. If during surveys East Contra Costa County Habitat Conservation Plan/Natural Communities Conservation Plan (ECCHCP/NCCP) covered or no-take species are found, the location, extent and condition of all occurrences shall be documented in a survey report and submitted to the City of Clayton. California Natural Diversity Database (CNDDB) California Native Species Field Survey Forms for all covered or no-take plants encountered on the site shall also be completed and submitted to the City of Clayton and the CNDDB.
    b. Results of surveys shall inform project design. In order to comply with the ECCHCP/NCCP, construction activities shall avoid all impacts on extremely rare no-take species and shall implement plant salvage when impacts to covered plant species are unavoidable. Conservation measures described in the ECCHCP/NCCP shall be adhered to. If a rare plant is found that is not covered by the ECCHCP/NCCP, appropriate conservation measures similar to those required by the ECCHCP/NCCP shall be developed on a plant by plant basis and in accordance with CDFW and CNPS. **[Mitigation Measure 3]**

68. _____ Prior to approval of grading plans for the proposed project, the project applicant shall complete a formal wetland delineation and submit the delineation to the USACE for verification.

a. In the event that the proposed project site is determined to include jurisdictional wetlands that would be altered as part of the proposed development, a Section 404 permit for fill of jurisdictional wetlands shall be acquired, and mitigation for impacts to jurisdictional waters that cannot be avoided shall conform with the USACE "no-net-loss" policy prior to approval of grading plans. To the extent feasible, however, the project shall be designed to avoid and minimize adverse effects on waters of the U.S. or jurisdictional waters of the State of California within the project area. Mitigation for impacts to both federal and State jurisdictional waters shall be addressed using these guidelines.
b. If a Section 404 permit is obtained, the applicant must also obtain a water quality certification from the Regional Water Quality Control Board (RWQCB) under Section 401 of the Clean Water Act (CWA). Written verification of the Section 404 permit and the Section 401 Water Quality Certification shall be submitted to the Community Development Department.
c. The applicant shall also provide evidence to the Community Development Department of consultation with CDFW to determine if a Streambed Alteration Agreement is required for on-site activities pursuant to Section 1602 of the CDFW Code.
d. If the mapped drainage shown on the U.S. Geological Survey and other data sources is determined by regulatory agencies to be a jurisdictional waters on the site, then an ECCCHCP/NCCP fee calculation for permanent impacts to wetlands or streams should be assessed in addition to the development fee, unless the design of the proposed project is modified to avoid regulated habitat or provide adequate alternative compensatory mitigation. **[Mitigation Measure 4]**

69. _____ Prior to the issuance of a grading permit, the grading plan shall include a requirement (via notation) indicating that if cultural resources or human remains are encountered during site grading or other site work, all such work shall be halted immediately within 100 feet of the area of discovery and the contractor shall immediately notify the City of the discovery. In such case, the City, at the expense of the project applicant, shall retain the services of a qualified archaeologist for the purpose of recording, protecting, or curating the discovery as appropriate. The archaeologist shall be required to submit to the City for review and approval a report of the findings and method of curation or protection of the resources. Further grading or site work within the vicinity of the discovery, as identified by the qualified archaeologist, shall not be allowed until the preceding steps have been taken. **[Mitigation Measure 6]**

70. _____ Pursuant to State Health and Safety Code §7050.5(c) State Public Resources Code §5097.98, if human bone or bone of unknown origin is found during construction, all work shall stop within 100 feet of the vicinity of the find and the Contra Costa County Coroner shall be contacted immediately. If the remains

are determined to be Native American, the Coroner shall notify NAHC who shall notify the person believed to be the MLD. The MLD shall work with the contractor to develop a program for re-internment of the human remains and any associated artifacts. Additional work shall not take place in the immediate vicinity of the find, which shall be identified by the qualified archaeologist at the applicant's expense, until the preceding actions have been implemented. **[Mitigation Measure 7]**

71._____ The Grading Plan shall be amended as follows:

a. Designs and actions listed in the Oak Tree Preservation Plan required to be prepared by Mitigation Measure 5 shall be incorporated into the grading plan.
b. A licensed surveyor or engineer shall survey the locations and limits of the trunk and dripline of all trees to be retained that could be affected by any work during project construction. The locations and limits shall be shown on the grading plans and appropriate construction and plot plans.
c. Add note: Construction contractors shall contact pipeline operators (e.g., Shell, Conoco-Phillips, Crimson) at least seventy-two (72) business hours (excluding weekend and public holidays) prior to start of construction activities to obtain information on the location of underground oil pipes.
d. The stormwater detention basin BR1 shall accommodate the flows of both BR2/3 that are to be eliminated.
e. All disturbed slopes steeper than 10% shall be track-walked for surface compaction, covered with jute netting and hydroseeded, or stabilized with other techniques acceptable to the City Engineer.
f. The exterior edges of the pads for lots 1-6 that are visible from off-site locations shall be contoured and feathered so that transitions between flat areas and graded slopes, or between graded and un-graded areas, are rounded off to avoid a mass-graded, padded lot effect. All new graded slopes must be configured to undulate and avoid relatively flat planes or sharp transitions to un-graded areas, particularly the western edges of lots 2 and 3.
g. All required side setbacks shall contain at least 5 feet of flat, unoccupied area. "Flat" means a cross-slope between 2% and 10%. "Unoccupied" means no encroachments by fireplaces, building popouts (with or without a foundation), air conditioning pads, and the like.
h. Two feet of flat area shall be provided on the graded portions of properties between a property or right-of-way line and the top of slope.
i. All retaining walls in the project shall be constructed of segmental units (a.k.a., keystone), masonry block, or concrete. All retaining walls visible from street or sidewalk areas shall be covered with a

stone fascia. Retaining walls greater than 3 feet in height shall be designed by a licensed engineer.

j. Signature blocks shall be provided for the Community Development Director and the City Engineer.

72. _____ Prior to approval of the improvement plans for the project, all recommendations from the Geotechnical Report prepared for the project by ENGEO (2008) shall be incorporated into the improvement plans to the satisfaction of the City Engineer. In addition, the applicant shall retain a California-registered Geotechnical Engineer to perform field observations during grading to determine the depth of removal of compressible soils. Compliance with the recommendations of the Geotechnical Engineer shall be provided to the City Engineer. **[Mitigation Measure 8]**

73. _____ Should any portion of the driveway providing access to lots 1 and 2 exceed a grade of 16%, the entire shall be widened to 20 feet in width or as approved by the City Engineer.

74. _____ Prior to the issuance of a grading permit, the project applicant shall prepare to the satisfaction of the City Engineer an erosion control plan that utilizes standard construction practices to limit the erosion effects of the proposed project during construction. Actions should include, but are not limited to:

a. Hydro-seeding;

b. Placement of erosion control measures within drainage ways and ahead of drop inlets;

c. The temporary lining (during construction activities) of drop inlets with “filter fabric”;

d. The placement of straw wattles along slope contours;

e. Use of a designated equipment and vehicle “wash-out” location;

f. Use of siltation fences;

g. Use of on-site rock/gravel road at construction access points; and

h. Use of sediment basins and dust palliatives. **[Mitigation Measure 9]**

75. _____ Grading and construction plans and specifications for the project shall include the wording which specifies that construction contractors shall contact all pipeline operators (e.g., Shell, Conoco-Phillips) at least forty-eight (48) hours prior to start of construction activities to obtain detailed identification of underground oil pipes. **[Mitigation Measure 12]**

76. _____ Notification shall be provided on the deeds and California Department of Real Estate disclosure forms to future property owners regarding the presence of crude oil pipelines. The wording of the notification shall be

approved by the Clayton Community Development Director and City Attorney. **[Mitigation Measure 13]**

77. _____ During grading and construction, the project contractor shall ensure that the following measures are implemented, consistent with the recommendations in the Environmental Noise and Analysis prepared for the proposed project:

    a. Grading and construction activities shall be limited to the daytime hours between 7:00 AM and 5:00 PM Monday through Friday, as specified in Section 15.01.101 of the Clayton Municipal Code. Any such work beyond said hours and days shall be strictly prohibited unless previously specifically authorized in writing by the City Engineer or designee or by project conditions of approval;

    b. All noise-producing project equipment and vehicles using internal-combustion engines shall be equipped with manufacturers-recommended mufflers and be maintained in good working condition;

    c. All mobile or fixed noise-producing equipment used on the project site that are regulated for noise output by a federal, State, or local agency shall comply with such regulations while in operation on-site;

    d. Electrically powered equipment shall be used instead of pneumatic or internal combustion-powered equipment, where feasible;

    e. Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors; and

    f. Construction site and access road speed limits shall be established and enforced during the construction period.

    g. The requirements above shall be included, via notation, on the final grading plan submitted for review and approval by the Community Development Director prior to grading permit issuance. **[Mitigation Measure 14]**

78. _____ The Developer shall identify the BMPs for protection of air quality to minimize the generation of dust during construction. The Bay Area Air Quality Management District's Basic Construction Measures shall be included within the project grading plan and shall be approved prior to issuance of project grading permits:

    a. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

b. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

c. All vehicle speeds on unpaved roads shall be limited to 15 mph.

d. 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.

e. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). Clear signage shall be provided for construction workers at all access points.

f. All construction equipment shall be maintained and properly tuned in accordance with manufacturers specifications. All equipment shall be checked by a certified visible emissions evaluator.

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

Street Conditions

79. _____ Prior to the issuance of a grading permit, the project road labeled Saltbrush Lane shall be modified. The right-of-way width for the project road shall be 48 feet. The ultimate street width shall be 32 feet from face-of-curb to face-of-curb. A sidewalk shall be provided on the north side of the project road and shall have a width of 4.5 feet (from face-of-curb). Residential setbacks shall be measured from the edge of the right-of-way.

80. _____ Parking shall be prohibited along the south side of the project road and along the north side of the project road from Marsh Creek Road to the northern end of the proposed median. The parking prohibition shall be indicated by painting the face and top of curb red.

81. _____ A meandering, 6-foot-wide pedestrian path shall be installed along Marsh Creek Road from the Community Park entrance to the eastern edge of the project site. The design and paving material of the path shall be subject to the review and approval of the City Engineer and Community Development Director. The path shall be set back at least 6 feet from the back of the curb, excepting the area east of the project intersection where it is adjacent to the curb to keep the path in the public right-of-way.

82. _____ The final map shall show dedication of a 10-foot-wide public access easement along the eastern edge of lots 5 and 6. A 6-foot-wide pedestrian trail shall be installed in the easement as shown on the March Creek Road Specific Plan. The design (including installation of removable bollards) and paving material of the trail shall be in accordance with any applicable oil pipeline easement restrictions and subject to the review and approval of the City Engineer and Community Development Director. In lieu of the easement, the developer may offer to dedicate the same area in-fee to the City.

83. _____ All streets, sidewalks, curbs, and gutters adjacent to this subdivision shall be improved as necessary to connect improvements constructed within this subdivision to existing improvements. Any existing street, sidewalk, curb, gutter, or other existing improvement which in the sole opinion of the City Engineer is damaged - either on or adjacent to - the project site, shall be repaired by the Developer to the satisfaction of, and in the manner required by, the City Engineer.

84. _____ All street grades and geometrics shall be subject to the approval of the City Engineer. Grades shall not exceed 6% through intersections. The grade break between a minor street and a major street, at the projected curb line of the major street, shall not exceed 6%. Street grades shall not exceed 16% grade, shall have a minimum outside turning radius of 42 feet, and must be capable of supporting the imposed loads of fire apparatus (i.e., 37 tons).

85. _____ The “Saltbrush Lane” name of the project road shall be subject to review and approval in accordance with City Council Resolution No. 68-2003, due to the time lapse of the project.

86. _____ All mailbox locations shall be constructed and grouped in accordance with U.S. Postal Service standards, and the grouping of mailboxes shall be architecturally treated to reduce massing and visual impact. All mailbox locations are subject to review and approval of the Community Development Department and the U.S. Postal Service.

87. _____ Lots 1 and 2 shall have a shared driveway easement with fee title to the driveway included in Lot 2. A road maintenance agreement shall be established for lots 1 and 2. The form and terms of said agreement shall be approved by the Community Development Director. (Duplicate COA)

88. _____ Prior to approval of the final map, the Developer shall contribute its fair share, as determined by the City, to a traffic calming/control fund for improvements such as installation of rumble strips, a flashing yellow light (on an interim basis), and/or a traffic signal (on a permanent basis at or east of the project entrance road).

Drainage Conditions

89. _____ The stormwater detention basin shall be sized and constructed to accommodate the stormwater flows solely created by the project.

90. _____ All ditches for conveying stormwater runoff shall be constructed of tan-colored reinforced concrete and shall have a maximum longitudinal slope of 10%. All stormwater runoff from impervious areas shall be treated and contaminants removed prior to discharge off of the site or into a natural water channel. The design of the detention and treatment facilities shall be subject to the approval of the City Engineer and Community Development Director and shall include, but not be limited to, the installation of drywells for percolation.

91. _____ All drainage collection (ditches, storm drains, etc.) and treatment facilities, and access to such facilities, shall be located in public storm drain easements, which shall be shown on the final map. City personnel or contracted forces shall have the right of access to conduct inspections and maintenance of all on-site drainage devices. Maintenance of such facilities shall be the responsibility of the HOA and/or CFD.

92. _____ The Mosquito and Vector Control District and its contractors shall have the right of access to conduct inspections and maintenance of all on-site drainage devices.

93. _____ All roofs shall have rain gutters with rainwater leaders that directly discharge into an on-lot underground system which discharges through the face of curb at streets or into a concrete-lined ditch or storm drain inlet.

94. _____ The improvement plans shall reflect that all on-site storm drain inlets shall be labeled "No Dumping — Drains to Creek" using thermoplastic stenciling or equivalent permanent method, subject to City approval.

95. _____ The Developer shall comply with all rules, regulations, and procedures of the National Pollution Discharge Elimination System (NPDES) as promulgated by the California State Water Resources Control Board (SWRCB), the San Francisco Bay RWQCB, and the Contra Costa County Clean Water Program. The project management and design shall include BMPs during construction and post-construction phases for the elimination of storm water pollutants to the maximum extent practicable.

96. _____ The Developer shall provide proof that a "Notice of Intent" has been filed with the State Regional Water Quality Control Board. Prior to acceptance of the subdivision the Developer shall provide proof to the City that the "Notice of Intent" has been closed out by the State Regional Water Quality Control Board.

97. _____ Prior to the issuance of a grading permit, the Developer shall prepare and submit to the City a Stormwater Pollution Prevention Plan (SWPPP) in conformance with the requirements set forth by the RWQCB. The SWPPP shall include pre-construction, construction, and post-construction BMPs. The SWPPP shall also include, but not be limited to:

    a) Sampling (pre-construction, during construction, and post-construction) of the stormwater outfall at Mount Diablo Creek for

sediments in accordance with State Construction General Permit (CGP) regulations.

b) Hydro-seeding or landscaping of all disturbed areas.
c) BMPs, including landscaping or hydro-seeding of front and rear yards prior to acceptance of the subdivision.
d) A site spill response plan.
e) An erosion control plan including such items as installation of berms, silt fences, sedimentation basins and other measures to minimize off-site transport of soil. Topsoil should be stockpiled during grading and distributed over the ground surface after grading has been completed.
f) Location of construction staging and materials storage areas.
g) On-site retention and treatment of stormwater through the use of water quality basins, grassy swales, biofilters and/or other methods acceptable to the City Engineer and the RWQCB. The project shall mitigate runoff quantities to the extent currently required by the City's NPDES Permit and Municipal Separate Storm Sewer System permit.
h) Installation of structural treatment facilities to remove total suspended solids and total petroleum hydrocarbon products to the extent currently required by the RWQCB, or to the satisfaction of the City Engineer. The methods and designs shall be shown on the grading and improvement plans, as appropriate, for review and approval by the City Engineer.

98. _____ Prior to commencement of any site work that will result in a land disturbance of one acre or more, the Developer shall provide evidence to the City that the requirements for a stormwater State CGP have been met.

99. _____ The Developer shall ensure that all project contractors shall conform to the requirements of the "Best Management Practices for Construction Sites" required by the City, including detention and/or filter materials to preclude an increase in water quantity and quality impacts from debris and sediments entering the stormwater system over "non-development" conditions.

100. _____ The deeds for lots 1, 2, and 3 shall contain wording that notifies future owners of the potential serious risks to the respective owners and residents from failure of the CCWD Seminary Water Tank and subsequent inundation of the respective lots and property. The notification wording on the deed shall be subject to the review and approval by the Community Development Director.

101. _____ The Developer shall dedicate to the City easements for drainage improvements. The volume and rate of stormwater runoff from the site shall not exceed the amounts allowed by Section C.3 of the City's stormwater permit. The project shall bear the financial responsibility of the construction and perpetual maintenance (including monitoring and reporting) of

these facilities with a funding mechanism acceptable to the City that addresses costs for capital replacement, inflation, and administration.

102. _____ The Developer shall prepare an operations and maintenance plan, including a schedule for ongoing maintenance and replacement, for the stormwater facilities. The plan shall be submitted for review and approval of the City Engineer prior to recordation of the final map.

103. _____ The quantity and rate of stormwater runoff may take into consideration any applicable comments from the Contra Costa County Flood Control and Water Conservation District (FC District) to ensure that the quantity and creation of runoff from the site does not exceed historic rates and does not adversely impact downstream drainage facilities.

104. _____ The Developer shall provide all project property owners with Clean Water Program educational materials.

105. _____ The Developer shall construct the County Standard Plan CD52i, Type "M" Headwall Structure at the headwall proposed at the easterly property limits.

106. _____ The Developer shall obtain a Contra Costa County Drainage Permit for any work within the County territory.

Utility Conditions

107. _____ All utilities shall be sized to accommodate buildout of the MCRSP buildout.

108. _____ The Developer shall dedicate an 8-foot-wide public utility easement along project's entire frontage on the north side of the Marsh Creek Road.

109. _____ The Developer shall, in the joint trench and across the project road at two locations specified by the City Engineer, install two four-inch conduits and pull-boxes with pull lines for City use for future telecommunication purposes. Conduits shall be installed in the public utility easement with termination at residential property lines.

110. _____ The Developer shall install all underground utilities (including sewers, water, storm drains, and joint trench) along the entire extent of the project road to the easterly boundary for possible future extension.

111. _____ Prior to approval of the final map, the Developer shall agree to financially participate, on a fair share basis as determined by the City, in a funding program to design, install, and/or upgrade any downstream sewers serving the MCRSP area. If the funding program has been established prior to the approval of the final map, payment of the Developer's share shall be made prior to approval of the final map.

112. _____ Sanitary sewers shall have a maximum depth of 10 feet from finished grade to invert.

113. _____ The Developer shall connect to the sanitary sewer system, obtain applicable permits, and pay applicable fees required by the City of Concord Public Works Department.

114. _____ The width of access and maintenance easements for underground facilities shall be twice the depth of the facility with a minimum width of 10 feet.

115. _____ Underground facilities crossing lots shall be located in flat portions of the lots, not within slope areas.

116. _____ Street lights shall be provided on the project road. Street light standards and photometrics showing levels of illumination shall be submitted for the review and approval of the Community Development Department. "Cut-off' fixtures and downward-oriented fixtures shall be used to minimize spillover of lighting into residences.

117. _____ Street lighting shall be installed and activated prior to occupancy of the first residence.

118. _____ Developer shall pay for the cost of installation, activation, and electrical usage until final acceptance of subdivision improvements by the City Council.

119. _____ The Developer shall prepare a construction traffic plan for the review and approval of the City Engineer which addresses the following issues:

a) All construction traffic associated with the development of the proposed subdivision safely enters and exits the site from Marsh Creek Road.
b) Warning devices (e.g., mobile reader boards) shall be located east and west of the project site entrance to alert motorists of turning movements by construction vehicles.

120. _____ The Developer is obligated to construct all street improvements and utilities (including, but not limited to, sanitary sewer, storm drain, and joint trench) in the project road from Marsh Creek Road to the project's easterly boundary. To avoid grading or the construction of improvements on the adjoining property to the east, the proposed grading and improvements may be shortened the least amount possible. That is, grading shall commence no further than 3 feet from the project boundary.

121. _____ Prior to filing of the final map, the Developer shall provide an interest-bearing, non-refundable cash deposit or cash bond, in an amount to be determined by the City Engineer, for use by the City in the

completion of the improvements as shown on the tentative map at some undetermined time in the future.

122. _____ Prior to approval of any grading or construction plans or maps, the Developer shall provide any necessary rights of entry, drainage easements, slope and/or grading easements, as may be required by the City Engineer, from adjoining property owners. Refer also to Advisory Notes.

123. _____ The Developer shall also provide written approval from the CCWD and the oil pipeline easement holders and operators for the proposed work within any easements controlled by said parties. Refer also to Advisory Notes.

124. _____ All work shall be designed and constructed in accordance with the Municipal Code, as well as the City's Standard Plans, Contra Costa County plans where applicable, and Specifications.

125. _____ Upon recording of the final map, the City shall be given a full size, reproducible, Mylar photocopy of the recorded map and an electronic file of the map in a form which can be imported into AutoCAD, and configured as directed by the City Engineer.

126. _____ Upon completion of the improvements and prior to City Council acceptance, the City shall be given a full size, reproducible copy of the improvement plans, and an electronic version in AutoCAD, annotated to reflect any changes that occurred during construction and signed by the Project Engineer, on USB key or other means acceptable to the City Engineer.

127. _____ Should the construction of any offsite improvements shown on the tentative map or required in these conditions of approval, necessitate the acquisition of sufficient title or interest in lands not controlled by the Developer, the Developer shall make a good faith effort to obtain the necessary title or interest prior to the filing of the final map pursuant to Section 66457 of the Subdivision Map Act. If the Developer is unable to obtain the necessary title or interest and has demonstrated a good faith effort to the City's satisfaction (including, but not limited to, preparation of an appraisal and submittal of a bona fide offer based on the appraisal), the City shall approve the final map, and, within 120 days of filing of the final map, obtain the necessary title or interest in accordance with Section 66462.5 of the Subdivision Map Act. The Developer shall pay for all costs, including City's legal, overhead, and administrative costs, involved in the acquisition of the necessary title or interest.

128. _____ At the City's sole discretion, if the Developer has made the good faith effort described above and was not able to obtain the required rights of entry or easements, in lieu of the City obtaining the necessary rights of entry and/or easements, the City may allow the proposed improvements to be modified to eliminate the need for such rights of entry and/or easements. Should the City allow such modifications and prior to the filing of the final map, the

Developer shall provide a non-refundable cash deposit or cash bond, in an amount to be determined by the City Engineer, for use by the City in the completion of the improvements as shown on the tentative map at some time in the future.

129. _____ The Developer shall underground the wires from the south side of Marsh Creek Road, across the development, to the CCWD property. All new utility lines shall be underground including those crossing Marsh Creek Road.

ADVISORY NOTES

THE FOLLOWING INFORMATION DOES NOT CONSTITUTE CONDITIONS OF APPROVAL. IT IS PROVIDED TO ALERT THE APPLICANT TO LEGAL REQUIREMENTS OF THE CITY AND OTHER PUBLIC AGENCIES TO WHICH THIS PROJECT MAY BE SUBJECT.

NOTICE OF 90-DAY OPPORTUNITY TO PROTEST FEES, DEDICATIONS, RESERVATIONS, OR OTHER EXACTIONS PERTAINING TO THE APPROVAL OF THIS PERMIT.

This notice is intended to advise the applicant that pursuant to Government Code Section 66000, et seq., the applicant has the opportunity to protest fees, dedications, reservations, and/or exactions required as part of this project approval. The opportunity to protest is limited to a 90-day period after the project is approved.

The ninety (90) day period, in which you may protest the amount of any fee or the imposition of any dedication, reservation, or other exaction required by this approved permit, begins on the date this permit was approved. To be valid, a protest must be in writing pursuant to Government Code Section 66020 and delivered to the Community Development Department within 90 days of the approval date of this permit.

A. The applicant/owner should be aware of the expiration dates and renewing requirements prior to recording the Final Maps.

B. Comply with the requirements of the Concord Sanitary District.

C. Comply with the requirements of the CCWD.

D. Comply with the requirements of the Consolidated Fire Protection District.

E. Comply with the requirements of the Health Services Department, Environmental Health Division.

F. Comply with the requirements of the Contra Costa County Building Inspection Department. Building permits are required prior to the construction of the proposed residences.

G. This project may be subject to the requirements of the CDFW. It is the applicant's responsibility to notify the CDFW, P.O. Box 47, Yountville, California 94599, of any

proposed construction within this development that may affect any fish and wildlife resources, per the CDFW Code.

H. This project may be subject to the requirements of the USACE. It is the applicant's responsibility to notify the appropriate district of the USACE to determine if a permit is required, and if it can be obtained.

Contra Costa County Flood Control District Advisory Notes

- Prior to issuance of the grading permit, the developer shall obtain a 1010 Drainage Permit from the FC District for any construction work (grading, dewatering, etc.) within the existing open drainage channel in unincorporated Contra Costa County.
- Prior to filing the final map, the developer shall enter into an Operations and Maintenance agreement with the City of Clayton (City), that creates a perpetual funding source for maintenance and repair, and includes yearly inspections, of on-site stormwater management facilities that are constructed to mitigate the development's drainage impacts on County and City residents and properties downstream of the development.

Contra Costa Fire Protection District Advisory Notes

- Provide emergency apparatus access roadways with all-weather (paved) driving surfaces of not less than 16 feet unobstructed width, and not less than 13 feet 6 inches of vertical clearance, to within 150 feet of travel distance to all portions of the exterior walls of every building. Access shall have a minimum outside turning radius of 35 feet, and must be capable of supporting the imposed fire apparatus loading of 22 tons. Access roadways shall not exceed 20% grade. Grades exceeding 16% shall be constructed of grooved concrete. (503 and tables B105.1 (1) Table C105.1)) CFC
- Access roadways of less than 28-feet unobstructed width shall have signs posted or curbs painted red with the words NO PARKING — FIRE LANE clearly marked. (22500.1) CVC, (503.3) CFC
- Access roadways of 28 feet or greater, but less than 36-feet unobstructed width shall have NO PARKING— FIRE LANE signs posted, allowing for parking on one side only or curbs painted red with the words NO PARKING — FIRE LANE clearly marked. Parking is permitted only on the side of the road that does not have hydrants. (22500.1) CVC, (503.3)
- Lot 2 as proposed shall require the installation of an approved Fire District turnaround. Dead-end emergency apparatus access roadways in excess of 150 feet in length shall be provided with approved provisions for the turning around of Fire District apparatus. Contact the Fire District for approved designs. (503.2.5) CFC
- The dead-end turnaround at the end of Sage Lane appears to comply with Fire District requirements.

- Access gates for Fire District apparatus shall be a minimum of 16 feet wide. Access gates shall slide horizontally or swing inward and shall be located a minimum of 30 feet from the street. Electrically operated gates shall be equipped with a Knox Company key-operated switch. Manually operated gates shall be equipped with a non-casehardened lock or approved Fire District lock. Contact the Fire District for information on ordering the key-operated switch. (D103.5) CFC.
- The Developer shall provide an adequate and reliable water supply for fire protection as set forth in the California Fire Code. (507.1) CFC
- The Developer shall provide an adequate and reliable water supply for fire protection with a minimum fire flow of 500 gallons per minute. Required flow must be delivered from not more than 1 hydrant flowing for a duration of 30 minutes while maintaining 20-pounds residual pressure in the main. (507.1), (B105) CFC
- The Developer shall provide 2 hydrants of the East Bay type. (C103.1) CFC
- The Developer shall submit a minimum of two copies of site improvement plans indicating all existing or proposed hydrant locations and fire apparatus access for review and approval prior to obtaining a building permit. Final placement of hydrants shall be determined by this office. (501.3) CFC
- Emergency apparatus access roadways and hydrants shall be installed, in service, and inspected by the Fire District prior to construction or combustible storage on site. (501.4) CFC
- Note: A temporary aggregate base or asphalt grindings roadway is not considered an all-weather surface for emergency apparatus access. The first lift of asphalt concrete paving shall be installed as the minimum roadway material and must be engineered to support the designated gross vehicle weight of 22 / 37 tons.
- The homes as proposed shall be protected with an approved automatic fire sprinkler system complying with the 2016 edition of National Fire Protection Association (NFPA) 13D or Section R313.3 of the 2016 California Residential Code (CRC). Submit a minimum of two sets of plans to this office for review and approval prior to installation. (903.2) CFC, (R313.3) CRC, Contra Costa County Ordinance 2016-23
- The homeowner shall maintain an effective firebreak by removing and clearing away flammable vegetation and combustible growth from areas within 30 feet of buildings or structures. (1276.01) P.R.C.
- Where existing access to open land or space, or to fire trail systems maintained for public or private use is obstructed by new development of any kind, the developer shall provide an alternate means of access into the area that is sufficient to allow access for fire personnel and apparatus. These access roadways shall be a minimum of 16 feet in width to accommodate Fire District equipment. Access locations will be determined by this office

upon submittal of three (3) copies of complete improvement plans. Contra Costa County Ordinance 2010-15

- Development on any parcel in this subdivision shall be subject to review and approval by the Fire District to ensure compliance with minimum requirements related to fire and life safety. Submit three (3) sets of plans to the Fire District prior to obtaining a building permit. (501.3) CFC
- The Developer shall submit a minimum of two (2) complete sets of plans and specifications of the subject project, including plans for any of the following required deferred submittals, to the Fire District for review and approval prior to construction to ensure compliance with minimum requirements related to fire and life safety. Plan review and inspection fees shall be submitted at the time of plan review submittal. (105.4.1) CFC, (901.2) CFC, (107) CBC
- Our preliminary review comments shall not be construed to encompass the complete project. Additional plans and specifications may be required after further review.

Contra Costa Water District Advisory Notes

The project is within CCWD's treated water service area and the CCWD is the local water service provider for this project. This project parcel surrounds CCWD's Seminary Water Tank on three sides (west, south and east) and the District has an easement through this property to access this tank. The District will provide treated (potable) water services to this project per CCWD Code of Regulations Section 5 and has the following comments related to this provision of water service:

- The CCWD's pipelines in easements and rights-of-way shall be protected at all times. No encroachment is allowed onto CCWD property, and no construction within the CCWD easement is allowed without a permit from the CCWD.
- New trees may not be planted within the CCWD's easement or easement projection to right-of-way.
- The existing 4-inch blow-off appurtenance at the creek discharge at the new Diablo Parkway/Sage Lane intersection shall remain and be accessible for future CCWD maintenance.
- A water main extension will be required down Sage Lane to serve this new development.
- The existing water infrastructure will need to be evaluated and any modifications will need to be designed and constructed at the Developer's expense.
- Each premise to be provided domestic service will require its own service connection and meter.
- A separate meter for landscape irrigation may be required, and a separate irrigation meter will be needed for the common landscape areas.

- A separate fire service is required for each residence which will include a 1-inch meter and a 1-inch backflow prevention device. The water pressure in this area is high, so each residence will require a pressure-reducing valve.
- Relocation and/or abandonment of CCWD facilities may be required which will require a quitclaim of the existing casement. Easements for proposed facilities may be also required.
- The water main in the street or right-of-way shall be located opposite the proposed meter locations, with sufficient capacity and pressure as determined by CCWD. The project/property may require a main extension or addition of other infrastructure.
- The SWRCB mandates certain separation requirements of water mains that are parallel to and/or crossing sewer and storm drains. Grading and/or utility plans should be developed to comply with all separation criteria mandated in SWRCB Section 64572.
- Water service will likely require backflow prevention devices, which could reduce water pressure. Proper planning is necessary to ensure backflow prevention devices are located appropriately.
- Relocation of public facilities must be performed by CCWD forces.

CRIMSON PIPELINE L.P. Advisory Notes

Construction Requirements in the Proximity of Crimson Pipelines

- Crimson Pipeline L.P. (Crimson) is committed to the continued, safe operation of its pipeline. The listed construction requirements are designed to help ensure that the pipeline is protected from excavation damage, encroachment or other risks that could adversely impact the pipeline or prevent required inspection and maintenance activities.
- Crimson requires two copies of any proposed plans for work within Crimson's right-of-way. Plans shall be provided 45 calendar days prior to commencement of work to the address listed above.
- Aboveground structures and improvements that interfere with the construction, maintenance, or repair of the pipeline are prohibited within Crimson's right-of-way. Structures and improvements include, but are not limited to, buildings, fences, and walls.
- Landscaped areas are permitted within the right-of-way. Trees and large bushes that impede the visual inspection of the ground surface are not permitted within the right-of-way. Crimson shall review all plans that encroach the pipeline and the pipeline right-of-way prior to 4.
- Federal law prohibits removing, damaging, or defacing of pipelines, pipeline signs, or other appurtenances installed on the pipelines right-of-way.
- Other utilities may be installed within the right-of-way with permission from Crimson. Such utilities must maintain a minimum of 5-feet-parallel and 1-

foot-vertical clearances unless approved in writing by Crimson prior to their installation. All clearances must conform to existing state and federal regulations.

- A minimum of 3 feet, but not more than 6 feet of cover, must be maintained over the pipeline at all times, unless otherwise approved by Crimson in writing. The ground contour cannot be changed within the right-of-way without prior written permission by Crimson.
- Proposed roads and utility crossings should cross Crimson's right-of-way as close to 90 degrees as possible. If, in Crimson's sole judgment, additional precautions are required to protect Crimson's pipeline, Crimson shall review and approve the construction plans in writing prior to the start of construction.
- California State Law requires that parties notify Underground Service Alert at 1-800-227-2600 two full working days prior to digging.
- All work on/or around the Crimson facility must comply with appropriate sections of Code of Federal Regulations Title 49, Part 195 - TRANSPORTATION OF HAZARDOUS LIQUIDS BY PIPELINE.
- Crimson may choose to have an inspector on-site during any grading or excavation activities near the Crimson pipeline. Arrangements may be made for on-site inspection by contacting Crimson Utilities Coordinator at the address shown above.
- Crimson requires that all excavation in the vicinity of the pipeline be done with hand tools in the presence of the Crimson's inspector consistent with California State Law requirements. Any damage to the pipeline shall be reported immediately. Crimson shall perform the necessary repair to ensure the safety of the public safety. Crimson shall be reimbursed for all repair work necessary to continue with the safe, reliable operation of the pipeline.
- In an emergency, including any damage or suspected damage to the Crimson pipeline, immediately notify Crimson at: 1-866-351-7473.
- Any questions regarding construction activities in the vicinity of Crimson's pipeline shall be directed to:

  CRIMSON PIPELINE L.P.
  3760 Kilroy Airport Way, Suite 300
  Long Beach, CA 90806
  UTILITIES COORDINATOR
  Ph: (562) 285-4112 or (833) 876-4589
  Email: landdepartment@crimsonpl.com

General Encroachment Guidelines for Property Developers and Land Owners near Phillips 66 Pipeline LLC and Facilities

Company (Permittor) constructs, repairs, operates and maintains its pipelines in compliance with current U.S. Department of Transportation (DOT) regulations and industry and Company standards for safe operations. Should Encroaching Party (Permittee) propose plans that infringe on Permittor's rights or affect Permittor's

ability to meet these requirements, modifications to the pipelines or plans shall be made. The cost of all such modifications shall be borne by the Permittee. The following guidelines apply to Permittee and any contractors, agents and or representatives it uses for construction activities conducted in Permittor's right-of-way and/or affecting Permittor's pipelines:

- Permittee requesting Permittor to restrict the right-of-way width will have a metes and bounds survey of the line completed across the land by a registered land surveyor at the Permittee's expense. The Permittee will provide proof of ownership of the property (i.e., warranty deed).
- Uninhabited Buildings and Engineered Works: No buildings, engineering works, patios, in- ground swimming pools, septic systems, or other permanent structures shall be permitted within 25 feet of any pipeline located within Permittor's right-of-way. No temporary structures, storage containers, construction equipment or vehicle parking will be permitted within 25 feet of any pipeline located within Permittor's right-of-way, without Permittor's prior written approval. Retaining walls are not permitted. This includes all water retention devices. Large debris such as old cars, trailers, scrap metal, etc., will not be permitted on the right-of-way. The right-of-way shall be kept clear for maintenance.
- Inhabited Structures: All private dwellings, industrial buildings, or places of public assembly shall comply with a building setback of 50 feet from the pipeline(s), and this setback requirement will be included as a deed and or plat restriction on any parcel carved out of the above referenced lands that abut the right-of-way. For easements containing multiple Permittor pipelines, this would be a strip extending 50 feet each side of Permittor's outermost pipelines.
- A greenbelt area will be established around the pipelines in the platting of any new residential or commercial subdivision subject to Permittor's easement. The width of the greenbelt should either be the width of Permittor' easement or, in the case of a blanket easement, extend 25 feet each side of a single Permittor pipeline or 25 feet each side of Permittor's outermost pipelines in the case of multiple Permittor pipelines. The purpose of a platted greenbelt in any new proposed development is to provide that no lot lines or fences cross into the right-of-way.
- No fences will be allowed on the right-of-way without Permittor's prior written approval. Fences shall be easily removable and not obstruct the view of the right-of-way for inspection purposes. No masonry, brick, or stone fences will be allowed. Fences that are perpendicular to the pipeline(s) shall include a gate or other form of access across the width of the right-of-way. Fence posts shall not be placed within 4 feet of the pipeline(s). Fences that are parallel to the pipeline(s) shall be located at least 10 feet from the nearest pipeline(s), or 25 feet if located on both sides of the line.
- No utility poles shall be allowed to cross the right-of-way if they interfere with future maintenance. Utility poles, guy wires, or anchors shall not be placed

within 8 feet of the pipeline(s). Utility poles running parallel to the pipeline(s) shall be located at least 25 feet from the nearest pipeline(s). All overhead cables shall maintain a minimum height of 20 feet above grade.

- Trees or deep-rooted plants are not permitted on the right-of-way. Existing trees and vegetation may be removed or side trimmed by Permittor in its sole discretion.
- For new roads running parallel to Permittor's pipeline(s), there shall be at least 25 feet from the edge of the road to the nearest pipeline. All roads passing over Permittor's pipeline(s) shall cross at an angle as close to 90 degrees as possible. Depth of cover shall be at least 48 inches in the barrow ditches and 48 inches under road surfaces from top of pipe to top of surface. Final grade and depth of pipeline shall be surveyed in sensitive areas and results provided to Permittor and Permittee involved with the construction/modification. In addition, it may be necessary to lower and recondition, replace, relocate, or protect the pipeline(s) at the point of crossing to ensure that they are not subjected to excessive stress from movement of traffic. Any such modification to the pipeline(s) shall be made at Permittee's expense.
- Construction of parking lots over the pipeline(s) shall not be permitted without Permittor's prior written approval in an Encroachment Agreement releasing Permittor from any and all future damages to the parking lot due to pipeline maintenance and repair. Depth of cover shall be at least 48 inches from top of pipe to top of finished surface. Concrete parking lots shall have jointed sections at no more than 20-foot intervals for ease of repair.
- If the project includes over-excavating to achieve the final grade, pipeline protective measures shall be discussed and agreed to in advance by the Permittor and the Permittee.
- Any utilities that parallel Permittor's pipeline(s) shall maintain a minimum separation distance of 25 feet from the utility's outside wall to the outside wall of Permittor's pipeline(s). All utilities that cross Permittor's pipeline(s) shall pass underneath existing pipeline(s) by a minimum of 18 inches and the crossing shall be as close to 90 degrees as possible and adequately marked on both sides of such pipeline(s). The markers shall be maintained by Permittee in the future. Any future relocation of the utility line due to Permittor's pipeline maintenance shall be done at the Permittee's expense. Any exceptions to these requirements shall not be allowed without Permittor's prior written approval.
- Telephone cables, TV cables, secondary electrical lines (240vac or less), and non-steel gas lines shall be in a minimum Schedule 40 steel or PVC casing. Primary (high voltage) underground electrical lines shall be in a minimum Schedule 40 PVC casing and have a minimum clearance of 24 inches underneath Permittor's pipeline(s). Trenched or open cut crossings shall also be covered with a red concrete slab a minimum of 4 inches thick and 24 inches wide for a distance of 10 feet on both sides of the pipeline(s).

Any bored or directionally drilled high voltage line shall have a metallic tape tracer installed inside the casing for ease of locating the high voltage line.

- If any of Permittee's lines that cross or run parallel to Permittor's pipeline(s) are installed and constructed of a material requiring cathodic protection, an interference survey shall be made by Permittor and Permittor shall determine what necessary steps shall be taken to prevent the damage of either line. The survey shall be done at Permittor's expense. Any measures required to address interference issues as a result of the installation of the Permittee's lines shall be done at Permittee's expense.
- Grade or elevation changes may not be made without Permittor's prior written approval. Changes in grade for the purpose of water retention shall not be approved.
- Permittee shall maintain a minimum of 48 inches of soil cover over Permittor's pipeline(s) across the entire width of the Encroachment. If sufficient cover does not currently exist, then at Permittee's sole cost and expense, the line shall be lowered or additional cover provided for placement over the right-of-way. Cover over the lines may not exceed 6 feet without Permittor's prior written approval. The method of achieving the required depth of cover shall be at Permittor's sole discretion.
- The Permittor retains the right to adequately mark the Permittor's pipelines with permanent line markers to ensure public safety and the future safe operation of the lines. DOT Regulations state that any person who willfully and knowingly defaces, damages, removes, or destroys any pipeline sign or right-of-way marker shall be subject to a fine, imprisonment, or both. The Permittee is required by State law to contact the local One-Call Center at least 48 hours prior to any excavation taking place near the pipeline(s). The Permittor reserves the right to have an inspector or representative on the job to oversee all construction within the right-of-way.
- The Permittee shall allow no material or equipment to be used in the construction of the Encroachment that would hinder or impair Permittor's ability to safely maintain and operate Permittor's pipeline(s). Temporary construction roads or crossings over Permittor's pipelines must be approved in advance in writing by Permittor. Permittee shall provide additional cover and/or stabilization to specifications determined by Permittor prior to commencement of traffic across pipelines.
- Permittee shall not allow the Encroachment to create an erosion problem along the right-of-way, and should such an erosion problem arise then Permittee, at Permittee's sole cost and expense, shall immediately correct the problem.
- Permittee will incorporate Permittor's Design Guidelines contained herein into any of Permittee's design and construction drawings issued "For Bid" purposes. All plan drawings issued either "For Bid" or "For Construction" will display the following statement on the drawings in areas around Permittor's pipeline(s):

WARNING: High Pressure Pipeline(s)

No Excavation or Construction in this area without ONE- CALL and without contacting Phillips 66 PipeLine LLC (P66PL)

ATTACHMENT A

CITY OF CLAYTON
PLANNING COMMISSION
RESOLUTION NO. 02 - 2020

A RESOLUTION OF THE CLAYTON PLANNING COMMISSION RECOMMENDING ADOPTING THE FINAL INITIAL STUDY/MITIGATED NEGATIVE DECLARATION AND MITIGATION MONITORING AND REPORTING PROGRAM FOR THE OAK CREEK CANYON RESIDENTIAL SUBDIVISION PROJECT (ENV-02-16)

WHEREAS, the City received an application from West Coast Home Builders requesting review and consideration of an Initial Study/Mitigated Negative Declaration (ENV-02-16), Tentative Subdivision Map (MAP-01-16), General Plan Map Amendment (GPA-02-18), Specific Plan Map Amendment (SPA-01-18), Zoning Map Amendment (ZOA-02-18), Development Plan Permit (DP-01-19) and Tree Removal Permit (TRP- 31-19) for the subdivision and development of six single-family residences on approximately 9.03-acres ("Project"). The Oak Creek Canyon Residential Subdivision project site is located on the north side of Marsh Creek Road at the intersection with Diablo Parkway, APN 119-070-008; and

WHEREAS, the City prepared an Initial Study/Mitigated Negative Declaration ("IS/MND") and Mitigation Monitoring and Reporting Program (MMRP) to evaluate the potential environmental impacts of the Project, in accordance with Section 15063 of Title 14 of the California Code of Regulations, the California Environmental Quality Act ("CEQA") Guidelines; and

WHEREAS, a draft IS/MND were duly noticed and circulated for a 20-day review period, with the public review comment period commencing on August 21, 2020 and ending September 9, 2020; and

WHEREAS, the Clayton Planning Commission has reviewed the IS/MND for the Project and the comments received during the public review comment period; and

WHEREAS, proper notice of this public hearing was given in all respects as required by law; and

WHEREAS, on October 13, 2020, the Clayton Planning Commission held a duly-noticed public hearing on the IS/MND and MMRP, received and considered testimony and evidence, both oral and documentary, and approved and adopted the Final IS/MND and MMRP with the attached errata sheets; and

WHEREAS, the custodian of the Final IS/MND is the Community Development Department and the Final IS/MND is available for public review at City Hall in the Community Development Department and the MMRP is attached as Exhibit A to this Resolution.

NOW, THEREFORE, BE IT RESOLVED, as follows:

1. The foregoing recitals are true and correct.

2. The Clayton Planning Commission hereby finds, on the basis of the whole record before it (including the IS/MND, MMRP, and all comments received) that:

    a. The City of Clayton exercised overall control and direction over the CEQA review for the Project, including the preparation of the Final IS/MND and MMRP, and independently reviewed the Final IS/MND and MMRP; and

    b. There is no substantial evidence that the Project will have a significant effect on the environment once mitigation measures have been followed; and

    c. The Final IS/MND and MMRP reflect the City's independent judgment and analysis.

3. The Clayton Planning Commission hereby approves and adopts the Oak Creek Canyon Residential Subdivision Initial Environmental Study/Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program.

PASSED AND ADOPTED by the Planning Commission of the City of Clayton at a regular meeting on the ____ day of _____, 2020.

APPROVED: ATTEST:

_____ _____

Chair Matthew Feske
Community Development Director

Exhibit A: Oak Creek Canyon Residential Subdivision Project Mitigation Monitoring and Reporting Program
Exhibit B: Errata Sheet

ATTACHMENT B

CITY OF CLAYTON
PLANNING COMMISSION
RESOLUTION NO. 03 - 2020

A RESOLUTION RECOMMENDING AMENDING THE GENERAL PLAN MAP FOR THE OAK CREEK CANYON RESIDENTIAL SUBDIVISION LOCATED ON MARSH CREEK ROAD, NORTH OF THE INTERSECTION WITH DIABLO PARKWAY

(GPA-02-18)

WHEREAS, the City received an application from West Coast Home Builders requesting review and consideration of an Initial Study/Mitigated Negative Declaration (ENV-02-16), Tentative Subdivision Map (MAP-01-16), General Plan Map Amendment (GPA-02-18), Specific Plan Map Amendment (SPA-01-18), Zoning Map Amendment (ZOA-01-18), Development Plan Permit (DP-01-19) and Tree Removal Permit (TRP- 31-19) for the subdivision and development of six single-family residences on approximately 9.03-acres ("Project"). The Oak Creek Canyon Residential Subdivision project site is located on the north side of Marsh Creek Road at the intersection with Diablo Parkway, APN 119-070-008; and

WHEREAS, State Planning and Zoning Law, and specifically Government Code Section 65358, authorizes cities to amend their general plans; and

WHEREAS, the Planning Commission held a duly-noticed public hearing on October 13, 2020 on amendment of the *General Plan Exhibit* to change the land use Single-Family Low Density Residential and Private Open Space areas, and eliminate the Public & Quasi-Public Facility designation of the Oak Creek Canyon site (APN 119-070-008) located on Marsh Creek Road, north of Diablo Parkway; and

WHEREAS, the proposed Single-Family Low Density Residential and Public Open Space designations for the project site are consistent with the companion amendments of the *Marsh Creek Road Specific Plan* and *Zoning Map*; and

WHEREAS, the proposed Private Open Space, and Single-Family Low Density Residential areas in the *General Plan Exhibit* are compatible with the existing Single-Family Low Density Residential and Public Park/Open Space/ Recreational, and grazing land designations adjacent to the project site; and

WHEREAS, the proposed amendment is in general conformance with the *General Plan*, is in the public interest, and fully complies with the Growth Management Program of the Contra Costa Transportation Authority; and

WHEREAS, a draft IS/MND were duly noticed and circulated for a 20-day review period, with the public review comment period commencing on August 21, 2020 and ending September 9, 2020; and

WHEREAS, there is no evidence that the proposed amendment will have the potential for any individual or cumulative adverse effect on fish and wildlife resources or their habitat, as defined in Section 711.2 of the Fish and Wildlife Code.

WHEREAS, proper notice of this public hearing was given in all respects as required by law; and

PASSED AND ADOPTED by the Planning Commission of the City of Clayton at a regular meeting on the ____ day of _____, 2020.

APPROVED:

_____
Chair

ATTEST:

_____
Matthew Feske
Community Development Director

Exhibit A: Oak Creek Canyon General Plan Exhibit

ATTACHMENT C

CITY OF CLAYTON
PLANNING COMMISSION
RESOLUTION NO. 04 - 2020

A RESOLUTION RECOMMENDING AMENDING THE MARSH CREEK ROAD SPECIFIC PLAN MAP FOR THE OAK CREEK CANYON RESIDENTIAL SUBDIVISION LOCATED ON MARSH CREEK ROAD, NORTH OF THE INTERSECTION WITH DIABLO PARKWAY

(SPA-01-18)

WHEREAS, the City received an application from West Coast Home Builders requesting review and consideration of an Initial Study/Mitigated Negative Declaration (ENV-02-16), Tentative Subdivision Map (MAP-01-16), General Plan Map Amendment (GPA-02-18), Specific Plan Map Amendment (SPA-01-18), Zoning Map Amendment (ZOA-01-18), Development Plan Permit (DP-01-19) and Tree Removal Permit (TRP- 31-19) for the subdivision and development of six single-family residences on approximately 9.03-acres ("Project"). The Oak Creek Canyon Residential Subdivision project site is located on the north side of Marsh Creek Road at the intersection with Diablo Parkway, APN 119-070-008; and

WHEREAS, the Planning Commission held a duly-noticed public hearing on October 13, 2020 on amendment of the *Marsh Creek Road Specific Plan Exhibit* to change the land use Single-Family Low Density Residential designated area and change the Open Space designation to Private Open Space of the Oak Creek Canyon site (APN 119-070-008) located on Marsh Creek Road, north of Diablo Parkway; and

WHEREAS, the proposed Single-Family Low Density Residential and Public Open Space designations for the project site are consistent with the companion amendments of the General Plan and Zoning Maps; and

WHEREAS, the proposed Private Open Space, and Single-Family Low Density Residential areas in the Oak Creek Canyon Residential Subdivision in the *Marsh Creek Road Specific Plan* are compatible with the existing Single-Family Low Density Residential and Public Park/Open Space/ Recreational, and Grazing Land designations adjacent to the project site; and

WHEREAS, the proposed amendment is in general conformance with the *Marsh Creek Road Specific Plan*, is in the public interest, and fully complies with the Growth Management Program of the Contra Costa Transportation Authority; and

WHEREAS, a draft IS/MND were duly noticed and circulated for a 20-day review period, with the public review comment period commencing on August 21, 2020 and ending September 9, 2020; and

WHEREAS, there is no evidence that the proposed amendment will have the potential for any individual or cumulative adverse effect on fish and wildlife resources or their habitat, as defined in Section 711.2 of the Fish and Wildlife Code.

WHEREAS, proper notice of this public hearing was given in all respects as required by law; and

PASSED AND ADOPTED by the Planning Commission of the City of Clayton at a regular meeting on the ____ day of _____, 2020.

APPROVED:

_____
Chair

ATTEST:

_____
Matthew Feske
Community Development Director

Exhibit A: Oak Creek Canyon Marsh Creek Road Specific Plan Exhibit

CITY OF CLAYTON
PLANNING COMMISSION
RESOLUTION NO. 05 - 2020

A RESOLUTION RECOMMENDING AMENDING THE ZONING MAP FOR THE OAK CREEK CANYON RESIDENTIAL SUBDIVISION LOCATED ON MARSH CREEK ROAD, NORTH OF THE INTERSECTION WITH DIABLO PARKWAY

(ZOA-01-18)

WHEREAS, the City received an application from West Coast Home Builders requesting review and consideration of an Initial Study/Mitigated Negative Declaration (ENV-02-16), Tentative Subdivision Map (MAP-01-16), General Plan Map Amendment (GPA-02-18), Specific Plan Map Amendment (SPA-01-18), Zoning Map Amendment (ZOA-01-18), Development Plan Permit (DP-01-19) and Tree Removal Permit (TRP- 31-19) for the subdivision and development of six single-family residences on approximately 9.03-acres ("Project"). The Oak Creek Canyon Residential Subdivision project site is located on the north side of Marsh Creek Road at the intersection with Diablo Parkway, APN 119-070-008; and

WHEREAS, the Planning Commission held a duly-noticed public hearing on October 13, 2020 on amendment of the *Zoning Map* to change the land use R-10 and Public Facility, and change the designation to Planned Development of the Oak Creek Canyon site (APN 119-070-008) located on Marsh Creek Road, north of Diablo Parkway; and

WHEREAS, the proposed Planned Development designation for the project site is consistent with the companion amendments of the General Plan and Marsh Creek Road Specific Plan; and

WHEREAS, the proposed Planned Development in the Oak Creek Canyon Residential Subdivision is compatible with the existing R-10 and Planned Development designations adjacent to the project site; and

WHEREAS, the proposed amendment is in general conformance with the *Official Zoning Map*, is in the public interest, and fully complies with the Growth Management Program of the Contra Costa Transportation Authority; and

WHEREAS, a draft IS/MND were duly noticed and circulated for a 20-day review period, with the public review comment period commencing on August 21, 2020 and ending September 9, 2020; and

WHEREAS, there is no evidence that the proposed amendment will have the potential for any individual or cumulative adverse effect on fish and wildlife resources or their habitat, as defined in Section 711.2 of the Fish and Wildlife Code.

WHEREAS, proper notice of this public hearing was given in all respects as required by law; and

PASSED AND ADOPTED by the Planning Commission of the City of Clayton at a regular meeting on the ____ day of _____, 2020.

APPROVED:

_____
Chair

ATTEST:

_____
Matthew Feske
Community Development Director

Exhibit A: Oak Creek Canyon Zoning Exhibit

CITY OF CLAYTON
PLANNING COMMISSION
RESOLUTION NO. 06 - 2020

A RESOLUTION RECOMMENDING APPROVAL OF THE VESTING TENTATIVE MAP (MAP-01-16), DEVELOPMENT PLAN PERMIT (DP-01-19), AND TREE REMOVAL PERMIT (TP-31-19) FOR THE OAK CREEK CANYON RESIDENTIAL SUBDIVISION LOCATED ON MARSH CREEK ROAD, NORTH OF THE INTERSECTION WITH DIABLO PARKWAY

WHEREAS, the City received an application from West Coast Home Builders requesting review and consideration of an Initial Study/Mitigated Negative Declaration (ENV-02-16), Tentative Subdivision Map (MAP-01-16), General Plan Map Amendment (GPA-02-18), Specific Plan Map Amendment (SPA-01-18), Zoning Map Amendment (ZOA-01-18), Development Plan Permit (DP-01-19) and Tree Removal Permit (TRP- 31-19) for the subdivision and development of six single-family residences on approximately 9.03-acres ("Project"). The Oak Creek Canyon Residential Subdivision project site is located on the north side of Marsh Creek Road at the intersection with Diablo Parkway, APN 119-070-008; and

WHEREAS, the Planning Commission held a duly-noticed public hearing on October 13, 2020 on the proposed project amendments and plans, for the 6-lot Oak Creek Canyon Residential Subdivision (APN 119-070-008) located on Marsh Creek Road, north of Diablo Parkway; and

WHEREAS, the proposed Planned Development designation for the project site is consistent with the amendments of the General Plan and Marsh Creek Road Specific Plan; and Rezone to Planned Unit Development; and

WHEREAS, the proposed Vesting Tentative Map, Development plan, and Tree removal Plans for the Oak Creek Canyon Residential Subdivision are compatible with the existing R-10 and Planned Development designations adjacent to the project site; and

WHEREAS, the proposed Vesting Tentative Map, Development plan, and Tree removal Plans are in general conformance with one another, is in the public interest, and fully complies with the Growth Management Program of the Contra Costa Transportation Authority; and

WHEREAS, a draft IS/MND were duly noticed and circulated for a 20-day review period, with the public review comment period commencing on August 21, 2020 and ending September 9, 2020; and

WHEREAS, there is no evidence that the proposed residential subdivision will have the potential for any individual or cumulative adverse effect on fish and wildlife resources or their habitat, as defined in Section 711.2 of the Fish and Wildlife Code.

WHEREAS, proper notice of this public hearing was given in all respects as required by law; and

PASSED AND ADOPTED by the Planning Commission of the City of Clayton at a regular meeting on the ____ day of _____, 2020.

APPROVED:

_____
Chair

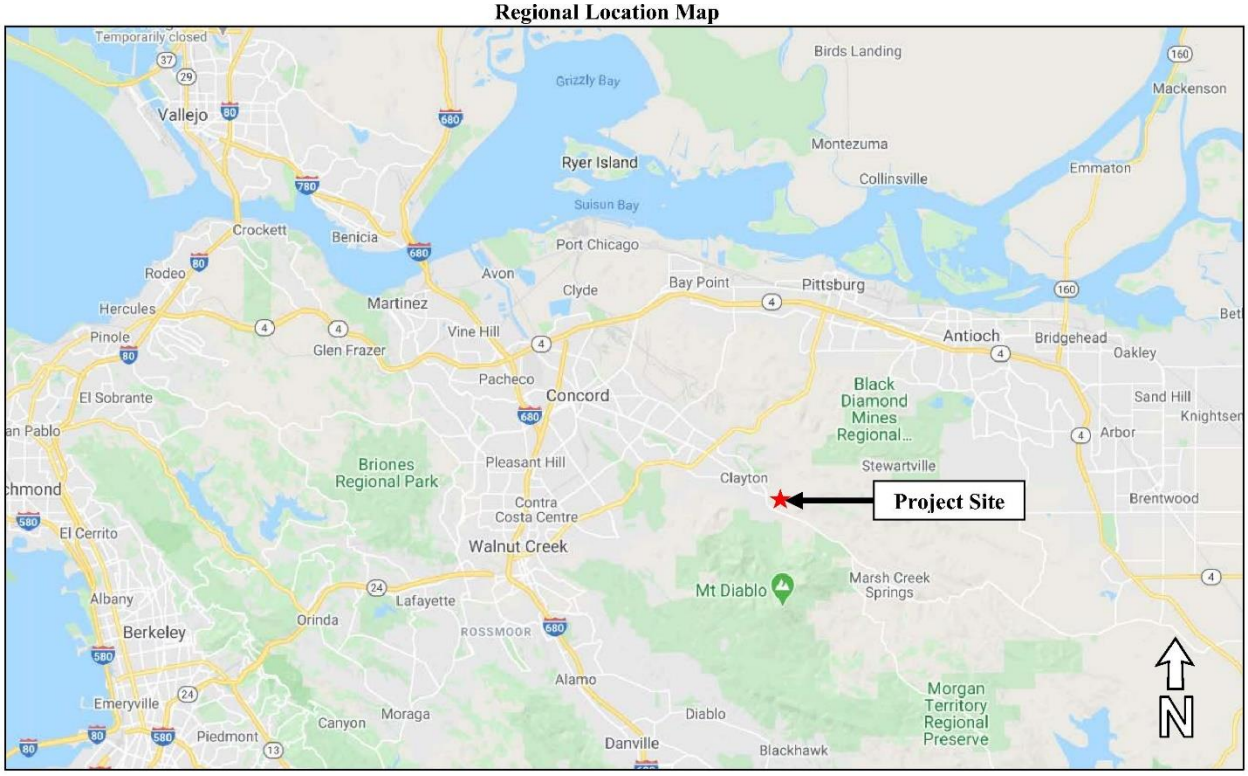
ATTEST:

_____
Matthew Feske
Community Development Director

Exhibit A: Oak Creek Canyon Zoning Exhibit

Attachment G Oak Creek Canyon Vicinity Maps

Regional Location Map



Project Site

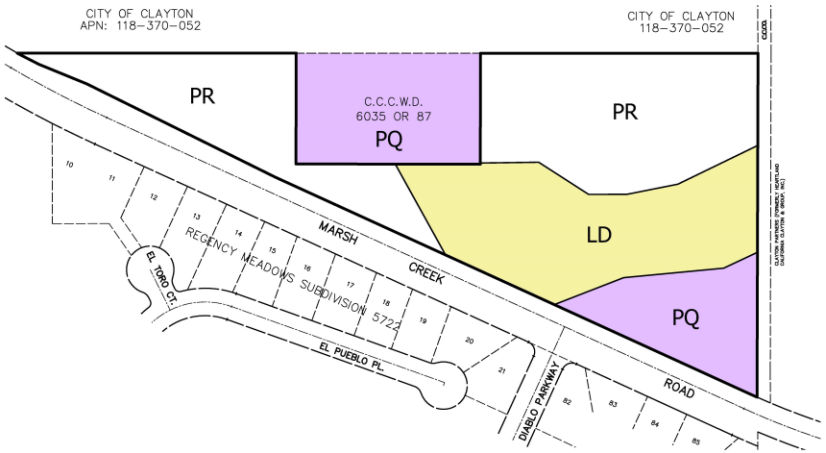
GENERAL PLAN EXHIBIT

"OAK CREEK CANYON"

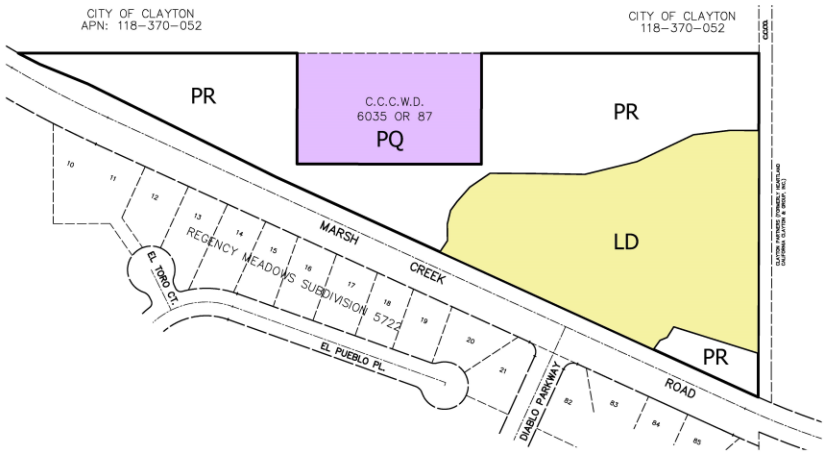
SUBDIVISION 6826

CITY OF CLAYTON
COUNTY OF CONTRA COSTA
STATE OF CALIFORNIA

VICINITY MAP
NO SCALE



EXISTING GENERAL PLAN



PROPOSED GENERAL PLAN

LEGEND

- SINGLE FAMILY LOW DENSITY
- PUBLIC/QUASI-PUBLIC
- PRIVATE OPEN SPACE

APPR.
DATE

REGISTERED PROFESSIONAL ENGINEER
DAVID O. ISAKSON
NO. 21764
CIVIL
STATE OF CALIFORNIA

SUBDIVISION 6826 OAK CREEK CANYON

GENERAL PLAN EXHIBIT

CLAYTON CONTRA COSTA COUNTY CALIFORNIA

Isakson & Assoc. Inc.
civil engineering & land surveying
2 Mirango Court, Clayton, CA. 94517 Phone:(925) 876-0889

DATE: 07-17-2020	DESIGNED BY: DOI	DRAWN BY: RLB	CHECKED BY: DOI	JOB NO. 200514	SHEET 1 OF 1

200514 - OAK CREEK CANYON (SUBD. 6826) GENERAL PLAN EXHIBIT - 07-17-2020

Attachment I Marsh Creek Road Specific Plan Map Amendment Exhibit

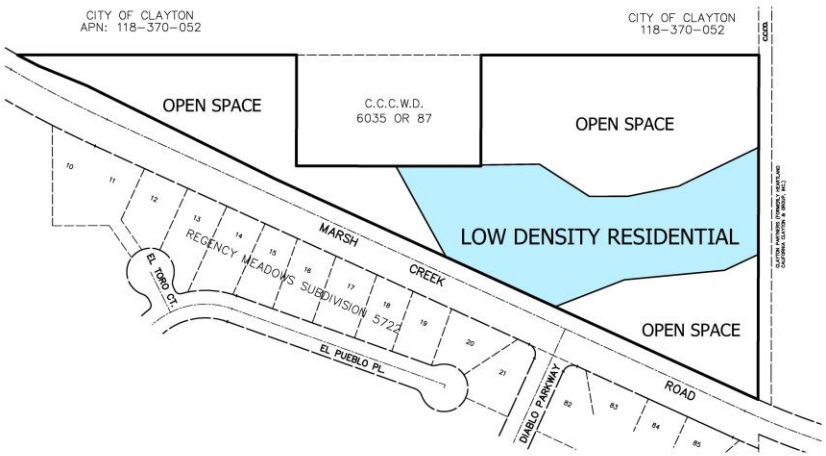
MARSH CREEK ROAD SPECIFIC PLAN

"OAK CREEK CANYON"

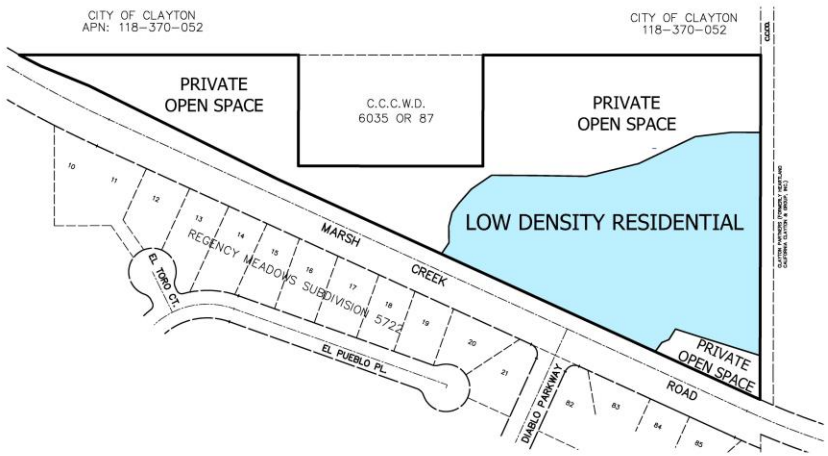
SUBDIVISION 6826

CITY OF CLAYTON
COUNTY OF CONTRA COSTA
STATE OF CALIFORNIA

VICINITY MAP
NO SCALE



EXISTING MCRSP



PROPOSED MCRSP

LEGEND

- PRIVATE OPEN SPACE
- LOW DENSITY RESIDENTIAL

REGISTERED PROFESSIONAL ENGINEER
DAVID D. ISAKSON
NO. 21764
CIVIL
STATE OF CALIFORNIA

SUBDIVISION 6826 OAK CREEK CANYON

MARSH CREEK ROAD SPECIFIC PLAN

CLAYTON CONTRA COSTA COUNTY CALIFORNIA

Isakson & Assoc. Inc.
civil engineering & land surveying
2 Mirango Court, Clayton, CA. 94517 Phone:(925) 876-0889

APPR.	DATE	DESIGNED	DRAWN	CHECKED	JOB NO.	SHEET
	07-07-2020	RLB	RLB	DOI	200514	1 OF 1

200514 - OAK CREEK CANYON (SUBD. 6826) MARSH CREEK ROAD SPECIFIC PLAN - 07-07-2020

Attachment J Zoning Map Amendment Exhibit

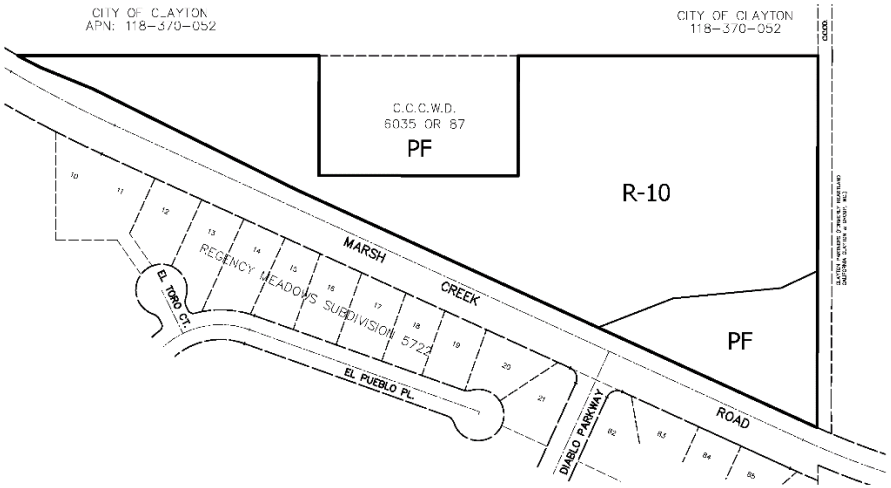
ZONING EXHIBIT

"OAK CREEK CANYON"

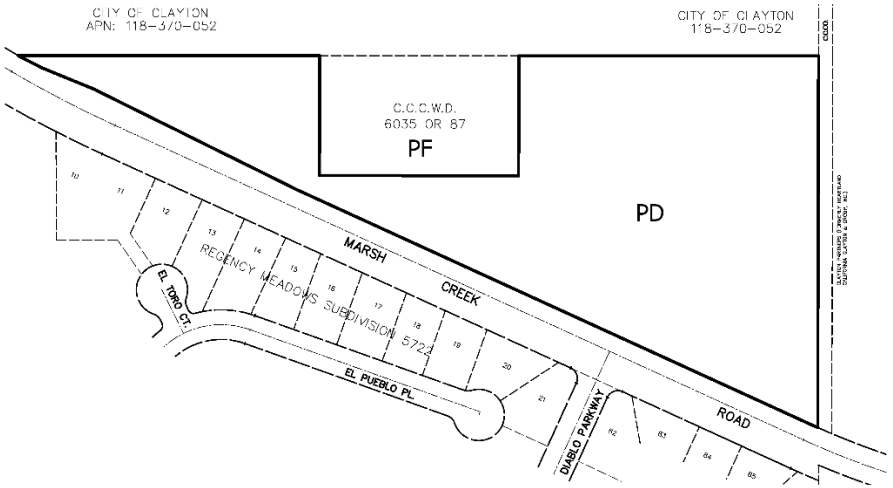
SUBDIVISION 6826

CITY OF CLAYTON
COUNTY OF CONTRA COSTA
STATE OF CALIFORNIA

VICINITY MAP
NO SCALE



EXISTING ZONING



PROPOSED ZONING

LEGEND

PD – PLANNED DEVELOPMENT
PF – PUBLIC FACILITY
R10 – 10,000 SF MIN LOT SIZE

APPR.
DATE

REGISTERED PROFESSIONAL ENGINEER
DAVID O. ISAKSON
No. 21764
CIVIL
STATE OF CALIFORNIA

SUBDIVISION 6826 OAK CREEK CANYON

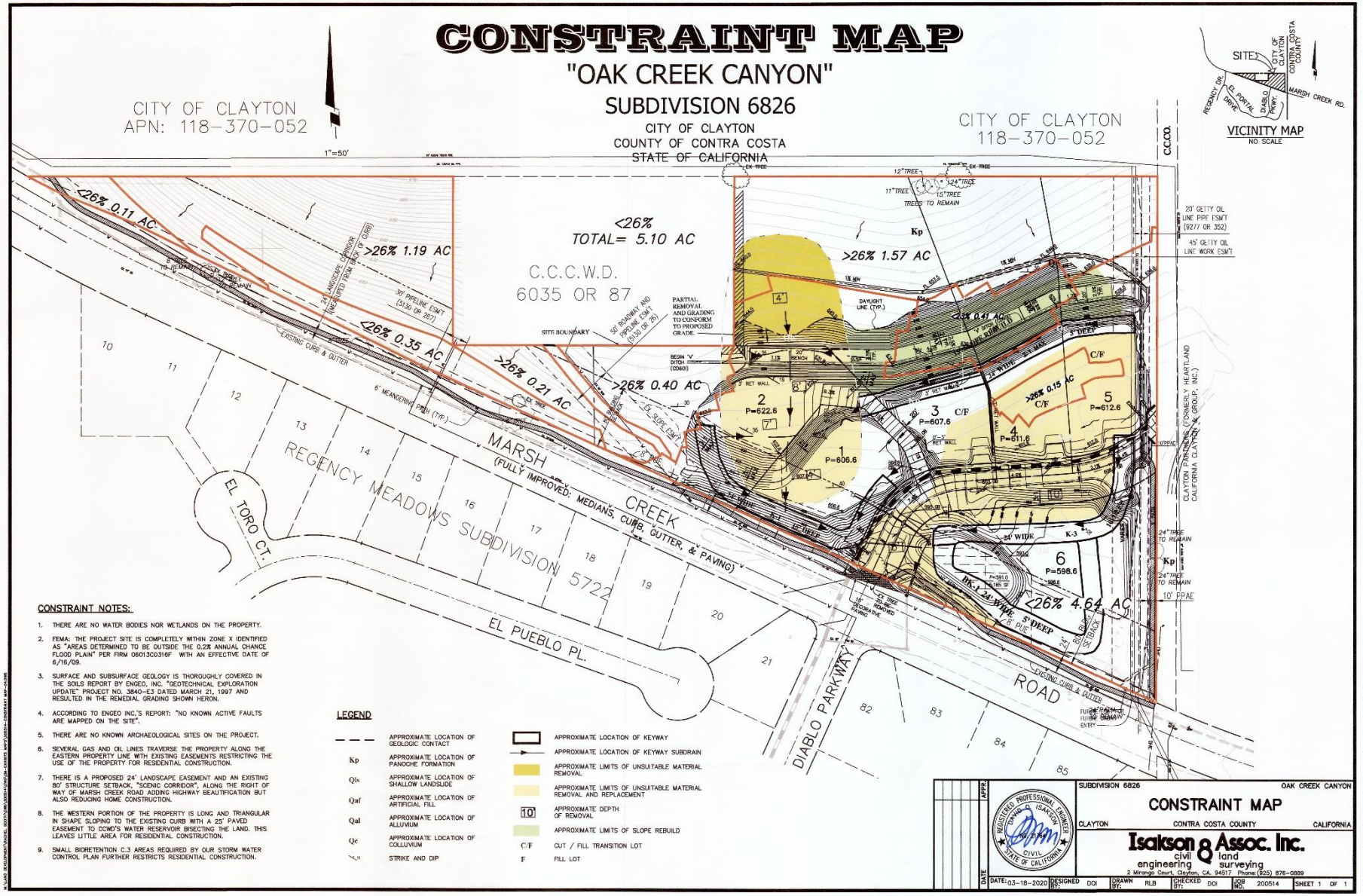
ZONING EXHIBIT

CLAYTON CONTRA COSTA COUNTY CALIFORNIA

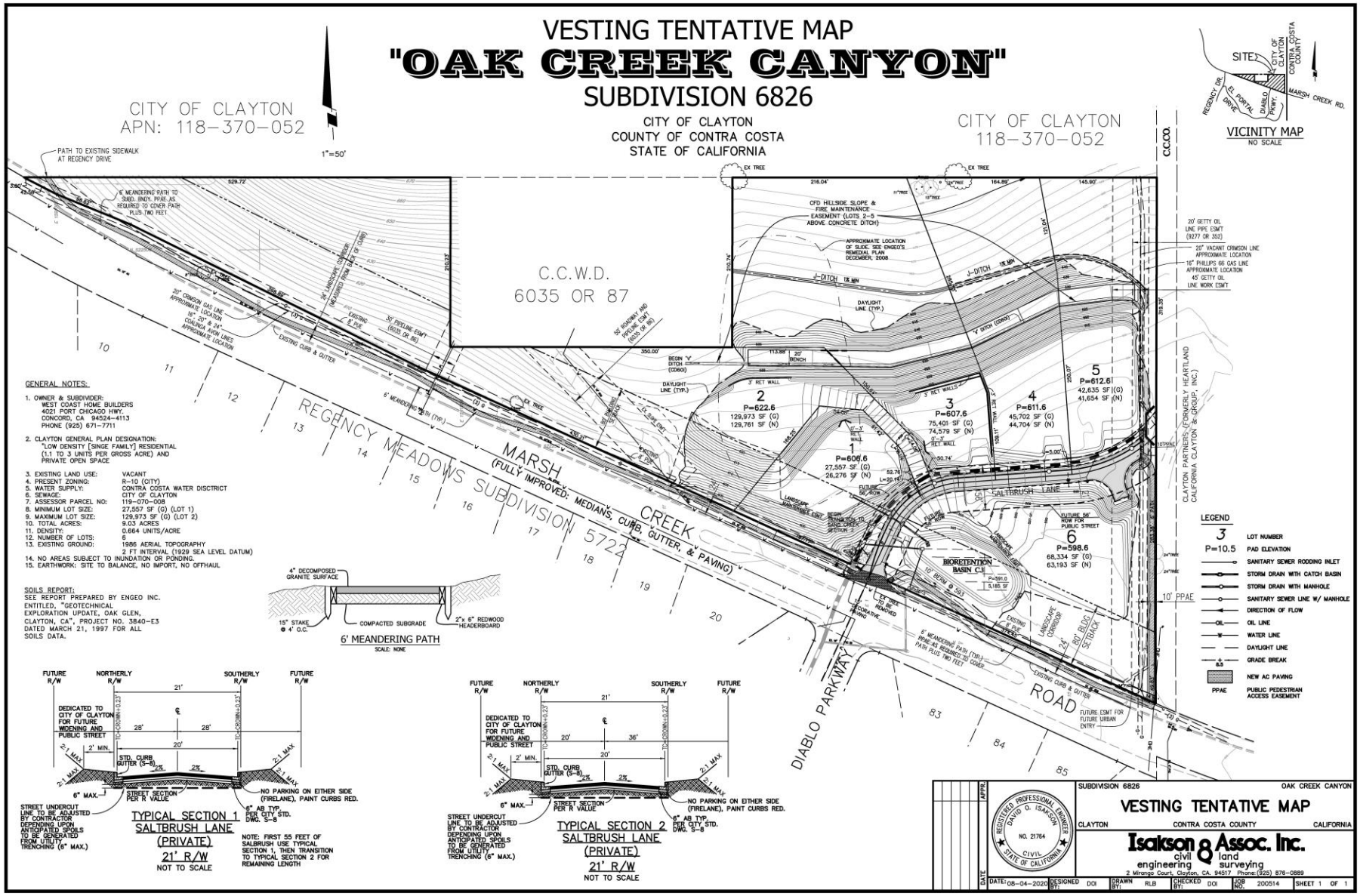
Isakson & Assoc. Inc.
civil engineering
land surveying
2 Mitchell Court, Clayton, CA. 94517 Phone:(925) 876-0889

DATE: 09-05-19 | DESIGNED DOI | DRAWN RLB | CHECKED DOI | JOB 200514 | SHEET 1 OF 1

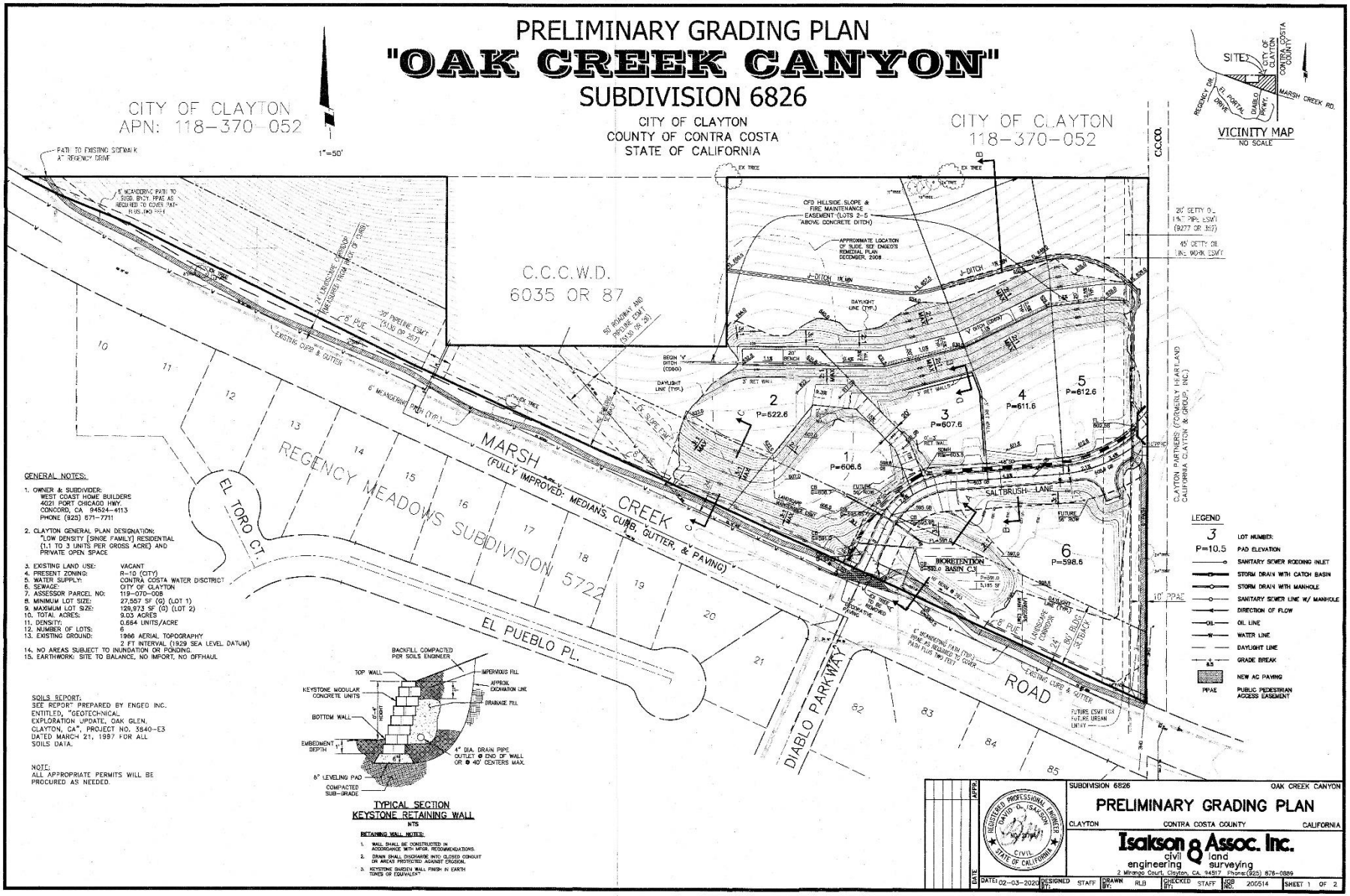
Attachment K Constraints Map



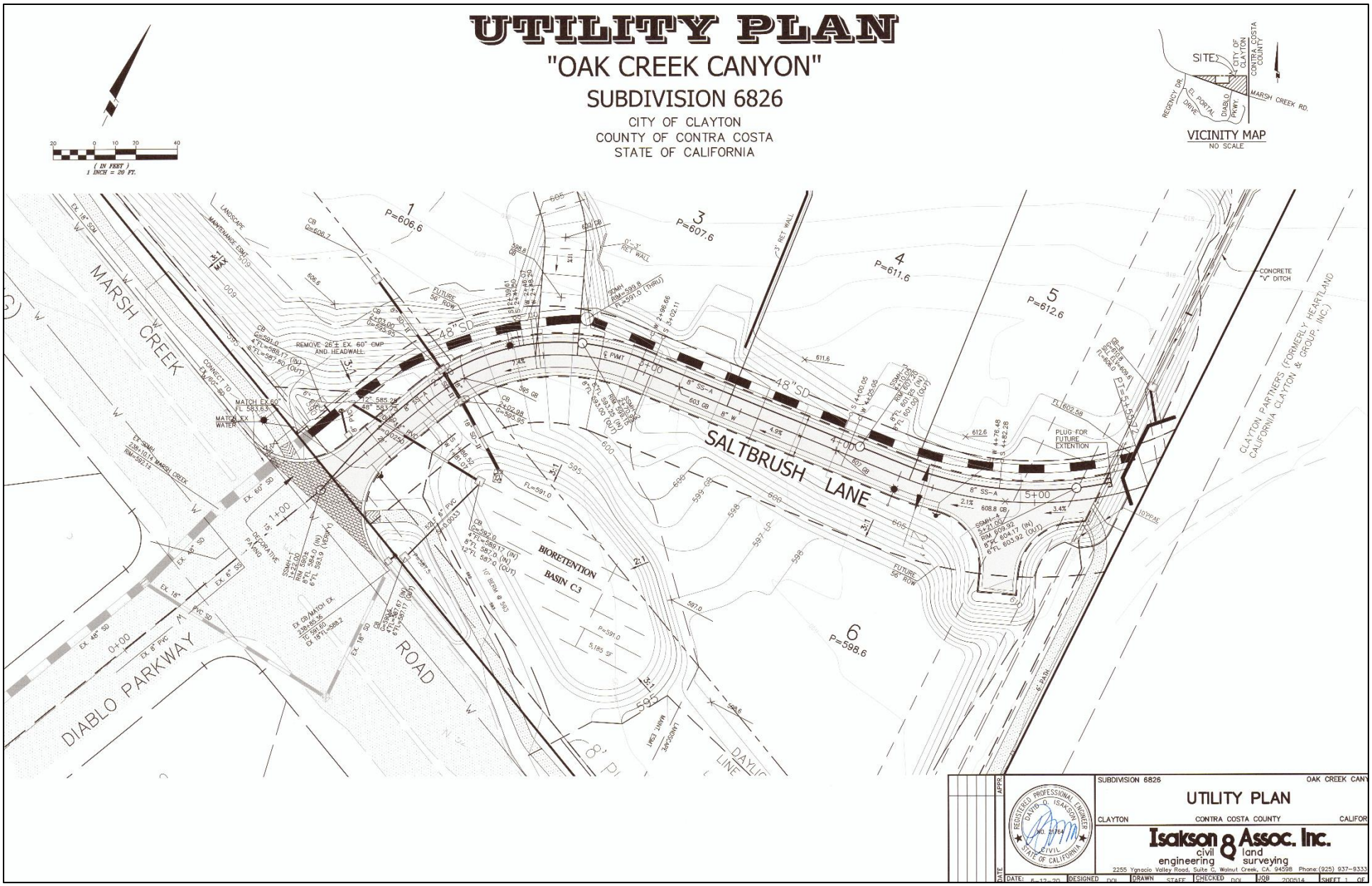
Attachment L Vesting Tentative Map



Attachment M Preliminary Grading Plan



Attachment N Preliminary Utility Plan



OAK CREEK CANYON
CITY OF CLAYTON, CA

WEST COAST HOME BUILDERS, INC.
4021 PORT CHICAGO HWY
CONCORD, CA 94520

OAK CREEK CANYON
CLAYTON, CA
DISCOVERY
DESIGN
GROUP
West Coast Home Builders
D a t e 01/29/2020


C.C.C.W.D.
6035 OR 87
1"=30'
50' ROADWAY AND PIPELINE ESM'T (5130 OR 26)
20' GETTY OIL LINE PIPE ESM'T (9277 OR 352)
45' GETTY OIL LINE WORK ESM'T
CLAYTON PARTNERS (FORMERLY HEARTLAND CALIFORNIA CLAYTON & GROUP, INC.)
80' BUILDING SETBACK
EX. SLOPE ESM'T
SEE PRELIMINARY GRADING PLAN FOR WALL HEIGHTS
1
2
3
4
5
6
SALTBRUSH LANE
FUTURE 56' ROW
LANDSCAPE MAINTENANCE ESMT
LANDSCAPE MAINT. ESMT
BIORETENTION BASIN C.3
C.3
10'PPAE
8' PUE
LANDSCAPE CORRIDOR
6' MEANDERING PATH (TYP.)
EXISTING CURB & GUTTER
24" TREE
MARSH CREEK ROAD
(FULLY IMPROVED: MEDIANS, CURB, GUTTER, & PAVING)
SUBDIVISION 5722
16
17
18
19
20
21
82
83
PARKWAY

OAK CREEK CANYON - SITE PLAN

CLAYTON, CA

DISCOVERY DESIGN GROUP

FEBRUARY 24, 2020

MATERIAL LEGEND

FLAT CONCRETE TILE ROOFING
GABLE ROOFS
VERTICAL LAP SIDING
WOOD TRIM
WOOD CORBEL
DECORATIVE GABLE
ROLL-UP GARAGE DOORS
WITH WINDOW LITES
SIMULATED STONE VENEER

Front Elevation

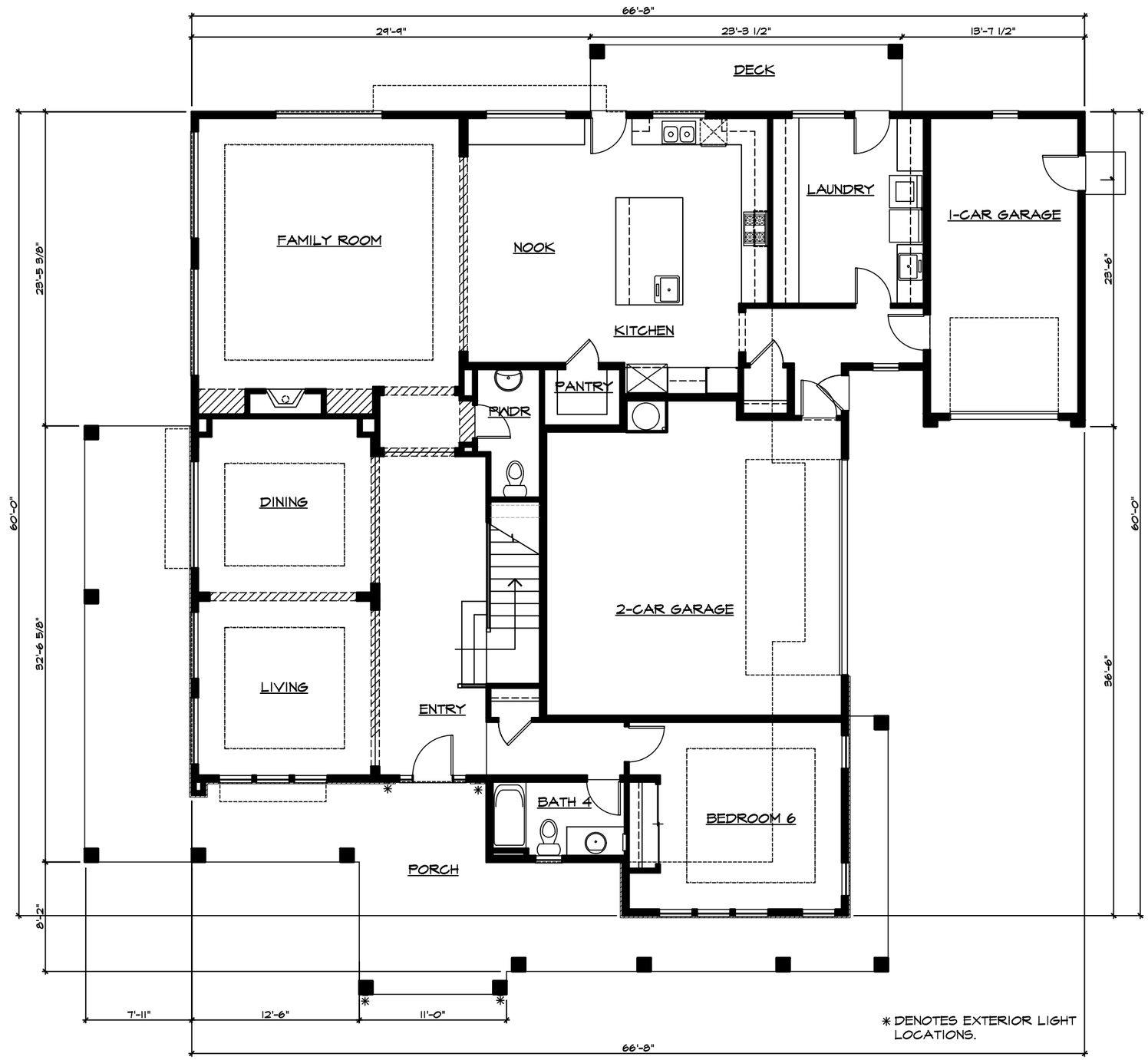
0 2 4 6 8 16

Lot 1
OAK CREEK CANYON

CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
D a t e 01/29/2020



Lot 1

SQUARE FOOTAGE	
FIRST FLOOR	2,293 SF
SECOND FLOOR	2,139 SF
TOTAL LIVING AREA	4,432 SF
GARAGE	787 SF
DECK	116 SF
PORCH	698 SF
FOOTPRINT	3,894 SF

0 2 4 6 8 16

First Floor Plan

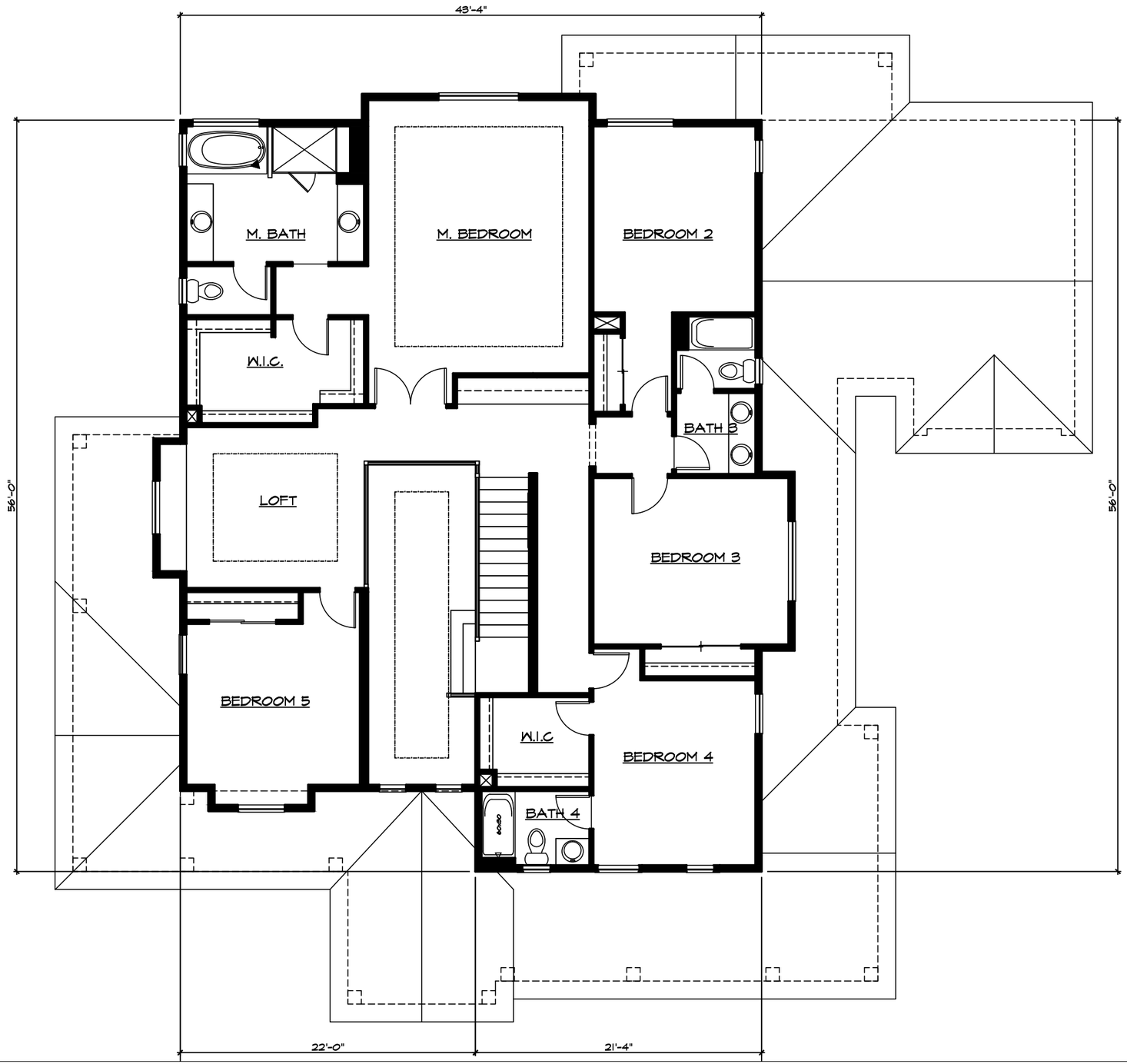
OAK CREEK CANYON

CLAYTON, CA

DISCOVERY DESIGN GROUP

West Coast Home Builders

Date 01/29/2020



Lot 1

0 2 4 6 8 16

Second Floor Plan

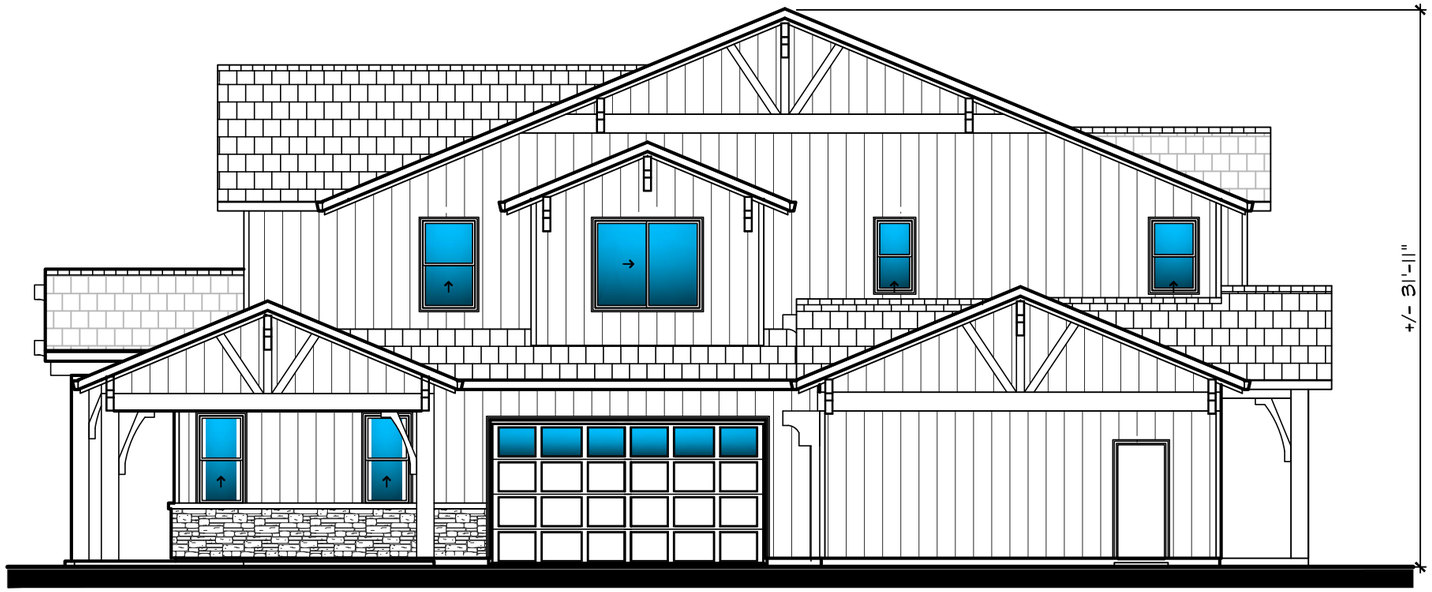
OAK CREEK CANYON

CLAYTON, CA

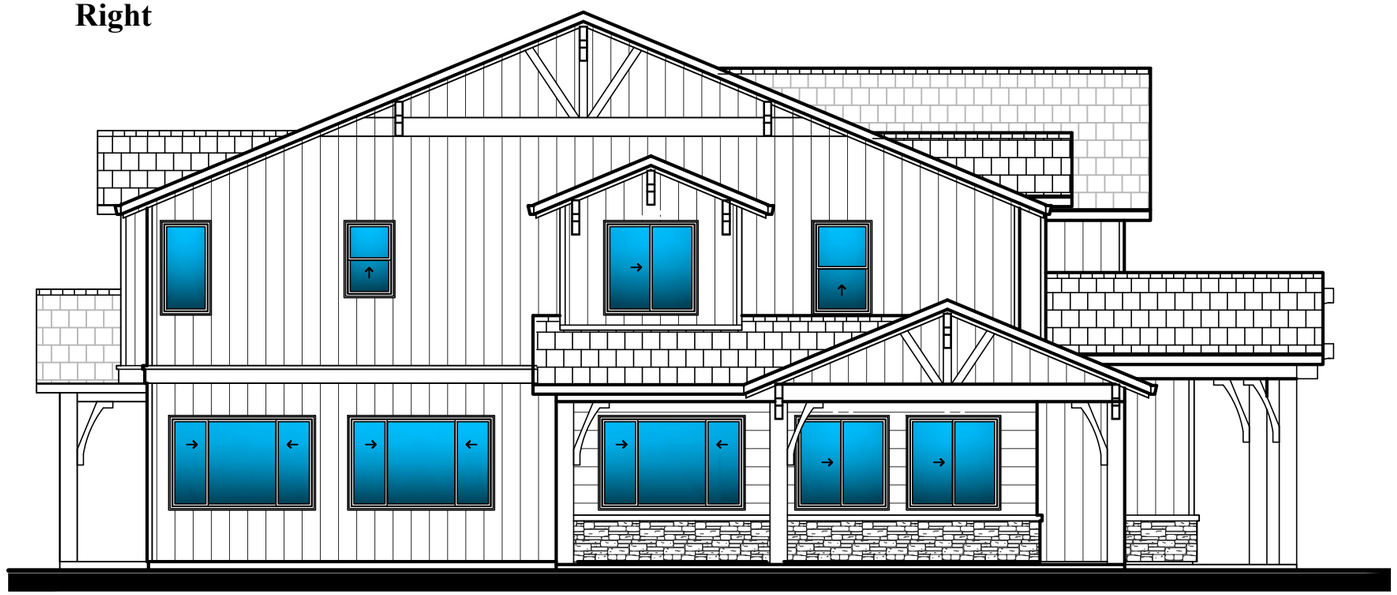
DISCOVERY
DESIGN
GROUP

West Coast Home Builders

D a t e 01/29/2020



Right



Left

Lot 1
Elevations

0 2 4 6 8 16

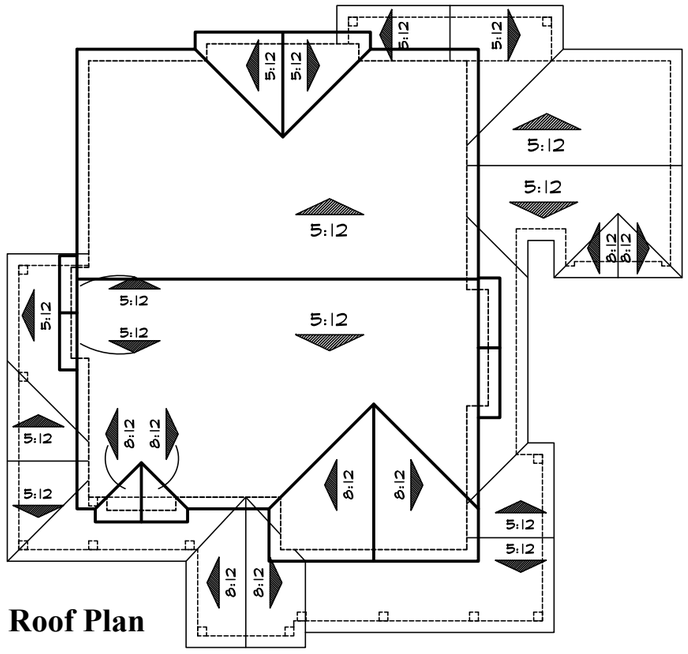
OAK CREEK CANYON

CLAYTON, CA

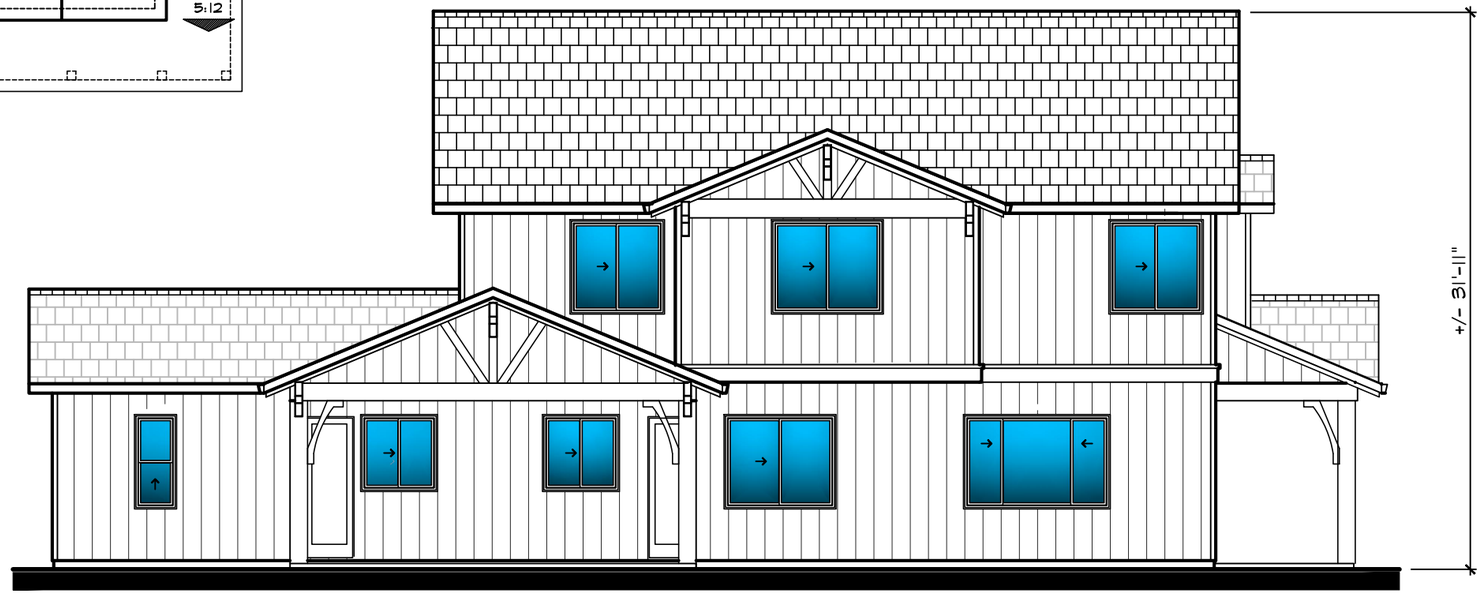
DISCOVERY
DESIGN
GROUP

West Coast Home Builders

D a t e 01/29/2020



Roof Plan



Rear

Lot 1
Elevation

0 2 4 6 8 16

OAK CREEK CANYON

CLAYTON, CA

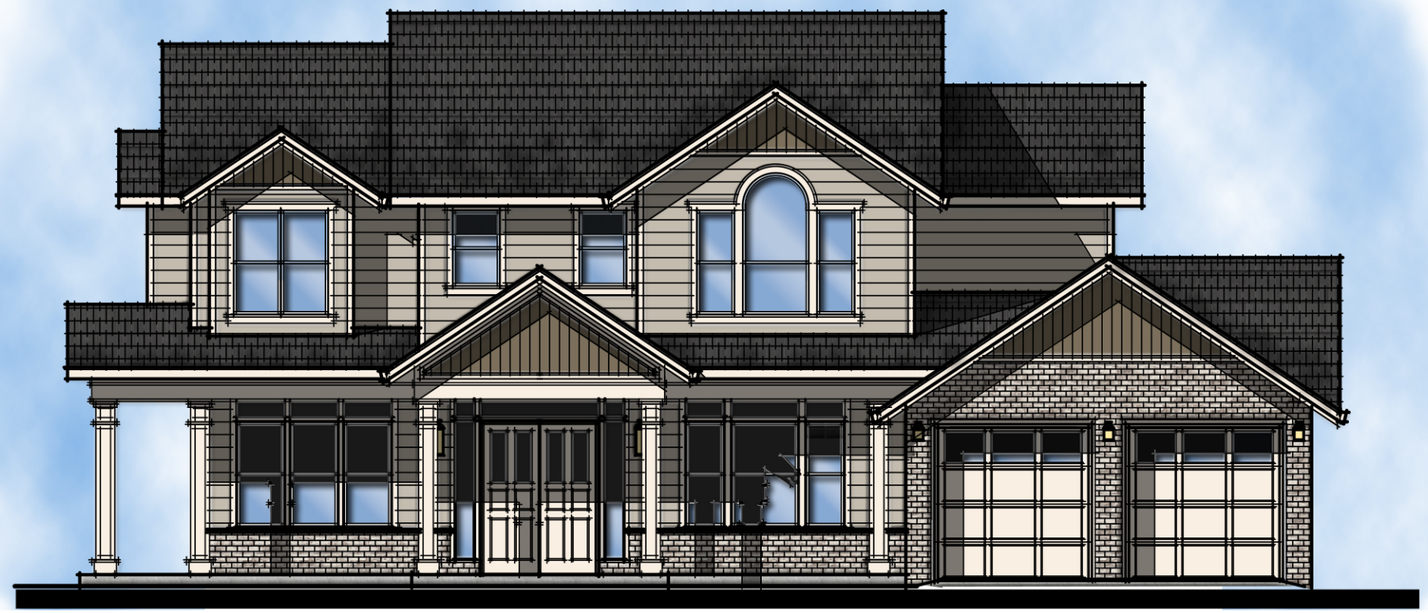
DISCOVERY
DESIGN
GROUP

West Coast Home Builders

D a t e 01/29/2020

MATERIAL LEGEND

FLAT CONCRETE TILE ROOFING
GABLE ROOFS
VERTICAL LAP SIDING
HORIZONTAL LAP SIDING
WOOD TRIM
ROLL-UP GARAGE DOORS
WITH WINDOW LITES
SIMULATED BRICK VENEER



Front Elevation

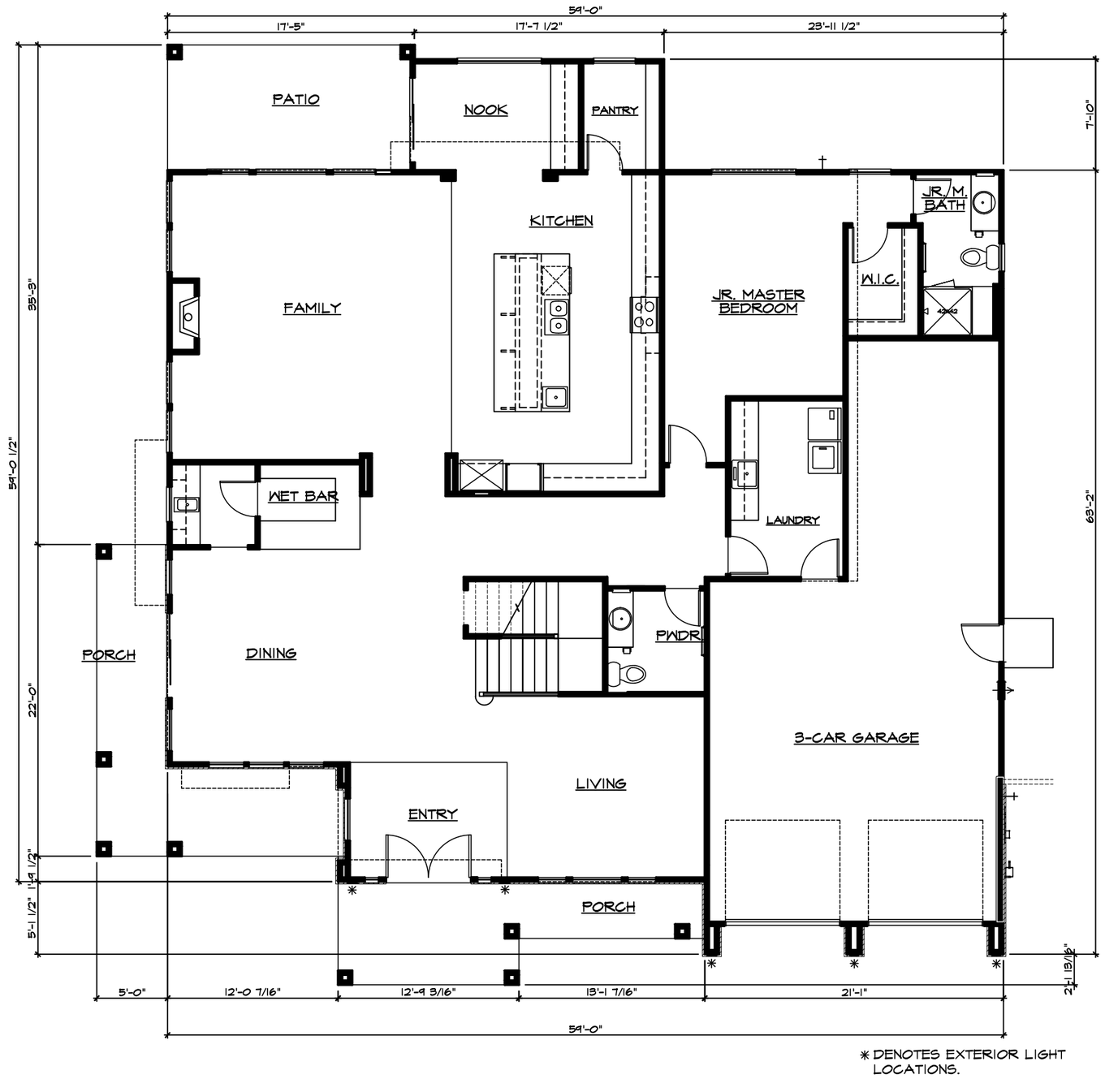
0 2 4 6 8 16

Lot 2
OAK CREEK CANYON

CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
D a t e 01/29/2020



Lot 2

SQUARE FOOTAGE	
FIRST FLOOR	2,374 SF
SECOND FLOOR	2,109 SF
TOTAL LIVING AREA	4,483 SF
GARAGE	694 SF
PORCH	334 SF
PATIO	152 SF
FOOTPRINT	3,554 SF

0 2 4 6 8 16

First Floor Plan

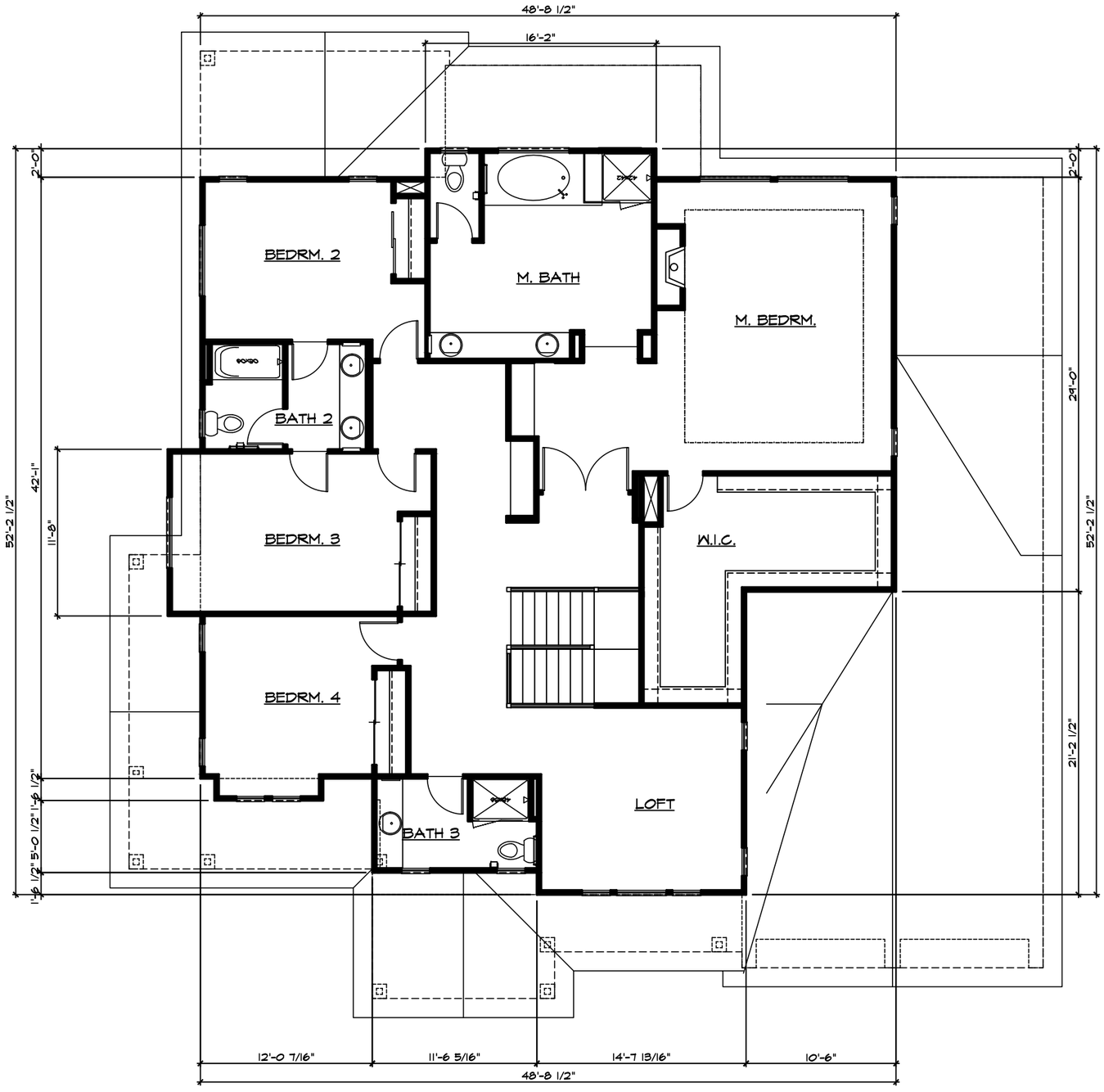
OAK CREEK CANYON

CLAYTON, CA

DISCOVERY DESIGN GROUP

West Coast Home Builders

Date 01/29/2020



Lot 2

0 2 4 6 8 16

Second Floor Plan

OAK CREEK CANYON

CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
Date 01/29/2020

Right

Left

Lot 2
Elevations

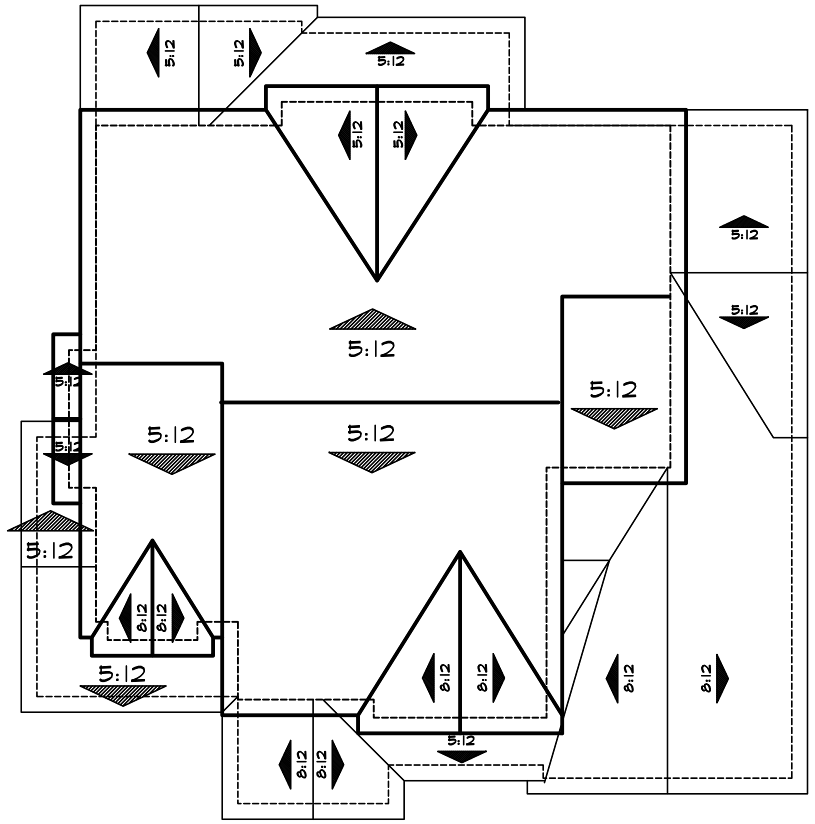
0 2 4 6 8 16

OAK CREEK CANYON

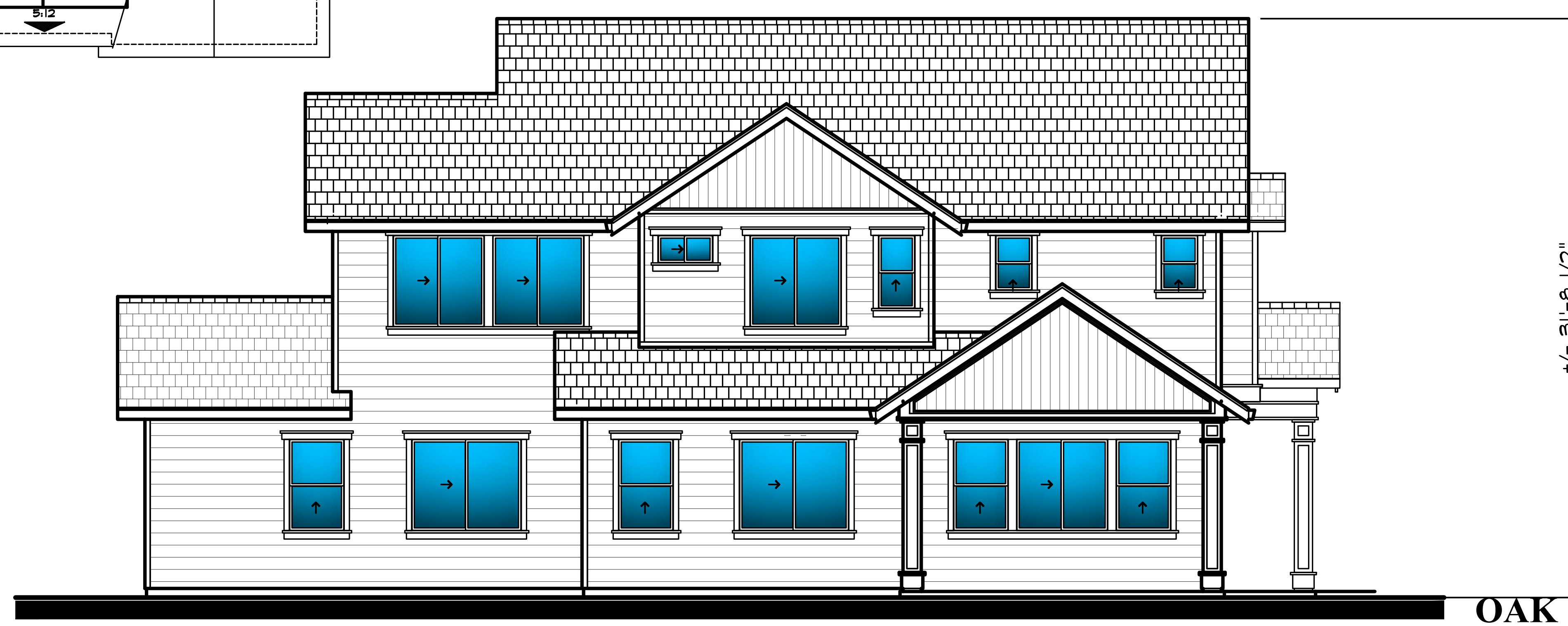
CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
D a t e 01/29/2020



Roof Plan 'A'



Rear

Lot 2
Elevation

0 2 4 6 8 16

OAK CREEK CANYON

CLAYTON, CA

DISCOVERY DESIGN GROUP

West Coast Home Builders
Date 01/29/2020

MATERIAL LEGEND

FLAT CONCRETE TILE ROOFING
GABLE ROOFS
VERTICAL LAP SIDING
HORIZONTAL LAP SIDING
WOOD TRIM
WOOD CORBEL
DECORATIVE GABLE
DECORATIVE RAILING
ROLL-UP GARAGE DOORS
WITH WINDOW LITES
SIMULATED STONE VENEER

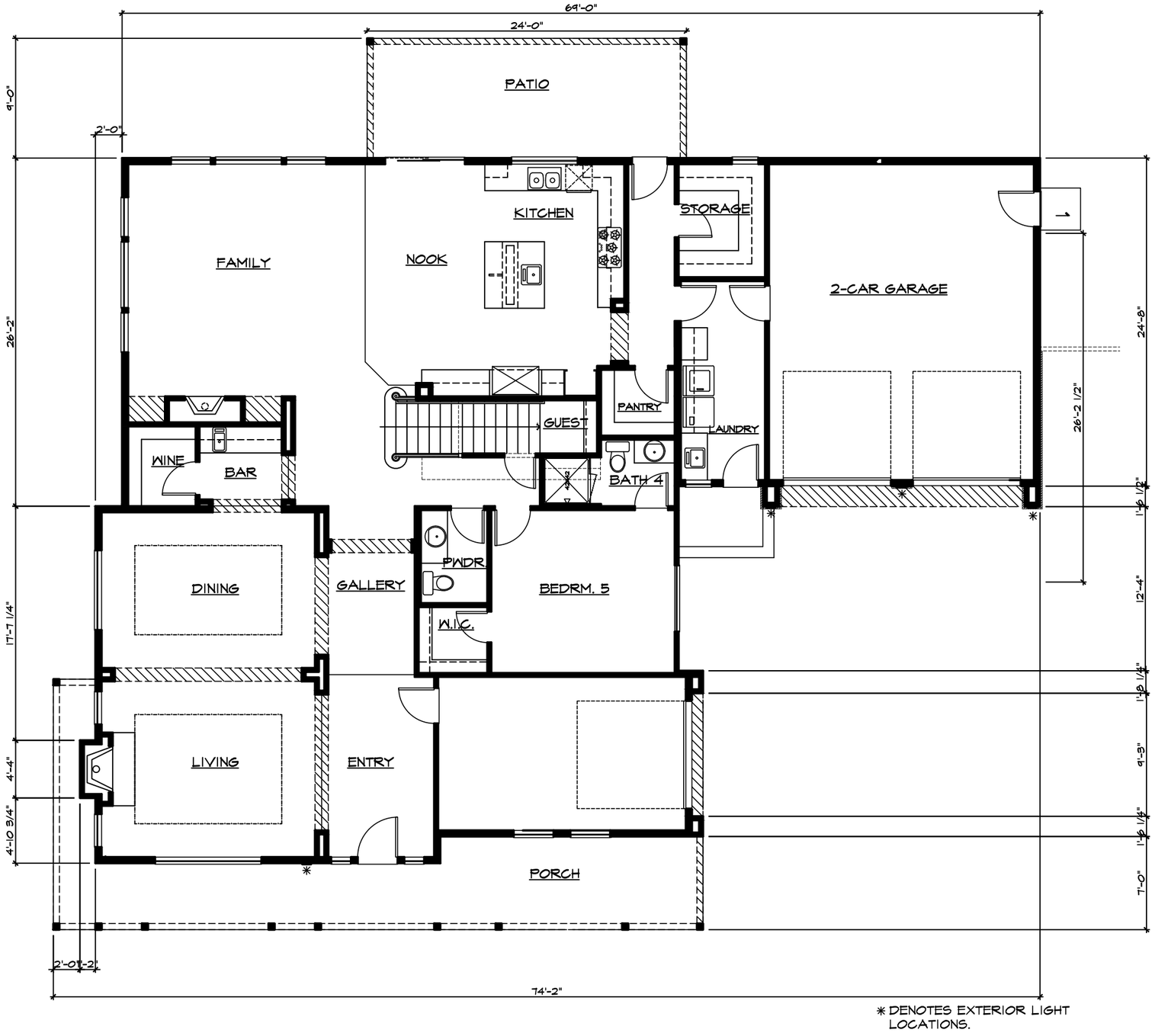
Front Elevation

0 2 4 6 8 16

Lot 3
OAK CREEK CANYON
CONCORD, CA

DISCOVERY
DESIGN
GROUP

Discovery Builders Inc.
Date 01/29/2020



Lot 3

SQUARE FOOTAGE	
FIRST FLOOR	2,191 SF
SECOND FLOOR	2,396 SF
TOTAL LIVING AREA	4,587 SF
GARAGE	732 SF
PATIO	216 SF
DECK	145 SF
PORCH	322 SF
FOOTPRINT	3,461 SF

0 2 4 6 8 16

First Floor Plan

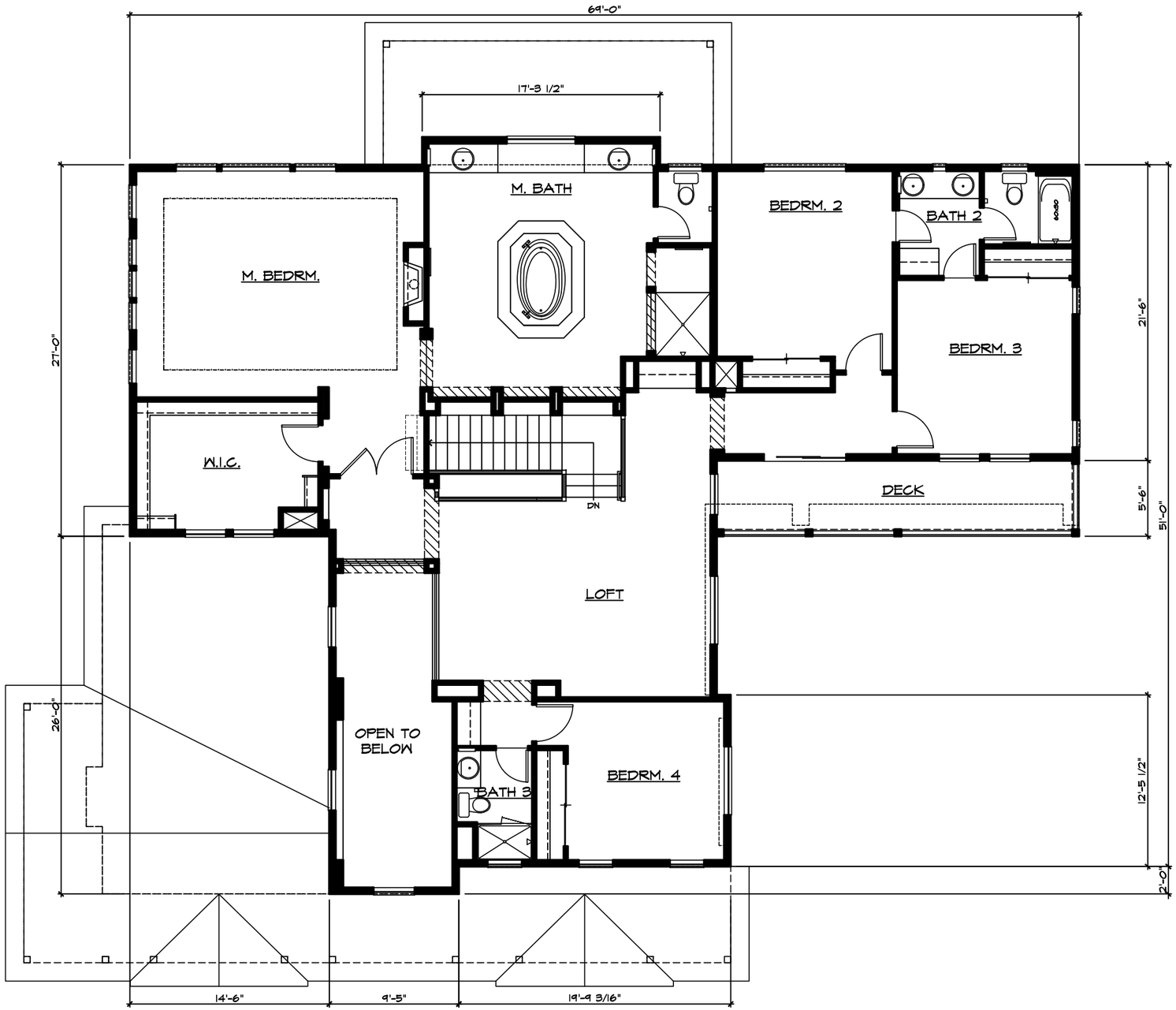
OAK CREEK CANYON

CLAYTON, CA

DISCOVERY DESIGN GROUP

West Coast Home Builders

Date 01/29/2020



Lot 3

0 2 4 6 8 16

Second Floor Plan

OAK CREEK CANYON

CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
Date 01/29/2020

Right

Left

Lot 3
Elevations

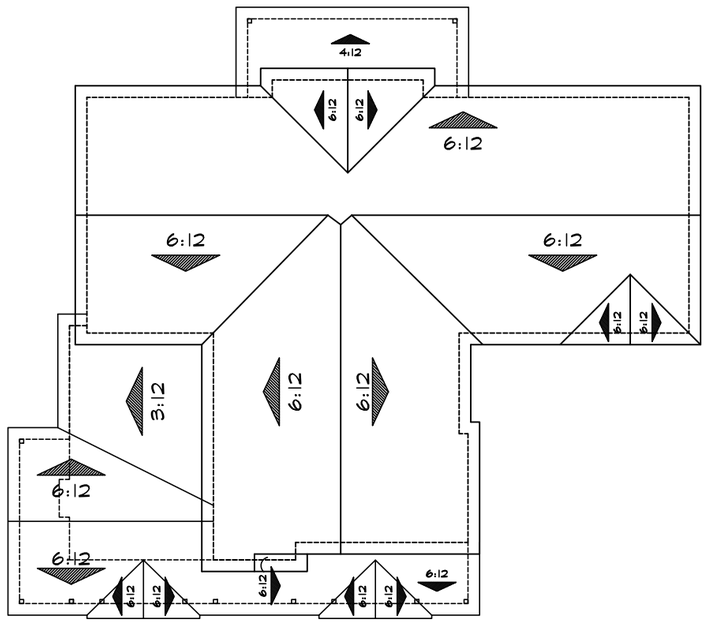
0 2 4 6 8 16

OAK CREEK CANYON

CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
D a t e 01/29/2020



Roof Plan 'A'

Rear

Lot 3
Elevation

0 2 4 6 8 16

OAK CREEK CANYON

CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
D a t e 01/29/2020

MATERIAL LEGEND

A FLAT CONCRETE TILE ROOFING
GABLE ROOFS
VERTICAL LAP SIDING
MOCK WOOD SHUTTERS
WOOD TRIM
WOOD CORBEL
DECORATIVE GABLE
ROLL-UP GARAGE DOORS
WITH WINDOW LITES
SIMULATED STONE VENEER

Front Elevation

0 2 4 6 8 16

Lot 4
OAK CREEK CANYON

CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
Date 01/29/2020

Lot 4

SQUARE FOOTAGE	
FIRST FLOOR	3,049 SF
TOTAL LIVING AREA	3,049 SF
GARAGE	704 SF
OUTDOOR LIVING	309 SF
PORCH	335 SF
FOOTPRINT	4,397 SF

0 2 4 6 8 16

First Floor Plan

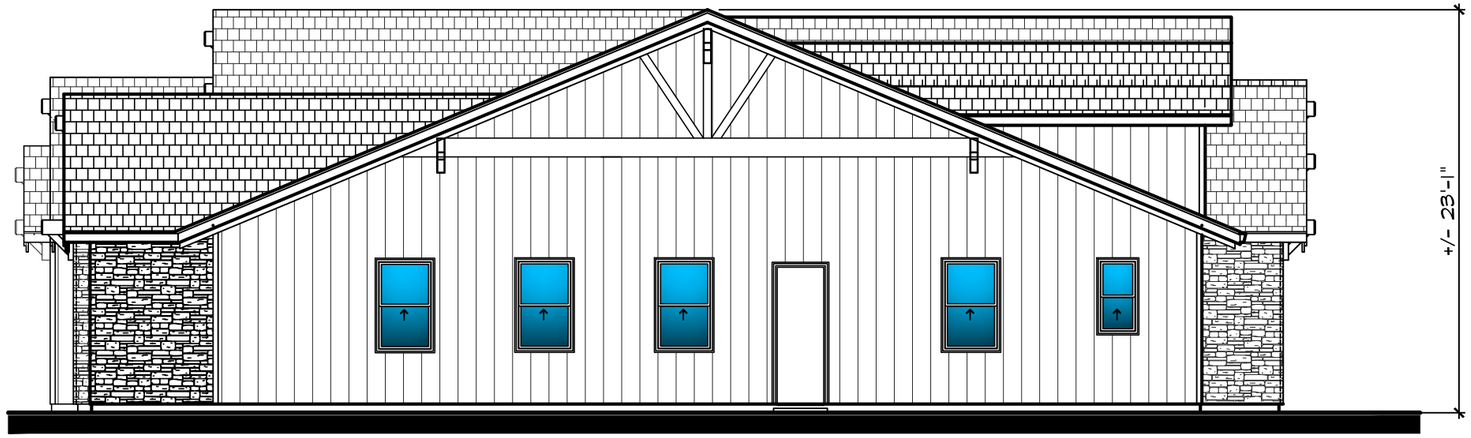
OAK CREEK CANYON

CLAYTON, CA

DISCOVERY DESIGN GROUP

Discovery Builders Inc.

Date 01/29/2020



Right

Left

Lot 4
Elevations

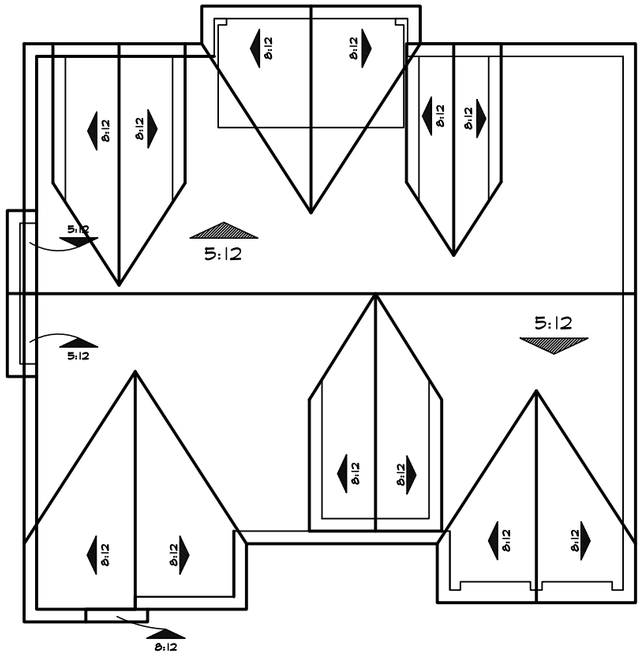
0 2 4 6 8 16

OAK CREEK CANYON

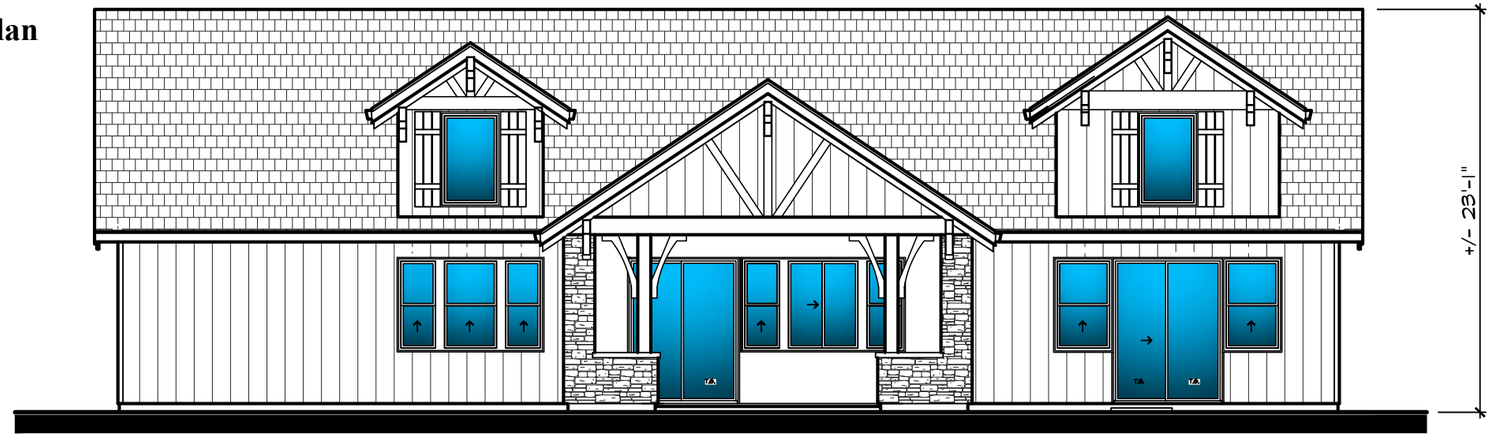
CLAYTON, CA

DISCOVERY
DESIGN
GROUP

Discovery Builders Inc.
Date 01/29/2020



Roof Plan



Rear

Lot 4
Elevation

0 2 4 6 8 16

OAK CREEK CANYON

CLAYTON, CA

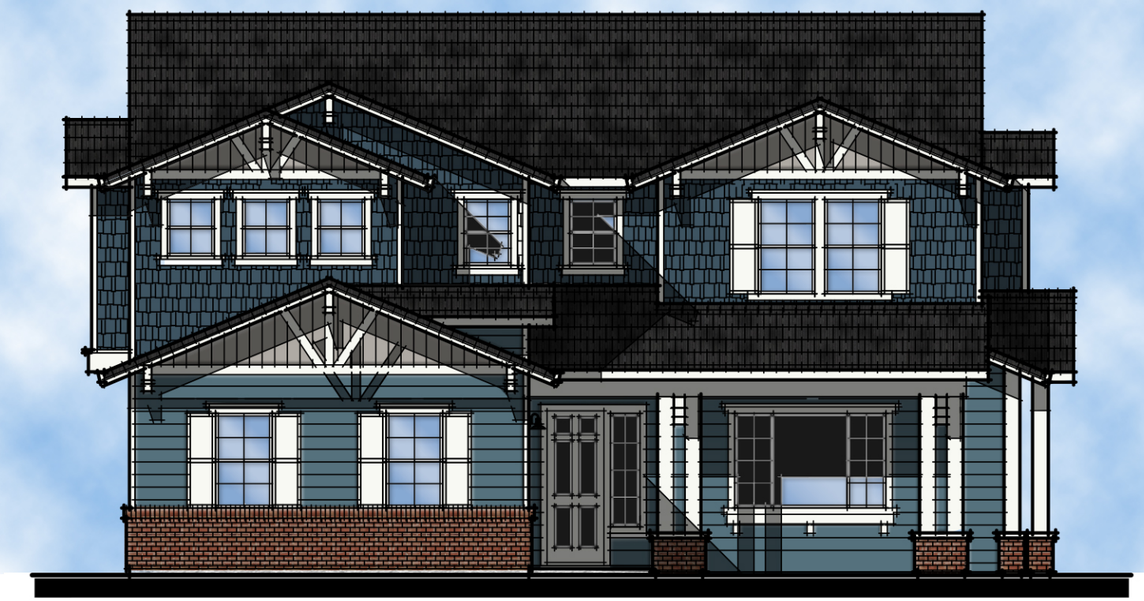
DISCOVERY
DESIGN
GROUP

Discovery Builders Inc.

D a t e 01/29/2020

MATERIAL LEGEND

FLAT CONCRETE TILE ROOFING
GABLE ROOFS
HORIZONTAL LAP SIDING
WOOD TRIM
WOOD CORBEL
WOOD SHINGLES
DECORATIVE GABLE
ROLL-UP GARAGE DOORS
WITH WINDOW LITES
SIMULATED BRICK VENEER



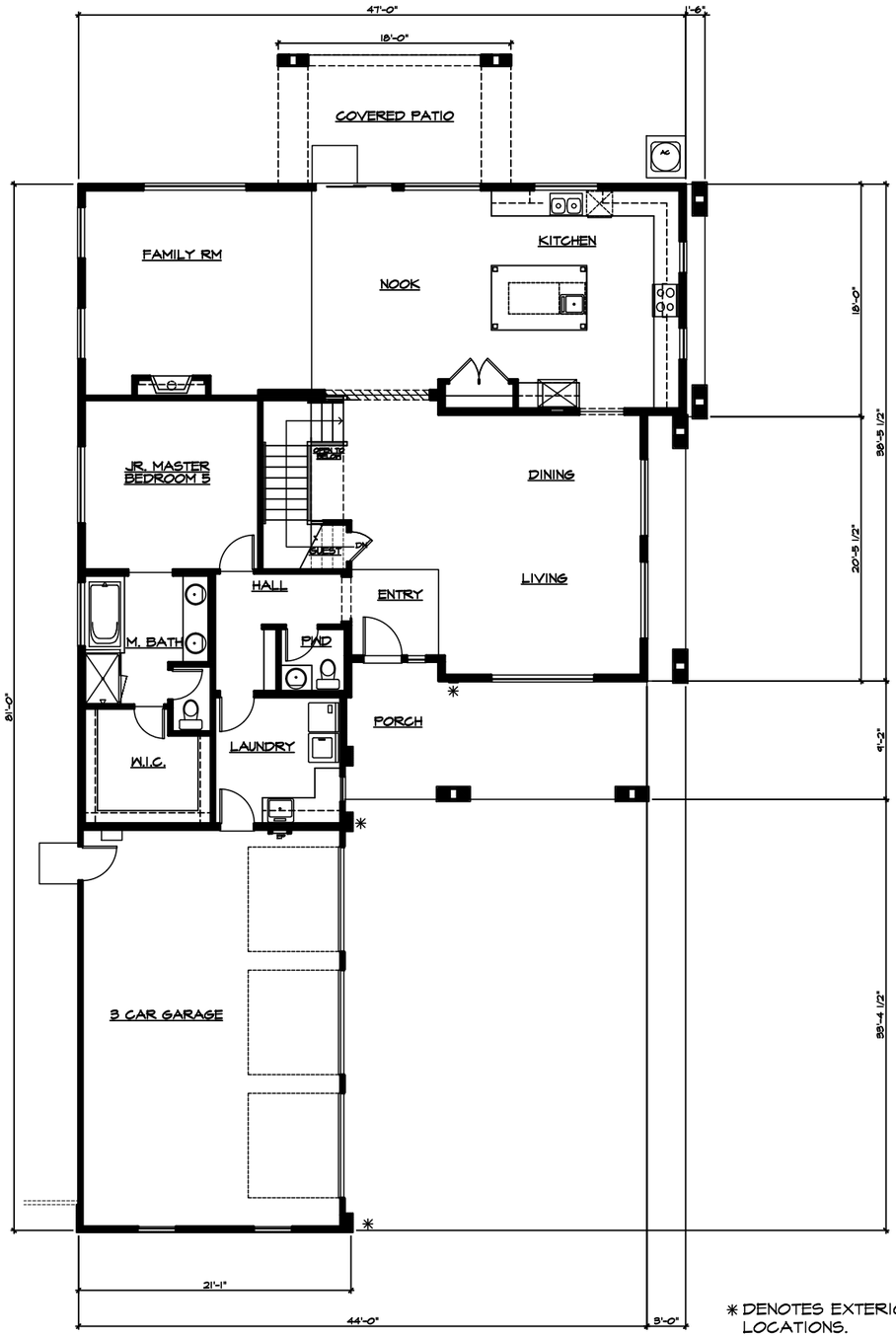
Front Elevation

0 2 4 6 8 16

Lot 5
OAK CREEK CANYON
CONCORD, CA

DISCOVERY
DESIGN
GROUP

Discovery Builders Inc.
Date 01/29/2020



✳ DENOTES EXTERIOR LIGHT LOCATIONS.

Lot 5

SQUARE FOOTAGE	
FIRST FLOOR	1,973 SF
SECOND FLOOR	2,004 SF
TOTAL LIVING AREA	3,977 SF
GARAGE	639 SF
PATIO	180 SF
PORCH	313 SF
FOOTPRINT	3,105 SF

0 2 4 6 8 16

First Floor Plan

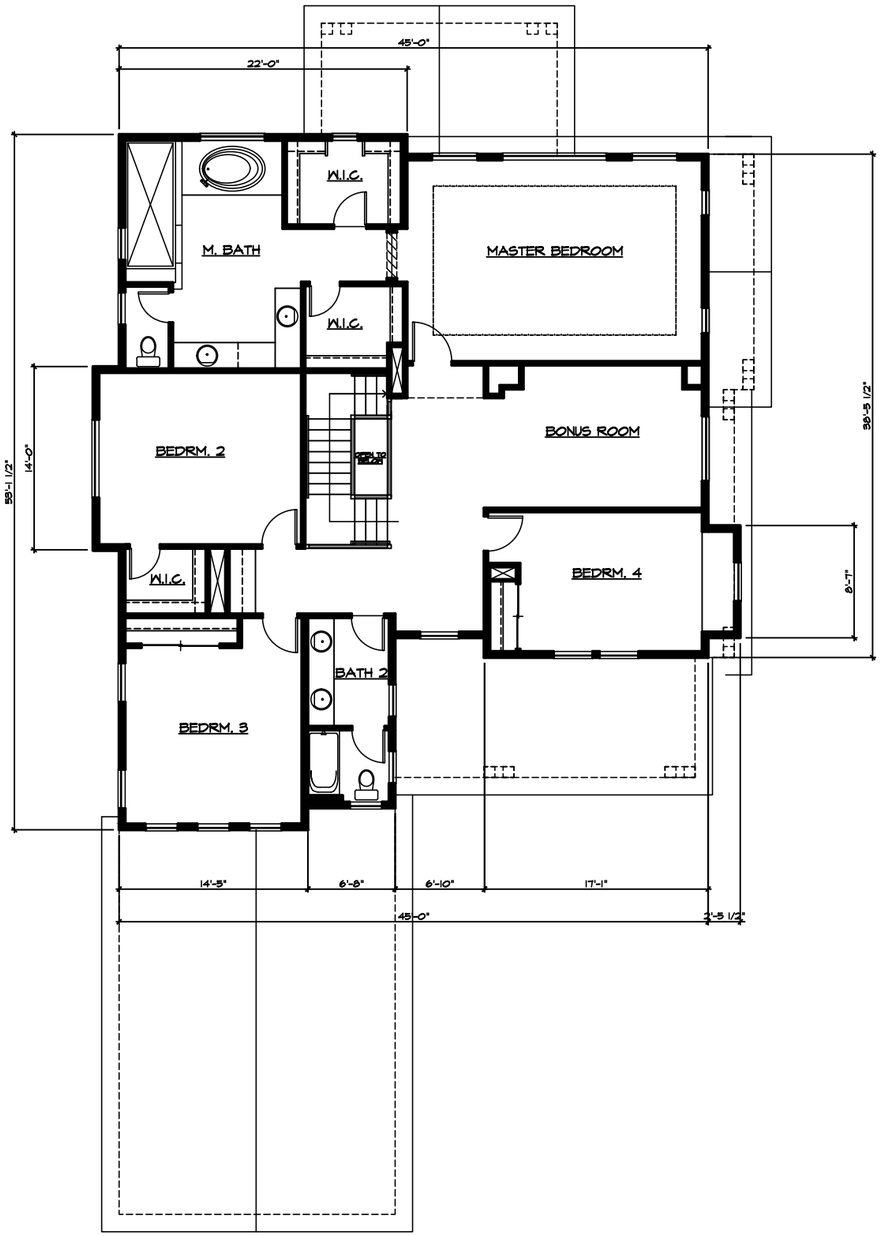
OAK CREEK CANYON

CLAYTON, CA

DISCOVERY DESIGN GROUP

West Coast Home Builders

Date 01/29/2020



Lot 5

0 2 4 6 8 16

Second Floor Plan

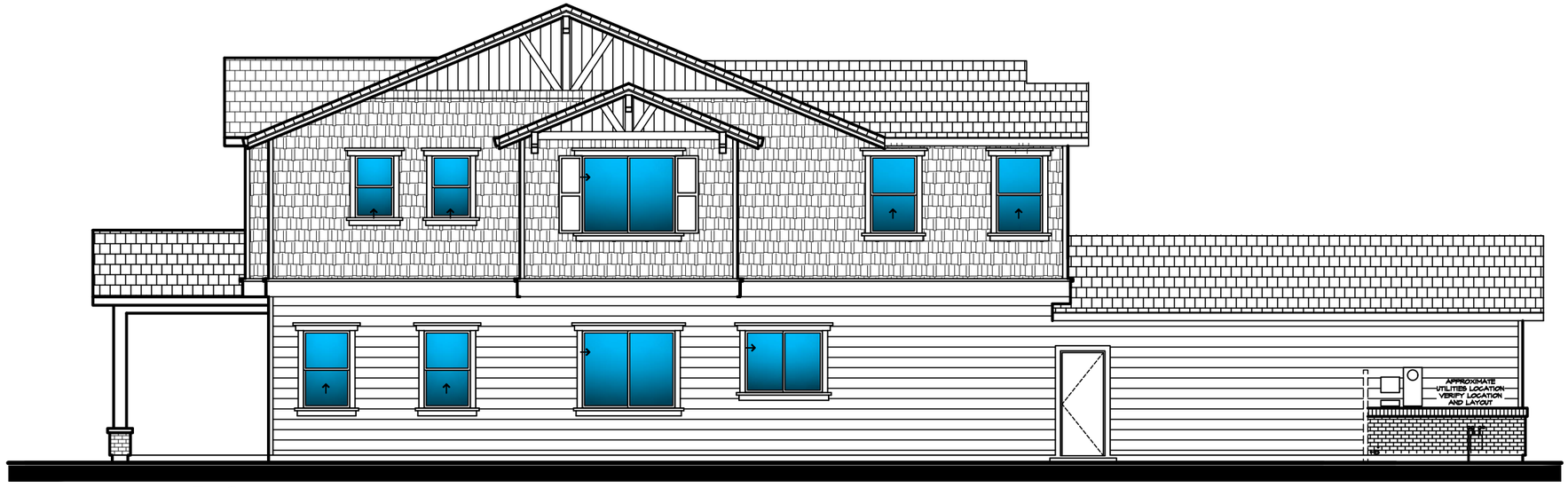
OAK CREEK CANYON

CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
D a t e 01/29/2020

Right



Left

Lot 5
Elevations

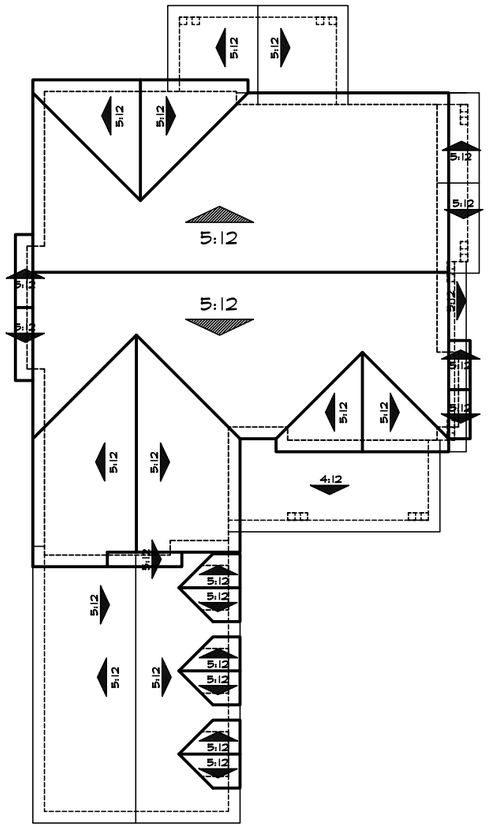
0 2 4 6 8 16

OAK CREEK CANYON

CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
D a t e 01/29/2020



Roof Plan

Rear

Lot 5
Elevation

0 2 4 6 8 16

OAK CREEK CANYON

CLAYTON, CA

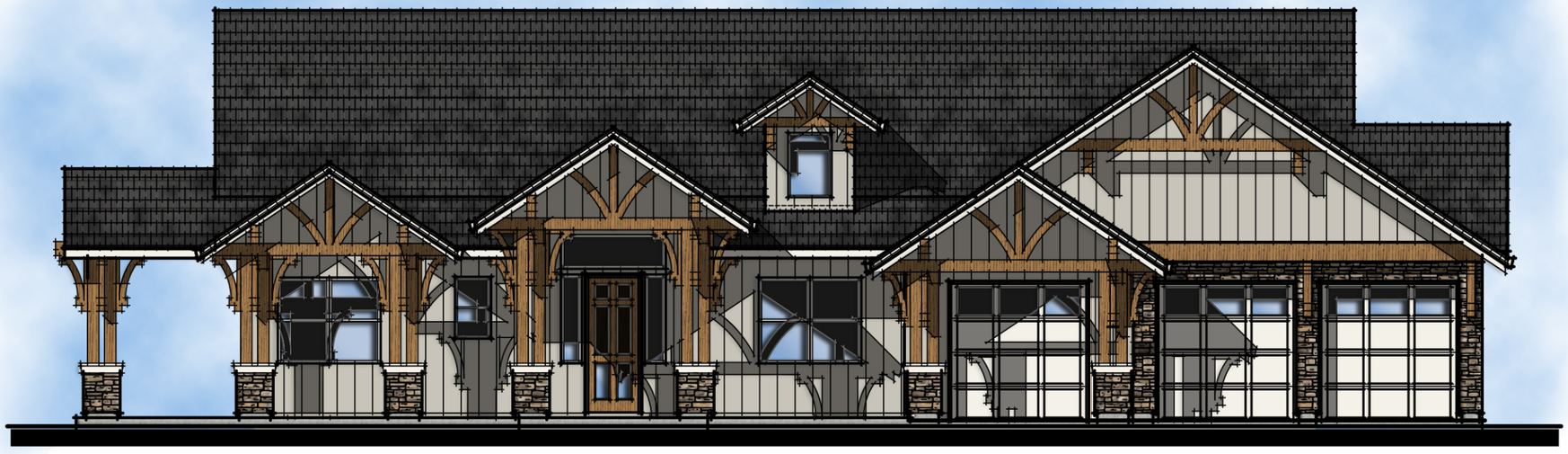
DISCOVERY
DESIGN
GROUP

West Coast Home Builders

D a t e 01/29/2020

MATERIAL LEGEND

FLAT CONCRETE TILE ROOFING
GABLE ROOFS
VERTICAL LAP SIDING
WOOD TRIM
WOOD CORBEL
DECORATIVE GABLE
ROLL-UP GARAGE DOORS
WITH WINDOW LITES
SIMULATED STONE VENEER



Front Elevation

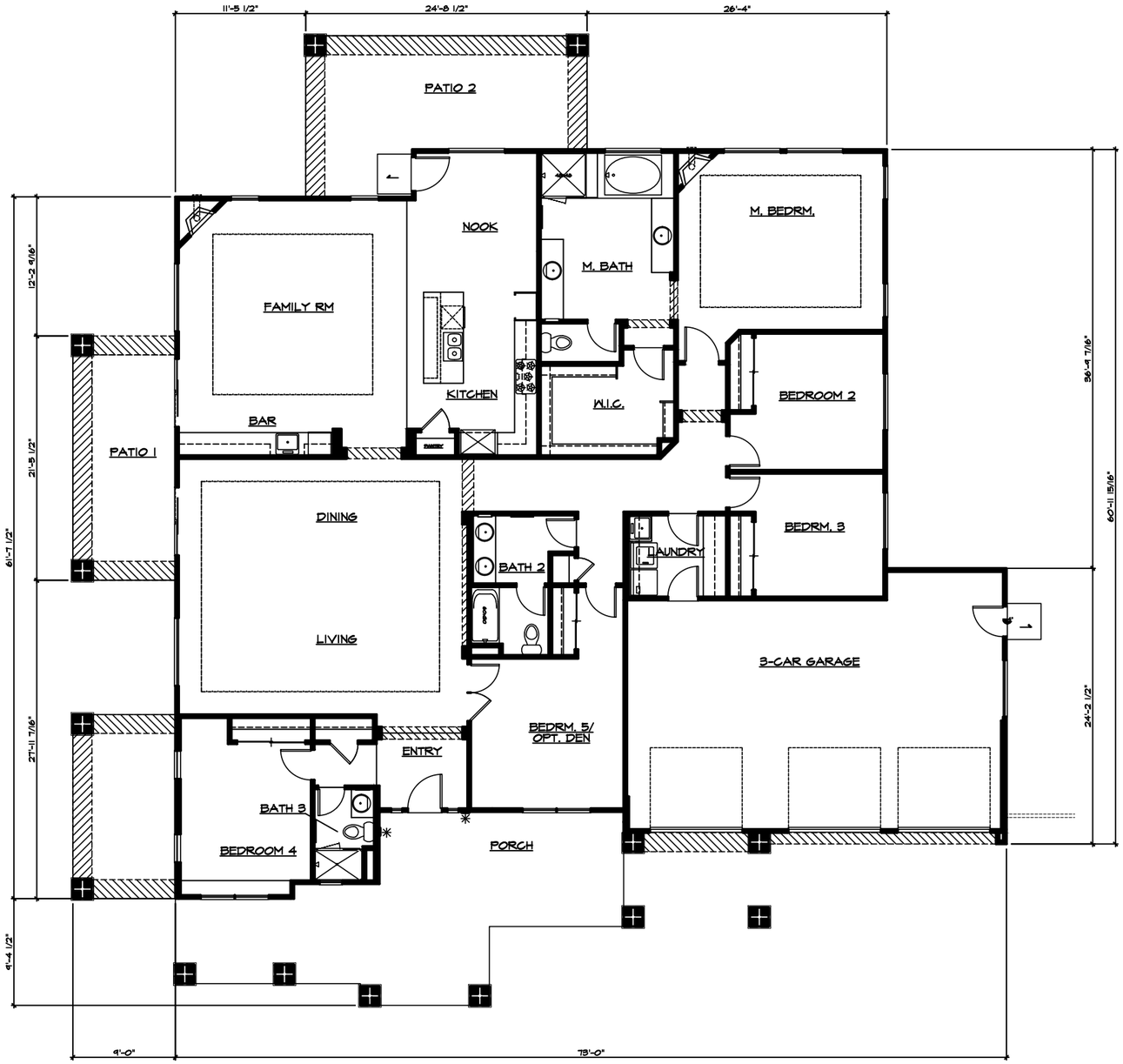
0 2 4 6 8 16

Lot 6
OAK CREEK CANYON

CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
Date 01/29/2020



* DENOTES EXTERIOR LIGHT LOCATIONS.

Lot 6

SQUARE FOOTAGE	
FIRST FLOOR	3,251 SF
TOTAL LIVING AREA	3,251 SF
GARAGE	711 SF
PATIO 1	193 SF
PATIO 2	285 SF
PORCH	575 SF
FOOTPRINT	5,015 SF

0 2 4 6 8 16

First Floor Plan

OAK CREEK CANYON

CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
Date 01/29/2020

Right

Left

Lot 6
Elevations

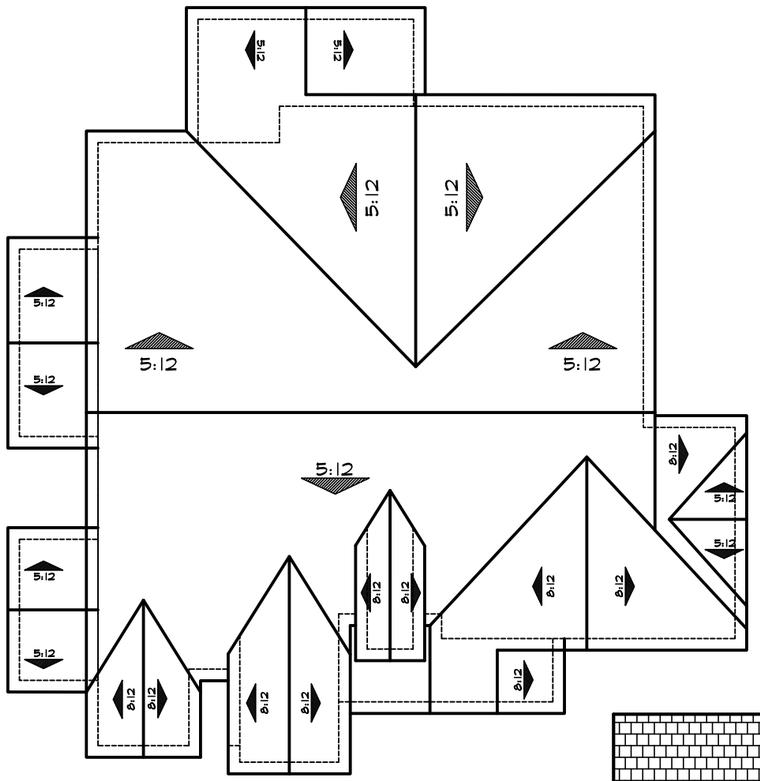
0 2 4 6 8 16

OAK CREEK CANYON

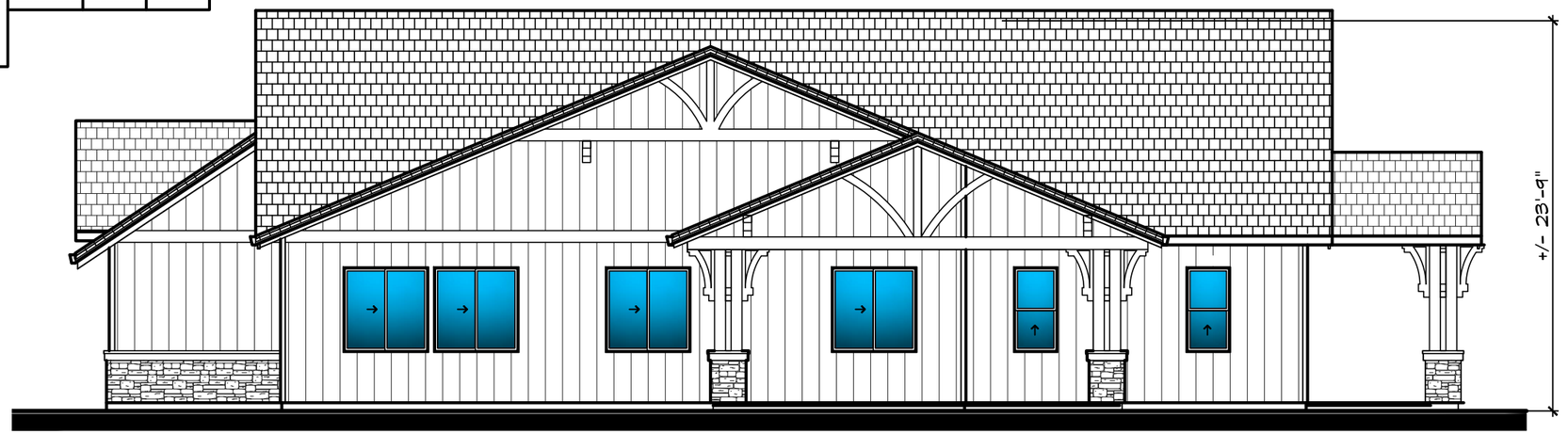
CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
Date 01/29/2020



Roof Plan



Rear

Lot 6
Elevation

0 2 4 6 8 16

OAK CREEK CANYON

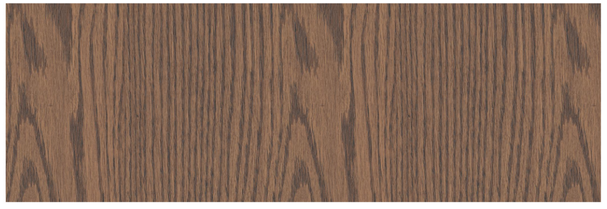
CLAYTON, CA

DISCOVERY
DESIGN
GROUP

West Coast Home Builders
Date 01/29/2020

SUBDIVISION: OAK CREEK CANYON

CLAYTON, CA

LOT NUMBER	FLAT ROOF	BODY & TRIM	FRONT DOOR, GARAGE DOOR, & COLUMNS	STONE
LOT 1	1FBCF1430 CHARCOAL BLEND 	KMW43 WHITEST WHITE	BRIARSMOKE 	FOG SOUTHERN LEDGESTONE 

LOT NUMBER	FLAT ROOF	BODY 1	BODY 2	TRIM & FRONT DOOR	BRICK
LOT 2	1FBCF1430 CHARCOAL BLEND 	KM5766-1 WHISPER RIDGE	KM5769-5 BACKCOUNTRY	KMW8-1 MARSHMALLOW	OLD EDISTO 

LOT NUMBER	FLAT ROOF	BODY 1	BODY 2	TRIM & RAILING	FRONT DOOR	STONE
LOT 3	1FBCF1430 CHARCOAL BLEND 	KM5828-2 BIG BAND	KM5825-3 NOT MY FAULT	KMW38-1 CRYSTAL BROOKE	159 SEQUOIA REDWOOD 	CHARDONNAY DRESSED FIELDSTONE 

ROOFING: BORAL CONCRETE TILE OR EQUIVALENT
STONE: BORAL CULTURED STONE/CULTURED BRICK EQUIVALENT
PAINT: KELLY MOORE OR EQUIVALENT
WOOD STAIN: VARATHANE OR EQUIVALENT

REVISED: 11/01/2019

SUBDIVISION: OAK CREEK CANYON

CLAYTON, CA

LOT NUMBER	FLAT ROOF	BODY 1	BODY 2	TRIM	SHUTTERS	FRONT DOOR	STONE
LOT 4	1FBCF1430 CHARCOAL BLEND 	KMW64-1 WHITE BLAZE	KM4868-3 PORCH SWING 	KMW57-1 CLOUD WHITE	KM4869-5 ROCKY CREEK 	407 CARBON 	WHITE OAK COUNTRY LEDGESTONE 

LOT NUMBER	FLAT ROOF	BODY 1	BODY 2	TRIM & FRONT DOOR	SHINGLES	BRICK
LOT 5	1FBCF1430 CHARCOAL BLEND 	KM5001-3 LILY POND BLUE 	KM5823-2 CITY TOWER 	KMW43 WHITEST WHITE	KM5002-5 DARK SECRET 	OLD GUIGNARD 

LOT NUMBER	FLAT ROOF	BODY	TRIM & GARAGE DOOR	FRONT DOOR & COLUMNS	STONE
LOT 6	1FBCF1430 CHARCOAL BLEND 	KM5827-1 UNION STATION 	KMW46-1 PICKET FENCE	CYPRESS 	CHARDONNAY COUNTRY LEDGESTONE 

ROOFING: BORAL CONCRETE TILE OR EQUIVALENT
STONE: BORAL CULTURED STONE/CULTURED BRICK EQUIVALENT
PAINT: KELLY MOORE OR EQUIVALENT
WOOD STAIN: VARATHANE OR EQUIVALENT

REVISED: 11/01/2019

SUBDIVISION: OAK CREEK CANYON

CLAYTON, CA

LOT 1

STYLE NO.: OL8600RSZ/T

STYLE NO.: OL8601RSZ/T

LOT 2

STYLE NO.: OL11102DWZ

STYLE NO.: OL11100DWZ

LOT 3

STYLE NO.: OL14402SBL

STYLE NO.: OL14403SBL

LIGHTING: FEISS COLLECTON OR EQUIVALENT

REVISED: 02/13/2020

SUBDIVISION: OAK CREEK CANYON

CLAYTON, CA

LOT 4

STYLE NO.: OL13201ANBZ

LOT 5

STYLE NO.: OL8600TRD/T

LOT 6

STYLE NO.: OL10601HTCP

LIGHTING: FEISS COLLECTON OR EQUIVALENT

REVISED: 02/13/2020

ATTACHMENT P LANDSCAPE AND FENCING

Preliminary Landscape Design

OAK CREEK CANYON

CITY OF CLAYTON
CONTRA COSTA COUNTY, CALIFORNIA

ABBREVIATIONS

PA	PLANTNG AREA
CJ	CONTROL JOINT
CDJ	COLD JOINT
EJ	EXPANSION JOINT
CL	CENTER LINE
TC	TOP OF CURB
TW	TOP OF WALL
FG	FINISH GRADE
FS	FINISH SURFACE
RE	RIM ELEVATION
IE	INVERT ELEVATION
TS	TOP OF STEP
BS	BOTTOM OF STEP
R	RADIUS
L	LENGTH
FFE	FINISH FLOOR ELEVATION
TYP.	TYPICAL
DIM. PT.	DIMENSION POINT
EQ.	EQUAL
HP	HIGH POINT
LP	LOW POINT
TC	TOP OF CURB
FC	FACE OF CURB
BC	BACK OF CURB
BSW	BACK OF SIDEWALK
(E)	EXISTING
SL	SLEEVE
PAE	PUBLIC ACCESS EASEMENT
ICP	INTERLOCKING CONCRETE PAVERS
STA	STATION POINT

This Project complies with applicable aspects of the State Water Efficiency Landscape Ordinance AB 1881. Planting and irrigation design features are in accordance with the efficient use of water in the landscape design plan. Drought restrictions in effect as of December 15, 2015 have been applied.

BY: _____ DATE: 3/10/2020

MICHAEL FOTHERINGHAM, LANDSCAPE ARCHITECT, CA #2481

Approvals

APPROVED:

_____
COMMUNITY DEVELOPMENT DIRECTOR DATE

_____
CITY ENGINEER DATE

_____
MAINTENANCE DEPARTMENT DATE

CONSTRUCTION NOTES:

THESE NOTES ARE PROVIDED IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS.

1. Owner: West Coast Home Builders, Inc. Contact: Kevin English at (925) 671-7711.

2. Landscape Contractor shall review all existing site conditions prior to submitting bids and prior to commencing installation. Bring any discrepancies or conflicts in field conditions that impede installation to the attention of the Owner.

3. Landscape Contractor shall notify Owner and City as required a minimum of 48 hours prior to beginning construction.

4. All work associated with these construction documents shall be installed in conformance with all applicable local codes and ordinances, by experienced workforce under the supervision of a licensed Landscape Contractor. Landscape Contractor shall obtain all necessary permits and pay all required fees as determined by Owner.

5. The developer shall maintain all landscaped areas, within and adjacent to the subdivision, both new and modified, for a period of 90 days after acceptance of of the subdivision improvements by the City Council. Prior to release of the Developer's maintenance responsibilities, all landscaped areas shall be inspected by representatives of the City Engineer and Maintenance Departments. This inspection shall include a water audit of the landscaped areas to identify any irrigation problems. The water audit shall be performed by City staff or contracted for by City staff and paid for by the Developer, at the City's sole discretion. All corrective measures shall be made as called for in the water audit and the punch list prepared by City staff and as-built plans, on reproducible mylars, shall be submitted to the City Engineer prior to the release of the Developer's responsibilities.

6. Landscape Contractor shall schedule regular site visits by City representatives and/or Owner throughout landscape construction, with a final site review and inspection required by the Owner prior to beginning the 90-day maintenance period.

7. Costs incurred due to repair, restoration or replacement of existing improvements which are not designated for removal which are damaged as a result of installation operations shall be the responsibility of the Landscape Contractor.

8. Landscape Contractor shall become familiar with site conditions and location of all new construction, and to coordinate irrigation work with other contractors in locating and installing pipe sleeves through walls and under paving, structures, etc.

9. Installation of these improvements shall be coordinated with installation of grading and drain system operations as shown on Civil Engineer's improvement plans, and with architectural plans.

10. All planting areas shall drain to area drains at a minimum of one and one-half (1.5) percent. Slopes within five feet of buildings shall drain a minimum of three-to-five (3-5) percent away from building walls and foundations. Landscape Contractor shall adjust drain heights, add drains or adjust minimum surface gradients, if needed, to ensure adequate drainage.

11. Piping, sleeves, valves, and other irrigation equipment shall be installed in parkway strip planting areas. Avoid any conflicts between the sprinkler system, planting, underground utilities and architectural features. IRRIGATION EQUIPMENT SHALL NOT BE INSTALLED OR WATER ALLOWED TO DRAIN INTO A NON-IRRIGATED ZONE THREE (3) FEET WIDE IMMEDIATELY ADJACENT TO ANY BUILDING.

12. Do not install the irrigation system when field obstructions, grade differences or dimension discrepancies exist that might conflict with prudent practice and engineering. Bring such conditions to the attention of the Owner. In the event this notification is not performed, the Landscape Contractor shall assume full responsibility for any revisions necessary.

13. Installation of all irrigation and landscaping shall be performed by a licensed contractor. Open trench inspection of the irrigation installation in City right-of-way (and areas to be maintained by the City or its contractor) is subject to approval of the Maintenance Department. Prior to the final inspection by the Maintenance Department, the installation shall be approved by the landscape architect.

14. Notify Owner of any aspects of layout which will not provide sufficient water coverage and do not proceed until notified.

15. Flush and adjust all sprinkler heads for optimum performance and to prevent overspray onto buildings. Select appropriate degree of arc to fit existing conditions and throttle the flow control at each valve or head to obtain optimum operating pressure and coverage.

16. Landscape Contractor to verify water pressure prior to installation and confirm minimum operating pressure shown on the plans.

17. Landscape Contractor shall notify all local jurisdictions as required to schedule trenching, temporary road closings, inspections, and testing of installed backflow prevention device.

18. Prior to trenching, locate underground utilities by calling Underground Service Alert at 1-800-227-2600.

19. Owner to verify with Project structural engineer the structural reinforcement of all slab-on-grade concrete paving.

20. Wood members for fences shall be per details. Bottom and sides of wood posts shall be treated with non-toxic wood preservative to six (6) inches above Finish Grades.

19. Use galvanized metal nails, flashing and coated screws and bolts for all wood connections.

GRADING/DRAIN SYSTEM NOTES:

1. It is the intent of the project to achieve a balance of cut and fill. Notify Owner of fine grading conditions that may create an unbalanced situation.

2. Preparation of subbase under all paving shall be per soils engineer's geotechnical report.

3. All fine grading and drain systems shall be installed in accordance with the soils engineer's geotechnical report and addenda prepared for the site.

4. All newly-graded areas in or adjacent to the public right-of-way shall not exceed a 3:1 (horizontal : vertical) ratio.

PLANTING NOTES:

1. Unless otherwise specified, structural improvements and paving shall be installed prior to planting.

2. Landscape Contractor shall be responsible for locating and staking existing sewer, water, cable, telephone and other utilities above or below grade that might be in conflict with planting operations. Notify Owner regarding tree locations affected by utilities.

3. All work related to irrigation system installation and testing shall be performed prior to planting operations.

4. Plant Schedule shall be used as a guideline only. Contractor shall verify sizes, quantities and availability by plan check and supply sufficient quantities to fulfill design intent of Construction Documents.

5. Final locations of plant materials on site shall be reviewed by the Owner's authorized representative prior to installation. Plant trees and shrubs faced to provide best appearance. Care shall be taken to space plant material evenly to allow optimum growth and aesthetics.

6. Trees and shrubs shall not be planted in drainage swales, in conflict with structures or to block irrigation patterns.

7. Shrub and ground cover areas on slopes less than 20% shall be mulched with a 3-inch thick layer of medium chip walk-on fir bark. Shrub and ground cover areas on slopes greater than 20% shall be mulched with a 3-inch thick layer of shredded fir bark (not gorilla hair). Contractor to submit samples.

8. Ground covers shall be planted under trees and shrubs unless otherwise indicated on the plans.

9. Trees shall be planted a minimum of three (3) feet from walls, fences, paving, mowstrips, curbs and irrigation heads. Notify Owner or Landscape Architect if soil conditions in plant pits allow water to stand beyond the following limits: 6 inches in bottom of tree pit should drain completely over a 12-hour period. If water does not drain, special provisions for pipe drain, gravel sumps, or drywells will be required to provide adequate tree pit drainage.

10. All trees planted within EIGHT (8) feet of paving or curbs, including in-tract street trees, shall be planted with a root guard as approved by City. See Planting Details for panel application.

11. All boxed plant material may be approved by the Owner/City at the place of origin prior to delivery.

12. Plant materials shall be erect after planting, staked or guyed as detailed. Remove nursery stakes but retain nursery labels until end of maintenance period. Vines shall be installed with vine runners espalliered to adjacent structure. Submit fasterner information to Owner for approval prior to installation.

13. All trees shall be planted a minimum of five (5) feet (or per local code) from fire hydrants, storm drain, sanitary sewer and other underground utilities. Trees shall be planted a minimum of three (3) feet from curbs. Trees shall be planted a minimum of 15 feet from street light poles and a minimum of 45 feet from the point of intersection of corner curves.

14. All plant material and irrigation ultimately to be maintained by the City Maintenance Department or staff contracted by the City:
   a. Shall be installed prior to occupancy of the first residence.
   b. Is subject to inspection by the Maintenance Department and must be guaranteed for one year from the date of acceptance of the subdivision improvements by the City Council.

15. Provide to Owner a soil fertility report prior to applying soil amendments. Soil amendments shall be properly applied and worked into the soil according to the soil fertility report, and prior to ground cover installation. Use the following soil amendments in all planting areas to a depth of 12 inches, and tree pit backfill mix
for bidding purposes only:

1/3 cubic yard nitrogen-stabilized organic amendment; 2/3 cubic yard well-pulverized native site soil; other amendments and fertilizers as follows (amounts per cubic yard): 17 lbs. Gro Power Plus, 1 lb. Iron Sulfate, 10 lbs. Agricultural Gypsum.

16. All back flow devices shall be screened with landscaping.

SEE CITY SPECIFICATIONS FOR ALL LANDSCAPE IMPROVEMENTS WITHIN THE PUBLIC R.O.W. OF THIS PROJECT.

Project Directory

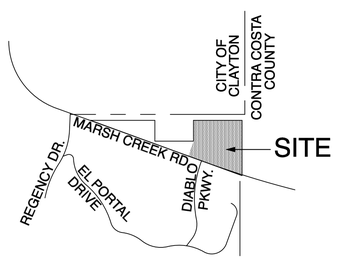
Landscape Architects:

M D FOTHERINGHAM, LANDSCAPE ARCHITECTS, INC.
1700 North Broadway, Suite 390
Walnut Creek, CA 94596
T/F: 925-939-8292
mdf@mdfotheringham.com

Civil Engineers:

Isakson & Assoc. Inc.
2255 Ygnacio Valley Rd
Walnut Creek, CA 94598
Telephone: 925-937-9333 Fax: 925-937-7926

Vicinity Map



N.T.S.

Sheet Index

M D FOTHERINGHAM

LANDSCAPE ARCHITECTS
1700 North Broadway, Suite 390
Walnut Creek, CA 94596
T: 925-939-8292
F: 925-939-8292
E: info@mdfotheringham.com

License Stamp

LICENSED LANDSCAPE ARCHITECT
MICHAEL D. FOTHERINGHAM
EXPIRATION 10/31/20
RENEWAL DATE
DATE #2481
STATE OF CALIFORNIA

Consultants

Project

OAK CREEK CANYON
SUBDIVISION 6826

City of Clayton,
Contra Costa County

Client

WEST COAST HOME BUILDERS, INC.
4021 PORT CHICAGO HIGHWAY
CONCORD, CALIFORNIA

Sheet Title

COVER

VTM SUBMITTAL
NOT FOR CONSTRUCTION

Scale

Designed by
MDF / CGW

Drawn by
MDF / CGW

Checked by
MDF

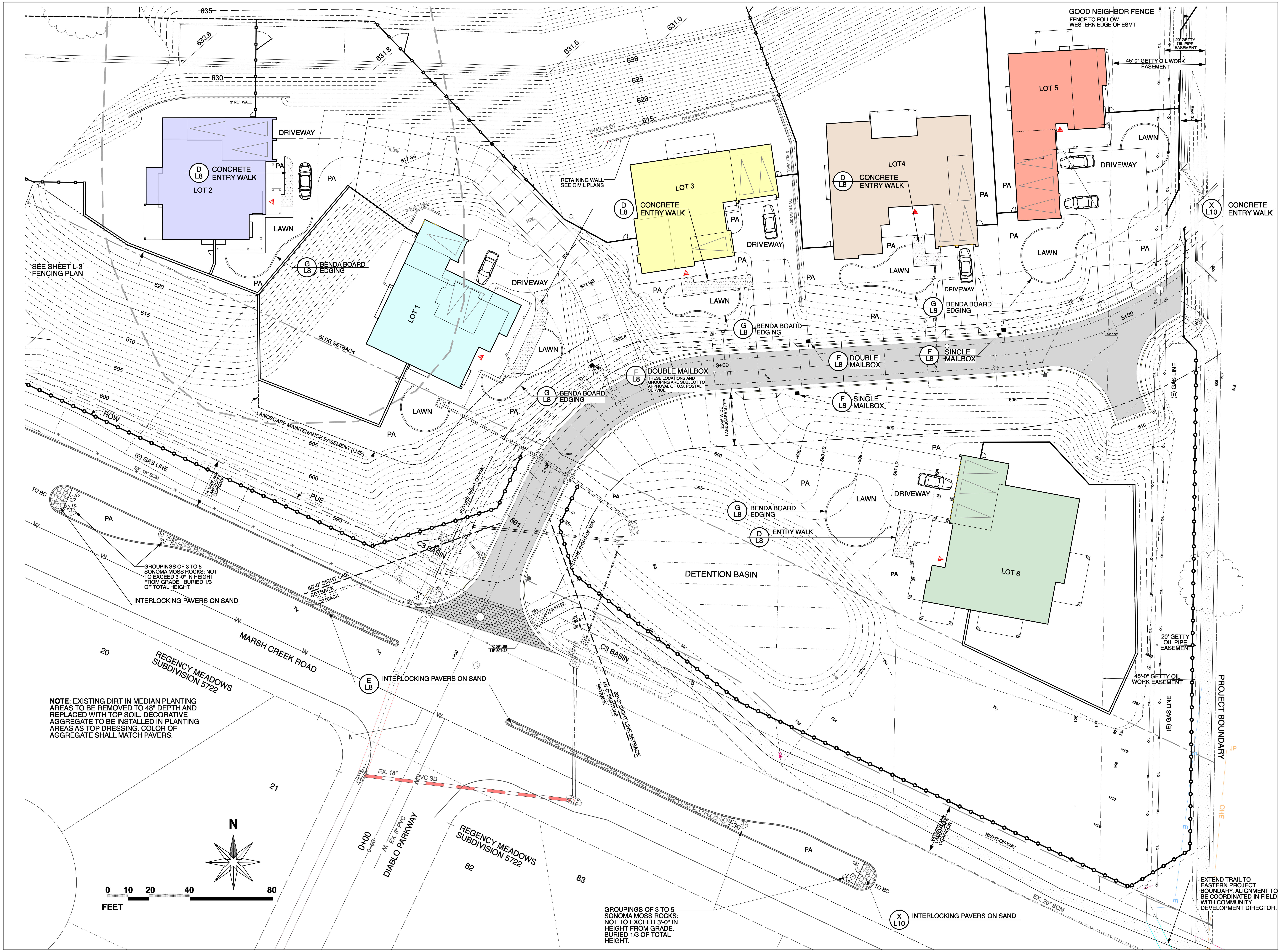
Revisions

△

Plot Stamp
Date: **Tuesday, March 10, 2020**
File name: **OakCreekVTMpreland v2020.vwx**

Project Number
22110

Sheet Number
L-1


GOOD NEIGHBOR FENCE
FENCE TO FOLLOW WESTERN EDGE OF ESMT
20' GETTY OIL PIPE EASEMENT
45'-0" GETTY OIL WORK EASEMENT
LOT 5
LOT 4
LOT 3
LOT 2
LOT 1
LOT 6
DRIVEWAY
LAWN
PA
CONCRETE ENTRY WALK
RETAINING WALL SEE CIVIL PLANS
SEE SHEET L-3 FENCING PLAN
BENDA BOARD EDGING
DOUBLE MAILBOX
THESE LOCATIONS AND GROUPING ARE SUBJECT TO APPROVAL OF U.S. POSTAL SERVICE
SINGLE MAILBOX
BLDG SETBACK
LANDSCAPE MAINTENANCE EASEMENT (LME)
ROW
(E) GAS LINE
PUE
FUTURE RIGHT-OF-WAY
C3 BASIN
DETENTION BASIN
ENTRY WALK
50'-0" SIGHT LINE SETBACK
GROUPINGS OF 3 TO 5 SONOMA MOSS ROCKS: NOT TO EXCEED 3'-0" IN HEIGHT FROM GRADE. BURIED 1/3 OF TOTAL HEIGHT.
INTERLOCKING PAVERS ON SAND
MARSH CREEK ROAD
REGENCY MEADOWS SUBDIVISION 5722
DIABLO PARKWAY
EX. 18" PVC SD
EX. 20" SCM
RIGHT-OF-WAY
PROJECT BOUNDARY
EXTEND TRAIL TO EASTERN PROJECT BOUNDARY. ALIGNMENT TO BE COORDINATED IN FIELD WITH COMMUNITY DEVELOPMENT DIRECTOR.
TO BC
NOTE: EXISTING DIRT IN MEDIAN PLANTING AREAS TO BE REMOVED TO 48" DEPTH AND REPLACED WITH TOP SOIL. DECORATIVE AGGREGATE TO BE INSTALLED IN PLANTING AREAS AS TOP DRESSING. COLOR OF AGGREGATE SHALL MATCH PAVERS.
N
0 10 20 40 80
FEET

M D FOTHERINGHAM
LANDSCAPE ARCHITECTS

1700 North Broadway, Suite 390
Walnut Creek, CA 94596
T: 925-939-8292
F: 925-939-8292
E: info@mdfotheringham.com

License Stamp

LICENSED LANDSCAPE ARCHITECT MICHAEL D. FOTHERINGHAM 10/31/20 #2481 STATE OF CALIFORNIA

Consultants

Project

OAK CREEK CANYON
SUBDIVISION 6826

City of Clayton, Contra Costa County

Client

WEST COAST HOME BUILDERS, INC.
4021 PORT CHICAGO HIGHWAY
CONCORD, CALIFORNIA

Sheet Title

LAYOUT PLAN

VTM SUBMITTAL
NOT FOR CONSTRUCTION

Scale
1" = 20'-0"

Designed by
MDF / CGW

Drawn by
MDF / CGW

Checked by
MDF

Revisions

Plot Stamp
Date: Tuesday, March 10, 2020
File name: OakCreekVTMpreland v2020.vwx

Project Number
22110

Sheet Number
L-2

NOTES:
1. ALL FENCING LOCATED ON UPSLOPE PORTIONS OF LOTS 2-5 SHALL BE OPEN WIRE FENCING. THE ONLY EXCEPTION IS THE EAST SIDE OF LOT 5, WHERE GOOD NEIGHBOR FENCING IS ALLOWED UP TO DRAINAGE BENCH.

2. ALL FENCING ON LOTS 1 AND 2 SHALL BE SETBACK AT LEAST 50'-0" FROM EDGE OF MARSH CREEK ROAD RIGHT-OF-WAY

A L9 WIRE OPEN SPACE FENCE

A L9 CATTLE GATE IN WIRE OPEN SPACE FENCE

C L8 OPEN SPACE FENCE

A L8 GOOD NEIGHBOR FENCE

B L8 SPLIT VIEW FENCE

H L8 SPLIT RAIL FENCE

9'-0" WIDE ACCESS LOCKABLE GATE ACROSS DRAINAGE EASEMENT IN REAR YARD (PER COA 36)

EX. TEXACO OIL PIPE

EX. TREE

PROJECT BOUNDARY

C.C.C.W.D.

190'-6"± WIRE FENCE DIM.

EX. C.C.C.W.D. EASEMENT

EX. MAINTENANCE ROAD

68'-3"± FENCE DIM.

160'±

98'-3"± FENCE DIM.

EX. SLOPE EASEMENT

206'-6"± OPEN SPACE FENCE DIM.

121'-0"± WIRE OPEN SPACE FENCE

154'-6"± OPEN SPACE FENCE DIM.

59'-0"± OPEN SPACE FENCE

37'-0"± GOOD NEIGHBOR FENCE

77'-0"± GOOD NEIGHBOR FENCE

RETAINING WALLS - SEE CIVIL

RETAINING WALL - SEE CIVIL

LOT 1

LOT 2

LOT 3

LOT4

LOT 5

LOT 6

BLDG SETBACK

50'-0" MIN. FENCING SETBACK FROM MARSH CREEK R.O.W. FOR LOTS 1 AND 2

50'-0" SIGHTLINE SETBACK

P.U.E.

ROW / PROJECT BOUNDARY

W. MARSH CREEK ROAD

REGENCY MEADOWS SUBDIVISION 5722

DIABLO PARKWAY

20' GETTY OIL PIPE EASEMENT

45'-0" GETTY OIL WORK EASEMENT

(E) GAS LINE

OHE

RIGHT-OF-WAY

N

0 15 30 60
FEET

M D FOTHERINGHAM
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MICHAEL D. FOTHERINGHAM
SIGNATURE
10/31/20
RENEWAL DATE
STATE OF CALIFORNIA
#2481

Consultants

Project

OAK CREEK CANYON
SUBDIVISION 6826

City of Clayton,
Contra Costa County

Client

WEST COAST HOME BUILDERS, INC.
4021 PORT CHICAGO HIGHWAY
CONCORD, CALIFORNIA

Sheet Title

FENCING PLAN

VTM SUBMITTAL
NOT FOR CONSTRUCTION

Scale
1" = 30'-0"

Designed by
MDF / CGW

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MDF / CGW

Checked by
MDF

Revisions

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22110

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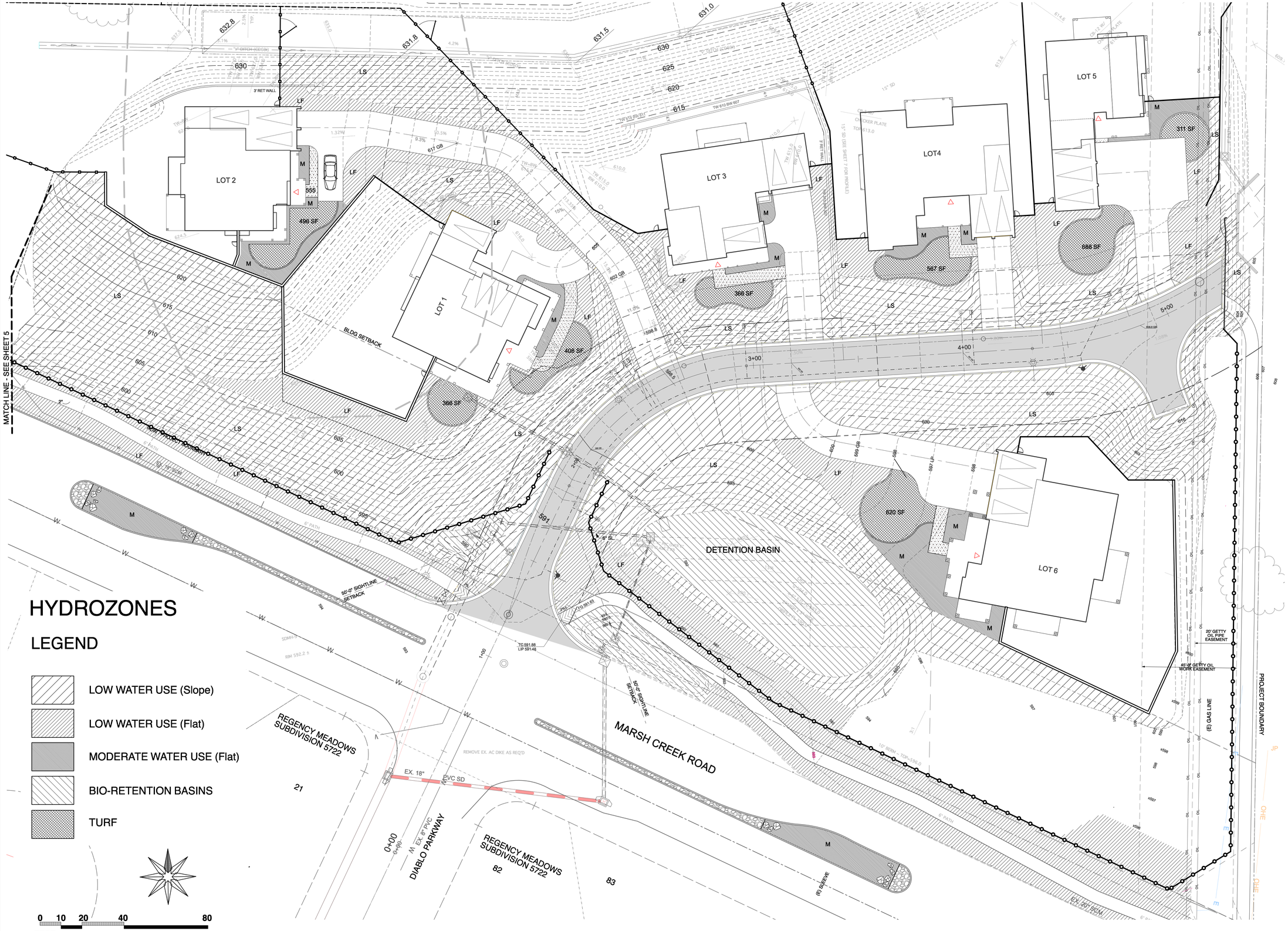
L-3



HYDROZONES

LEGEND

- LOW WATER USE (Slope)
- LOW WATER USE (Flat)
- MODERATE WATER USE (Flat)
- BIO-RETENTION BASINS
- TURF

0 10 20 40 80
FEET

M D FOTHERINGHAM

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MICHAEL D. FOTHERINGHAM
10/31/20
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STATE OF CALIFORNIA

Consultants

Project

OAK CREEK CANYON
SUBDIVISION 6826

City of Clayton,
Contra Costa County

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WEST COAST HOME BUILDERS, INC.
4021 PORT CHICAGO HIGHWAY
CONCORD, CALIFORNIA

Sheet Title

HYDROZONE PLAN 1

VTM SUBMITTAL
NOT FOR CONSTRUCTION

Scale
1" = 20'-0"

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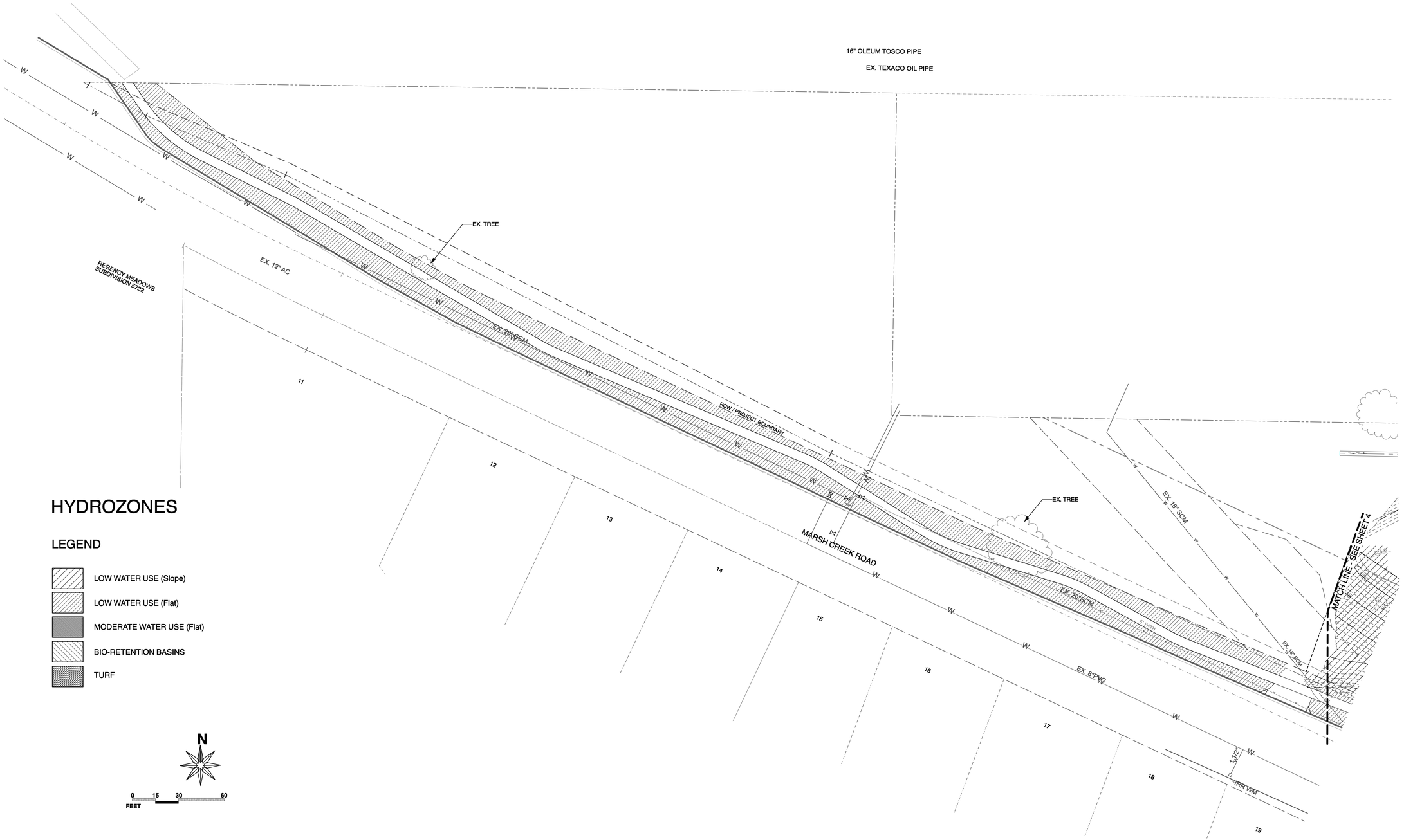

HYDROZONES

LEGEND

- LOW WATER USE (Slope)
- LOW WATER USE (Flat)
- MODERATE WATER USE (Flat)
- BIO-RETENTION BASINS
- TURF

N

0 15 30 60
FEET

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OAK CREEK CANYON
SUBDIVISION 6826

City of Clayton,
Contra Costa County

Client

WEST COAST HOME BUILDERS, INC.
4021 PORT CHICAGO HIGHWAY
CONCORD, CALIFORNIA

Sheet Title

HYDROZONE PLAN 2

VTM SUBMITTAL
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22110

Sheet Number
L-5

NOTES:

1. TREES SHALL BE PLANTED AT LEAST 10'-0" FROM GAS, PUBLIC WATER, SEWER AND STORM DRAINS, UNLESS CLOSER LOCATION IS APPROVED BY THE CITY.

2. ALL TREES SHALL BE PLANTED AT LEAST 10 FEET FROM ANY OIL PIPELINE, UNLESS A CLOSER LOCATION IS APPROVED BY PIPELINE EASEMENT HOLDER AND OPERATOR.

M D FOTHERINGHAM

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SUBDIVISION 6826

City of Clayton,
Contra Costa County

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WEST COAST HOME BUILDERS, INC.
4021 PORT CHICAGO HIGHWAY
CONCORD, CALIFORNIA

Sheet Title

PLANTING PLAN 1

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22110

Sheet Number
L-6

FLOWERING SEED MIX

19,570± SF

NON-IRRIGATED HYDROSEEDED FOR AREAS WITH SLOPES LESS THAN 10% - SEE PLANS

COMMON NAME / *SCIENTIFIC NAME*	APPLICATION RATE (LBS./ACRE)	MINIMUM % PURITY/ % GERMINATION
CALIFORNIA POPPY / *ESCHSCHOLZIA CALIFORNICA*	9.0	98/75
CHICK LUPINE / *LUPINUS MICROCARPUS*	8.0	98/70
SUCCULENT ANNUAL LUPINE / *LUPINUS SUCCULENTUS*	11.0	98/70
STERILE WHEAT GRASS / *ELYMUS X TRITICUM*	10.0	95/70
FESCUE / *FESTUCA MICROSTACHYS*	3.0	95/70
CREEPING WILD RYE / *LEYMUS TRITICOIDES*	2.0	95/80
TOTAL LBS. PER ACRE	43.0	

PLANT SCHEDULE

SYMBOL	BOTANICAL NAMES	COMMON NAMES	PLANTING SIZE	EXPOSURE	WATER DEMAND	O. C. SPACING
TREES						
T1	Koelreuteria bipinnata	Golden Chain Tree	24" Box	SW	Moderate	See Plan
T2	Lagerstroemia X. 'Muskogee'	Crape Myrtle	24" Box	SW	Low	See Plan
T3	Carpinus b. 'Fastigiata'	Euorpean Hornbean	24" Box	SW	Moderate	See Plan
T4	Pistacia chinensis	Chinese Pistache	24" Box	SW	Low	See Plan
T5	Podocarpus macrophyllus	Yew Pine	24" Box	SW	Moderate	See Plan
T6	Quercus agrifolia	Coast Live Oak	24" Box	SW	Low	See Plan
T7	Quercus lobata	Valley Oak	24" Box	SW	Low	See Plan
SHRUBS						
S1	Arbutus unedo 'Elfin King'	Dwarf Strawberry Tree	5 Gallon	SW/NE	Low	6 FT. O.C.
S2	Acca sellowiana	Pineapple Guava	5 Gallon	SW/NE	Low	7 FT. O.C.
S3	Arctostaphylos e. 'Carmel Sur'	Carmel Sur Manzanita	5 Gallon	SW	Low	8 FT. O.C.
S4	Cercis occidentalis	Western Redbud	5 Gallon	SW	Moderate	10 FT. O.C.
S5	Cistus laurifolius	Rockrose	5 Gallon	SW	Low	5 FT. O.C.
S6	Cistus x purpureus	Orchid Rockrose	1 Gallon	SW	Low	4 FT. O.C.
S7	Coleonema pulchrum 'Sunset Gold'	Pink Breath of Heaven	1 Gallon	SW/NE	Moderate	4 FT. O.C.
S8	Correa pulchella 'Orange Flame'	Australian Fuchsia	5 Gallon	NE	Moderate	7 FT. O.C.
S9	Ceanothus 'Yankee Point'	Spreading California Lilac	5 Gallon	SW	Low	8 FT. O.C.
S10	Rosa 'Red Flower Carpet'	Red Ground Cover Rose	5 Gallon	SW/NE	Moderate	4 FT. O.C.
S11	Hemerocallis hybrids	Daylily (Orange)	1 Gallon	NE	Moderate	2 FT. O.C.
S12	Heteromeles arbutifolia	Toyon	5 Gallon	SW/NE	Low	10 FT. O.C.
S13	Lagerstroemia 'Zuni'	Dwarf Crape Myrtle	5 Gallon	SW	Low	8 FT. O.C.
S14	Lantana 'Dwarf Yellow' or 'Gold Rush'	Yellow Flowering Lantana	1 Gallon	SW	Low	4 FT. O.C.
S15	Lavandula a. 'Munstead'	Dwarf English Lavander	1 Gallon	SW	Low	2 FT. O.C.
S16	Moraea iridioides (Dietes iridioides)	Fortnight Lily	1 Gallon	SW/NE	Low	3 FT. O.C.
S17	Myrtus communis 'Compacta'	Dwarf Myrtle	1 Gallon	SW/NE	Low	3 FT. O.C.
S18	Nandina domestica 'Fire Power'	Heavenly Bamboo	1 Gallon	SW/NE	Low	2 FT. O.C.
S19	Nandina domestica 'Moonbay'	Heavenly Bamboo	1 Gallon	SW/NE	Low	2.5 FT. O.C.
S20	Pittosporum tobira 'Variegata'	Tobira	5 Gallon	SW/NE	Low	6 FT. O.C.
S21	Loropetalum chinense	Loropetalum	1 Gallon	SW/NE	Moderate	7 FT. O.C.
S22	Muhlenbergia rigens	Deer Grass	5 Gallon	SW	Low	8 FT. O.C.
S23	Lantana montevidensis	Lavender Lantana	1 Gallon	SW/NE	Low	3 FT. O.C.
S24	Rosa 'Pink Flower Carpet'	Pink Ground Cover Rose	5 Gallon	SW	Moderate	4 FT. O.C.
S25	Rhaphiolepis i. 'Ballerina'	India Hawthorn	1 Gallon	SW	Low	4 FT. O.C.
S26	Rhaphiolepis indica 'Dancer'	India Hawthorn	1 Gallon	SW/NE	Low	4 FT. O.C.
S27	Rosmarinus officinalis 'Blue Spires'	Rosemary	5 Gallon	SW	Low	5 FT. O.C.
S28	Salvia 'Hot Lips'	Evergreen Sage	5 Gallon	SW	Low	4 FT. O.C.
S29	Sollya heterophylla	Australian Bluebell Creeper	1 Gallon	SW/NE	Low	3 FT. O.C.
S30	Viburnum t. 'Spring Bouquet'	Dwarf Laurustinus	5 Gallon	NE	Moderate	4 FT. O.C.
S31	Rhamnus c. 'Seaview'	Seaview Coffeeberry	5 Gallon	SW/NE	Low	6-8 FT. O.C.
GROUNDCOVERS						
GC1	Helictotrichon sempervirens	Blue Oak Grass	1 Gallon	SW	Low	3 FT. O.C.
GC2	Arctostaphylos 'Emerald Carpet'	Emerald Carpet Manzanita	1 Gallon	SW/NE	Moderate	2 FT. O.C.
GC3	Trachelospermum jasminoides	Star Jasmine	1 Gallon	SW	Moderate	3 FT. O.C.
GC4	Liriope muscari 'Lilac Beauty'	Big Blue Lily Turf	1 Gallon	SW/NE	Moderate	2 FT. O.C.
L1	90% Creeping Red Fescue/10% Blue Grass		Sod		High	See Plan
L2	Hordeum californicum, etc.	Biofiltration Sod Mix (TM/DBC)	SOD	SW/NE	Moderate	See Plan
Flowering Hydroseed Mix			Hydroseed			

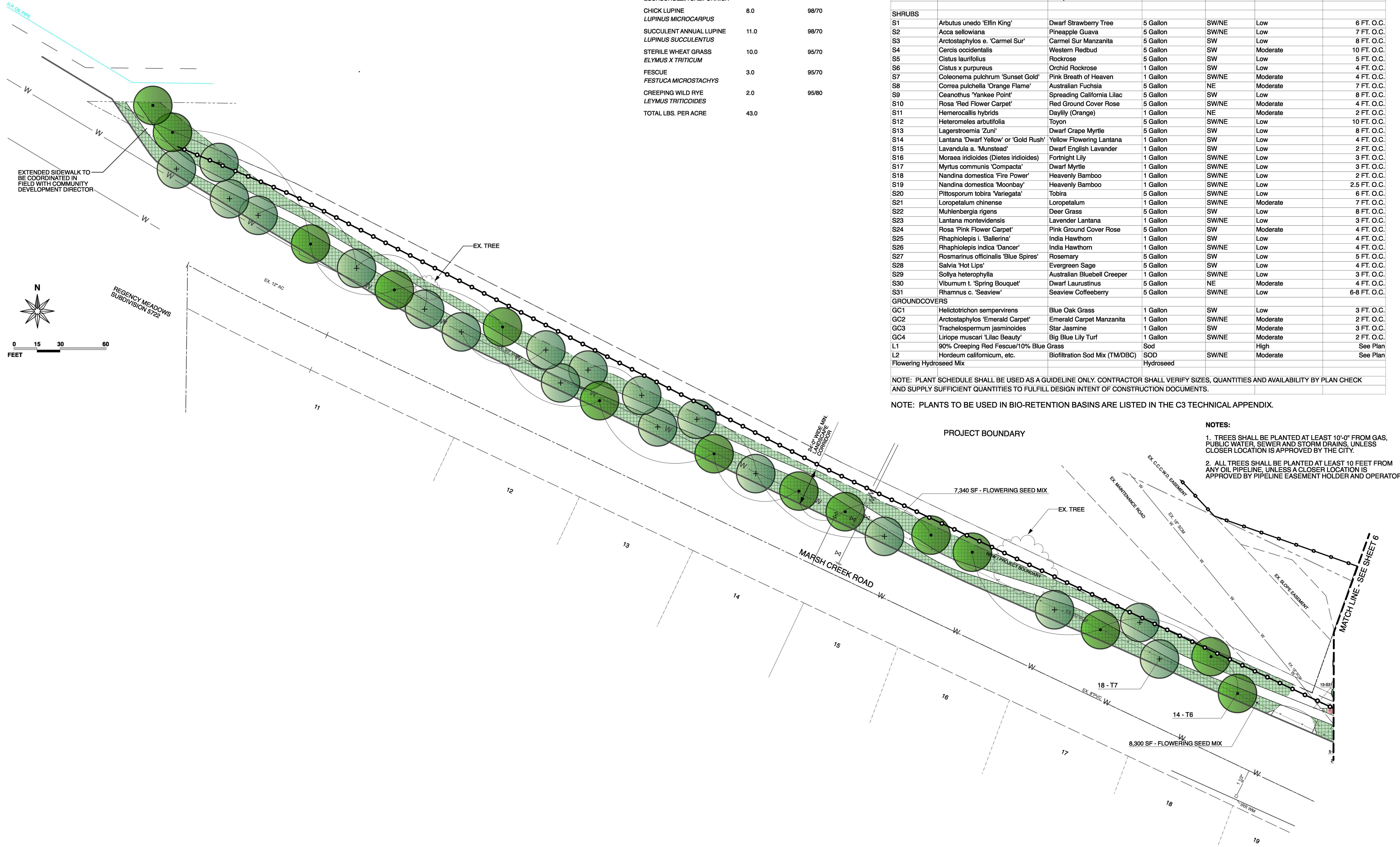
NOTE: PLANT SCHEDULE SHALL BE USED AS A GUIDELINE ONLY. CONTRACTOR SHALL VERIFY SIZES, QUANTITIES AND AVAILABILITY BY PLAN CHECK AND SUPPLY SUFFICIENT QUANTITIES TO FULFILL DESIGN INTENT OF CONSTRUCTION DOCUMENTS.

NOTE: PLANTS TO BE USED IN BIO-RETENTION BASINS ARE LISTED IN THE C3 TECHNICAL APPENDIX.

NOTES:

1. TREES SHALL BE PLANTED AT LEAST 10'-0" FROM GAS, PUBLIC WATER, SEWER AND STORM DRAINS, UNLESS CLOSER LOCATION IS APPROVED BY THE CITY.

2. ALL TREES SHALL BE PLANTED AT LEAST 10 FEET FROM ANY OIL PIPELINE, UNLESS A CLOSER LOCATION IS APPROVED BY PIPELINE EASEMENT HOLDER AND OPERATOR.



M D FOTHERINGHAM
LANDSCAPE ARCHITECTS

1700 North Broadway, Suite 390
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License Stamp

LICENSED LANDSCAPE ARCHITECT MICHAEL D. FOTHERINGHAM SIGNATURE 10/31/20 RENEWAL DATE DATE #2481 STATE OF CALIFORNIA

Consultants

Project

OAK CREEK CANYON
SUBDIVISION 6826

City of Clayton,
Contra Costa County

Client

WEST COAST HOME BUILDERS, INC.
4021 PORT CHICAGO HIGHWAY
CONCORD, CALIFORNIA

Sheet Title

PLANTING PLAN 2

VTM SUBMITTAL
NOT FOR CONSTRUCTION

Scale
1" = 30'-0"

Designed by
MDF / CGW

Drawn by
MDF / CGW

Checked by
MDF

Revisions

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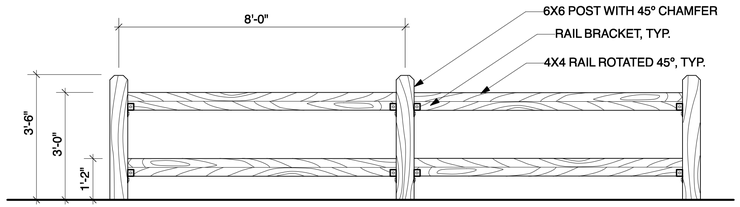
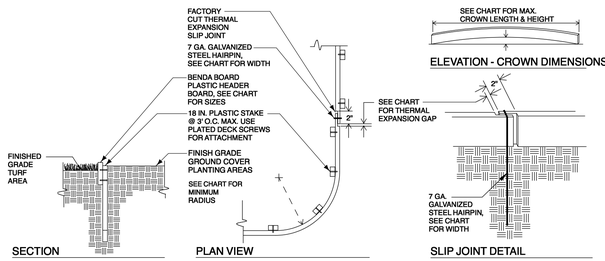
L-7



NOTES:

1. RAIL FENCE TO BE USED ONLY AS SHOWN ON PLAN.
2. ALL WOOD MEMBERS TO BE MINIMUM 2" ACTUAL THICKNESS.
3. ALL WOOD POSTS TO BE PRESSURE TREATED ROUGH FIR #2 OR BETTER.
4. ALL WOOD RAILS TO BE FIR #2 OR BETTER.
5. ALL METAL HARDWARE TO BE HOT DIP GALVANIZED.

H / L8 RAIL FENCE
1/2" = 1' - 0"



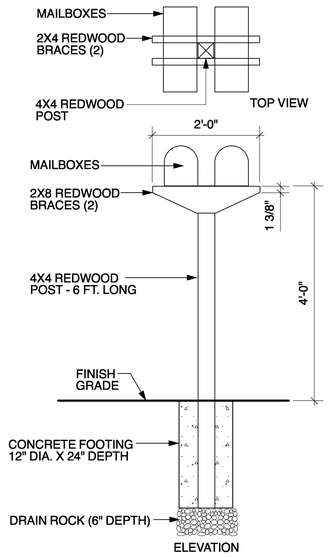
HDR. SIZE	ACTUAL DIMENSIONS	MINIMUM RADIUS POSSIBLE	MAXIMUM CROWN POSSIBLE	THERMAL EXPANSION GAP AT SLIP JOINT	SLIP JOINT HAIRPIN DIMENSIONS
1X4	3 3/8" x 11/16" x 20'	24"	19" / 20'	1/4" - 1/2"	3/4" ID x 13"
2X4	3 3/8" x 1 3/8" x 20'	36"	16" / 20'	1/2" - 3/4"	1 1/2" ID x 13"
1X6	5 3/8" x 11/16" x 20'	24"	9" / 20'	1/2" - 3/4"	3/4" ID x 13"
2X6	5 3/8" x 11/2" x 16'	36"	6" / 16'	1/2" - 3/4"	1 1/2" ID x 13"

BENDA BOARD CHART

COLOR: "REDWOOD", INCLUDING STAKES
MANUFACTURED BY: EPIC PLASTICS, 104 EAST TURNER RD., LODI CA 95240
URL ADDRESS: www.epicplastics.com

1. DO NOT SCREW THROUGH SLIP JOINT
2. USE COARSE WOOD WORKING TOOLS FOR CUTTING & DRILLING
3. USE PLATED SCREWS OR RING SHANK NAILS TO JOIN BOARD TO STAKE
4. ALLOW FOR THERMAL EXPANSION & CONTRACTION BY LEAVING GAPS IN THE SLIP JOINTS OR AT THE END OF THE RUN. (SEE CHART)
   WARM WEATHER INSTALL MIN GAP
   COLD WEATHER INSTALL MAX GAP
5. STAKE APPROX 3' 0" OC (MORE FOR STRAIGHT RUNS LESS FOR CURVES). USE 18" LONG STAKE IN ALL CASES.

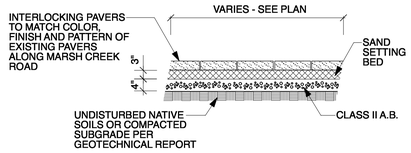
G / L8 BENDA BOARD
PLASTIC HEADER BOARD DETAIL #110
BENDA BOARD IS INTENDED FOR NON-STRUCTURAL USE ONLY
NTS



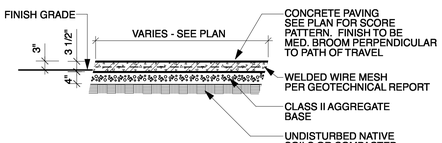
F / L8 DOUBLE MAILBOX
3/4"=1'-0"

NOTES:

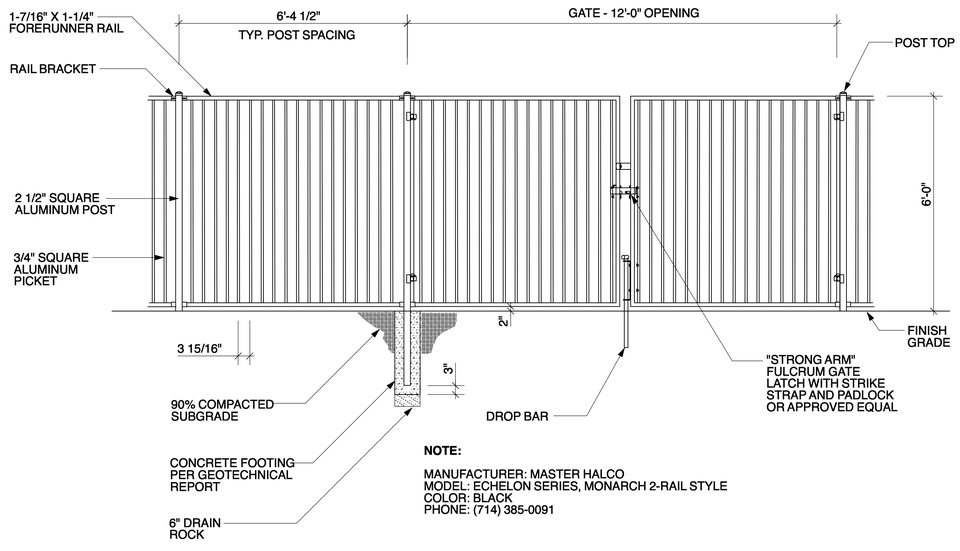
1. AT LOTS WITH SINGLE MAILBOX, CENTER MAILBOX OVER POST.
2. MAILBOX LOCATIONS AND DESIGN ARE DEPENDENT UPON GROUPING REQUIREMENTS OF US POSTAL SERVICE. CITY WILL REVIEW DESIGN AFTER USPS DETERMINES LOCATION(S).
3. ALL WOOD SHALL BE REDWOOD.



E / L8 INTERLOCKING PAVERS ON SAND
1/2 " = 1'- 0"



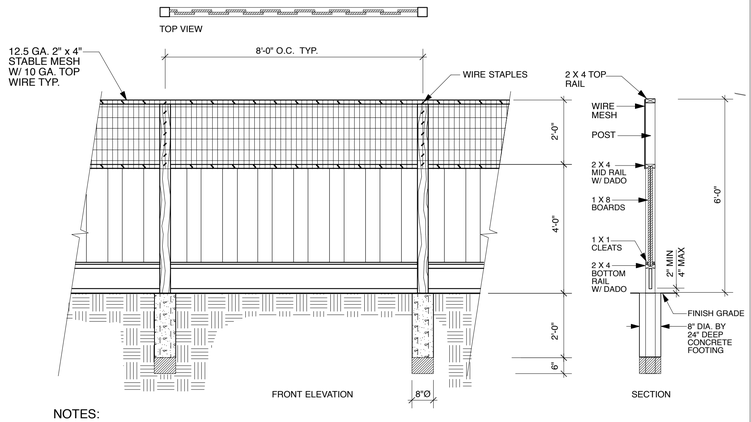
D / L8 CONCRETE WALK
1/2" = 1' - 0"



NOTE:

MANUFACTURER: MASTER HALCO
MODEL: ECHELON SERIES, MONARCH 2-RAIL STYLE
COLOR: BLACK
PHONE: (714) 385-0091

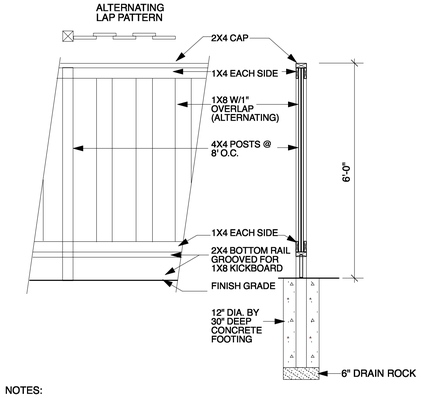
C / L8 OPEN SPACE FENCE WITH ACCESS GATE
1/2" = 1' - 0"



NOTES:

1. WOVEN WIRE SHALL BE 1972-2-12.5 (STABLE MESH) 12 1/2 GAUGE, CLASS 3 GALVANIZED W/ 16 GAUGE TOP WIRE.
2. POSTS SHALL BE 4 x 4 PRESSURE-TREATED FIR, "CEDARTONE" COLOR OR CEDAR IN 8-FOOT LENGTHS.
3. POSTS SHALL BE INSTALLED AT 8 FEET ON CENTER, CLOSER IF CONDITIONS REQUIRE, AND SHALL BE PLACED IN A MIN. 8" DIAMETER, 24" DEEP AUGERED HOLES; SET IN CONCRETE.
4. WOOD OTHER THAN POSTS TO BE CONSTRUCTION COMMON REDWOOD OR CEDAR.
5. ALL METAL HARDWARE TO HAVE HOT DIPPED GALVANIZED FINISH.

B / L8 SPLIT-VIEW FENCE
1/2" = 1'- 0"



NOTES:

1. All wood except posts shall be construction heart redwood or cedar.
2. All fence posts shall be pressure-treated douglas fir, 'Cedartone'.
3. All nails and fasteners shall be hot-dipped galvanized.
4. Staples will not be allowed.
5. Nail guns shall be pre-approved by city.

A / L8 GOOD NEIGHBOR FENCE
1/2" = 1' - 0"

M D FOTHERINGHAM

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SUBDIVISION 6826

City of Clayton, Contra Costa County

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4021 PORT CHICAGO HIGHWAY
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CONSTRUCTION DETAILS 1

VTM SUBMITTAL
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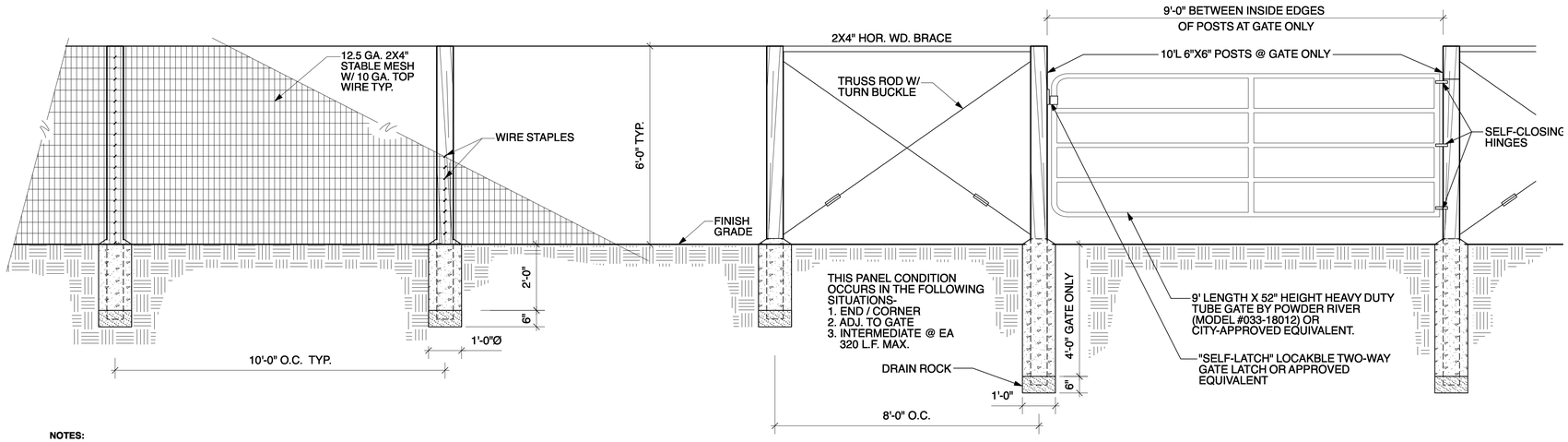
MDF

Revisions

Plot Stamp
Date: Tuesday, March 10, 2020
File name: OakCreekVTMpreland v2020.vwx

Project Number
22110

Sheet Number
L-8



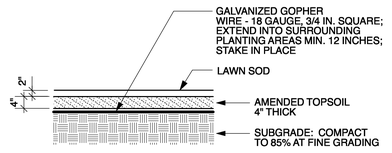
NOTES:

1. FENCE SHALL BE CONSTRUCTED OF WOOD POSTS AND WOVEN WIRE WITH 10GA. TOP WIRE. IT WILL INCLUDE CORNERS, BRACES AND GATES AS NECESSARY.
2. WOVEN WIRE SHALL BE 1972-2-12.5 (STABLE MESH) 12 1/2 GAUGE, CLASS 3 GALVANIZED AS DISTRIBUTED BY PACIFIC STEEL & SUPPLY OF SAN LEANDRO, CA.
3. POSTS SHALL BE 6X6 P.T. FIR IN 8 FOOT LENGTHS.
4. POSTS SHALL BE INSTALLED 10 FOOT ON CENTER, CLOSER IF CONDITIONS REQUIRE, AND SHALL BE PLACED IN A MIN. 12" DIAMETER, 36" DEEP AUGERED HOLE AND SHALL BE SET IN CONCRETE.
5. END AND CORNER POST ASSEMBLIES: HORIZONTAL WOOD CORNER BRACES AND CRISS-CROSS TRUSS RODS SHALL BE PROVIDED AT ALLL END AND CORNER POSTS, ANGLE POINTS IN THE FENCING OR MORE THAN 15 DEGREES SHALL REQUIRE A BRACED AND TRUSSED CORNER POST ASSEMBLY.
6. FENCE BRACING ADJACENT TO GATES: FENCE PANELS DIRECTLY ADJACENT TO GATES SHALL HAVE HORIZONTAL BRACES AND CRISS-CROSSED TRUSS RODS.
7. INTERMEDIATE BRACING OF LINE POSTS: AT 320 FOOT MAXIMUM INTERVALS, TANGENT SECTIONS OF OPEN SPACE FENCE SHALL BE BRACED WITH PULL POST ASSEMBLIES. THE PULL POST ASSEMBLIES SHALL INCLUDE A HORIZONTAL WOOD BRACE BETWEEN CONSECUTIVE POLES AND CRISS-CROSSED TRUSS RODS WITH TURN BUCKLES.

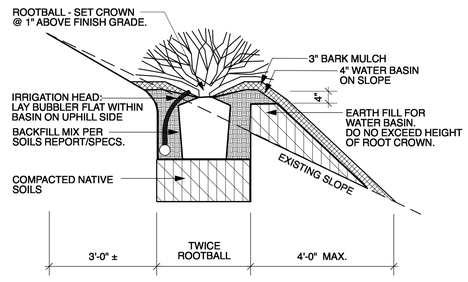
MATERIAL NOTES:

1. ALL WOOD POSTS TO BE PRESSURE TREATED ROUGH FIR #2 OR BETTER.
2. ALL WOOD RAILS TO BE FIR #2 OR BETTER.
3. ALLMETAL HARDWARE TO BE HOT DIP GALVANIZED.
4. ALL GATES TO BE METAL POWDER RIVER RANCH GATES.

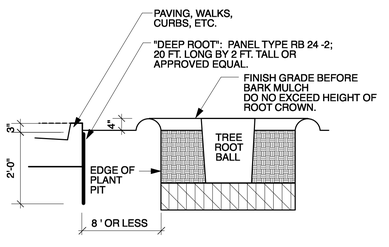
A / L9 WIRE OPEN SPACE FENCE AND ACCESS GATE
1/2" = 1' - 0"



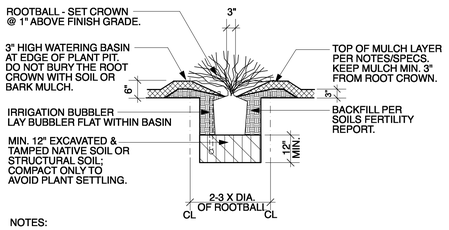
GOPHER-RESISTANT LAWN INSTALLATION
NTS



SHRUB PLANTING ON SLOPE DETAIL
NTS



ROOT BARRIER DETAIL
NTS

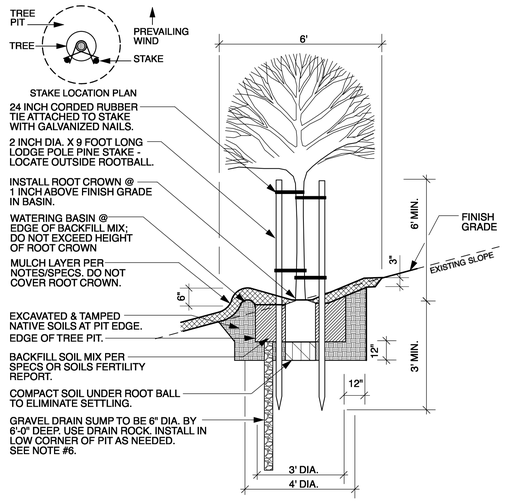


NOTES:

1. FOR GROUND COVER AREAS, ROTOTILL AMENDMENTS AS RECOMMENDED BY SOILS REPORT OR TO 8" DEPTH AFTER CROSS-RIPPING SUBGRADE TO 12" DEPTH.
2. SIDES AND BOTTOM OF PLANT PIT SHALL BE SCARIFIED BEFORE PLANTING.
3. ADD AGRIFORM PLANT TABLETS OR APPROVED EQUAL AT MANUFACTURER'S RATES, 1/3 DOWN FROM TOP OF BACKFILL.

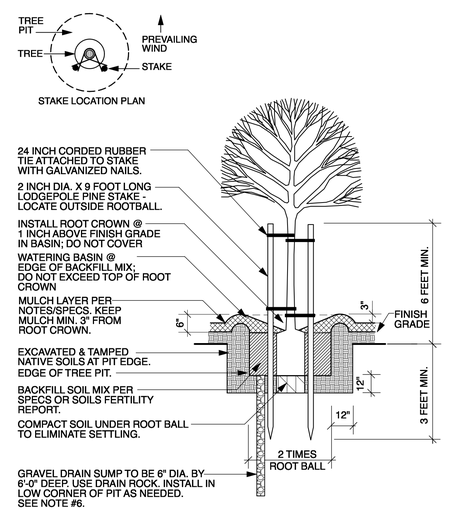
SHRUB PLANTING DETAIL
NTS

NOTES:
1. PLACE STAKES PLUMB & AS SHOWN IN STAKE LOCATION PLAN.
2. TREES SHALL NOT BE ROOT-BOUND. CAREFULLY SCARIFY ROOTBALL BEFORE PLANTING.
3. ELIMINATE WATER BASIN WHEN TREES ARE PLANTED IN LAWN.
4. USE WOOD STAKES FOR 15 GALLON & 24" BOX CONTAINERS.
5. TREE PIT SHALL BE 3 TO 5 TIMES DIAMETER OF ROOT BALL IN CLAY SOILS OR HARDPAN CONDITIONS.
6. TREE PIT PERCOLATION TESTS SHALL BE PERFORMED IN CLAY SOILS OR HARDPAN CONDITIONS. SEE PLANTING NOTE #9, COVER SHEET FOR TEST PARAMETERS.
7. SEE ADDITIONAL NOTES ON COVER SHEET.



TREE ON SLOPE INSTALLATION DETAIL
NTS

NOTES:
1. PLACE STAKES PLUMB & AS SHOWN IN STAKE LOCATION PLAN.
2. TREES SHALL NOT BE ROOT-BOUND. CAREFULLY SCARIFY ROOTBALL BEFORE PLANTING.
3. ELIMINATE WATER BASIN WHEN TREES ARE PLANTED IN LAWN.
4. USE WOOD STAKES FOR 15 GALLON & 24" BOX CONTAINERS.
5. TREE PIT SHALL BE 3 TO 5 TIMES DIAMETER OF ROOT BALL IN CLAY SOILS OR HARDPAN CONDITIONS.
6. TREE PIT PERCOLATION TESTS SHALL BE PERFORMED IN CLAY SOILS OR HARDPAN CONDITIONS. SEE PLANTING NOTE #9, COVER SHEET FOR TEST PARAMETERS.
7. SEE ADDITIONAL NOTES ON COVER SHEET.



TREE INSTALLATION DETAIL
NTS

M D FOTHERINGHAM
LANDSCAPE ARCHITECTS
1700 North Broadway, Suite 390
Walnut Creek, CA 94596
T: 925-939-8292
F: 925-939-8292
E: info@mdfotheringham.com

License Stamp

LICENSED LANDSCAPE ARCHITECT
MICHAEL D. FOTHERINGHAM
SIGNATURE
10/31/20
RENEWAL DATE
DATE
#2481
STATE OF CALIFORNIA

Consultants

Project

OAK CREEK CANYON
SUBDIVISION 6826

City of Clayton, Contra Costa County

Client

WEST COAST HOME BUILDERS, INC.
4021 PORT CHICAGO HIGHWAY
CONCORD, CALIFORNIA

Sheet Title

CONSTRUCTION DETAILS 2

VTM SUBMITTAL
NOT FOR CONSTRUCTION

Scale

Designed by
MDF / CGW

Drawn by
MDF / CGW

Checked by
MDF

Revisions

Plot Stamp
Date: Tuesday, March 10, 2020
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MAXIMUM APPLIED WATER ALLOWANCE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 1 — Date: 2/27/2020

CITY OF:		**Clayton**				ETo Location	**Concord**					
SECTION B1		**MAXIMUM APPLIED WATER ALLOWANCE**										
		MAWA = ETo x .62 x (.55 x HA) + (.45 x SLA)										
YEARLY ETo											**43.4**	
CONVERSION FACTOR											0.62	
ET ADJUSTMENT FACTOR											0.55	
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)											23,476	
SPECIAL LANDSCAPE AREA (SLA in Square Feet)											0	
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)											**347,431**	
TOTAL ACRE FEET											1.07	
CALCULATIONS:												
43.4	x	0.62	x	0.55	x	23,476	+	0.45	x	0	=	**347,431**

	Effective Precipitation (Eppt)		
	Use 25% of annual precipitation in the following equation:		
	MAWA = (ETo - Eppt) x .62 x (.55 x HA) + (.45 x SLA)		
YEARLY ETo		**43.4**	
EFFECTIVE PRECIPITATION		0	
NET Eto		43.4	
CONVERSION FACTOR		0.62	
ET ADJUSTMENT FACTOR		0.55	
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)		23,476	
SPECIAL LANDSCAPE AREA (SLA in Square Feet)		0	
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)		**347,431**	
TOTAL ACRE FEET		1.07	
CALCULATIONS:			
43.4 x 0.62 x 0.55 x 23,476 + 0.45 x 0 =			**347,431**
RESULTS:	Irrigation reductions by adding precipitation (gallons/year):		**0**

WATER EFFICIENCY LANDSCAPE ORDINANCE
PROJECT SUMMARY

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 1 — Date: 2/27/2020

CITY LOCATION: Clayton — ETo LOCATION: **Concord**

LANDSCAPE ARCHITECT: Michael Fotheringham, Landscape Architect #2481 CA

Total Landscape Area (SF): 3,286 — Total Calculated Hydrozone Area (SF): 23,476

Annual ETo (inches): 43.4 — Total Special Landscape Areas: 0

INCLUDED IN THIS PROJECT SUBMITTAL PACKAGE:
(Check to indicate completion)

				gallons/year without rainfall	gallons/year with rainfall
X	1	Maximum Applied Water Allowance:		347,431	347,431
X	2	Estimated Total Water Use:		251,341	251,341
X	2(a)	Expected Water from Effective Precipitation:			0
X	3	Expected Water Savings:		96,090	96,090

Note: If the design assumes that a part of the ETWU will be provided by precipitation, the Effective Precipitation Disclosure Statement shall be completed and submitted.

X	4	Hydrozone Report	
	5	Soil Fertility Analysis	
X	6	Grading Design Plan	
X	7	Planting Design Plan	
	8	Irrigation Design Plan	
	9	Irrigation Schedule	

POST-INSTALLATION INSPECTION:

	A	Maintenance Schedule
	B	Irrigation Audit
	C	Plants installed as specified (substitutions accepted)
	D	Irrigation system installed as designed (as-builts included)
	E	Landscape irrigation audit performed
	F	Submittal package and this certification package have been provided to owner, building or site manager and local water agency.

ESTIMATED TOTAL WATER USE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 1 — Date: 2/27/2020

CITY OF: **Clayton** — ETo City: **Concord**

SECTION B2 **ESTIMATED TOTAL WATER USE (ETWU, gallons per year)**
ETWU = ETo x .62 x ((PF x HA) /IE) + SLA

Calculate the following for each Hydrozone (HZ):

YEARLY ETo (inches per year)	43.4
CONVERSION FACTOR (to gallons per square foot)	0.62
Average PF - PLANT FACTOR (plant water demand, defined for each hydrozone)	0.325
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)	23,476
SPECIAL LANDSCAPE AREA (SLA in Square Feet x .45)	0
Average IE - IRRIGATION EFFICIENCY FACTOR (minimum .75)	0.81
TOTAL ESTIMATED TOTAL WATER USE (gallons/year):	251,341
TOTAL ACRE FEET:	0.77

CALCULATIONS:

Yearly ETo	Conversion Factor	HZ NO.	HYDROZONE DESCRIPTION	PLANT FACTOR (PF)	Irrigation Method	Irrigation Efficiency (IE)	ETAF (PF/IE)	Hydrozone Area (HA) (Sq Ft)	ETWU Gal/Yr	% Landscape Area	ETAF x Area
43.4	0.62	1	Shrubs Flat (L)	0.30	B	0.81	0.37	2,511	25,024	10.7%	930
43.4	0.62	2	Shrubs Slope (L)	0.30	B	0.81	0.37	19,570	195,033	83.4%	7248
43.4	0.62	3	Shrubs Flat (M)	0.60	B	0.81	0.74	194	3,867	0.8%	144
43.4	0.62	4	C3 Basin (L)	0.30	B	0.81	0.37	426	4,245	1.8%	158
43.4	0.62	5	Turf (H)	1.00	D	0.90	1.11	775	23,171	3.3%	861
			Special Landscape Area	0.45				0	0		
			TOTALS:					**23,476**	**251,341**	**100.00%**	**9,341**
			AVERAGE PF:	**0.50**							
			AVERAGE IE			**0.83**					
			AVERAGE ETAF:								**0.40**

MAXIMUM APPLIED WATER ALLOWANCE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 2 — Date: 2/27/2020

CITY OF:		**Clayton**				ETo Location	**Concord**					
SECTION B1		**MAXIMUM APPLIED WATER ALLOWANCE**										
		MAWA = ETo x .62 x (.55 x HA) + (.45 x SLA)										
YEARLY ETo											**43.4**	
CONVERSION FACTOR											0.62	
ET ADJUSTMENT FACTOR											0.55	
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)											4,939	
SPECIAL LANDSCAPE AREA (SLA in Square Feet)											0	
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)											**73,094**	
TOTAL ACRE FEET											0.22	
CALCULATIONS:												
43.4	x	0.62	x	0.55	x	4,939	+	0.45	x	0	=	**73,094**

	Effective Precipitation (Eppt)		
	Use 25% of annual precipitation in the following equation:		
	MAWA = (ETo - Eppt) x .62 x (.55 x HA) + (.45 x SLA)		
YEARLY ETo		**43.4**	
EFFECTIVE PRECIPITATION		0	
NET Eto		43.4	
CONVERSION FACTOR		0.62	
ET ADJUSTMENT FACTOR		0.55	
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)		4,939	
SPECIAL LANDSCAPE AREA (SLA in Square Feet)		0	
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)		**73,094**	
TOTAL ACRE FEET		0.22	
CALCULATIONS:			
43.4 x 0.62 x 0.55 x 4,939 + 0.45 x 0 =			**73,094**
RESULTS:	Irrigation reductions by adding precipitation (gallons/year):		**0**

WATER EFFICIENCY LANDSCAPE ORDINANCE
PROJECT SUMMARY

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 2 — Date: 2/27/2020

CITY LOCATION: Clayton — ETo LOCATION: **Concord**

LANDSCAPE ARCHITECT: Michael Fotheringham, Landscape Architect #2481 CA

Total Landscape Area (SF): 2,102 — Total Calculated Hydrozone Area (SF): 4,939

Annual ETo (inches): 43.4 — Total Special Landscape Areas: 0

INCLUDED IN THIS PROJECT SUBMITTAL PACKAGE:
(Check to indicate completion)

				gallons/year without rainfall	gallons/year with rainfall
X	1	Maximum Applied Water Allowance:		73,094	73,094
X	2	Estimated Total Water Use:		64,639	64,639
X	2(a)	Expected Water from Effective Precipitation:			0
X	3	Expected Water Savings:		8,455	8,455

Note: If the design assumes that a part of the ETWU will be provided by precipitation, the Effective Precipitation Disclosure Statement shall be completed and submitted.

X	4	Hydrozone Report	
	5	Soil Fertility Analysis	
X	6	Grading Design Plan	
X	7	Planting Design Plan	
	8	Irrigation Design Plan	
	9	Irrigation Schedule	

POST-INSTALLATION INSPECTION:

	A	Maintenance Schedule
	B	Irrigation Audit
	C	Plants installed as specified (substitutions accepted)
	D	Irrigation system installed as designed (as-builts included)
	E	Landscape irrigation audit performed
	F	Submittal package and this certification package have been provided to owner, building or site manager and local water agency.

ESTIMATED TOTAL WATER USE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 2 — Date: 2/27/2020

CITY OF: **Clayton** — ETo City: **Concord**

SECTION B2 **ESTIMATED TOTAL WATER USE (ETWU, gallons per year)**
ETWU = ETo x .62 x ((PF x HA) /IE) + SLA

Calculate the following for each Hydrozone (HZ):

YEARLY ETo (inches per year)	43.4
CONVERSION FACTOR (to gallons per square foot)	0.62
Average PF - PLANT FACTOR (plant water demand, defined for each hydrozone)	0.325
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)	4,939
SPECIAL LANDSCAPE AREA (SLA in Square Feet x .45)	0
Average IE - IRRIGATION EFFICIENCY FACTOR (minimum .75)	0.81
TOTAL ESTIMATED TOTAL WATER USE (gallons/year):	64,639
TOTAL ACRE FEET:	0.20

CALCULATIONS:

Yearly ETo	Conversion Factor	HZ NO.	HYDROZONE DESCRIPTION	PLANT FACTOR (PF)	Irrigation Method	Irrigation Efficiency (IE)	ETAF (PF/IE)	Hydrozone Area (HA) (Sq Ft)	ETWU Gal/Yr	% Landscape Area	ETAF x Area
43.4	0.62	1	Shrubs Flat (L)	0.30	B	0.81	0.37	1,606	16,005	32.5%	595
43.4	0.62	2	Shrubs Slope (L)	0.30	B	0.81	0.37	2,282	22,742	46.2%	845
43.4	0.62	3	Shrubs Flat (M)	0.60	B	0.81	0.74	555	11,062	11.2%	411
43.4	0.62	4	C3 Basin (L)	0.30	B	0.81	0.37	0	0	0.0%	0
43.4	0.62	5	Turf (H)	1.00	D	0.90	1.11	496	14,829	10.0%	551
			Special Landscape Area	0.45				0	0		
			TOTALS:					**4,939**	**64,639**	**100.00%**	**2,402**
			AVERAGE PF:	**0.50**							
			AVERAGE IE			**0.83**					
			AVERAGE ETAF:								**0.49**

MAXIMUM APPLIED WATER ALLOWANCE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 3 — Date: 2/27/2020

CITY OF:		**Clayton**				ETo Location	**Concord**					
SECTION B1		**MAXIMUM APPLIED WATER ALLOWANCE**										
		MAWA = ETo x .62 x (.55 x HA) + (.45 x SLA)										
YEARLY ETo											**43.4**	
CONVERSION FACTOR											0.62	
ET ADJUSTMENT FACTOR											0.55	
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)											3,361	
SPECIAL LANDSCAPE AREA (SLA in Square Feet)											0	
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)											**49,741**	
TOTAL ACRE FEET											0.15	
CALCULATIONS:												
43.4	x	0.62	x	0.55	x	3,361	+	0.45	x	0	=	**49,741**

	Effective Precipitation (Eppt)		
	Use 25% of annual precipitation in the following equation:		
	MAWA = (ETo - Eppt) x .62 x (.55 x HA) + (.45 x SLA)		
YEARLY ETo		**43.4**	
EFFECTIVE PRECIPITATION		0	
NET Eto		43.4	
CONVERSION FACTOR		0.62	
ET ADJUSTMENT FACTOR		0.55	
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)		3,361	
SPECIAL LANDSCAPE AREA (SLA in Square Feet)		0	
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)		**49,741**	
TOTAL ACRE FEET		0.15	
CALCULATIONS:			
43.4 x 0.62 x 0.55 x 3,361 + 0.45 x 0 =			**49,741**
RESULTS:	Irrigation reductions by adding precipitation (gallons/year):		**0**

WATER EFFICIENCY LANDSCAPE ORDINANCE
PROJECT SUMMARY

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 3 — Date: 2/27/2020

CITY LOCATION: Clayton — ETo LOCATION: **Concord**

LANDSCAPE ARCHITECT: Michael Fotheringham, Landscape Architect #2481 CA

Total Landscape Area (SF): 1,143 — Total Calculated Hydrozone Area (SF): 3,361

Annual ETo (inches): 43.4 — Total Special Landscape Areas: 0

INCLUDED IN THIS PROJECT SUBMITTAL PACKAGE:
(Check to indicate completion)

				gallons/year without rainfall	gallons/year with rainfall
X	1	Maximum Applied Water Allowance:		49,741	49,741
X	2	Estimated Total Water Use:		43,003	43,003
X	2(a)	Expected Water from Effective Precipitation:			0
X	3	Expected Water Savings:		6,738	6,738

Note: If the design assumes that a part of the ETWU will be provided by precipitation, the Effective Precipitation Disclosure Statement shall be completed and submitted.

X	4	Hydrozone Report	
	5	Soil Fertility Analysis	
X	6	Grading Design Plan	
X	7	Planting Design Plan	
	8	Irrigation Design Plan	
	9	Irrigation Schedule	

POST-INSTALLATION INSPECTION:

	A	Maintenance Schedule
	B	Irrigation Audit
	C	Plants installed as specified (substitutions accepted)
	D	Irrigation system installed as designed (as-builts included)
	E	Landscape irrigation audit performed
	F	Submittal package and this certification package have been provided to owner, building or site manager and local water agency.

ESTIMATED TOTAL WATER USE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 3 — Date: 2/27/2020

CITY OF: **Clayton** — ETo City: **Concord**

SECTION B2 **ESTIMATED TOTAL WATER USE (ETWU, gallons per year)**
ETWU = ETo x .62 x ((PF x HA) /IE) + SLA

Calculate the following for each Hydrozone (HZ):

YEARLY ETo (inches per year)	43.4
CONVERSION FACTOR (to gallons per square foot)	0.62
Average PF - PLANT FACTOR (plant water demand, defined for each hydrozone)	0.325
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)	3,361
SPECIAL LANDSCAPE AREA (SLA in Square Feet x .45)	0
Average IE - IRRIGATION EFFICIENCY FACTOR (minimum .75)	0.81
TOTAL ESTIMATED TOTAL WATER USE (gallons/year):	43,003
TOTAL ACRE FEET:	0.13

CALCULATIONS:

Yearly ETo	Conversion Factor	HZ NO.	HYDROZONE DESCRIPTION	PLANT FACTOR (PF)	Irrigation Method	Irrigation Efficiency (IE)	ETAF (PF/IE)	Hydrozone Area (HA) (Sq Ft)	ETWU Gal/Yr	% Landscape Area	ETAF x Area
43.4	0.62	1	Shrubs Flat (L)	0.30	B	0.81	0.37	777	7,744	23.1%	288
43.4	0.62	2	Shrubs Slope (L)	0.30	B	0.81	0.37	1,996	19,892	59.4%	739
43.4	0.62	3	Shrubs Flat (M)	0.60	B	0.81	0.74	222	4,425	6.6%	164
43.4	0.62	4	C3 Basin (L)	0.30	B	0.81	0.37	0	0	0.0%	0
43.4	0.62	5	Turf (H)	1.00	D	0.90	1.11	366	10,943	10.9%	407
			Special Landscape Area	0.45				0	0		
			TOTALS:					**3,361**	**43,003**	**100.00%**	**1,598**
			AVERAGE PF:	**0.50**							
			AVERAGE IE			**0.83**					
			AVERAGE ETAF:								**0.48**

M D FOTHERINGHAM
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License Stamp

LICENSED LANDSCAPE ARCHITECT
MICHAEL D. FOTHERINGHAM
SIGNATURE
10/31/20
RENEWAL DATE
DATE
#2481
STATE OF CALIFORNIA

Consultants

Project

OAK CREEK CANYON
SUBDIVISION 6826

City of Clayton,
Contra Costa County

Client

WEST COAST HOME BUILDERS, INC.
4021 PORT CHICAGO HIGHWAY
CONCORD, CALIFORNIA

Sheet Title

WELO CALCULATIONS 1

VTM SUBMITTAL
NOT FOR CONSTRUCTION

Scale

Designed by
MDF / CGW

Drawn by
MDF / CGW

Checked by
MDF

Revisions

Plot Stamp
Date: **Tuesday, March 10, 2020**
File name: **OakCreekVTMpreland v2020.vwx**

Project Number
22110

Sheet Number
L-10

WATER EFFICIENCY LANDSCAPE ORDINANCE
PROJECT SUMMARY

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 4 — Date: 2/27/2020

CITY LOCATION: Clayton — ETo LOCATION: **Concord**

LANDSCAPE ARCHITECT: Michael Fotheringham, Landscape Architect #2481 CA

Total Landscape Area (SF): 1,341 — Total Calculated Hydrozone Area (SF): 3,584

Annual ETo (inches): 43.4 — Total Special Landscape Areas: 0

INCLUDED IN THIS PROJECT SUBMITTAL PACKAGE:
(Check to indicate completion)

			gallons/year without rainfall	gallons/year with rainfall
X	1	Maximum Applied Water Allowance:	53,041	53,041
X	2	Estimated Total Water Use:	49,491	49,491
X	2(a)	Expected Water from Effective Precipitation:		0
X	3	Expected Water Savings:	3,550	3,550

Note: If the design assumes that a part of the ETWU will be provided by precipitation, the Effective Precipitation Disclosure Statement shall be completed and submitted.

X	4	Hydrozone Report	
	5	Soil Fertility Analysis	
X	6	Grading Design Plan	
X	7	Planting Design Plan	
	8	Irrigation Design Plan	
	9	Irrigation Schedule	

POST-INSTALLATION INSPECTION:

	A	Maintenance Schedule
	B	Irrigation Audit
	C	Plants installed as specified (substitutions accepted)
	D	Irrigation system installed as designed (as-builts included)
	E	Landscape irrigation audit performed
	F	Submittal package and this certification package have been provided to owner, building or site manager and local water agency.

MAXIMUM APPLIED WATER ALLOWANCE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 4 — Date: 2/27/2020

CITY OF: **Clayton** — ETo Location **Concord**

SECTION B1 **MAXIMUM APPLIED WATER ALLOWANCE**
MAWA = ETo x .62 x (.55 x HA) + (.45 x SLA)

YEARLY ETo	**43.4**
CONVERSION FACTOR	0.62
ET ADJUSTMENT FACTOR	0.55
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)	3,584
SPECIAL LANDSCAPE AREA (SLA in Square Feet)	0
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)	**53,041**
TOTAL ACRE FEET	0.16

CALCULATIONS:
43.4 x 0.62 x 0.55 x 3,584 + 0.45 x 0 = **53,041**

Effective Precipitation (Eppt)
Use 25% of annual precipitation in the following equation:
MAWA = (ETo - Eppt) x .62 x (.55 x HA) + (.45 x SLA)

YEARLY ETo	**43.4**
EFFECTIVE PRECIPITATION	0
NET Eto	43.4
CONVERSION FACTOR	0.62
ET ADJUSTMENT FACTOR	0.55
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)	3,584
SPECIAL LANDSCAPE AREA (SLA in Square Feet)	0
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)	**53,041**
TOTAL ACRE FEET	0.16

CALCULATIONS:
43.4 x 0.62 x 0.55 x 3,584 + 0.45 x 0 = **53,041**

RESULTS: Irrigation reductions by adding precipitation (gallons/year): **0**

ESTIMATED TOTAL WATER USE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 4 — Date: 2/27/2020

CITY OF: **Clayton** — ETo City **Concord**

SECTION B2 **ESTIMATED TOTAL WATER USE (ETWU, gallons per year)**
ETWU = ETo x .62 x ((PF x HA)/IE) + SLA

Calculate the following for each Hydrozone (HZ):

YEARLY ETo (inches per year)	43.4
CONVERSION FACTOR (to gallons per square foot)	0.62
Average PF - PLANT FACTOR (plant water demand, defined for each hydrozone)	0.325
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)	3,584
SPECIAL LANDSCAPE AREA (SLA in Square Feet x .45)	0
Average IE - IRRIGATION EFFICIENCY FACTOR (minimum .75)	0.81
TOTAL ESTIMATED TOTAL WATER USE (gallons/year):	49,491
TOTAL ACRE FEET:	0.15

CALCULATIONS:

Yearly ETo	Conversion Factor	HZ NO.	HYDROZONE DESCRIPTION	PLANT FACTOR (PF)	Irrigation Method	Efficency (IE)	ETAF (PF/IE)	Hydrozone Area (HA) (Sq Ft)	ETWU Gal/Yr	% Landscape Area	ETAF x Area
43.4	0.62	1	Shrubs Flat (L)	0.30	B	0.81	0.37	774	7,714	21.6%	287
43.4	0.62	2	Shrubs Slope (L)	0.30	B	0.81	0.37	1,995	19,882	55.7%	739
43.4	0.62	3	Shrubs Flat (M)	0.60	B	0.81	0.74	248	4,943	6.9%	184
43.4	0.62	4	C3 Basin (L)	0.30	B	0.81	0.37	0	0	0.0%	0
43.4	0.62	5	Turf (H)	1.00	D	0.90	1.11	567	16,952	15.8%	630
			Special Landscape Area	0.45				0	0		
			TOTALS:					**3,584**	**49,491**	**100.00%**	**1,839**
			AVERAGE PF:	**0.50**							
			AVERAGE IE			**0.83**					
			AVERAGE ETAF:								**0.51**

WATER EFFICIENCY LANDSCAPE ORDINANCE
PROJECT SUMMARY

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 5 — Date: 2/27/2020

CITY LOCATION: Clayton — ETo LOCATION: **Concord**

LANDSCAPE ARCHITECT: Michael Fotheringham, Landscape Architect #2481 CA

Total Landscape Area (SF): 2,895 — Total Calculated Hydrozone Area (SF): 4,857

Annual ETo (inches): 43.4 — Total Special Landscape Areas: 0

INCLUDED IN THIS PROJECT SUBMITTAL PACKAGE:
(Check to indicate completion)

			gallons/year without rainfall	gallons/year with rainfall
X	1	Maximum Applied Water Allowance:	71,881	71,881
X	2	Estimated Total Water Use:	71,555	71,555
X	2(a)	Expected Water from Effective Precipitation:		0
X	3	Expected Water Savings:	325	325

Note: If the design assumes that a part of the ETWU will be provided by precipitation, the Effective Precipitation Disclosure Statement shall be completed and submitted.

X	4	Hydrozone Report	
	5	Soil Fertility Analysis	
X	6	Grading Design Plan	
X	7	Planting Design Plan	
	8	Irrigation Design Plan	
	9	Irrigation Schedule	

POST-INSTALLATION INSPECTION:

	A	Maintenance Schedule
	B	Irrigation Audit
	C	Plants installed as specified (substitutions accepted)
	D	Irrigation system installed as designed (as-builts included)
	E	Landscape irrigation audit performed
	F	Submittal package and this certification package have been provided to owner, building or site manager and local water agency.

MAXIMUM APPLIED WATER ALLOWANCE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 5 — Date: 2/27/2020

CITY OF: **Clayton** — ETo Location **Concord**

SECTION B1 **MAXIMUM APPLIED WATER ALLOWANCE**
MAWA = ETo x .62 x (.55 x HA) + (.45 x SLA)

YEARLY ETo	**43.4**
CONVERSION FACTOR	0.62
ET ADJUSTMENT FACTOR	0.55
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)	4,857
SPECIAL LANDSCAPE AREA (SLA in Square Feet)	0
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)	**71,881**
TOTAL ACRE FEET	0.22

CALCULATIONS:
43.4 x 0.62 x 0.55 x 4,857 + 0.45 x 0 = **71,881**

Effective Precipitation (Eppt)
Use 25% of annual precipitation in the following equation:
MAWA = (ETo - Eppt) x .62 x (.55 x HA) + (.45 x SLA)

YEARLY ETo	**43.4**
EFFECTIVE PRECIPITATION	0
NET Eto	43.4
CONVERSION FACTOR	0.62
ET ADJUSTMENT FACTOR	0.55
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)	4,857
SPECIAL LANDSCAPE AREA (SLA in Square Feet)	0
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)	**71,881**
TOTAL ACRE FEET	0.22

CALCULATIONS:
43.4 x 0.62 x 0.55 x 4,857 + 0.45 x 0 = **71,881**

RESULTS: Irrigation reductions by adding precipitation (gallons/year): **0**

ESTIMATED TOTAL WATER USE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 5 — Date: 2/27/2020

CITY OF: **Clayton** — ETo City **Concord**

SECTION B2 **ESTIMATED TOTAL WATER USE (ETWU, gallons per year)**
ETWU = ETo x .62 x ((PF x HA)/IE) + SLA

Calculate the following for each Hydrozone (HZ):

YEARLY ETo (inches per year)	43.4
CONVERSION FACTOR (to gallons per square foot)	0.62
Average PF - PLANT FACTOR (plant water demand, defined for each hydrozone)	0.325
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)	4,857
SPECIAL LANDSCAPE AREA (SLA in Square Feet x .45)	0
Average IE - IRRIGATION EFFICIENCY FACTOR (minimum .75)	0.81
TOTAL ESTIMATED TOTAL WATER USE (gallons/year):	71,555
TOTAL ACRE FEET:	0.22

CALCULATIONS:

Yearly ETo	Conversion Factor	HZ NO.	HYDROZONE DESCRIPTION	PLANT FACTOR (PF)	Irrigation Method	Efficency (IE)	ETAF (PF/IE)	Hydrozone Area (HA) (Sq Ft)	ETWU Gal/Yr	% Landscape Area	ETAF x Area
43.4	0.62	1	Shrubs Flat (L)	0.30	B	0.81	0.37	1,896	18,895	39.0%	702
43.4	0.62	2	Shrubs Slope (L)	0.30	B	0.81	0.37	1,637	16,314	33.7%	606
43.4	0.62	3	Shrubs Flat (M)	0.60	B	0.81	0.74	325	6,478	6.7%	241
43.4	0.62	4	C3 Basin (L)	0.30	B	0.81	0.37	0	0	0.0%	0
43.4	0.62	5	Turf (H)	1.00	D	0.90	1.11	999	29,868	20.6%	1110
			Special Landscape Area	0.45				0	0		
			TOTALS:					**4,857**	**71,555**	**100.00%**	**2,659**
			AVERAGE PF:	**0.50**							
			AVERAGE IE			**0.83**					
			AVERAGE ETAF:								**0.55**

WATER EFFICIENCY LANDSCAPE ORDINANCE
PROJECT SUMMARY

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 6 — Date: 2/27/2020

CITY LOCATION: Clayton — ETo LOCATION: **Concord**

LANDSCAPE ARCHITECT: Michael Fotheringham, Landscape Architect #2481 CA

Total Landscape Area (SF): 8,684 — Total Calculated Hydrozone Area (SF): 31,242

Annual ETo (inches): 43.4 — Total Special Landscape Areas: 0

INCLUDED IN THIS PROJECT SUBMITTAL PACKAGE:
(Check to indicate completion)

			gallons/year without rainfall	gallons/year with rainfall
X	1	Maximum Applied Water Allowance:	462,363	462,363
X	2	Estimated Total Water Use:	339,021	339,021
X	2(a)	Expected Water from Effective Precipitation:		0
X	3	Expected Water Savings:	123,342	123,342

Note: If the design assumes that a part of the ETWU will be provided by precipitation, the Effective Precipitation Disclosure Statement shall be completed and submitted.

X	4	Hydrozone Report	
	5	Soil Fertility Analysis	
X	6	Grading Design Plan	
X	7	Planting Design Plan	
	8	Irrigation Design Plan	
	9	Irrigation Schedule	

POST-INSTALLATION INSPECTION:

	A	Maintenance Schedule
	B	Irrigation Audit
	C	Plants installed as specified (substitutions accepted)
	D	Irrigation system installed as designed (as-builts included)
	E	Landscape irrigation audit performed
	F	Submittal package and this certification package have been provided to owner, building or site manager and local water agency.

MAXIMUM APPLIED WATER ALLOWANCE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 6 — Date: 2/27/2020

CITY OF: **Clayton** — ETo Location **Concord**

SECTION B1 **MAXIMUM APPLIED WATER ALLOWANCE**
MAWA = ETo x .62 x (.55 x HA) + (.45 x SLA)

YEARLY ETo	**43.4**
CONVERSION FACTOR	0.62
ET ADJUSTMENT FACTOR	0.55
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)	31,242
SPECIAL LANDSCAPE AREA (SLA in Square Feet)	0
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)	**462,363**
TOTAL ACRE FEET	1.42

CALCULATIONS:
43.4 x 0.62 x 0.55 x 31,242 + 0.45 x 0 = **462,363**

Effective Precipitation (Eppt)
Use 25% of annual precipitation in the following equation:
MAWA = (ETo - Eppt) x .62 x (.55 x HA) + (.45 x SLA)

YEARLY ETo	**43.4**
EFFECTIVE PRECIPITATION	0
NET Eto	43.4
CONVERSION FACTOR	0.62
ET ADJUSTMENT FACTOR	0.55
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)	31,242
SPECIAL LANDSCAPE AREA (SLA in Square Feet)	0
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)	**462,363**
TOTAL ACRE FEET	1.42

CALCULATIONS:
43.4 x 0.62 x 0.55 x 31,242 + 0.45 x 0 = **462,363**

RESULTS: Irrigation reductions by adding precipitation (gallons/year): **0**

ESTIMATED TOTAL WATER USE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Lot 6 — Date: 2/27/2020

CITY OF: **Clayton** — ETo City **Concord**

SECTION B2 **ESTIMATED TOTAL WATER USE (ETWU, gallons per year)**
ETWU = ETo x .62 x ((PF x HA)/IE) + SLA

Calculate the following for each Hydrozone (HZ):

YEARLY ETo (inches per year)	43.4
CONVERSION FACTOR (to gallons per square foot)	0.62
Average PF - PLANT FACTOR (plant water demand, defined for each hydrozone)	0.325
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)	31,242
SPECIAL LANDSCAPE AREA (SLA in Square Feet x .45)	0
Average IE - IRRIGATION EFFICIENCY FACTOR (minimum .75)	0.81
TOTAL ESTIMATED TOTAL WATER USE (gallons/year):	339,021
TOTAL ACRE FEET:	1.04

CALCULATIONS:

Yearly ETo	Conversion Factor	HZ NO.	HYDROZONE DESCRIPTION	PLANT FACTOR (PF)	Irrigation Method	Efficency (IE)	ETAF (PF/IE)	Hydrozone Area (HA) (Sq Ft)	ETWU Gal/Yr	% Landscape Area	ETAF x Area
43.4	0.62	1	Shrubs Flat (L)	0.30	B	0.81	0.37	7,864	78,372	25.2%	2913
43.4	0.62	2	Shrubs Slope (L)	0.30	B	0.81	0.37	16,237	161,817	52.0%	6014
43.4	0.62	3	Shrubs Flat (M)	0.60	B	0.81	0.74	1,136	22,643	3.6%	841
43.4	0.62	4	C3 Basin (L)	0.30	B	0.81	0.37	5,185	51,673	16.6%	1920
43.4	0.62	5	Turf (H)	1.00	D	0.90	1.11	820	24,516	2.6%	911
			Special Landscape Area	0.45				0	0		
			TOTALS:					**31,242**	**339,021**	**100.00%**	**12,599**
			AVERAGE PF:	**0.50**							
			AVERAGE IE			**0.83**					
			AVERAGE ETAF:								**0.40**

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License Stamp

LICENSED LANDSCAPE ARCHITECT
MICHAEL D. FOTHERINGHAM
SIGNATURE
10/31/20
RENEWAL DATE
DATE
#2481
STATE OF CALIFORNIA

Consultants

Project

OAK CREEK CANYON
SUBDIVISION 6826

City of Clayton,
Contra Costa County

Client

WEST COAST HOME BUILDERS, INC.
4021 PORT CHICAGO HIGHWAY
CONCORD, CALIFORNIA

Sheet Title

WELO CALCULATIONS 2

VTM SUBMITTAL
NOT FOR CONSTRUCTION

Scale

Designed by
MDF / CGW

Drawn by
MDF / CGW

Checked by
MDF

Revisions

Plot Stamp
Date: **Tuesday, March 10, 2020**
File name: **OakCreekVTMpreland v2020.vwx**

Project Number
22110

Sheet Number
L-11

WATER EFFICIENCY LANDSCAPE ORDINANCE
PROJECT SUMMARY

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Commons				Date: 2/27/2020	
CITY LOCATION:	Clayton	ETo LOCATION:	**Concord**		
LANDSCAPE ARCHITECT: Michael Fotheringham, Landscape Architect #2481 CA					
Total Landscape Area (SF):	20,628	Total Calculated Hydrozone Area (SF):	23,229		
Annual ETo (inches):	43.4	Total Special Landscape Areas:	0		

INCLUDED IN THIS PROJECT SUBMITTAL PACKAGE:
(Check to indicate completion)

			gallons/year without rainfall	gallons/year with rainfall
X	1	Maximum Applied Water Allowance:	343,775	343,775
X	2	Estimated Total Water Use:	245,112	245,112
X	2(a)	Expected Water from Effective Precipitation:		0
X	3	Expected Water Savings:	98,663	98,663

Note: If the design assumes that a part of the ETWU will be provided by precipitation, the Effective Precipitation Disclosure Statement shall be completed and submitted.

X	4	Hydrozone Report
	5	Soil Fertility Analysis
X	6	Grading Design Plan
X	7	Planting Design Plan
	8	Irrigation Design Plan
	9	Irrigation Schedule

POST-INSTALLATION INSPECTION:

	A	Maintenance Schedule
	B	Irrigation Audit
	C	Plants installed as specified (substitutions accepted)
	D	Irrigation system installed as designed (as-builts included)
	E	Landscape irrigation audit performed
	F	Submittal package and this certification package have been provided to owner, building or site manager and local water agency

MAXIMUM APPLIED WATER ALLOWANCE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Commons											Date: 2/27/2020		
CITY OF:		**Clayton**				ETo Location	**Concord**						
SECTION B1		**MAXIMUM APPLIED WATER ALLOWANCE**											
		MAWA = ETo x .62 x (.55 x HA) + (.45 x SLA)											
YEARLY ETo											**43.4**		
CONVERSION FACTOR											0.62		
ET ADJUSTMENT FACTOR											0.55		
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)											23,229		
SPECIAL LANDSCAPE AREA (SLA in Square Feet)											0		
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)											**343,775**		
TOTAL ACRE FEET											1.06		
CALCULATIONS:													
43.4	x	0.62	x	0.55	x	23,229	+	0.45	x	0	=	**343,775**	
		Effective Precipitation (Eppt)											
		Use 25% of annual precipitation in the following equation:											
		MAWA = (ETo - Eppt) x .62 x (.55 x HA) + (.45 x SLA)											
YEARLY ETo											**43.4**		
EFFECTIVE PRECIPITATION											0		
NET ETo											43.4		
CONVERSION FACTOR											0.62		
ET ADJUSTMENT FACTOR											0.55		
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)											23,229		
SPECIAL LANDSCAPE AREA (SLA in Square Feet)											0		
MAXIMUM APPLIED WATER ALLOWANCE (gallons/year)											**343,775**		
TOTAL ACRE FEET											1.06		
CALCULATIONS:													
43.4	x	0.62	x	0.55	x	23,229	+	0.45	x	0	=	**343,775**	
RESULTS:		Irrigation reductions by adding precipitation (gallons/year):											**0**

ESTIMATED TOTAL WATER USE
WATER BUDGET CALCULATIONS

prepared by:
MD Fotheringham, Landscape Architects, Inc.
1700 North Broadway, Suite 390, Walnut Creek, CA 94596
925-939-8292

Oak Creek Canyon - Commons													Date: 2/27/2020			
CITY OF:			**Clayton**				ETo City	**Concord**								
SECTION B2			**ESTIMATED TOTAL WATER USE (ETWU, gallons per year)**													
			ETWU = ETo x .62 x ((PF x HA)+IE) + SLA													
Calculate the following for each Hydrozone (HZ):																
YEARLY ETo (inches per year)														43.4		
CONVERSION FACTOR (to gallons per square foot)														0.62		
Average PF - PLANT FACTOR (plant water demand, defined for each hydrozone)														0.325		
TOTAL IRRIGATED LANDSCAPE AREA (HA in Square Feet)														23,229		
SPECIAL LANDSCAPE AREA (SLA in Square Feet x .45)														0		
Average IE - IRRIGATION EFFICIENCY FACTOR (minimum .75)														0.81		
TOTAL ESTIMATED TOTAL WATER USE (gallons/year):														245,112		
TOTAL ACRE FEET:														0.75		
CALCULATIONS:																
Yearly ETo		Conversion Factor	HZ NO.	HYDROZONE DESCRIPTION		PLANT FACTOR (PF)	Irrigation Method	Irrigation Efficiency (IE)	ETAF (PF/IE)	Hydrozone Area (HA) (Sq Ft)		ETWU Gal/Yr	% Landscape Area	ETAF x Area
43.4		0.62	1	Shrubs Flat (L)		0.30	B	0.81	0.37	20,628		205,577	88.8%	7640
43.4		0.62	2	Shrubs Slope (L)		0.30	B	0.81	0.37	0		0	0.0%	0
43.4		0.62	3	Shrubs Flat (M)		0.60	B	0.81	0.74	1,366		27,227	5.9%	1012
43.4		0.62	4	C3 Basin (L)		0.30	B	0.81	0.37	1,235		12,308	5.3%	457
43.4		0.62	5	Turf (H)		1.00	O	0.90	1.11	0		0	0.0%	0
				Special Landscape Area		0.45				0		0		
				TOTALS:						**23,229**		**245,112**	**100.00%**	**9,109**
				AVERAGE PF:		**0.50**								
				AVERAGE IE				**0.83**						
				AVERAGE ETAF:										**0.39**

IRRIGATION SCHEDULE

SYMBOL	MODEL NUMBER	DESCRIPTION	PSI	GPM	PRECIPITATION RATE	MAX RADIUS	MAX SPACING
▽ ▽	1804-SAM-P45-R-VAN14 H,Q	RAINBIRD POP-UP PART CIRCLE LAWN ROTARY NOZZLE	30	.28, .56	.64	14'	13'
⊗	1804-SAM-P45-R13-18 F	RAINBIRD POP-UP FULL CIRCLE LAWN ROTARY NOZZLE	30	1.60	.61	16'	14'
■	RWS-B-C-1401	RAINBIRD ROOT WATERING SYSTEM, PRESS. COMP. BUBBLER INSTALL 2 RWS WITH BUBBLERS PER TREE (.5 GPM)					
▲ ▲▼	XFD BLANK, XB-10PC	RAINBIRD SHRUB IRRIGATION: BLANKLINE W/ XB EMITTERS: 2 - XB-10PC per 1 Gal. (2 GPH); 3 - XB-10PC per 5 Gal. (3 GPH); 5 - XB-10PC per 7-15 Gal. (5 GPH) with XQ 1/4" tubing					
△	XFS FLUSH POINT	RAINBIRD FLUSH VALVE - LOCATE AT LOW POINT OR ALONG FLUSH HEADER					
NOT SHOWN	ARV050	RAINBIRD 1/2" AIR RELIEF VALVE - LOCATE AT HIGH POINT OR ALONG SUPPLY HEADER					
(ND)	OPERIND	RAINBIRD XERI-POP-UP DRIP OPERATION INDICATOR - LOCATE AT FAR END FROM WATER SOURCE					
	XACZ-100-PRF, XACZ-075-PRF	RAINBIRD 1" (or 3/4") LOW FLOW ANTI-SIPHON VALVE W/ 1" (or 3/4") PR RBY Filter					
	100-ASVF	RAINBIRD REMOTE CONTROL VALVE WITH ATMOSPHERIC BACKFLOW PREVENTER					
	765 1 1/2"	FEBCO REDUCED BACKFLOW PREVENTER (Optional -use only if anti-siphon valves CANNOT be used)					
	4660-T PVC	NIBCO PVC SCHEDULE 40 BALL VALVE - 4" AND SMALLER (LINE SIZE)					
	A-1 1" 3	CONTROLLER AND STATION NUMBER APPROXIMATE GALLONS PER MINUTE (GPM) VALVE SIZE					
		MAINLINE: 1" DIA. 1120-SCHEDULE 40 PVC PLASTIC PIPE WITH SCHEDULE 80 PVC SOLVENT WELD FITTINGS. 18" MIN. COVER.					
		LATERAL LINE: 1120 - 200 PSI PVC SOLVENT WELD PIPE WITH SCHEDULE 40 PVC SOLVENT WELD FITTINGS. 12" MIN. COVER. FOR DRIPLINE SEE DRIP IRRIGATION DETAILS					
		SLEEVE: 1120-CLASS 200 PVC PLASTIC PIPE. (SL. 6" OR 4" - SEE PLAN) PVC SOLVENT WELD FITTINGS. 18" COVER.					
		XFS - 06 - 12 - 500: RAINBIRD SUB-SURFACE DRIPLINE - FOR LAWN AREAS ONLY; 12" EMITTER SPACING, .6 GPH PER EMITTER: BURY IN TOPSOIL 2" MINIMUM: USE ONLY RAINBIRD 17 MM XFF FITTINGS					
Ⓐ	ESP4SMTEi - ESPSM6	RAINBIRD ESP-SMTe SMART MODULAR CONTROL SYSTEM, BASE MODEL WITH ONE 6-STATION EXPANSION MODULE, & ONE 3-STATION EXPANSION MODULE AS NEEDED					
Ⓡ	RSD-CEx	RAINBIRD WIRED RAIN SENSOR WITH EXTENSION WIRE - MOUNT ON GARAGE EXTERIOR ROOF					
	MWELO 490.1 (c) Applicability: Any project with an aggregate landscape area of 2,500 square feet or less may comply with the performance requirements of this ordinance, or conform to the prescriptive measures contained in Appendix D. The above equipment list complies with Appendix D. Any approved "or equal" substitutions must also comply with Appendix D.						

PVC LATERAL LINE SIZING CHART

SPRINKLER TYPE	GALLONS PER MINUTE	PIPE SIZE
SPRAY & BUBBLERS	1-8 9-15 16-25	3/4" 1" 1 1/4"

MAIN LINE SIZING: ALL MAIN LINE FOR PRIVATE LOT IRRIGATION SHALL BE MIN. 1" DIA.

NOTES:

1. ALL SLEEVES SHALL BE A MINIMUM OF 4" DIA. CLASS 200 PVC WHENEVER MAINLINE CROSSES UNDER PAVING. INSTALL 2 SLEEVES FOR MAINLINES (1 FOR MAINLINE, 1 FOR CONTROL WIRES).
2. MINIMIZE SLEEVE LOCATIONS. WHERE MULTIPLE SLEEVES CROSS UNDER THE SAME WALKWAY, INSTALL ADJACENT TO EACH OTHER. NOT ALL IRRIGATION SLEEVES ARE SHOWN. SIZE AND LOCATION OF SLEEVES MAY CHANGE PER CONTRACTOR LAYOUT PREFERENCES.
3. PROVIDE AN IRRIGATION SERVICE WITH GATE VALVE TO BACK YARDS. (TYPICAL FRONT YARDS DESIGN ONLY)
4. STREET TREES AND ACCENT TREE MAY BE ON THE SAME VALVE IF THEY HAVE THE SAME WATER REQUIREMENTS.
5. SEE WATER EFFICIENT LANDSCAPE CALCULATIONS ON SHEET L-10 (MODELS), AND SHEETS L-14, L-15 (TYPICAL FRONT YARDS).
6. THE NUMBER OF IRRIGATION VALVES FOR EACH CONTROLLER IS BASED ON MEETING WELO REQUIREMENTS. ANY COMBINING OF VALVE ZONES WILL REQUIRE REVISED WELO CALCULATIONS.
7. ANY WATERING SCHEDULES PROVIDED PRIOR TO INSTALLATION MAY REQUIRE MODIFICATIONS IF AS-BUILT IRRIGATION DESIGN IS DIFFERENT FROM THESE DESIGN PLANS.
8. SEE ALSO THE CITY OF FAIRFIELD NOTES ON THE COVER SHEET L-1. THOSE NOTES APPLY TO INSTALLATION OF THE PARKWAY STRIP IRRIGAITON.
9. THE IRRIGATION EQUIPMENT SHOWN IN THIS IRRIGATION SCHEDULE INCLUDES EQUIPMENT FOR OVERHEAD SPRAY AND SUB-SURFACE DRIPLINE APPLICATIONS. CONTRACTOR, WITH BUILDER'S AUTHORIZATION, MAY SUBSTITUTE ONE APPLICATION FOR ANOTHER. ANY SUBSTITUTIONS MAY ALTER THE WATERING SCHEDULE PROVIDED.

M D FOTHERINGHAM
LANDSCAPE ARCHITECTS
1700 North Broadway, Suite 390
Walnut Creek, CA 94596
T: 925-939-8292
F: 925-939-8292
E: info@mdfotheringham.com

License Stamp

LICENSED LANDSCAPE ARCHITECT
MICHAEL D. FOTHERINGHAM
SIGNATURE
10/31/20
RENEWAL DATE
DATE
#2481
STATE OF CALIFORNIA

Consultants

Project

OAK CREEK CANYON
SUBDIVISION 6826

City of Clayton,
Contra Costa County

Client

WEST COAST HOME BUILDERS, INC.
4021 PORT CHICAGO HIGHWAY
CONCORD, CALIFORNIA

Sheet Title

IRRIGATION PARAMETERS & WELO CALCULATIONS 3

VTM SUBMITTAL
NOT FOR CONSTRUCTION

Scale

Designed by
MDF / CGW

Drawn by
MDF / CGW

Checked by
MDF

Revisions

△

Plot Stamp
Date: **Tuesday, March 10, 2020**
File name: **OakCreekVTMpreland v2020.vwx**

Project Number
22110

Sheet Number
L-12

ATTACHMENT Q - ARBORIST REPORT

TRAVERSO TREE SERVICE
WHEN IT HAS TO BE DONE RIGHT

October 10, 2019

West Coast Homebuilders, Inc.
4061 Port Chicago Hwy Suite H
Concord, CA 94520
Attn: Kevin English
925-682-6419 | kenglish@discoverybuilders.com

Re: Arborist Report for Oak Creek Canyon, Marsh Creek Road & Diablo Parkway, Clayton

Dear Kevin,

This arborist report addresses the proposed subdivison for the property at Marsh Creek Road & Diablo Parkway, APN 119-070-008. Per the City of Clayton's Tree Protection Ordinance Chapter 15.70, the scope of work includes:

- Tag, identify and measure trees with a single trunk or multiple trunks with a cumulative diameter of 6" or greater at 4.5' above grade, on or overhanging the property within 50' of proposed improvements.
- Note trees that are considered protected per city ordinance, defined as any tree of the following species: Ash (*Fraxinus dipetala*), Bay (*Umbellularia californica*), Box Elder (*Acer negundo*), Buckeye (*Aesculus californica*), Cherry (*Prunus emarginata, P. illicifolia, P. subcordata*), Cottonwood (*Populus fremontii*), Elderberry (*Sambucus mexicana*), Hop Tree (*Ptelea crenulata*), Madrone (*Arbutus menziesii*), Maple (*Acer macrophyllum*), Oak (*Quercus agrifolia, Q. chrysolepis, Q. douglasii, Q. kelloggii, Q. lobata, Q. wislizeni*), Sycamore (*Platanus racemosa*), Walnut (*Juglans hindsii)*
- Identify dripline locations and tree numbers on site plan.
- Assess individual tree health and structural condition.
- Assess proposed improvements for potential encroachment.
- Based on proposed encroachment, tree health, structure, and species susceptibility, make recommendations for preservation.

Project Summary
The property is an undeveloped hilly site at the outskirts of Clayton (Figure 1). Current vegetation is consistent with the native hillsides of our region, consisting of annual grasses, weeds, with scattered trees. Existing improvements include asphalt paving, curbs & gutters, and water lines from the Contra Costa County Water District (CCCWD) property to the street.

I included twenty-one (21) trees in my tree inventory. None are considered protected trees per city ordinance, though there are native oaks located in the CCCWD property and on the hillside far above the proposed subdivision. It is my opinion that nine (9) trees will need to be removed to accommodate the proposed project (Figure 2), seven (7) of which are notoriously weedy trees of heaven. The remaining twelve (12) trees can be retained given that the protection measures within this report are followed.


Figure 2. Two black locusts will need to be removed for a proposed path.

Assumptions & Limitations
This report is based on my site visit on 9/30/19, and vesting tentative map by Isakson & Associates, Inc. dated 9/5/19. It was assumed that the trees and proposed improvements were accurately surveyed. Off-site trees were not surveyed, so I approximately located them on the tree protection plan based on visual estimates of their locations.

The health and structure of the trees were assessed visually from ground level. No drilling, root excavation, or aerial inspections were performed. Internal or non-detectable defects may exist and could lead to part or whole tree failures. Due to the dynamic nature of trees and their environment, it is not possible for arborists to guarantee that trees will not fail in the future.

Tree Inventory & Assessment Table
#s: Each tree was given a number from #41-61 (off-site trees were not physically tagged). Their locations are given in the tree protection plan.
DBH (Diameter at Breast Height): Trunk diameters in inches were calculated from the circumference measured at 4.5' above average grade.

Health & Structural Condition Rating
Dead: Dead or declining past chance of recovery.
Poor (P): Stunted or declining canopy, poor foliar color, possible disease or insect issues. Severe structural defects that may or may not be correctable. Usually not a reliable specimen for preservation.
Fair (F): Fair to moderate vigor. Minor structural defects that can be corrected. More susceptible to construction impacts than a tree in good condition.
Good (G): Good vigor and color, with no obvious problems or defects. Generally more resilient to impacts.
Very Good (VG): Exceptional specimen with excellent vigor and structure. Unusually nice.

Age
Young (Y): Within the first 20% of expected life span. High resiliency to encroachment.
Mature (M): Between 20% - 80% of expected life span. Moderate resiliency to encroachment.
Overmature (OM): In >80% of expected life span. Low resiliency to encroachment.

	DBH	Health	Structure	Dripline N	E	S	W	Age	DE	CI	Comments	Action
ia)	6	P	P	8	8	8	10	OM	X	H	4 of 5 stems dead. Major decay in remaining stem; girdled by barbed wire. 6" west of existing asphalt. Proposed path up to trunk.	Remove.
	14, 17	G-F	F-P	10	0	15	15	M	X	H	Co-dominant trunks. Sided for power line clearance. Barbed wire girdling stem. Asphalt road right up to trunk; trunk flare buried. Decay between stems. Proposed path up top trunk.	Remove.
nia	20	G	G	4	4	4	4	Y	X	M	DBH estimated due to dense skirt of dead fronds. Trunk pushing against fence. 10' clear trunk. Proposed path 2' from trunk.	Provide 2' additional clearance from path; install temporary protection fencing.
	8.5, 12.5, 7, 6	F-P	F-P	15	18	18	15	M	X	H	Multiple stems at 2'. Barbed wire girdling smallest stem. Wire fence engulfed in lower trunk. 7' from proposed path. Notoriously weedy species.	Remove. Treat stumps with systemic herbicide.
	4, 4	F	F	15	15	0	0	Y		L-M	Co-dominant stems at 1'. Stunted growth. Notoriously weedy species. 5' from proposed path.	
	6, 5, 6	F	F	10	15	10	10	M	X	H	Co-dominant stems at 3' with included bark. Barbed wire starting to embed into trunk. Notoriously weedy species. In proposed path.	
	5, 6.5	F	P	0	20	0	0	Y	X	H	Recent large branch failure at attachment point. Notoriously weedy species. 2' from proposed path.	
	3.5, 4.5	F	F-P	18S				Y	X	H	Co-dominant trunks. All canopy to S. Notoriously weedy species. In proposed path.	
	15.5	F	VP	20	20	20	20	M	X	M-H	Co-dominant stems at 3.5' with severe included bark; again at 5' with serious included bark. Notoriously weedy species. 5' from proposed path.	
	10.5, 10	F	F-P	15	0	18	10	M	X	H	Co-dominant stems at 1.5'; one with large failure of secondary co-dominant stem. Notoriously weedy species. In proposed path.	

	DBH	Health	Structure	Dripline N	E	S	W	Age	DE	CI	Comments	Action
	2.5, 4, 2	F	F	0	6	8	6	Y		L	Off-site, no tag, DBH estimated; not surveyed. Foliage half brown half chewed. Phototropic lean. Clear of construction.	None.
	6, 3	G-F	F	0	8	10	10	Y		L	Off-site, no tag, DBH estimated; not surveyed. Trunk cankers. Clear of construction.	None.
	8	G-F	G-F	6	8	10	8	Y		L	Off-site, no tag, DBH estimated; not surveyed. Clear of construction.	None.
	6.5, 4, 3.5	G-F	F	6	6	10	12	M		L	Off-site, no tag, DBH estimated; not surveyed. Co-dominant stems at 1'. Moderate chewing damage of leaves. Clear of construction.	None.
	14, 17	G	G	10	12	18	20	M		L	Off-site, no tag, DBH estimated; not surveyed. Co-dominant stems at 3'. Trunk with minor lean down slope, partially corrected. Clear of construction.	None.
	11	F	F	0	6	10	10	M		L	Off-site, no tag, DBH estimated; not surveyed. Decent structure in lower trunk; co-dominant stems at 8'. Clear of construction.	None.
	19	F-P	F	20	8	20	18	M		L	Off-site, no tag, DBH estimated; not surveyed. More elongated scaffolds to S. Slightly sparse canopy. Clear of construction.	None.
	15, 8	F	F	20	15	20	8	M		L	Off-site, no tag, DBH estimated; not surveyed. Elongated / large diameter scaffolds; decent single trunk. Small woody roots visible outside fence area. Clear of construction.	None.
s)	28	G	F-P	25	25	10	20	M		L	Off-site, no tag, DBH estimated; not surveyed. Multiple co-dominant stems at 8' twisted with included bark. Minor branch failures. Clear of construction.	None.
e a)	30	G-F	G-F	15	15	18	15	M	X	L-M	Off-site, no tag, DBH estimated; not surveyed. Several 4" roots visible along fence line. Pitch flow may be due to birds/larger insects. 23' N of proposed V ditch.	Install temporary protection fencing.

	DBH	Health	Structure	Dripline N	E	S	W	Age	DE	CI	Comments	Action
	11, 7, 22	G	F	18	18	18	18	M	X	M	Off-site, no tag, DBH estimated; not surveyed. Multiple trunks. 15' from proposed end of J-ditch.	Cleanly prune roots ≥ 2" diameter if encountered.

ment Summary
hat will need to be removed: 41, 42, 44-49, 50 (9 trees)
o be saved that will be subjected to dripline encroachment: 43, 60, 61 (3 trees)
o be saved that will not be encroached: 51-59 (9 trees)

homes have a minor impact on existing trees, since they are located in open areas. Construction encroachment s from the proposed paths along the south and east property lines. Two black locusts (#41 & 42, Figure 2) along the ne will need to be removed. Neither tree is in excellent condition; one is nearly dead and the other has relatively poor r canopies also conflict with adjacent power lines, and clearance pruning has resulted in lopsided canopies.

tree removals consist of seven trees of heaven. The species is highly undesirable in both urban and natural habitats wing characteristics: can grow anywhere, especially disturbed areas; grows quickly with weak branches and wood; ndant quantities of seeds; vigorously re-sprouts from the entire root system if the top is damaged. Ideally, the stumps ted with systemic herbicide immediately after the trees are removed. Systemic herbicides will be absorbed into the ll help kill roots and mitigate re-sprouting. Unfortunately, treatment is perhaps 60%-70% effective at best and may e applications.

he CCCWD property may be affected by the construction of the proposed J & V ditches. I suspect the Monterey pine e significantly affected, but it's likely that large roots ≥ 2" diameter will be encountered near the Italian stone pine roots are encountered, they should be cleanly pruned with a handsaw or sawzall.

#43, Figure 3) at the southeast corner of the property will be subject to moderate encroachment from the proposed ffer from trees in that they readily regenerate roots at the base of their trunks, so they tolerate disturbance closer than recommend moving the path a few feet further away to reduce encroachment.

Recommendations (to be printed on site plans)

Pre-construction

- Adjust proposed path design to provide 2' additional clearance from tree #43.
- Remove trees #41, 42 & 44-50. Treat stumps with systemic herbicide immediately after removal.
- Prior to construction or grading, contractor shall install fencing to construct a temporary Tree Protection Zone (TPZ) around trees #43 & 60 as indicated on the tree protection plan.
- TPZ fencing shall remain in an upright sturdy manner from the start of grading until the completion of construction. Fencing shall not be adjusted or removed without consulting the project arborist (PA).

Figure 3. Proposed path should be adjusted further from the palm tree (#43) to reduce encroachment.

Foundation, Grading, and Construction Phase

- If roots ≥ 2" diameter are encountered by tree #61 during construction of the proposed J-ditch, roots shall be cleanly pruned with a handsaw or sawzall.
- Pruning shall be performed by personnel certified by the International Society of Arboriculture (ISA). All pruning shall adhere to ISA and American National Standards Institute (ANSI) Standards and Best Management Practices.
- Should TPZ encroachment be necessary, the contractor shall contact the project arborist (PA) for consultation and recommendations.
- Contractor shall keep TPZs free of all construction-related materials, debris, fill soil, equipment, etc. The only acceptable material is mulch spread out beneath the trees.
- Should any damage to the trees occur, the contractor shall promptly notify the PA to appropriately mitigate the damage.

Thank you for the opportunity to provide this report, and please do not hesitate to contact me if there are any questions or concerns.

Please see attached tree protection plan.

Sincerely,

VESTING TENTATIVE MAP

"OAK CREEK CANYON"

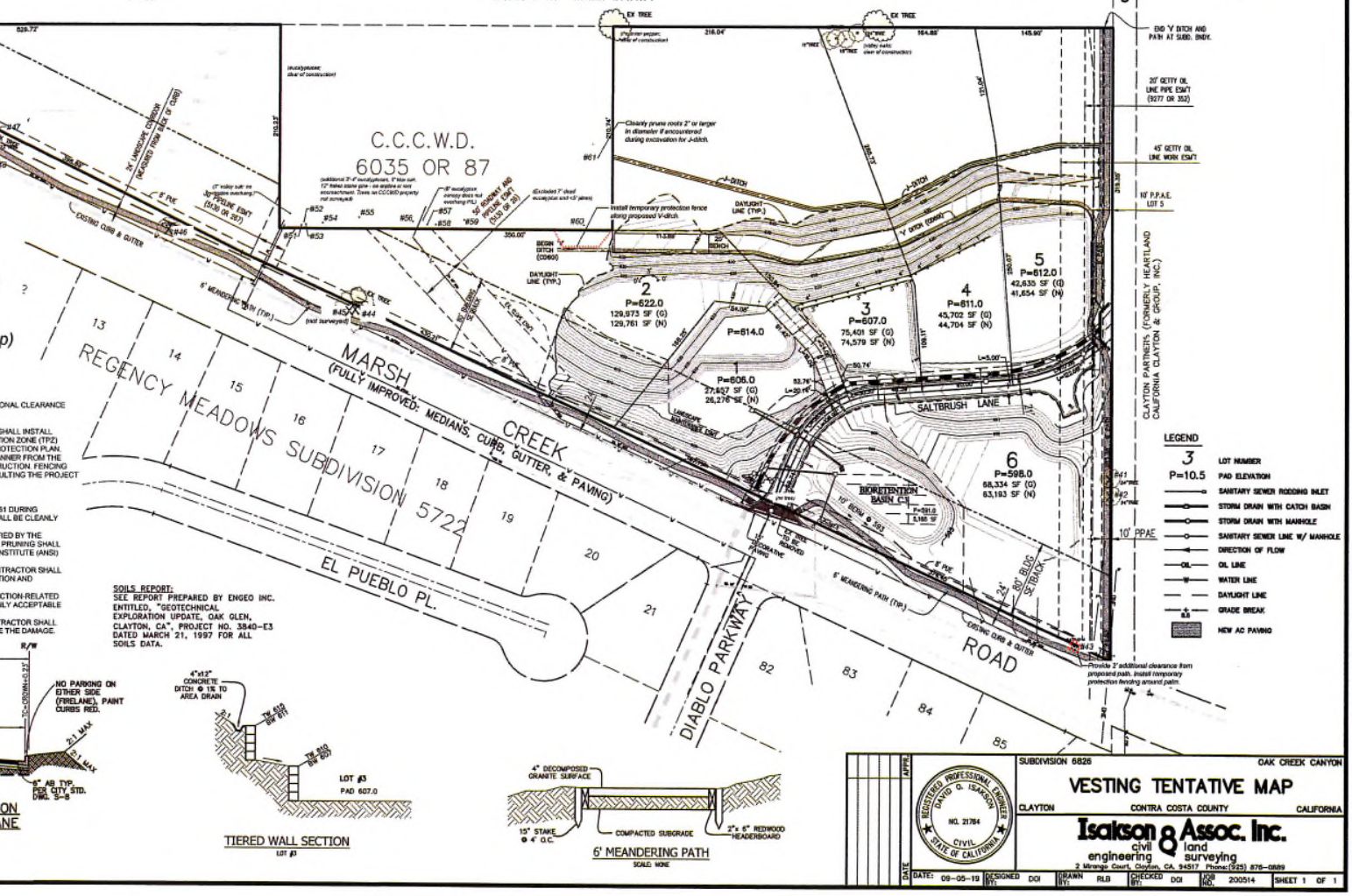
SUBDIVISION 6826

CITY OF CLAYTON
COUNTY OF CONTRA COSTA
STATE OF CALIFORNIA

CLAYTON
-370-052

1"=50'

CITY OF CLAYTON
118-370-052



VICINITY MAP
NO SCALE

LEGEND

3	LOT NUMBER
P=10.5	PAD ELEVATION
	SANITARY SEWER RODDING INLET
	STORM DRAIN WITH CATCH BASIN
	STORM DRAIN WITH MANHOLE
	SANITARY SEWER LINE W/ MANHOLE
	DIRECTION OF FLOW
OL	OIL LINE
W	WATER LINE
	DAYLIGHT LINE
	GRADE BREAK
	NEW AC PAVING

SOILS REPORT:
SEE REPORT PREPARED BY ENGEO INC. ENTITLED, "GEOTECHNICAL EXPLORATION UPDATE, OAK GLEN, CLAYTON, CA", PROJECT NO. 3840-E3 DATED MARCH 21, 1997 FOR ALL SOILS DATA.

NO PARKING ON EITHER SIDE (FIRELANE), PAINT CURBS RED.

4"x12" CONCRETE DITCH @ 1% TO AREA DRAIN

TIERED WALL SECTION

4" DECOMPOSED GRANITE SURFACE
15" STAKE @ 4' O.C.
COMPACTED SUBGRADE
2"x 6" REDWOOD HEADERBOARD

6' MEANDERING PATH
SCALE: NONE

Provide 2' additional clearance from proposed path. Install temporary protection fencing around palm.

SUBDIVISION 6826 OAK CREEK CANYON

VESTING TENTATIVE MAP

CLAYTON CONTRA COSTA COUNTY CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER DAVID O. ISAKSON NO. 21784 CIVIL STATE OF CALIFORNIA

Isakson & Assoc. Inc.
civil engineering & land surveying
2 Mirange Court, Clayton, CA, 94517 Phone:(925) 675-0889

DATE: 09-05-19 | DESIGNED BY: DOI | DRAWN BY: RLG | CHECKED BY: DOI | JOB NO.: 200514 | SHEET 1 OF 1

200514 - OAK CREEK CANYON (SUBD. 6826) TENTATIVE MAP - 09-05-2019

Oak Creek Canyon Residential Subdivision
Initial Study/Mitigated Negative Declaration
ENV-02-16

CITY OF CLAYTON

Founded 1857 .. Incorporated 1964

City of Clayton
Community Development Department
6000 Heritage Trail
Clayton, California 94517
(925) 673-7340

August 2020

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

INTRODUCTION

West Coast Home Builders, Inc., has proposed to subdivide a portion of a 9.03-acre site into six single-family residential lots. The project site is located on the north side of Marsh Creek Road opposite the intersection of Marsh Creek Road and Diablo Parkway. The project site has been annexed to the City of Clayton.

This Initial Study/Mitigated Negative Declaration (IS/MND) identifies potentially significant environmental impacts for the following environmental areas:

- Biological Resources;
- Cultural Resources;
- Geology and Soils;
- Hazards and Hazardous Materials;
- Noise; and
- Tribal Cultural Resources.

Environmental analysis determined that measures were available to mitigate potential adverse impacts to insignificant levels. As a result, a Mitigated Negative Declaration has been prepared pursuant to Public Resources Code Section 21064.5, and Article 6 of the California Environmental Quality Act (CEQA) Guidelines.

Pursuant to the requirements of CEQA Guidelines Section 15071, this Negative Declaration describes the proposed project; identifies, analyzes, and evaluates the potential significant environmental impacts, which may result from the proposed project; and identifies measures to mitigate adverse environmental impacts. With implementation of the included mitigation measures, the project would not have a significant impact on the environment.

I. PROJECT/APPLICANT INFORMATION

1.	Project Title:	Oak Creek Canyon Residential Subdivision Project
2.	Lead Agency Name and Address:	City of Clayton 6000 Heritage Trail Clayton, CA 94517
3.	Contact Person and Phone Number:	Matthew Feske Community Development Director City of Clayton (925) 673-7343
4.	Project Location:	North side of Marsh Creek Road, at intersection with Diablo Parkway Clayton, CA 94517
5.	Project Sponsor's Name and Address:	West Coast Home Builders, Inc 4061 Port Chicago Highway Concord, CA 94520 Contact: Kevin English (925) 682-6419
6.	Existing General Plan Designations:	Single-Family Low Density (LD) Public/Quasi-Public (PQ) Private Open Space (PR)
7.	Proposed General Plan Designations:	Single-Family Low Density (LD) Private Open Space (PR)
8.	Existing Marsh Creek Road Specific Plan Designations:	Low Density Residential Open Space
9.	Proposed Marsh Creek Road Specific Plan Designations:	Low Density Residential Private Open Space
10.	Existing Zoning Designations:	Single-Family Residential (R-10) Public Facility (PF)
11.	Proposed Zoning Designations:	Planned Development (PD)

12. Project Description Summary:

The proposed project would include development of a total of six single-family residential lots, an internal drive, and a bio-retention basin in the southeast portion of the project site; the remainder of the project site would remain vacant and undeveloped. Access to the site would be provided by a new roadway that would extend northeastward through the site from the existing Marsh Creek

Road/Diablo Parkway intersection. City of Clayton entitlements include a General Plan Map Amendment, Zoning Map Amendment, re-approval of the expired Vesting Tentative Map, Development Plan Review Permit, and a Tree Removal Permit.

The environmental factors checked below would be potentially affected by this project. The following Evaluation of Environmental Impacts identifies at least one impact that is "Less Than Significant with Mitigation Incorporated" for each of the checked environmental factors.

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

II. 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.

X 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 since the Project proponent has made revisions in the Project and has agreed to the mitigation measures listed in "Section V. List of Mitigation Measures." I further find that the mitigation measures and the information in this study constitute a MITIGATED NEGATIVE DECLARATION in accordance with Section 15071 of the State CEQA Guidelines.

☐ 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" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

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

Signature Date

Matthew Feske
Community Development Director

III. BACKGROUND

The Oak Canyon Creek Annexation and Residential Subdivision Project was approved by the City of Clayton on April 5, 2005, along with adoption of an Initial Study/Mitigated Negative Declaration (IS/MND); however, the project was never constructed.[1] The previously-approved entitlements for the project included a property annexation, a General Plan Amendment, an amendment to the *Marsh Creek Road Specific Plan*, pre-zoning of the project site, a tentative subdivision map for six single-family lots and a bio-retention basin, and a Development Plan Review Permit for home landscape and design, and the stormwater basin. It should be noted that the General Plan Amendment pertained to a parcel that is not included in the current project proposal.

Given that original project was never constructed, several project entitlements have since expired. In addition, the project applicant has modified the project to include six homes instead of the five homes included in the original proposal, and the size of the proposed bio-retention basin has been reduced. As discussed in greater detail below, the project applicant is requesting approval of a General Plan Amendment, Zoning Map Amendment, Marsh Creek Road Specific Plan Map Amendment, new Vesting Tentative Subdivision Map, Development Plan Review Permit, and a Tree Removal Permit.

This IS/MND identifies and analyzes the potential environmental impacts of the current proposal for the Oak Creek Canyon Project. The information and analysis presented in this document is organized in accordance with the order of the CEQA checklist in Appendix G of the CEQA Guidelines. If the analysis provided in this document identifies potentially significant environmental effects of the project, mitigation measures that should be applied to the project are prescribed.

This IS/MND relies on site-specific studies prepared for the project, the City of Clayton General Plan, the *Marsh Creek Road Specific Plan,* the *Marsh Creek Road Specific Plan Environmental Impact Report* (Specific Plan EIR)*,*[2] and, where applicable, information from the 2005 Initial Study previously approved by the City.

IV. PROJECT DESCRIPTION

A description of the project location and setting, the components of the project, and project entitlements is provided below.

Site Location and Setting

The proposed project site consists of approximately 9.03 acres of land located northwest of the intersection of Marsh Creek Road and Diablo Parkway in the City of Clayton, California (see Figure 1 and Figure 2). The site is identified by Assessor's Parcel Number (APN) 119-070-008.

[1] City of Clayton. *Initial Environmental Study/Negative Declaration (ENV 02-03).* April 5, 2005.
[2] City of Clayton. *Marsh Creek Road Specific Plan Environmental Impact Report.* June 28, 1995.

Figure 1
Regional Location Map

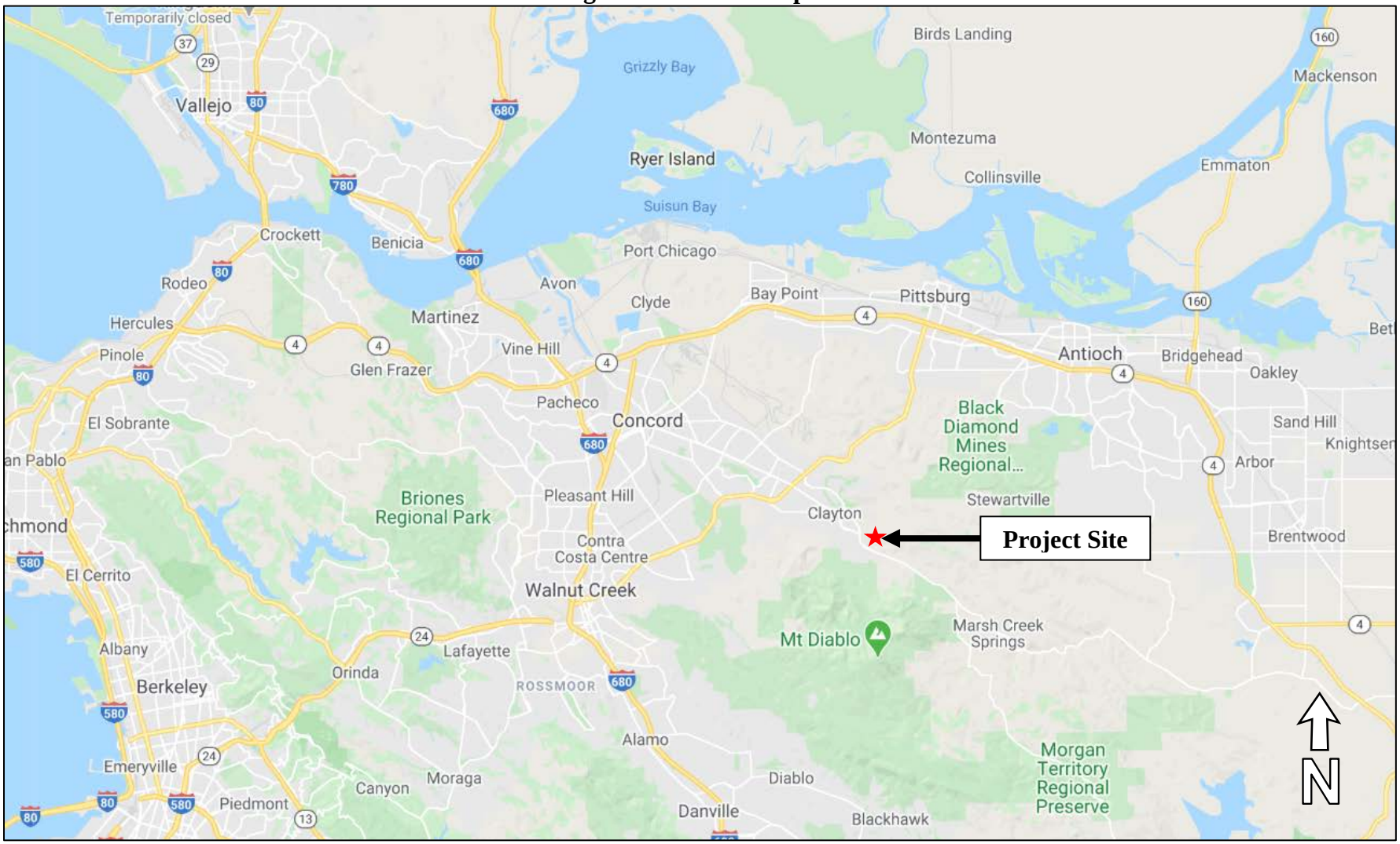


Figure 2
Project Site

The proposed project site, as well as the areas to the northeast and east of the project site, are within the planning area of the *Marsh Creek Road Specific Plan*, within unincorporated Contra Costa County. [3] The areas west, north, and south of the project site are outside of the *Marsh Creek Road Specific Plan*, but within the Clayton city limits. The site is designated Single-Family Low Density (LD), Public/Quasi-Public (PQ), and Private Open Space (PR) per the City of Clayton General Plan and zoned Single-Family Residential (R-10) and Public Facility (PF). The Marsh Creek Road Specific Plan designation for the site is Open Space and Low Density Residential.

Currently, the project site is vacant and undeveloped, consisting primarily of annual grasses and weedy vegetation. The site slopes downward from north to south towards Marsh Creek Road along the site's southern boundary. An existing drainage swale traverses the southeast portion of the project site in a northeast to southwest direction and discharges into a storm drain system at the intersection of Marsh Creek Road and Diablo Parkway.

The central portion of the site wraps around a 1.68-acre parcel owned by the Contra Costa County Water District (CCCWD). The CCCWD parcel contains a 500,000-gallon water tank, various associated infrastructure, and a small number of trees. Vehicular access and pipeline easements serving the water tank on the CCCWD parcel cross the western portion of the proposed project site, extending towards Marsh Creek Road. In addition, several oil pipeline operation and maintenance easements owned by Getty Oil Company are situated along the eastern site boundary. Within the easements are a 20-inch vacant pipeline operated by Crimson and a 16-inch gas line operated by Phillips 66. Four active oil pipelines are located in Marsh Creek Road along the project site frontage. One is a 20-inch pipeline owned by Crimson Midstream, LLC. The other three lines along Marsh Creek Road consist of a 16-inch pipeline, a 20-inch pipeline, and a 24-inch pipeline operated by Coalinga-Avon.

Surrounding Land Uses

The project site is bordered primarily by hilly, undeveloped open space areas to the north and east. The Clayton Community Park is located approximately 750 feet north of the site behind an intervening knoll. Surrounding land uses to the south and west of the project site consist of single-family residential subdivisions.

Project Components

The proposed project would require approval of a General Plan Amendment, Zoning Map Amendment, Marsh Creek Road Specific Plan Map Amendment, Vesting Tentative Subdivision Map, Development Plan Review Permit, and a Tree Removal Permit. Each of the project components is discussed in detail below.

General Plan Map Amendment

The project site is currently designated by the City of Clayton General Plan Land Use Element as LD, PQ, and PR. Single-family dwellings are not consistent with the PQ and PR designation. Therefore, the proposed project includes a General Plan Map Amendment to change the

[3] City of Clayton. *Marsh Creek Road Specific Plan.* Adopted June 28, 1995.

boundaries of the LD and PR areas, and eliminate the PQ designation, which would allow for the construction of six single-family residential lots (see Figure 3).

Marsh Creek Road Specific Plan Map Amendment

The project site is currently designated by the Marsh Creek Road Specific Plan Low Density Residential and Open Space. The MCRSP allows for alternative Open Space preservation. The Marsh Creek Road Specific Plan Map Amendment would allow the project site to include Private Open Space (see Figure 4).

Zoning Map Amendment

The project site is currently zoned R-10 and PF. R-10 allows the construction of residences for the owner or lessee, while PF is intended to provide areas for public facilities such as government offices, public safety facilities, and other public land uses. The proposed project includes a request to rezone the entire site from R-10 and PF to Planned Development (PD) in order to encompass the residential uses, private open space, and bioretention basin (see Figure 5).

Vesting Tentative Subdivision Map

The proposed Vesting Tentative Subdivision Map would subdivide the site into a total of six single-family residential lots and a bio-retention basin in the southeast portion of the project site (see Figure 6 and Figure 7). As indicated on the Vesting Tentative Map, all homes would be set back a minimum of 80 feet from the Marsh Creek Road property line, consistent with Specific Plan Policy DD-2d. Access to the site would be provided by a new roadway that would extend northeastward through the site from the existing Marsh Creek Road/Diablo Parkway intersection.

Grading

Per the Preliminary Grading Plan, the site would be graded to create building pads for Lots #1 through #6 and the proposed roadway. Grading would consist of cutting back portions of the hill to the north of the building pads on Lots #1 through #5 and adding fill material between the new building pads and the proposed road. In addition, a bench for a drainage ditch would be created to the north of the proposed building pads. Slopes above the bench would range from 3:1 to 2:1 slopes, whereas slopes between the bench and the building pads would all be 2:1. The portion of the development area fronting Marsh Creek Road would have more gradual slopes (3:1). To the south of the proposed road, the hill would be graded at a 3:1 slope to accommodate the building pad for Lot #6. Retaining walls would be constructed at the northern edge of the building pads on Lots #1, #2, and #3 for additional slope protection.

Utilities

Water and sewer utilities to serve the proposed development would be extended within the new on-site roadway from existing Contra Costa Water District and City sewer lines located in Marsh Creek Road (see Figure 8).

Figure 3
General Plan Exhibit

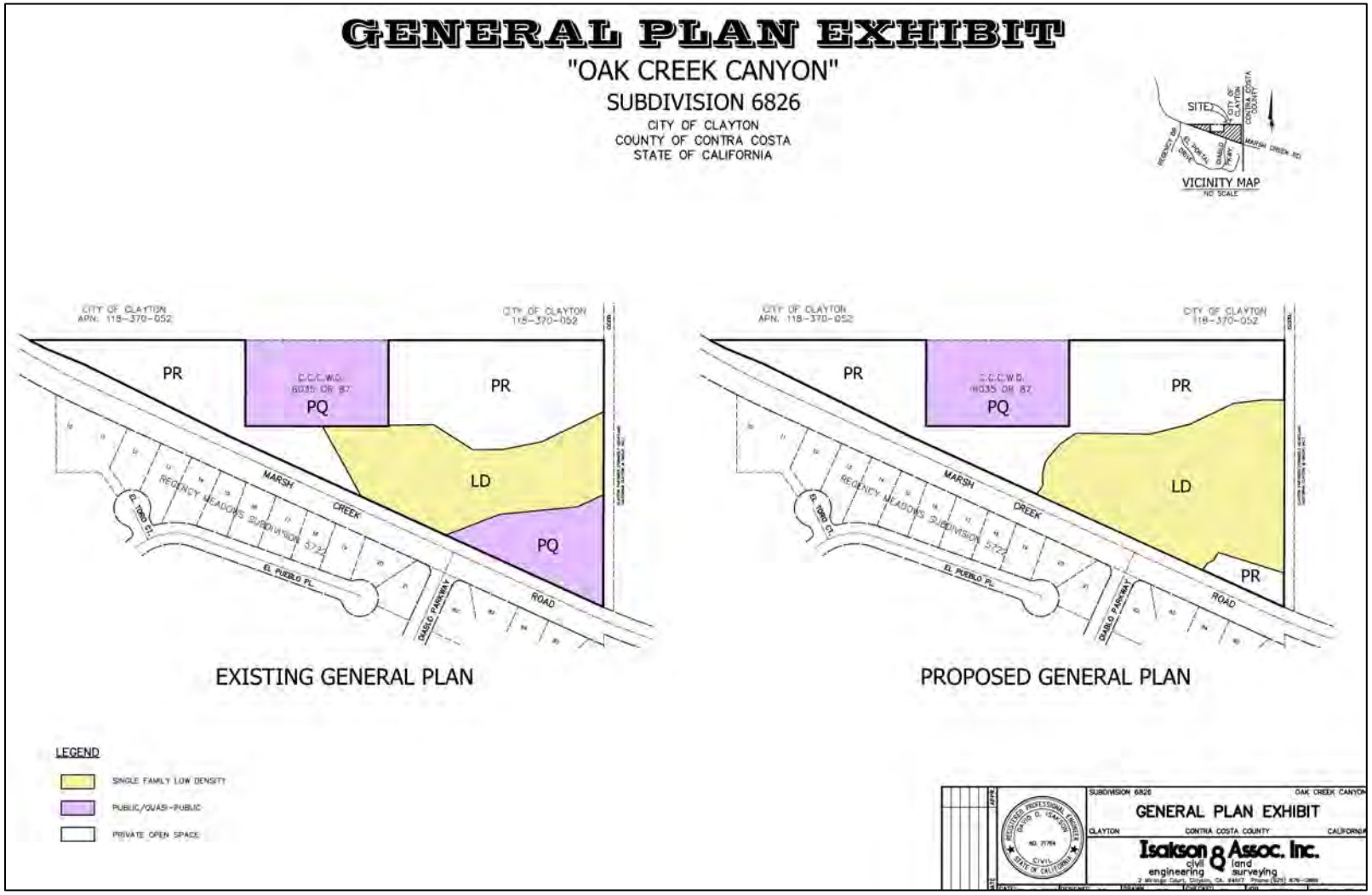


Figure 4
Marsh Creek Road Specific Plan Exhibit

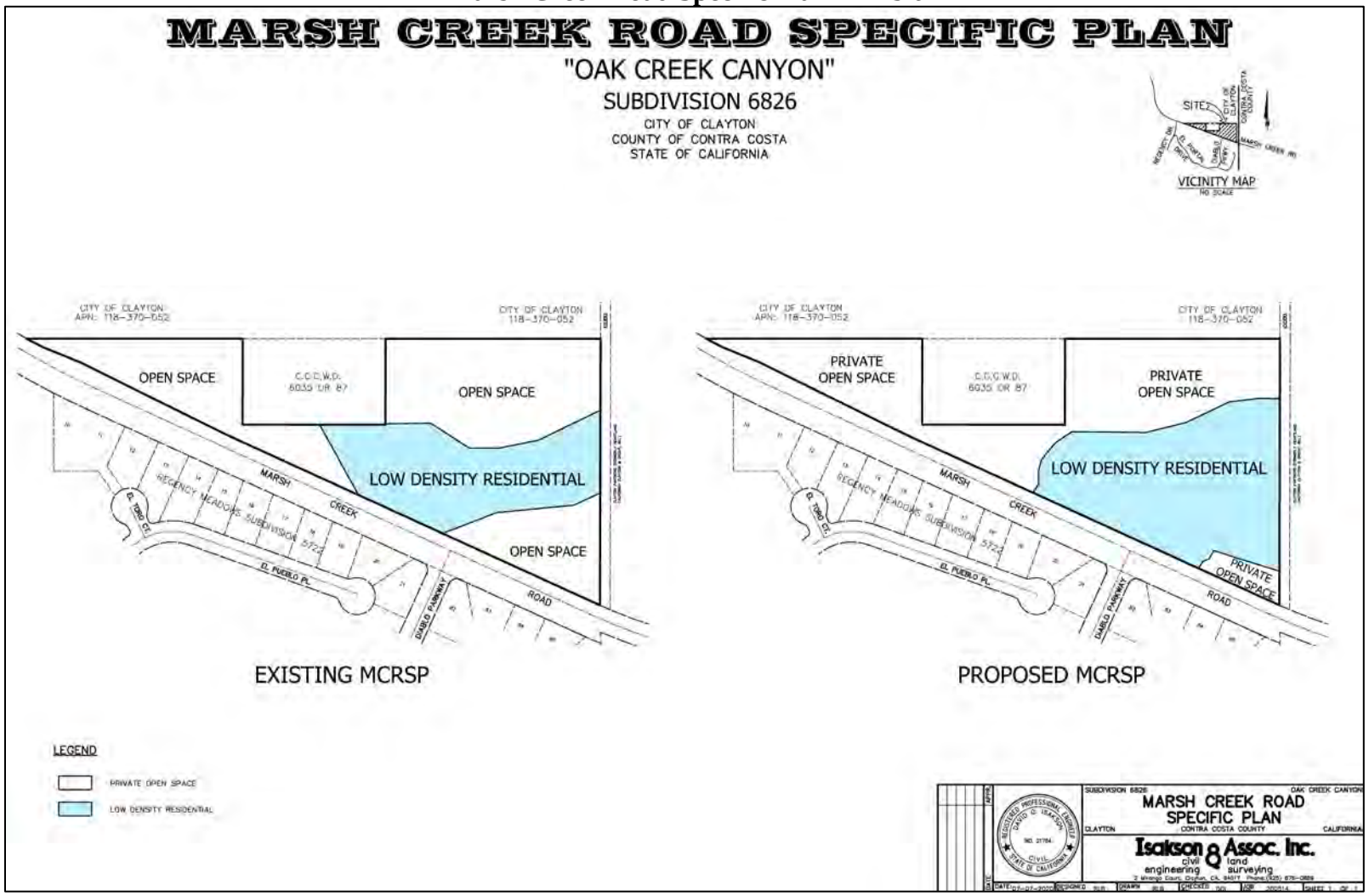


Figure 5
Zoning Exhibit

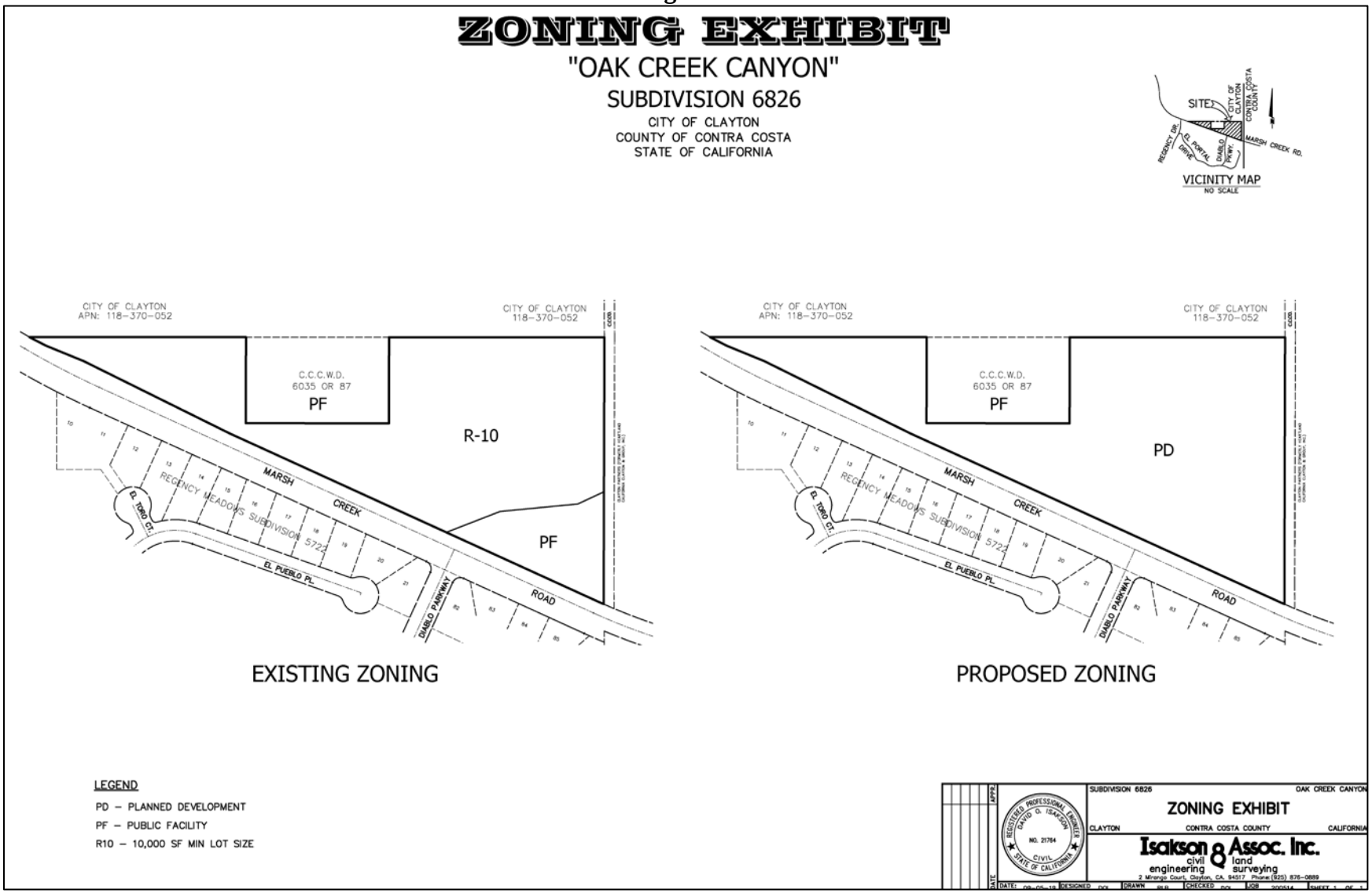


Figure 6
Vesting Tentative Subdivision Map

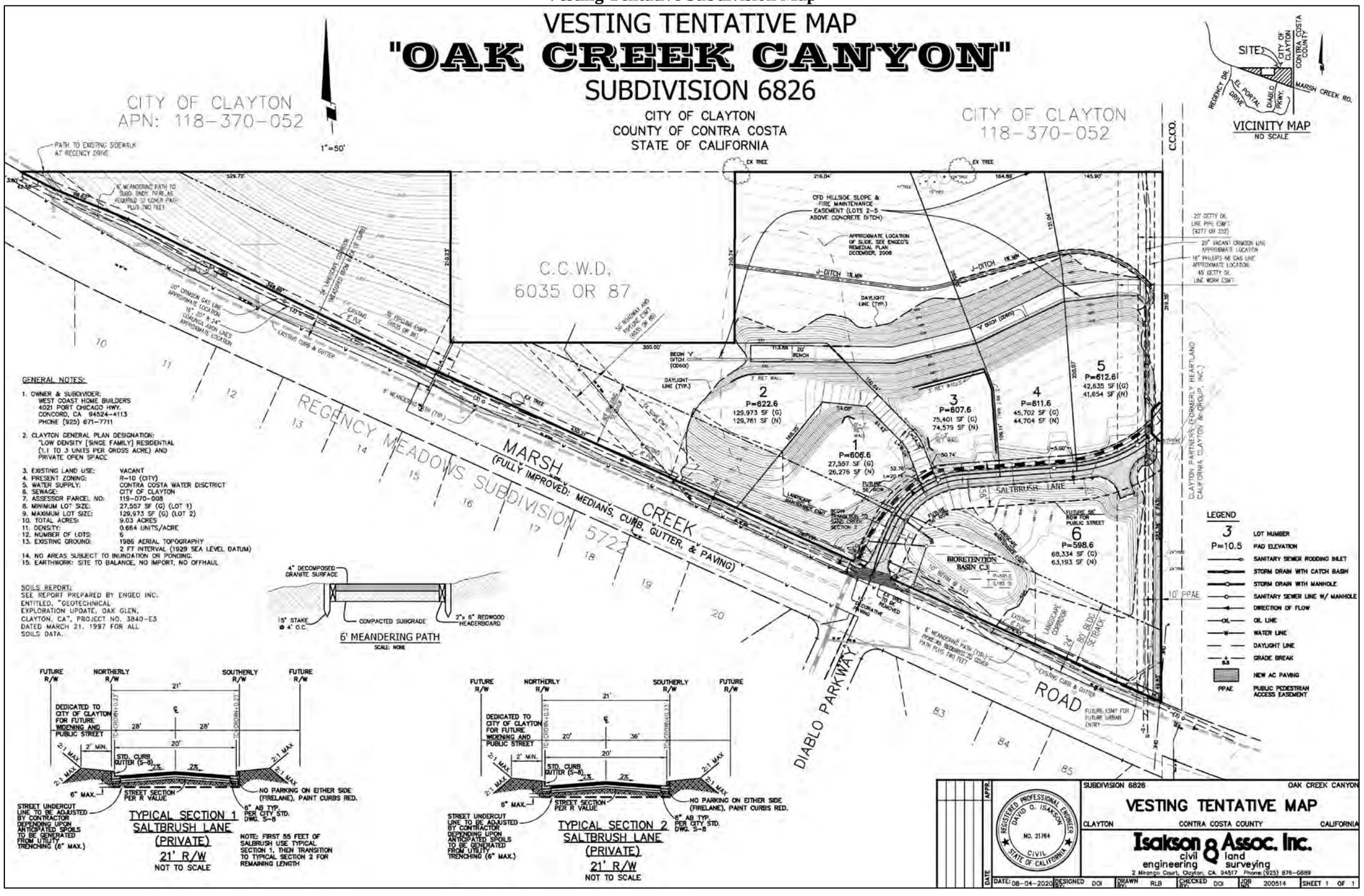


Figure 7
Site Development Plan

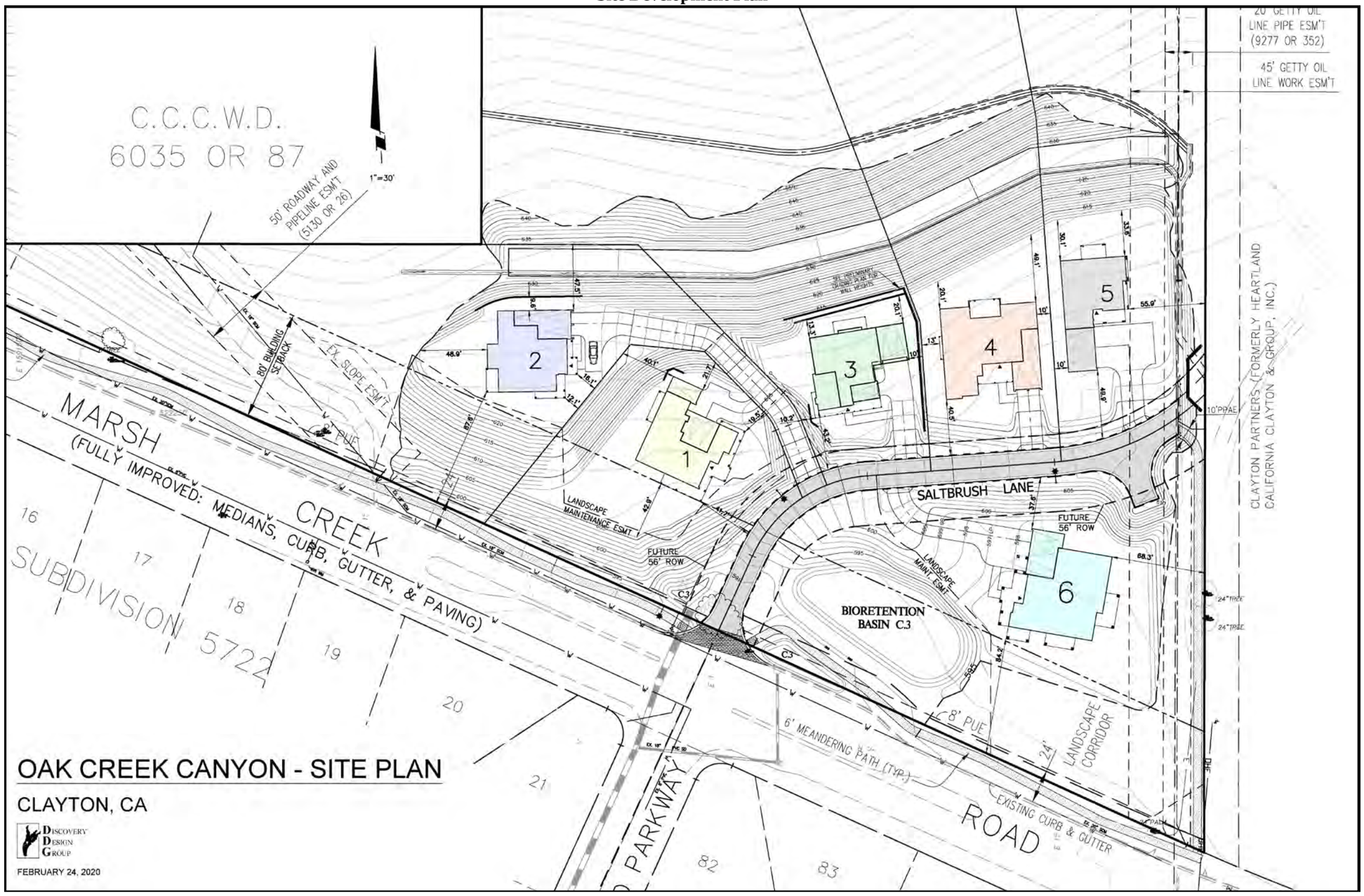
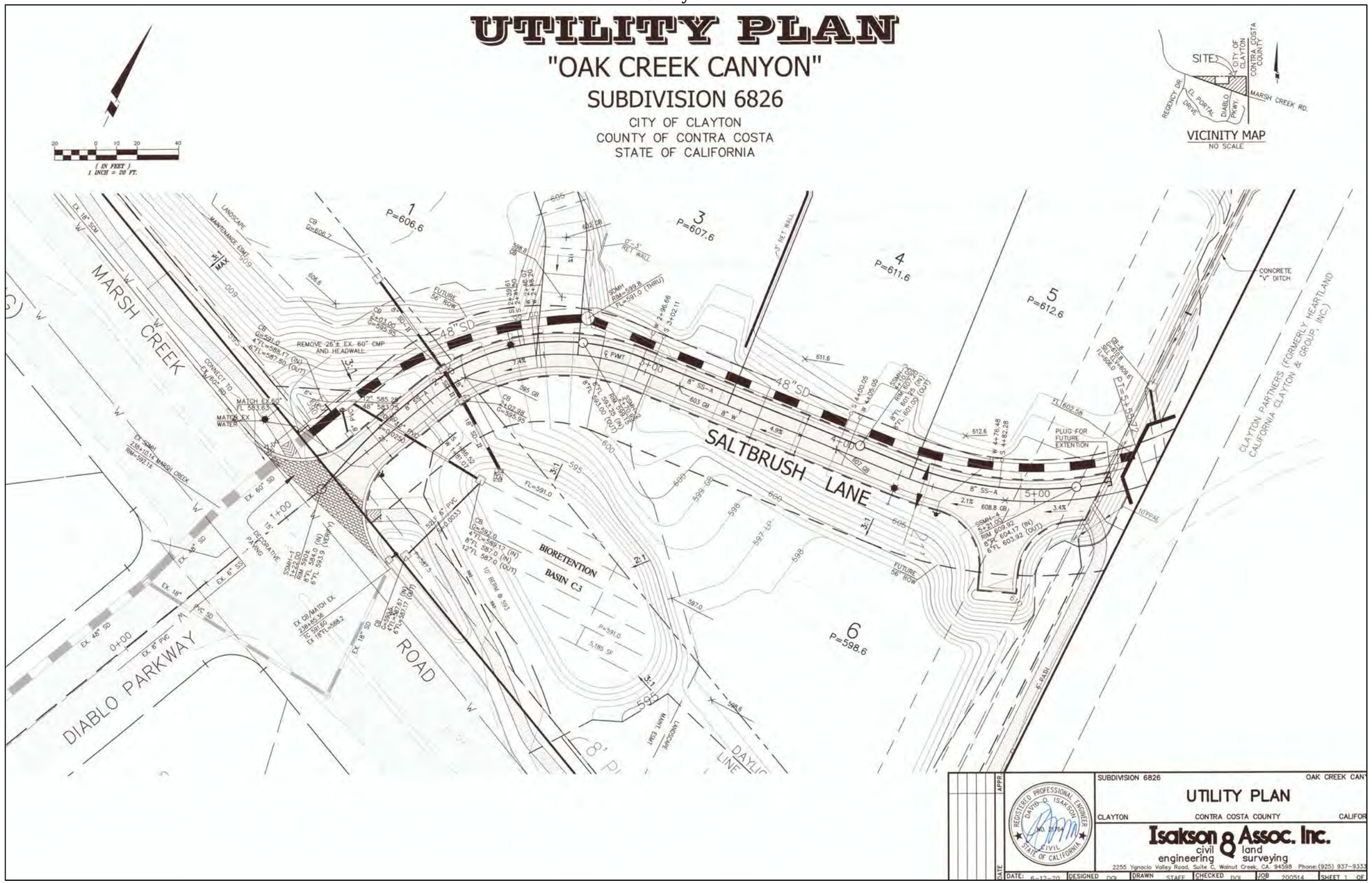


Figure 8
Utility Plan



With respect to stormwater, runoff from pavement and rooftop areas from Lots #1-#6 and pavement from the proposed roadway would drain to the main bioretention basin west of Lot #6. (see Figure 9). Runoff from undeveloped areas of the project site will primarily be self-treating. For example, runoff from the upslope portions of the residential lots would be intercepted by a proposed v-ditch, which would route runoff around Lot #5 and into the proposed 48-inch storm drain pipe in the proposed roadway. The 48-inch pipe would transport the stormwater to the City's existing 60-inch storm drain under Marsh Creek Road and Diablo Parkway in a similar manner as the existing drainage swale.

Landscaping and Sound Walls

As shown in Figure 10 and Figure 11, the proposed project would incorporate landscaping features throughout the developed portions of the project site, within the Marsh Creek Road median, and along the project frontage. A 24-foot landscape corridor would be provided along the Marsh Creek Road frontage and include various types of trees, shrubs, and ground cover. The proposed landscaping would include 24-inch box trees, as well as one-gallon and five-gallon shrubs. In addition, a six-foot-wide meandering trail would be provided along the project site frontage. The trail would run along Marsh Creek Road from the east and connect to an existing sidewalk at Regency Drive, located west of the project site.

Furthermore, a six-foot tall sound wall would be included at the south and east edges of the Lot #6 building pad, and at the south edge of the Lot #1 building pad. Other fencing improvements would also be included as part of the proposed project (see Figure 12 and Figure 13 for details). The proposed fencing improvements would include the construction of a split rail fence along the project site frontage at Marsh Creek Road and the eastern site boundary. In addition, an open space fence, split view fence, and good neighbor fence would be constructed near the proposed lots within the site. The open space fencing would be used to divide Lots #2 through #5, above the drainage bench, while the split view fence would be located within the western portion of Lot #2. The good neighbor fence is located where some privacy is warranted. In locations near Marsh Creek Road, sound walls would be constructed rather than the split view fence (see Figure 16).

Development Plan Review Permit

The proposed project would require approval of a Development Plan Review Permit for the proposed single-family residences on Lots #1 through #6 and a bioretention basin within Lot #6. Lots #1 through #3, and Lot #5, would contain two-story homes, whereas Lots #4 and #6 would contain single-story homes. The residences on Lots #5 and #6 would include adequate setbacks from existing petroleum pipeline easements located within the eastern boundary of the project site. Total living area of the proposed residences would range from 3,049 square feet (sf) to 4,587 sf, with building footprints ranging from to 3,105 sf to 5,015 sf. Landscaping would be provided within each residential lot and a bioretention basin would be provided within Lot #6.

Tree Removal Permit

A tree removal permit would be required for the proposed removal of nine trees on the site.

Figure 9
Stormwater Control Plan

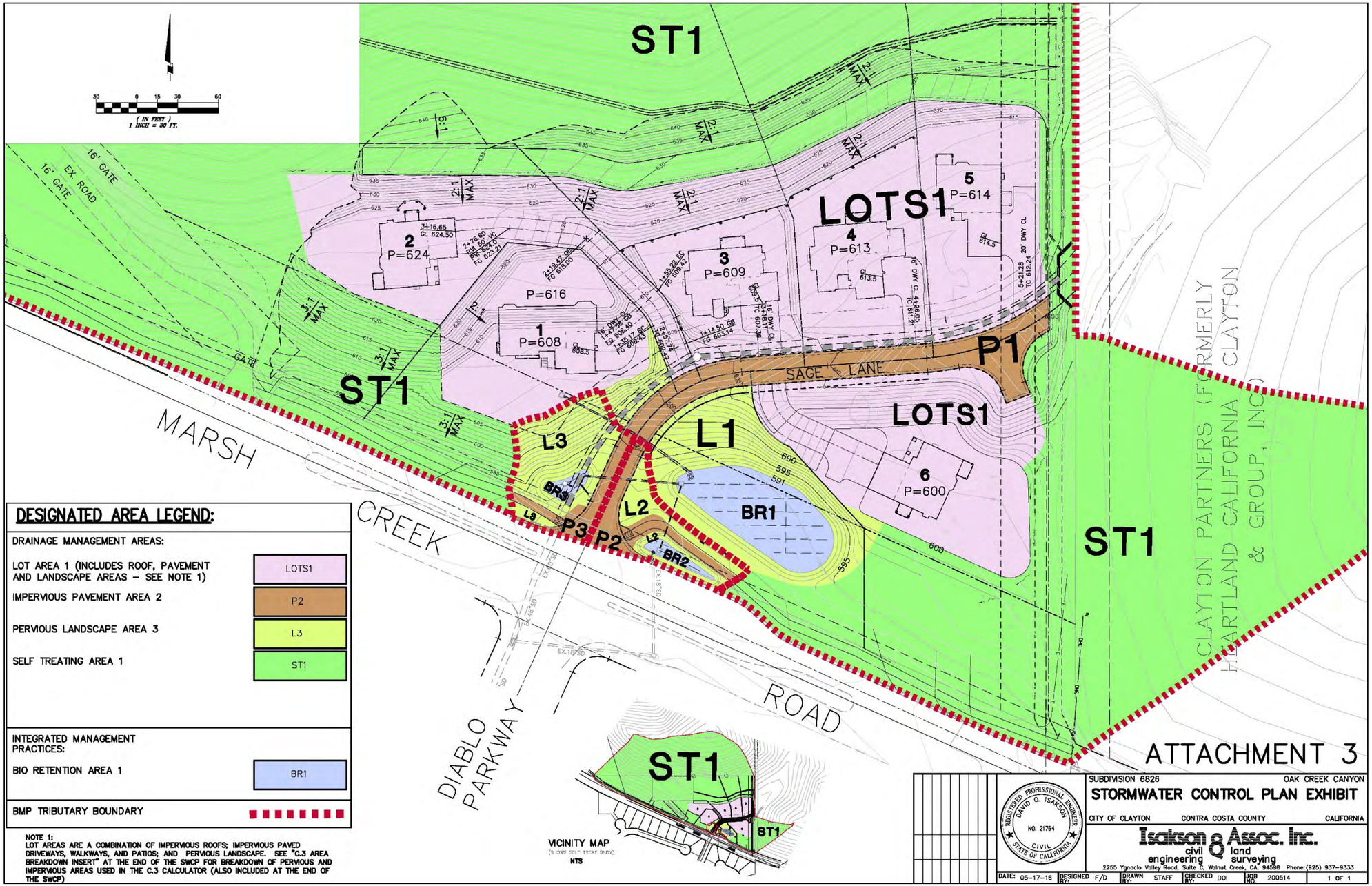


Figure 10
Landscape Plan (East)

Figure 11
Landscape Plan (West)

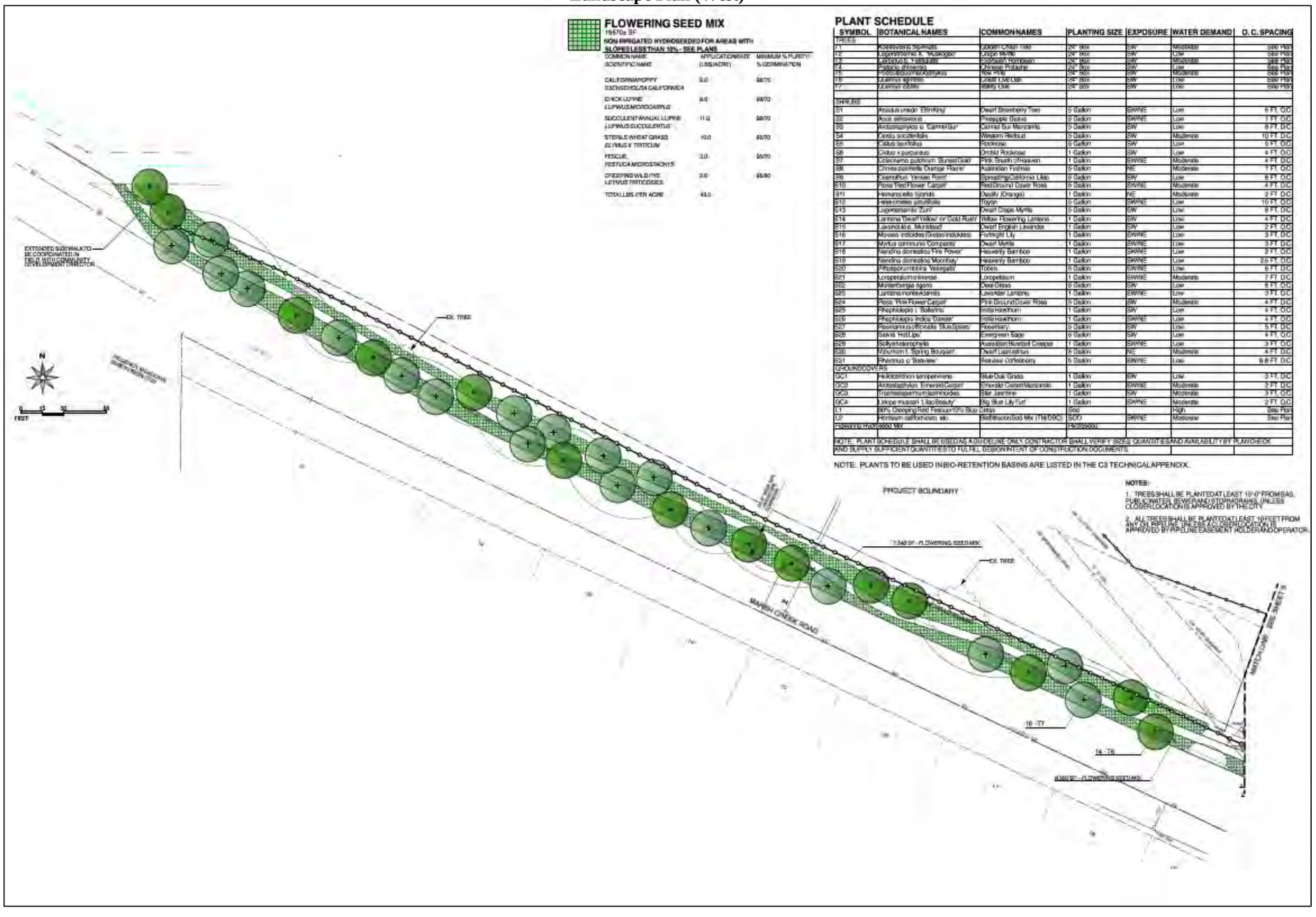


Figure 12
Layout Plan

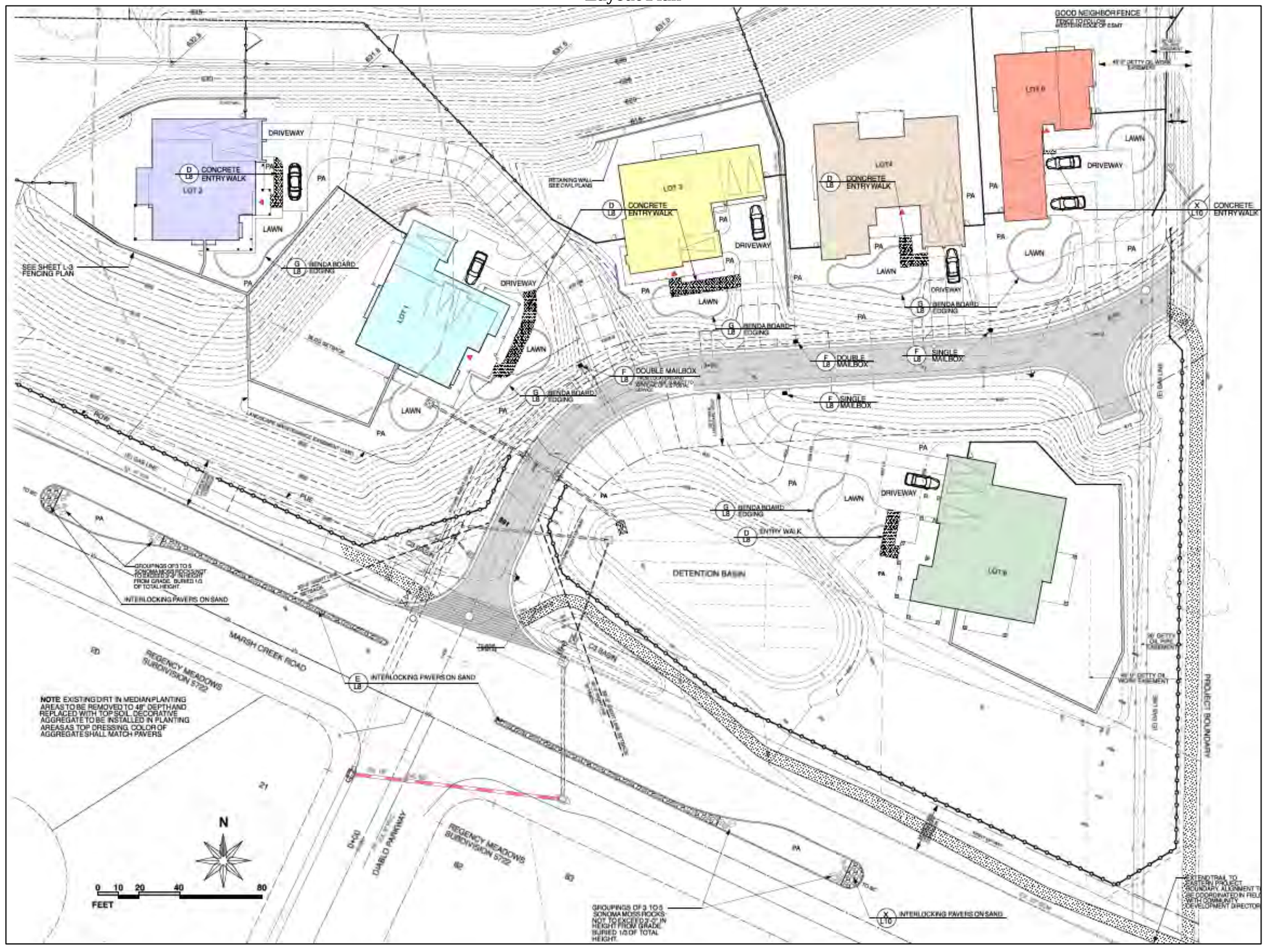
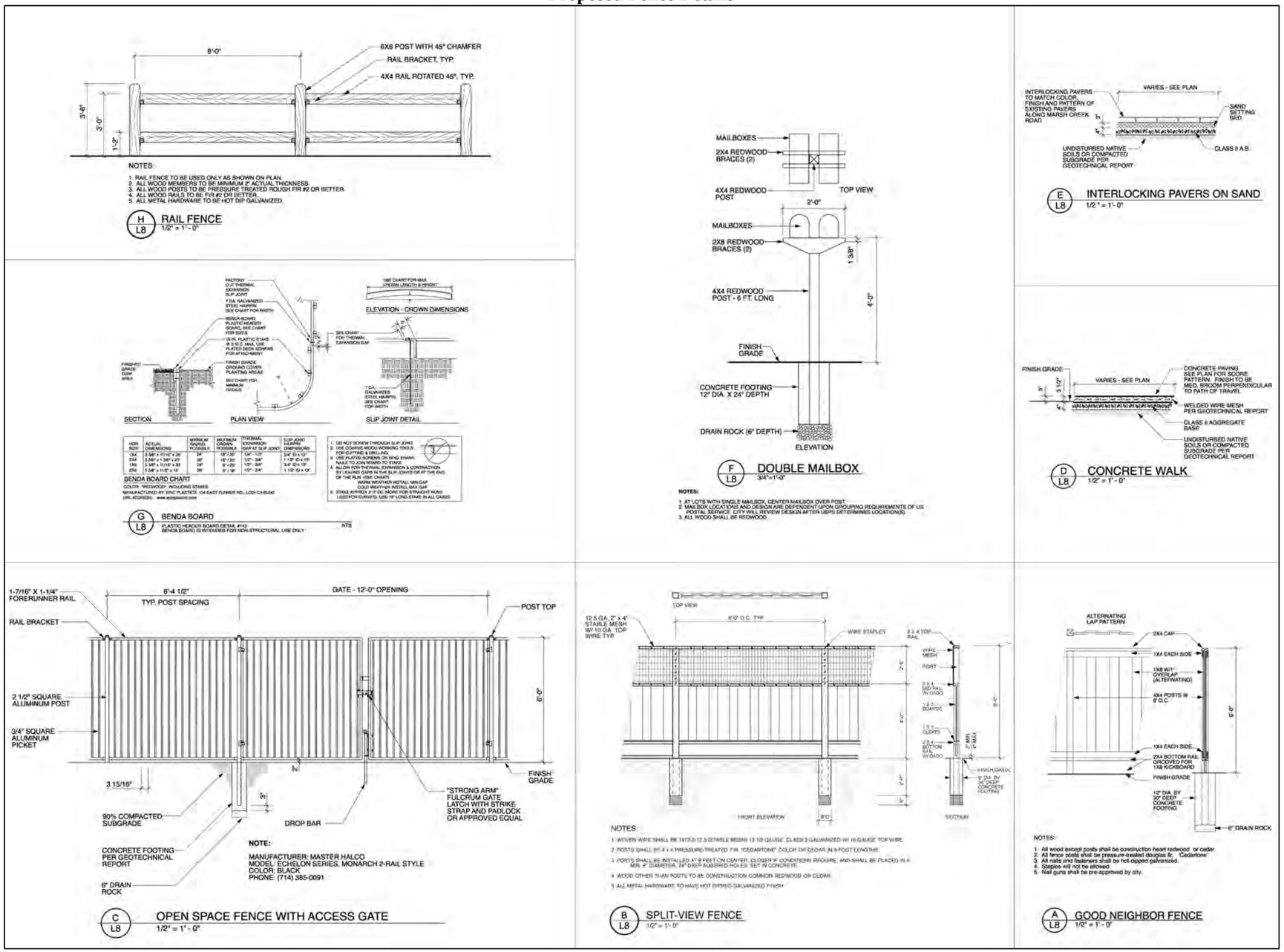


Figure 13
Proposed Fence Details



Discretionary Actions

As discussed in detail above, the proposed project would require the following approvals from the City of Clayton:

- General Plan Map Amendment;
- Marsh Creek Road Specific Plan Map Amendment;
- Zoning Map Amendment;
- Vesting Tentative Subdivision Map;
- Development Plan Review Permit; and
- Tree Removal Permit.

VI. LIST OF MITIGATION MEASURES

Mitigation Measure 1. *Prior to any ground disturbance related to covered activities, a USFWS/CDFW-approved biologist shall conduct a preconstruction 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 (California Department of Fish and Game 1995).*

On the parcel where the activity is proposed, the biologist shall 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 shall not be surveyed. Surveys shall take place near sunrise or sunset in accordance with CDFW guidelines. All 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 to August 31), surveys shall document whether burrowing owls are nesting in or directly adjacent to disturbance areas. During the nonbreeding season (September 1 to January 31), surveys shall document whether burrowing owls are using habitat in or directly adjacent to any disturbance area. Survey results shall 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 to 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 birds have not begun egg-laying and incubation or that the juveniles from the occupied burrows have fledged. During the nonbreeding season (September 1 to January 31), the project proponent should avoid the owls and the burrows they are using, if possible. Avoidance shall 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 shall be established around each occupied burrow (nest site). Buffer zones of 160 feet shall be established around each burrow being used during the nonbreeding season. The buffers shall be delineated by highly visible, temporary construction fencing.

If occupied burrows for burrowing owls are not avoided, passive relocation shall 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.

Mitigation Measure 2. *If work is scheduled to take place between February 1 and August 31, a pre-construction nesting bird survey shall be conducted by a qualified biologist within 14 days of construction, covering a radius of 250 feet for non-listed raptors and 100 feet for non-*

listed passerines at all locations. The findings of the survey shall be submitted to the Community Development Department. If an active bird nest is found within these buffers, species-specific measures shall be prepared by a qualified biologist and implemented to prevent abandonment of the active nest. At a minimum, grading in the vicinity of a nest shall be postponed until the young birds have fledged. If an active nest is present, a minimum exclusion buffer of 100 feet shall be maintained during construction, depending on the species and location. The perimeter of the nest setback zone shall be fenced or adequately demarcated with stakes and flagging at 20-foot intervals, and construction personnel and activities restricted from the area. A survey report by a qualified biologist verifying that no active nests are present, or that the young have fledged, shall be submitted prior to initiation of grading in the nest-setback zone. The qualified biologist shall serve as a biological monitor during those periods when construction activities occur near active nest areas to ensure that no inadvertent impacts on these nests occur.

Mitigation Measure 3. *Protocol-level special-status plant surveys were conducted within the project area in April, June, August and October of 2018, and no special-status plant species were identified. Survey results are valid for three years. If construction does not commence before Spring of 2021, then new focused plant surveys shall be performed according to CDFW and CNPS protocol, as generally described below. Surveys for rare plant species shall be conducted using approved CDFW/USFWS methods during the appropriate season for identification of large flowered fiddleneck, big tarplant, round-leaved filaree, Mt. Diablo fairy lantern, diamond-petaled poppy, and showy golden madia. The blooming periods for each species is described in the Biological Resources Assessment prepared for the proposed project by Swaim Biological, Inc.*

If during surveys ECCHCP/NCCP covered or no take species are found, the location, extent and condition of all occurrences shall be documented in a survey report and submitted to the City of Clayton. CNDDB California Native Species Field Survey Forms for all covered or no-take plants encountered on the site shall also be completed and submitted to the City of Clayton and CNDDB.

Results of surveys shall inform project design. In order to comply with the ECCHCP/NCCP, construction activities shall avoid all impacts on extremely rare no take species and shall implement plant salvage when impacted covered plant species are unavoidable. Conservation measures described in the ECCHCP/NCCP shall be adhered to. If a rare plant is found that is not covered by the ECCHCP/NCCP, appropriate conservation measures similar to those required by the ECCHCP/NCCP shall be developed on a plant by plant basis and in accordance with CDFW and CNPS.

Mitigation Measure 4. *Prior to approval of grading plans for the proposed project, the project applicant shall complete a formal wetland delineation and submit the delineation to the U.S. Army Corps of Engineers (USACE) for verification.*

In the event that the proposed project site is determined to include jurisdictional wetlands that would be altered as part of the proposed development, a Section 404 permit for fill of jurisdictional wetlands shall be acquired, and mitigation for impacts to jurisdictional waters that cannot be avoided shall conform with the USACE "no-net-loss" policy prior to approval of grading plans. To the extent feasible, however, the project shall be designed to avoid and minimize adverse effects to waters of the U.S. or jurisdictional waters of the State of California within the project area.

Mitigation for impacts to both federal and State jurisdictional waters shall be addressed using these guidelines.

If a Section 404 permit is obtained, the applicant must also obtain a water quality certification from the RWQCB under Section 401 of the Clean Water Act (CWA). Written verification of the Section 404 permit and the Section 401 water quality certification shall be submitted to the Community Development Department.

The applicant shall also provide evidence to the Community Development Department of consultation with CDFW to determine if a Streambed Alteration Agreement is required for on-site activities pursuant to Section 1602 of the State Fish and Game Code.

If the mapped drainage shown on the USGS and other data sources is determined by regulatory agencies to be a jurisdictional waters on the site, then an ECCCHCP/NCCP fee calculation for permanent impacts to wetlands or streams should be assessed in addition to the development fee, unless the design of the proposed project is modified to avoid regulated habitat or provide adequate alternative compensatory mitigation.

Mitigation Measure 5. *The following tree protection measures shall be implemented pursuant to the recommendations listed in the Arborist Report, to the extent feasible:*

a) The applicant shall submit for the review and approval of the Community Development Director a tree protection plan to identify the location of the existing trees to be retained, as identified in the Arborist Report.
b) Adjust the proposed Marsh Creek Road path design to provide two feet of additional clearance from tree #43.
c) Prior to construction or grading, the project contractor shall install fencing to construct a temporary Tree Protection Zone (TPZ) around trees #43 and #60.
d) TPZ fencing shall remain in an upright sturdy manner from the start of grading until the completion of construction. Fencing shall not be adjusted or removed without consulting the project arborist.
e) If roots greater than two-inches in diameter are encountered near tree #61 during construction of the proposed ditch, roots shall be cleanly pruned with a handsaw or sawzall.
f) Pruning shall be performed by personnel certified by the International Society of Arboriculture (ISA). All pruning shall adhere to ISA and American National Standards and Best Management Practices.
g) Should TPZ encroachment be necessary, the project contractor shall contact the project arborist for consultation and recommendations.
h) The project contractor shall keep TPZs free of all construction-related materials, debris, fill soil, equipment, etc. The only acceptable material is mulch spread out beneath the trees.
i) Should any damage to the trees occur, the contractor shall promptly notify the project arborist to appropriately mitigate the damage.

Mitigation Measure 6. *Prior to the issuance of a grading permit, the grading plan shall include a requirement (via notation) indicating that if cultural resources, or human remains are*

encountered during site grading or other site work, all such work shall be halted immediately within 100 feet of the area of discovery and the contractor shall immediately notify the City of the discovery. In such case, the City, at the expense of the project applicant, shall retain the services of a qualified archaeologist for the purpose of recording, protecting, or curating the discovery as appropriate. The archaeologist shall be required to submit to the City for review and approval a report of the findings and method of curation or protection of the resources. Further grading or site work within the vicinity of the discovery, as identified by the qualified archaeologist, shall not be allowed until the preceding steps have been taken.

Mitigation Measure 7. *Pursuant to State Health and Safety Code §7050.5(c) State Public Resources Code §5097.98, if human bone or bone of unknown origin is found during construction, all work shall stop within 100 feet of the vicinity of the find and the Contra Costa County Coroner shall be contacted immediately. If the remains are determined to be Native American, the Coroner shall notify the Native American Heritage Commission who shall notify the person believed to be the Most Likely Descendant (MLD). The MLD shall work with the contractor to develop a program for re-internment of the human remains and any associated artifacts. Additional work shall not take place in the immediate vicinity of the find, which shall be identified by the qualified archaeologist at the applicant's expense, until the preceding actions have been implemented.*

Mitigation Measure 8. *Prior to approval of the improvement plans for the project, all recommendations from the Geotechnical Report prepared for the project by ENGEO (2008) shall be incorporated into the improvement plans to the satisfaction of the City Engineer. In addition, the applicant shall retain a California Registered Geotechnical Engineer to perform field observations during grading to determine the depth of removal of compressible soils. Compliance with the recommendations of the Geotechnical Engineer shall be provided to the City Engineer.*

Mitigation Measure 9. *Prior to the issuance of a grading permit, the project applicant shall prepare to the satisfaction of the City Engineer, an erosion control plan that utilizes standard construction practices to limit the erosion effects during construction of the proposed project. Actions should include, but are not limited to:*

a) Hydro-seeding;
b) Placement of erosion control measures within drainage ways and ahead of drop inlets;
c) The temporary lining (during construction activities) of drop inlets with "filter fabric";
d) The placement of straw wattles along slope contours;
e) Use of a designated equipment and vehicle "wash-out" location;
f) Use of siltation fences;
g) Use of on-site rock/gravel road at construction access points; and
h) Use of sediment basins and dust palliatives.

Mitigation Measure 10. *Grading and construction plans and specifications for the project shall include the wording which specifies that construction contractors shall contact all pipeline operators (e.g., Shell, Conoco-Phillips) at least forty-eight (48) hours prior to start of construction activities to obtain detailed identification of underground oil pipes.*

Mitigation Measure 11. *Notification shall be provided on the deeds and California Department of Real Estate disclosure forms to future property owners regarding the presence of crude oil pipelines. The wording of the notification shall be approved by the Clayton Community Development Director and City Attorney.*

Mitigation Measure 12. *During grading and construction, the project contractor shall ensure that the following measures are implemented, consistent with the recommendations in the Environmental Noise and Analysis prepared for the proposed project:*

a) *Grading and construction activities shall be limited to the daytime hours between 7:00 AM to 5:00 PM Monday through Friday, as specified in Section 15.01.101 of the Clayton Municipal Code. Any such work beyond said hours and days shall be strictly prohibited unless previously specifically authorized in writing by the City Engineer or designee or by project conditions of approval;*
b) *All noise-producing project equipment and vehicles using internal-combustion engines shall be equipped with manufacturers-recommended mufflers and be maintained in good working condition;*
c) *All mobile or fixed noise-producing equipment used on the project site that are regulated for noise output by a federal, State, or local agency shall comply with such regulations while in operation on-site;*
d) *Electrically powered equipment shall be used instead of pneumatic or internal combustion-powered equipment, where feasible;*
e) *Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors; and*
f) *Construction site and access road speed limits shall be established and enforced during the construction period.*

The requirements above shall be included, via notation, on the final grading plan submitted for review and approval by the Community Development Director prior to grading permit issuance.

VII. EVALUATION OF ENVIRONMENTAL IMPACTS

1. AESTHETICS.

Issues		Potentially Significant Impact	Less-Than-Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:					
a.	Have a substantial adverse effect on a scenic vista?	□	□	X	□
b.	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?	□	□	□	X
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 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?	□	□	X	□
d.	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	□	□	X	□

a. Would the project have a substantial adverse effect on a scenic vista? ..... Less-Than-Significant Impact

Discussion (a.)

The City of Clayton General Plan identifies the protection of scenic resources as a core concern for future development and planning. Impacts to the views of open spaces or vistas would diminish the rural character of the City, and should be avoided. However, the City's General Plan does not contain any policies that address scenic vistas, nor does the General Plan define or identify any specific scenic vistas.

The *Marsh Creek Road Specific Plan* identifies Marsh Creek Road as a Scenic Route. While the project includes a request to amend the General Plan and Marsh Creek Road Specific Plan land use designations, both plans anticipate residential development of the project site at similar densities. In addition, the project includes a mix of single-story and two-story homes so as to break up the massing of the development and enhance views of the upslope portions of the project site. Therefore, the proposed project would not have a substantial adverse effect on a scenic vista, and a ***less-than-significant*** impact would occur.

b. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway? ..... No Impact

Discussion (b.)

According to the California Scenic Highway Mapping System, two highways in Contra Costa County are officially-designated State Scenic Highway corridors: [4] Interstate 680 (I-680), from the Alameda County line to the junction with State Route (SR) 24; and SR 24 from the east portal of the Caldecott tunnel to I-680 near Walnut Creek. Neither of the aforementioned corridors provide views of Clayton or the project site. Accordingly, the proposed project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, or historic buildings within a State Scenic Highway. Thus, the project would result in ***no impact***.

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 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

Discussion (c.)

The implementation of the proposed project would change the existing visual setting from vacant grass land to a single-family residential subdivision. The following discussion provides an analysis of the changes in visual character and quality, as viewed from public areas in the project vicinity, that would be expected to occur as a result of the proposed project.

Distinguishing between public and private views is important, because private views are views seen from privately-owned land and are typically associated with individual viewers, including views from private residences. Public views are experienced by the collective public, and include views of significant landscape features and along scenic roads. According to CEQA (Pub. Resources Code, § 21000 et seq.) case law, only public views, not private views, are protected under CEQA. For example, in *Association for Protection etc. Values v. City of Ukiah* (1991) 2 Cal.App.4th 720, the court determined that "we must differentiate between adverse impacts upon particular persons and adverse impacts upon the environment of persons in general. As recognized by the court in *Topanga Beach Renters Assn. v. Department of General Services* (1976) 58 Cal.App.3d 188: '[A]ll government activity has some direct or indirect adverse effect on some persons. The issue is not whether [the project] will adversely affect particular persons but whether [the project]

[4] California Department of Transportation. *Scenic Highways*. Available at: https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways. Accessed June 2020.

will adversely affect the environment of persons in general.'" Therefore, the focus in this section is on potential impacts to public views.

Public views in the project vicinity would consist primarily of views seen by motorists traveling on Marsh Creek Road and motorists, bicyclists, and pedestrians traveling on local roadways to the south of the project site, including Diablo Parkway. The proposed project would convert a portion of the undeveloped project site to a residential use, and, thus, would alter the existing visual character of the site. However, the project is consistent with the type, location, and intensity of the proposed residential development that has been anticipated in the *Marsh Creek Road Specific Plan*. In addition, consistent with Policy DD-2d of the Marsh Creek Road Specific Plan, the proposed residential structures would be set back 80 feet from the Marsh Creek Road right-of-way. This would help to maintain a view corridor along Marsh Creek Road through the project vicinity. The project also includes landscaping along the project's Marsh Creek Road frontage, and along each residential lot, in an effort to help screen the on-site structures from view. Specifically, a 24-foot landscape corridor would be provided along the Marsh Creek Road frontage and would include various types of trees, shrubs, and ground cover such as 24-inch-box trees and one-gallon and five-gallon shrubs. Importantly, the upslope portions of the residential lots would be maintained as open space, thus, preserving views of the hills from Marsh Creek Road.

All development occurring on the project site would be subject to the City's Development Plan Review Permit consistent with Chapter 17.28.050 set forth in the Clayton Municipal Code. The Development Plan Review process would include a review of the exterior appearance of all proposed facilities and structures to ensure compliance with the City's established General Plan and Marsh Creek Road Specific Plan policies.

Given the fact that: 1) the Marsh Creek Road Specific Plan and General Plan anticipate low density residential development for the project site, generally consistent with what is being proposed, 2) the project includes the preservation of the upslope portions of the project site as private open space, and 3) the project will adhere to the Development Plan Review requirements and other applicable policies set forth in the *Marsh Creek Road Specific Plan*, such as the 80-foot structure setback from Marsh Creek Road, the proposed project would not substantially degrade the existing visual character or quality of the site and its surroundings, and a ***less-than-significant*** impact would occur.

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

Discussion (d.)

The proposed project site is currently vacant and undeveloped. As such, development of the project site with six single-family residences, a street, and various other associated improvements would introduce new sources of light and/or glare to the site where none currently exist. Potential sources of nighttime light would include, but not be limited to, lighting spilling from the interiors of the proposed residences, exterior light fixtures, street

lighting on the new on-site roadway, and headlights from vehicles. Sources of glare could include windows on the proposed residential structures, as well as any other reflective surfaces.

The project would be required to comply with the Section 8.09 of the City's Municipal Code, which prohibits the installation or maintenance of outdoor light fixtures that would cause an undue annoyance to persons on neighboring parcels in residential zoning districts. In addition, the nearest sensitive viewers are located approximately 100 feet south of the project site across Marsh Creek Road, and, thus, nighttime light from the project site would not have a substantial adverse effect on such viewers, especially given the proposed intervening landscaping.

Based on the above, the proposed project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area, and a ***less-than-significant*** impact would occur.

2. AGRICULTURE RESOURCES.

Issues		Potentially Significant Impact	Less-Than-Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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 forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. 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 Program of the California Resources Agency, to non-agricultural use?	□	□	□	X
b.	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	□	□	□	X
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))?	□	□	□	X
d.	Result in the loss of forest land or conversion of forest land to non-forest use?	□	□	□	X
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?	□	□	□	X

a. Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use? ..... No Impact

b. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract? ..... No Impact

Discussion (a. and b.)

According to the California Department of Conservation Farmland Mapping and Monitoring Program, the proposed project site is classified as Grazing Land.[5] The site does not contain Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and, thus, the project would not convert such lands to non-agricultural use. Conflicts with existing zoning for agricultural use or a Williamson Act contract would not occur. As such, the proposed project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural uses and would not conflict with existing zoning for agricultural use, or a Williamson Act contract. Thus, ***no impact*** would occur as a result of the proposed project.

[5] California Department of Conservation. *Contra Costa County Important Farmland 2016.* Published August 2018.

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))? ..... No Impact

d. Result in the loss of forest land or conversion of forest land to non-forest use? ..... No Impact

Discussion (c. and d.)

The project site is not considered forest land (as defined in Public Resources Code section 12220[g]) or timberland (as defined by Public Resources Code section 4526), and the site is not zoned Timberland Production (as defined by Government Code section 51104[g]). Therefore, the proposed project would have ***no impact*** with regard to conversion of forest land or any potential conflict with forest land, timberland, or Timberland Production zoning.

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? ..... No Impact

Discussion (e.)

The project site is located within the City of Clayton, and is located near existing residential development. Agricultural activities do not currently occur on the site, nor do they occur in any areas adjacent to or near the project site. Therefore, constructing six new residences on the southeastern portion of the project site would not result in conflicts between existing agricultural activities and the proposed residential land uses, which could impair existing agricultural operations or lead to induced conversion of agricultural lands due to incompatible uses. Therefore, the proposed project would not involve other changes in the existing environment, due to their location or nature, that could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use and, thus, ***no impact*** would occur.

3. AIR QUALITY.

Issues		Potentially Significant Impact	Less-Than-Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:					
a.	Conflict with or obstruct implementation of the applicable air quality plan?	□	□	X	□
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?	□	□	X	□
c.	Expose sensitive receptors to substantial pollutant concentrations?	□	□	X	□
d.	Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	□	□	X	□

a. Would the project conflict with or obstruct implementation of the applicable air quality plan? ..... Less-Than-Significant Impact

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 Impact

Discussion (a. and b.)

The City of Clayton is located in the San Francisco Bay Area Air Basin (SFBAAB), which is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The SFBAAB area is currently designated as a nonattainment area for State and federal ozone, State and federal fine particulate matter 2.5 microns in diameter ($PM_{2.5}$), and State respirable particulate matter 10 microns in diameter (PM_{10}) ambient air quality standards (AAQS). The SFBAAB is designated attainment or unclassified for all other AAQS. It should be noted that on January 9, 2013, the U.S. Environmental Protection Agency (USEPA) issued a final rule to determine that the Bay Area has attained the 24-hour $PM_{2.5}$ federal AAQS. Nonetheless, the Bay Area must continue to be designated as nonattainment for the federal $PM_{2.5}$ AAQS until such time as the BAAQMD submits a redesignation request and a maintenance plan to the USEPA, and the USEPA approves the proposed redesignation. The USEPA has not yet approved a request for redesignation of the SFBAAB; therefore, the SFBAAB remains in nonattainment for 24-hour $PM_{2.5}$.

In compliance with regulations, due to the nonattainment designations of the area, the BAAQMD periodically prepares and updates air quality plans that provide emission reduction strategies to achieve attainment of the AAQS, including control strategies to reduce air pollutant emissions through regulations, incentive programs, public education, and partnerships with other agencies. The current air quality plans are prepared in cooperation with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG).

The most recent federal ozone plan is the 2001 Ozone Attainment Plan, which was adopted on October 24, 2001 and approved by the California Air Resources Board (CARB) on November 1, 2001. The plan was submitted to the USEPA on November 30, 2001 for review and approval. The most recent State ozone plan is the 2017 Clean Air Plan (CAP), adopted on April 19, 2017. The 2017 CAP was developed as a multi-pollutant plan that provides an integrated control strategy to reduce ozone, PM, toxic air contaminants (TACs), and greenhouse gases (GHGs). Although a plan for achieving the State PM_{10} standard is not required, the BAAQMD has prioritized measures to reduce PM in developing the control strategy for the 2017 CAP. The control strategy serves as the backbone of the BAAQMD's current PM control program.

The aforementioned air quality plans contain mobile source controls, stationary source controls, and transportation control measures to be implemented in the region to attain the State and federal AAQS within the SFBAAB. Adopted BAAQMD rules and regulations, as well as the thresholds of significance, have been developed with the intent to ensure continued attainment of AAQS, or to work towards attainment of AAQS for which the area is currently designated nonattainment, consistent with applicable air quality plans. For development projects, BAAQMD establishes significance thresholds for emissions of the ozone precursors reactive organic gases (ROG) and oxides of nitrogen (NO_X), as well as for PM_{10} and $PM_{2.5}$, expressed in pounds per day (lbs/day) and tons per year (tons/yr). The thresholds are listed in Table 1. Thus, by exceeding the BAAQMD's mass emission thresholds for operational emissions of ROG, NO_X, PM_{10}, or $PM_{2.5}$, a project would be considered to conflict with or obstruct implementation of the BAAQMD's air quality planning efforts.

Table 1
BAAQMD Thresholds of Significance

	Construction	Operational	
Pollutant	**Average Daily Emissions (lbs/day)**	**Average Daily Emissions (lbs/day)**	**Maximum Annual Emissions (tons/year)**
ROG	54	54	10
NO_x	54	54	10
PM_{10} (exhaust)	82	82	15
$PM_{2.5}$ (exhaust)	54	54	10

Source: BAAQMD, CEQA Guidelines, May 2017.

The proposed project's construction and operational emissions were quantified using the California Emissions Estimator Model (CalEEMod) software version 2016.3.2 - a Statewide model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify air quality emissions, including GHG emissions, from land use projects. The model applies inherent default values for various land uses, including construction data, vehicle mix, trip length, average speed, etc. Where project-specific information is available, such information is applied in the model. The proposed project's modeling assumed the following:

- The modeled land use consists of: six single-family residential units totaling 30,306 sf on 9.03 acres of land;
- Construction would begin in April of 2021 and occur over approximately one year;
- A total of 4.3 acres of land would be disturbed during grading and import or export of material is not anticipated to be required;

- The trip generation rate was set to 9.52 trips/unit, based on the ITE 9th edition trip generation rate for Single Family Homes (210);
- Six natural gas fireplaces would be installed;
- The project would improve connectivity of the local pedestrian network; and
- The project would comply with all applicable provisions of the 2019 CBSC, including installation of water efficient fixtures and generation of 100 percent of electricity on-site from renewable sources.

The proposed project's estimated emissions associated with construction and operations and the project's contribution to cumulative air quality conditions are provided below. All CalEEMod results are included as Appendix A to this IS/MND.

Construction Emissions

According to the CalEEMod results, the proposed project would result in maximum unmitigated construction criteria air pollutant emissions as shown in Table 2. As shown in the table, the proposed project's construction emissions would be below the applicable thresholds of significance for ROG, NO_X, PM_{10}, and $PM_{2.5}$.

Table 2
Maximum Construction Emissions (lbs/day)

Pollutant	Proposed Project Emissions	Threshold of Significance	Exceeds Threshold?
ROG	6.65	54	**NO**
NO_X	43.84	54	**NO**
PM_{10} (exhaust)	2.21	82	**NO**
PM_{10} (fugitive)	18.21	None	**N/A**
$PM_{2.5}$ (exhaust)	2.06	54	**NO**
$PM_{2.5}$ (fugitive)	9.97	None	**N/A**

Source: CalEEMod, June 2020 (see Appendix A)

Although thresholds of significance for mass emissions of fugitive dust PM_{10} and $PM_{2.5}$ have not been identified by BAAQMD, the proposed project's estimated fugitive dust emissions have been included for informational purposes. All projects within the jurisdiction of the BAAQMD are required to implement all of the BAAQMD's Basic Construction Mitigation Measures, which include the following:

1. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
2. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
3. All vehicle speeds on unpaved roads shall be limited to 15 mph.
4. 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.
5. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of

Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

6. All construction equipment shall be maintained and properly tuned in accordance with manufacturers specifications. All equipment shall be checked by a certified visible emissions evaluator.
7. Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

The proposed project's implementation of the BAAQMD's Basic Construction Mitigation Measures would further minimize construction-related emissions.

Because the proposed project would be below the applicable thresholds of significance for construction emissions, project construction would not result in a significant air quality impact.

Operational Emissions

According to the CalEEMod results, the proposed project would result in maximum unmitigated operational criteria air pollutant emissions as shown in Table 3. As shown in the table, the proposed project's operational emissions would be below the applicable thresholds of significance.

Table 3
Unmitigated Maximum Operational Emissions

Pollutant	Proposed Project Emissions		Threshold of Significance		Exceeds Threshold?
	lbs/day	tons/yr	lbs/day	tons/yr	
ROG	0.88	0.16	54	10	**NO**
NO_X	0.46	0.07	54	10	**NO**
PM_{10} (exhaust)	0.02	0.004	82	15	**NO**
PM_{10} (fugitive)	0.27	0.05	None	None	**N/A**
$PM_{2.5}$ (exhaust)	0.02	0.004	54	10	**NO**
$PM_{2.5}$ (fugitive)	0.07	0.01	None	None	**N/A**

Source: CalEEMod, June 2020 (see Appendix A)

Because the proposed project's operational emissions would be below the applicable thresholds of significance, the proposed project would be considered to result in a less-than-significant air quality impact during operations.

Cumulative Emissions

Past, present and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By nature, air pollution is largely a cumulative impact. A single project is not sufficient in size to, by itself, result in nonattainment of AAQS. 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, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. The thresholds of significance presented in Table 1 represent the levels at which a project's individual

emissions of criteria air pollutants or precursors would result in a cumulatively considerable contribution to the SFBAAB's existing air quality conditions. If a project exceeds the significance thresholds presented in Table 1, the proposed project's emissions would be cumulatively considerable, resulting in significant adverse cumulative air quality impacts to the region's existing air quality conditions. Because the proposed project would result in emissions below the applicable thresholds of significance, the project would not be expected to result in a cumulatively considerable contribution to the region's existing air quality conditions.

Conclusion

As stated previously, the applicable regional air quality plans include the 2001 Ozone Attainment Plan and the 2017 CAP. According to BAAQMD, if a project would not result in significant and unavoidable air quality impacts, after the application of all feasible mitigation, the project may be considered consistent with the air quality plans. Because the proposed project would result in emissions below the applicable thresholds of significance, the project would not be considered to conflict with or obstruct implementation of regional air quality plans.

Because the proposed project would not conflict with or obstruct implementation of the applicable air quality plans, violate any air quality standards or contribute substantially to an existing or projected air quality violation, or result in a cumulatively considerable net increase in any criteria air pollutant, impacts would be considered ***less than significant***.

c. Would the project expose sensitive receptors to substantial pollutant concentrations? ..... Less-Than-Significant Impact

Discussion (c.)

Some land uses are considered more sensitive to air pollution than others, due to the types of population groups or activities involved. Heightened sensitivity may be caused by health problems, proximity to the emissions source, and/or duration of exposure to air pollutants. Children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the effects of air pollution. Accordingly, land uses that are typically considered to be sensitive receptors include residences, schools, childcare centers, playgrounds, retirement homes, convalescent homes, hospitals, and medical clinics. The nearest existing sensitive receptors to the site would be the single-family residences surrounding the project site.

The major pollutant concentrations of concern are localized carbon monoxide (CO) emissions and toxic air contaminants (TAC) emissions, which are addressed in further detail below.

Localized CO Emissions

Localized concentrations of CO are related to the levels of traffic and congestion along streets and at intersections. High levels of localized CO concentrations are only expected where background levels are high, and traffic volumes and congestion levels are high. Emissions of CO are of potential concern, as the pollutant is a toxic gas that results from the incomplete combustion of carbon-containing fuels such as gasoline or wood. CO emissions are particularly related to traffic levels.

In order to provide a conservative indication of whether a project would result in localized CO emissions that would exceed the applicable threshold of significance, the BAAQMD has established screening criteria for localized CO emissions. According to BAAQMD, a proposed project would result in a less-than-significant impact related to localized CO emission concentrations if all of the following conditions are true for the project:

- The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans;
- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour; and
- The project traffic 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, underpass, etc.).

According to the Contra Costa Transportation Authority (CCTA) Congestion Management Plan (CMP), any land development application generating less than 100 peak hour trips is not required to prepare a study of its traffic impacts on the CMP network as such projects are expected to have minimal impacts on the CMP network.[6] As discussed in further detail in Section 17, Transportation, of this IS/MND, the proposed project would result in an estimated 57 new daily vehicle trips, with five new AM and six new PM peak hour vehicle trips. Because the project is anticipated to only generate 11 total peak hour trips per day, the project would be well below the CCTA CMP threshold of 100 new peak hour trips, and would thus be considered to be consistent with the CCTA CMP.

As discussed above, the project is not expected to generate a significant increase in peak hour trips. The proposed residences are anticipated to generate approximately 57 trips per day, which would contribute a nominal increase in local traffic levels, and would not increase traffic volumes at any intersection to more than 44,000 vehicles per hour. As such, the proposed project's increase of 11 new peak hour trips would not increase traffic volumes at nearby intersections to more than the hourly traffic volumes set forth in the BAAQMD's localized CO screening criteria. Furthermore, intersections where vertical and/or horizontal mixing is limited are not located in the project vicinity.

Based on the above, per the BAAQMD's screening criteria for localized CO emissions, the proposed project would not be expected to result in substantial levels of localized CO at surrounding intersections or generate localized concentrations of CO that would exceed standards or cause health hazards.

TAC Emissions

Another category of environmental concern is TACs. The CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (Handbook) provides recommended setback distances for sensitive land uses from major sources of TACs, including, but not limited to, freeways and high traffic roads, distribution centers, and rail yards. The CARB has identified diesel particulate matter (DPM) from diesel-fueled engines as a TAC; thus,

[6] Contra Costa Transportation Authority. *2019 Update of the Contra Costa Congestion Management Program* [pg. 72]. Adopted December 18, 2019.

high volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic are identified as having the highest associated health risks from DPM. Health risks associated with TACs are a function of both the concentration of emissions and the duration of exposure, where the higher the concentration and/or the longer the period of time that a sensitive receptor is exposed to pollutant concentrations would correlate to a higher health risk. The nearest sensitive receptors to the proposed project are single-family residences located approximately 100 feet to the south of the proposed project site across Marsh Creek Road.

The proposed project does not include any operations that would be considered a substantial source of TACs. Accordingly, operations of the proposed project would not expose sensitive receptors to excess concentrations of TACs.

Short-term, construction-related activities could result in the generation of TACs, specifically DPM, from on-road haul trucks and off-road equipment exhaust emissions. However, construction is temporary and occurs over a relatively short duration in comparison to the operational lifetime of the proposed project. Specifically, as noted above, construction would occur over an approximately one-year period. The exposure period typically analyzed in health risk assessments is 30 years or greater, which is substantially longer than the estimated one-year construction period associated with the proposed project. In addition, all construction equipment and operation thereof would be regulated by the In-Use Off-Road Diesel Vehicle Regulation, which is intended to help reduce emissions associated with off-road diesel vehicles and equipment, including DPM. Project construction would also be required to comply with all applicable BAAQMD rules and regulations, particularly associated with permitting of air pollutant sources. In addition, per the City of Clayton Municipal Code Section 15.01.101, construction activities would be limited to daytime hours only.

During construction, only portions of the project site would be disturbed at a time. Operation of construction equipment would occur on portions of the site intermittently throughout the course of a day over the overall construction period. Because construction equipment on-site would not operate for any long periods of time and would be used at varying locations within the site, associated emissions of DPM would not occur at the same location (or be evenly spread throughout the entire project site) for long periods of time. Due to the temporary nature of construction and the relatively short duration of potential exposure to associated emissions, sensitive receptors in the area would not be exposed to pollutants for a permanent or substantially extended period of time. Furthermore, any one nearby sensitive receptor would be exposed to varying concentrations of DPM emissions throughout the construction period. According to BAAQMD, research conducted by CARB indicates that DPM is highly dispersive in the atmosphere. Thus, emissions at the project site would be substantially dispersed at the nearest sensitive receptors.

Considering the short-term nature of construction activities, the regulated and intermittent nature of the operation of construction equipment, and the highly dispersive nature of DPM, the likelihood that any one sensitive receptor would be exposed to high concentrations of DPM for any extended period of time would be low. For the aforementioned reasons, project construction would not be expected to expose sensitive receptors to substantial pollutant concentrations.

Conclusion

Based on the above discussion, the proposed project would not expose any sensitive receptors to substantial concentrations of localized CO or TACs from construction or operation. Therefore, the proposed project would result in a ***less-than-significant*** impact related to the exposure of sensitive receptors to substantial pollutant concentrations.

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

Discussion (d.)

Emissions such as those leading to odors have the potential to adversely affect sensitive receptors within the project area. Pollutants of principal concern include emissions leading to odors, emission of dust, or emissions considered to constitute air pollutants. Air pollutants have been discussed in sections "a" through "c" above. Therefore, the following discussion focuses on emissions of odors and dust.

Pursuant to the BAAQMD CEQA Guidelines, odors are generally regarded as an annoyance rather than a health hazard.[7] Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The presence of an odor impact is dependent on several variables including: the nature of the odor source; the frequency of odor generation; the intensity of odor; the distance of odor source to sensitive receptors; wind direction; and sensitivity of the receptor.

Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact, and the variety of odor sources, quantification of significant odor impacts is relatively difficult. Typical odor-generating land uses include, but are not limited to, wastewater treatment plants, landfills, and composting facilities. The proposed project would not introduce any such land uses.

Construction activities often include diesel-fueled equipment and heavy-duty diesel trucks, which can create odors associated with diesel fumes, which could be found to be objectionable. However, as discussed above, construction activities would be temporary, and operation of construction equipment would be regulated and intermittent. Project construction would also be required to comply with all applicable BAAQMD rules and regulations, particularly associated with permitting of air pollutant sources. The aforementioned regulations would help to minimize air pollutant emissions as well as any associated odors. Accordingly, substantial objectionable odors would not occur during construction activities or affect a substantial number of people.

In addition, the BAAQMD rules and regulations would act to reduce construction-related dust, which would ensure that construction of the proposed project does not result in substantial emissions of dust. Following project construction, the project site would not

[7] Bay Area Air Quality Management District. *California Environmental Quality Act Air Quality Guidelines* [pg. 7-1]. May 2017.

include any exposed topsoil. Thus, project operations would not include any substantial sources of dust.

For the aforementioned reasons, construction and operation of the proposed project would not result in emissions (such as those leading to odors) adversely affecting a substantial number of people, and a ***less-than-significant*** impact would result.

4. BIOLOGICAL RESOURCES.

Issues		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 Game or U.S. Fish and Wildlife Service?	□	X	□	□
b.	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	□	X		□
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?	□	X		□
d.	Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?	□	□	X	□
e.	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	□	X	□	□
f.	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?	□	□	X	□

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 Game or U.S. Fish and Wildlife Service? ..... Less-Than-Significant With Mitigation Incorporated

Discussion (a.)

This section is based upon a Planning Survey Report (PSR) prepared for the project site in order to comply with and receive Permit coverage under the East Contra Costa County Habitat Conservation Plan (ECCCHCP),[8] as well as a Biological Resources Assessment[9]

[8] Swaim Biological, Inc. *Application Form and Planning Survey Report, Oak Creek Canyon Development*. July 2015.

[9] Swaim Biological, Inc. *Biological Resources Assessment for the Oak Creek Canyon Residential Development, Contra Costa County, California.* May 2018.

(BRA) and Rare Plant Survey Report[10] prepared for the proposed project by Swaim Biological, Inc. (see Appendix B).

The following discussion describes the sensitive biological resources that have the potential to be present within the project site based on the BRA and Rare Plant Survey Report. Sensitive biological resources include habitats and/or individual plant and animal species that have special recognition by federal, State, or local conservation agencies. For purposes of this analysis, special-status animal species are defined as animals protected under the California and Federal Endangered Species Acts (CESA and FESA, respectively), or other regulations, and species that are considered rare by the scientific community. Special-status plant species are defined as plants that are protected under the CESA and FESA or listed as rare by California Department of Fish and Wildlife (CDFW) and the California Native Plant Society (CNPS). Special-status species include:

- Animals and plants listed or proposed for listing as threatened or endangered under the CESA (Fish and Game Code §2050 et seq.; 14 CCR §670.1et seq.) or the FESA (50 CFR 17.11);
- Animals and plants that are candidates for possible future listing as threatened or endangered under the FESA (50 CFR 17; FR Vol. 64, No. 205, pages 57533-57547, October 25, 1999); and under the CESA (California Fish and Game Code §2068);
- Animals that meet the definition of endangered, rare, or threatened under the California Environmental Quality Act (CEQA) (14 CCR §15380) that may include species not found on either State or Federal Endangered Species lists;
- Animals that are designated as "species of special concern" by CDFW (2016);
- Animal species that are designated as “fully protected” under California (Fish and Game Code 3511, 4700, 5050, and 5515);
- Animal species that are designated as “covered” species under the ECCHCP/NCCP
- Bat Species that are designated on the Western Bat Working Group’s (WBWG) Regional Bat Species Priority Matrix as: “Red or High.” These species are considered to be “imperiled or are at high risk of imperilment”;
- Plants that are listed by CNPS Rare Plant Program as rank 1A – plants presumed extirpated in California and either rare or extinct elsewhere, 1B – plants rare, threatened or endangered in California or elsewhere, 2A – plants presumed extirpated in California but common elsewhere, 2B – plants rare, threatened or endangered in California by common elsewhere, 3 – plants about which more is needed and 4 – plants of limited distribution; and
- Plants that are listed by the ECCHCP/NCCP as “covered” or “no take” species.

In addition to regulations for special-status species, most birds in the United States, including non-status species, are protected by the Migratory Bird Treaty Act (MBTA) of 1918. Under the MBTA, destroying active nests, eggs, and young is illegal. The presence of species with legal protection under the Endangered Species Act often represents a major constraint to development, particularly when the species are wide-ranging or highly sensitive to habitat disturbance and where proposed development would result in a take of these species.

[10] Swaim Biological, Inc. *Rare Plant Survey Report for the Oak Creek Canyon Residential Development, Contra Costa County, California.* October 2018.

The project site is located within the boundaries of the *East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan* (ECCCHCP/NCCP), which is intended to provide an effective framework to protect natural resources in the County. The project site is located within Zone 2 of the Fee Payment Zones designated in the ECCCHCP/NCCP. As per the Fee Payment Zones, the proposed project would be subject to payment of all applicable fees prior to construction of the project. According to the PSR, the project site consists of approximately 6.57 acres of annual grassland land cover and 2.46 acres of ruderal land cover. In addition, the Rare Plant Survey Report identified oak woodland northwest of the project site, near the existing water storage tank. Visual reconnaissance surveys of the project area were conducted by biologist Leslie Koenig on October 5, 2017 and May 9, 2018. During the field survey the biologist walked the entire project site in meandering transects to evaluate biological resource conditions at the site. At the time of the field survey, the southern portion of the project site had been recently disked and, thus, ground cover was not present. Two black locust trees and one Mexican fan palm tree were noted within the project site along the southern site boundary during the survey. In addition, various trees and shrubs are located along the northern site boundary.

As part of the BRA and Rare Plant Survey Report prepared for the project, the California Natural Diversity Database (CNDDB) was used to determine what special-status species are known to have occurred within the nine USGS 7.5-minute quadrangles in the project area. A total of 28 special-status wildlife species and 54 special-status plant species were identified through the literature review and database queries as having been sighted in the project region. Of the special-status species occurrences noted, one wildlife species and six plant species were determined to have a moderate potential to occur within the project site based on habitat requirements. In addition, the BRA noted that birds protected under the MBTA could occur within existing trees in the project area. Such species are discussed in further detail below.

Special-Status Wildlife

The following discussions summarize the potential for the proposed project to result in adverse effects to western burrowing owl and birds protected by the MBTA.

Western Burrowing Owl

The western burrowing owl is designated by CDFW as a Species of Special Concern. Burrowing owls are found in open arid and semiarid habitats with short or sparse vegetation, including grasslands, deserts, agricultural fields, ruderal areas and open, landscaped areas. The species is dependent on mammals such as the California ground squirrel that dig underground burrows, which the owls occupy. Some burrowing owls have adapted to urban landscapes, and in some instances, open lots, roadsides, and landscaped areas can provide suitable habitat. Breeding typically occurs from March to August but can begin as early as February and can last into December.

The proposed project site is located within the ECCHCP/NCCP modeled suitable habitat for the western burrowing owl. The two nearest CNDDB observations are both 4.8 miles away and are from 1989 and 1991, respectively. The project site contains a mix of annual grassland and disturbed grassland which provides potential suitable breeding and foraging habitat for the owl. California ground squirrel burrows were observed during surveys;

however, burrows of suitable size to support the species (four inches or greater in diameter) were not observed during field surveys conducted on the parcel within 500 feet of the project site. Nonetheless, given that the site contains suitable California ground squirrel habitat, construction activities associated with the proposed project could result in adverse impacts to the species.

Birds Protected by the MBTA

Per the BRA, the three trees present on the proposed project site could serve as nesting locations for common and sensitive passerine and raptor species protected under the MBTA. Site construction activities, including tree removal during the active nesting season (February 1 to August 31) would have the potential to cause the failure or abandonment of active nests of migratory birds. Impacts to nesting birds, their eggs, and/or young caused by implementation of the project would be regarded as a potentially significant impact.

Special-Status Plants

The Rare Plant Survey Report indicates that the following six special-status plant species have a moderate potential to occur on-site, based upon detailed background research, including the CNDDB, California Native Plant Society's Online Inventory of Rare and Endangered Plants, and the botanical list compiled for ECCCHCP/NCCP Planning Survey Report Form, Table 2b for projects occurring in annual grassland settings. The six special-status plant species that have a moderate potential to occur on-site include large-flowered fiddleneck (*Amsinckia grandiflora,* ECCHCP No Take species), big tarplant (*Blepharizonia plumosa*, ECCHCP Covered species), round-leaved filaree (*California macrophylla*, ECC HCP Covered species), Mt. Diablo fairy lantern (*Calochortus pulchellus,* ECCHCP Covered species), diamond-petaled California poppy (*Eschscholzia rhombipetala*, ECCHCP No Take species), and showy golden madia (*Madia radiata*, ECCHCP Covered species).

Four rounds of floristic surveys were determined appropriate to encompass the blooming periods of target species, and thus a single survey was conducted each month in April, June August, and early October 2018. No special-status plants were observed during 2018 surveys.

Although special-status plants were not identified within the project area during field surveys in 2018, the USFWS only considers plant surveys to be valid for three years. Should project construction not occur within three years from the date of the survey, construction activity could impact special-status plant species that may have colonized the project site. Therefore, impacts related to the disturbance of special-status plant species could be significant.

Conclusion

Based on the above, in the absence of appropriate mitigation, construction activities associated with the proposed project could result in adverse effects to western burrowing owl, birds protected by the MBTA, and special-status plant species should they colonize the site prior to construction. Thus, a ***potentially significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the above potential impacts to a *less-than-significant* level.

Mitigation Measure 1. *Prior to any ground disturbance related to covered activities, a U SFWS/CDFW-approved biologist shall conduct a preconstruction 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 (California Department of Fish and Game 1995).*

On the parcel where the activity is proposed, the biologist shall 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 shall not be surveyed. Surveys shall take place near sunrise or sunset in accordance with CDFW guidelines. All 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 to August 31), surveys shall document whether burrowing owls are nesting in or directly adjacent to disturbance areas. During the nonbreeding season (September 1 to January 31), surveys shall document whether burrowing owls are using habitat in or directly adjacent to any disturbance area. Survey results shall 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 to 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 birds have not begun egg-laying and incubation or that the juveniles from the occupied burrows have fledged. During the nonbreeding season (September 1 to January 31), the project proponent should avoid the owls and the burrows they are using, if possible. Avoidance shall 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 shall be established around each occupied burrow (nest site). Buffer zones of 160 feet shall be established around each burrow

being used during the nonbreeding season. The buffers shall be delineated by highly visible, temporary construction fencing.

If occupied burrows for burrowing owls are not avoided, passive relocation shall 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.

Mitigation Measure 2. *If work is scheduled to take place between February 1 and August 31, a pre-construction nesting bird survey shall be conducted by a qualified biologist within 14 days of construction, covering a radius of 250 feet for non-listed raptors and 100 feet for non-listed passerines at all locations. The findings of the survey shall be submitted to the Community Development Department. If an active bird nest is found within these buffers, species-specific measures shall be prepared by a qualified biologist and implemented to prevent abandonment of the active nest. At a minimum, grading in the vicinity of a nest shall be postponed until the young birds have fledged. If an active nest is present, a minimum exclusion buffer of 100 feet shall be maintained during construction, depending on the species and location. The perimeter of the nest setback zone shall be fenced or adequately demarcated with stakes and flagging at 20-foot intervals, and construction personnel and activities restricted from the area. A survey report by a qualified biologist verifying that no active nests are present, or that the young have fledged, shall be submitted prior to initiation of grading in the nest-setback zone. The qualified biologist shall serve as a biological monitor during those periods when construction activities occur near active nest areas to ensure that no inadvertent impacts on these nests occur.*

Mitigation Measure 3. *Protocol-level special-status plant surveys were conducted within the project area in April, June, August and October of 2018, and no special-status plant species were identified. Survey results are valid for three years. If construction does not commence before Spring of 2021, then new focused plant surveys shall be performed according to CDFW and CNPS protocol, as generally described below. Surveys for rare*

plant species shall be conducted using approved CDFW/USFWS methods during the appropriate season for identification of large flowered fiddleneck, big tarplant, round-leaved filaree, Mt. Diablo fairy lantern, diamond-petaled poppy, and showy golden madia. The blooming periods for each species is described in the Biological Resources Assessment prepared for the proposed project by Swaim Biological, Inc.

If during surveys ECCHCP/NCCP covered or no take species are found, the location, extent and condition of all occurrences shall be documented in a survey report and submitted to the City of Clayton. CNDDB California Native Species Field Survey Forms for all covered or no-take plants encountered on the site shall also be completed and submitted to the City of Clayton and CNDDB.

Results of surveys shall inform project design. In order to comply with the ECCHCP/NCCP, construction activities shall avoid all impacts on extremely rare no take species and shall implement plant salvage when impacted covered plant species are unavoidable. Conservation measures described in the ECCHCP/NCCP shall be adhered to. If a rare plant is found that is not covered by the ECCHCP/NCCP, appropriate conservation measures similar to those required by the ECCHCP/NCCP shall be developed on a plant by plant basis and in accordance with CDFW and CNPS.

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 Game or US Fish and Wildlife Service? ..... Less-Than-Significant With Mitigation Incorporated

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 With Mitigation Incorporated

Discussion (b. and c.)

Per the USGS 7.5-minute quadrangle for the project area, an intermittent blue-line stream traverses the lower elevations of the proposed project site.[11] In addition, the National Wetland Inventory map of the project site shows a riverine wetland type drainage following a similar alignment to the blue-line stream mapped on the USGS quadrangle. Presence of such an aquatic feature within the project site is supported by historical aerial photography, as well as the Aquatic Resources Inventory contained in Appendix J of the ECCHCP/NCCP. As noted in Section 9, Hydrology, of this IS/MND, the proposed project would include construction of a 48-inch diameter underground storm drain pipe to reroute the drainage through the project site.

It should be noted that visual evidence of the drainage has been obscured by past site disturbance, including recent disking. However, several indicators suggest that considerable surface water flows across the site in the vicinity of the mapped drainage alignment, and that without the routine disturbance from disking, a natural drainage with a bed and bank could form within the site. On the upstream end of the mapped drainage alignment, flood debris is entangled in several locations on the lower strands of the barbed wire fence separating the site from the adjacent property, reaching a depth of up to 10 inches in height, indicating considerable surface flows during storm events. Noted flood debris includes dense mats of grass and other foliage, smaller sticks, and branches. Outside of the site boundaries along the Marsh Creek Road frontage, concrete rubble has been installed onto an incised erosion channel where the slope drops down into the four-foot wide corrugated metal pipe. The pipe conveys surface flows under the roadway and eventually discharges into Mount Diablo Creek.

The U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual and the 2008 Regional Supplement for the Arid West Region provide guidance for conducting wetland delineations and determining the possible limits of their jurisdiction under the federal Clean Water Act. These include methodologies for evaluating the three criteria used by the Corps in determining the presence or absence of regulated waters – hydrology, soils, and vegetation. Typically, all three of the criteria must be met for an area to meet the USACE definition of regulated wetlands under "normal conditions". The qualifier of "normal conditions" was included in the definition of wetlands to reflect the fact that specific instances exist in which the vegetation or other criteria have been inadvertently or purposely removed or altered as a result of recent natural events or human activities. When such activities occur, an area may fail to meet the diagnostic criteria for a wetland but does not disqualify the area from possible USACE regulation. The 1987 Wetland Delineation Manual and Chapter 5 of the 2008 Regional Supplement for the Arid West Region provide guidance for making wetland determinations in difficult-to-identify wetland situations. Such guidance typically involves more robust analysis as part of the wetland delineation process and can include cessation of the human disturbance that could be influencing vegetation, hydrology, and soil conditions.

Without a formal wetland delineation verified by the Corps, the potential for jurisdictional waters (either wetlands or other waters) remains unresolved because of the atypical conditions from the routine disking of the lower elevations of the site. Mapping data and

[11] Environmental Collaborative. *Peer Review of Planning Survey Report, Oak Creek Canyon Updated CEQA Review, Clayton, California*. February 8, 2018.

evidence observed in the field indicates that concentrated surface flows reach and leave the site in the vicinity of the mapped drainage alignment. Such information provides an indication that jurisdictional waters may be present on the site, and that a determination by the USACE as part of the wetland delineation verification process for atypical conditions is warranted.

In the event that the on-site drainage feature is determined to be under the jurisdiction of the USACE, the project applicant would be required to obtain permits from regulatory agencies for construction activities associated with the channel (Section 404 Clean Water Act Nationwide permit, Section 401 Water Quality Certification, and Section 1600 Lake and Streambed Alteration Agreement). It should be noted that construction of the proposed 48-inch storm drain pipe would be limited to the project site and would not include any construction work within the portion of the existing drainage channel located in unincorporated Contra Costa County to the east of the site. As such, issuance of a Contra Costa County Drainage Permit from the Contra Costa County Flood Control & Water Conservation District would not be required.

Based on the above, the proposed project could result in a ***potentially significant*** impact related to having a substantial adverse effect on a state or federally protected wetlands (including, but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the above potential impact to a *less-than-significant* level.

Mitigation Measure 4. *Prior to approval of grading plans for the proposed project, the project applicant shall complete a formal wetland delineation and submit the delineation to the U.S. Army Corps of Engineers (USACE) for verification.*

In the event that the proposed project site is determined to include jurisdictional wetlands that would be altered as part of the proposed development, a Section 404 permit for fill of jurisdictional wetlands shall be acquired, and mitigation for impacts to jurisdictional waters that cannot be avoided shall conform with the USACE "no-net-loss" policy prior to approval of grading plans. To the extent feasible, however, the project shall be designed to avoid and minimize adverse effects to waters of the U.S. or jurisdictional waters of the State of California within the project area. Mitigation for impacts to both federal and State jurisdictional waters shall be addressed using these guidelines.

If a Section 404 permit is obtained, the applicant must also obtain a water quality certification from the RWQCB under Section 401 of the Clean Water Act (CWA). Written verification of the Section 404 permit and the Section 401

water quality certification shall be submitted to the Community Development Department.

The applicant shall also provide evidence to the Community Development Department of consultation with CDFW to determine if a Streambed Alteration Agreement is required for on-site activities pursuant to Section 1602 of the State Fish and Game Code.

If the mapped drainage shown on the USGS and other data sources is determined by regulatory agencies to be a jurisdictional waters on the site, then an ECCCHCP/NCCP fee calculation for permanent impacts to wetlands or streams should be assessed in addition to the development fee, unless the design of the proposed project is modified to avoid regulated habitat or provide adequate alternative compensatory mitigation.

d. Would the project interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites? ..... Less-Than-Significant Impact

Discussion (d.)

The proposed project site is bordered by Marsh Creek Road to the south and is fenced on all sides. Such features present a partial barrier to wildlife movement. The site does not contain any existing waterways that would provide habitat for native resident or migratory fish. Furthermore, the proposed improvements would be limited to the southeastern portion of the project site; the remainder of the site would designated open space and would remain as such. 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, and a ***less-than-significant*** impact would occur.

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 With Mitigation Incorporated

Discussion (e.)

The proposed project would be required to comply with all relevant policies and ordinances of the City of Clayton, including the Tree Protection Ordinance (Chapter 15.70 of the Municipal Code). The Tree Protection Ordinance calls for the protection of certain species of trees, and a Tree Removal Permit when removal of any tree with a trunk diameter of six inches or greater is proposed. In addition, the Marsh Creek Road Specific Plan includes policies related to protection of existing trees (pg. 63), encouraging retention of existing

trees wherever possible. An Arborist Report was prepared by Traverso Tree Service, for the project site to inventory all on-site trees and make recommendations regarding tree preservation and removal based on tree health, structural condition, and location (see Appendix B).[12] The Arborist Report evaluated a total of 21 trees, ten of which are located on-site.[13] Given their close proximity to the project site, 11 off-site trees were surveyed. None of the 21 trees surveyed are protected under the City of Clayton Tree Ordinance due to their size and species. According to the Arborist Report, approximately nine (non-native) on-site trees (two black locusts and seven trees of heaven) would require removal to accommodate the proposed project. Because the trees are non-native, they would not require replacement pursuant to the City's Tree Preservation Ordinance. It is noted, however, that the project includes landscaping along Marsh Creek Road and throughout the proposed subdivision, as shown in Figure 10 and Figure 11. The remaining trees, the majority of which are located off-site, along the boundaries of the CCWD parcel, would be retained. Though not protected by the City's Tree Protection Ordinance, the arborist report includes recommendations to protect these trees during construction. Without implementation of protection measures, the proposed project could conflict with policies protecting biological resources, and could result in a ***potentially significant*** impact.

Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the above potential impact to a *less-than-significant* level.

Mitigation Measure 5. *The following tree protection measures shall be implemented pursuant to the recommendations listed in the Arborist Report, to the extent feasible:*

a) The applicant shall submit for the review and approval of the Community Development Director a tree protection plan to identify the location of the existing trees to be retained, as identified in the Arborist Report.

b) Adjust the proposed Marsh Creek Road path design to provide two feet of additional clearance from tree #43.

c) Prior to construction or grading, the project contractor shall install fencing to construct a temporary Tree Protection Zone (TPZ) around trees #43 and #60.

d) TPZ fencing shall remain in an upright sturdy manner from the start of grading until the completion of construction. Fencing shall not be adjusted or removed without consulting the project arborist.

e) If roots greater than two-inches in diameter are encountered near tree #61 during construction of the

[12] Traverso Tree Service. *Re: Arborist Report for Oak Creek Canyon, Marsh Creek Road & Diablo Parkway, Clayton.* October 10, 2019.

[13] It is noted that a few additional trees are located on-site, notably, a few valley oak trees located at the far north end of proposed Lot #4. Because these trees are well outside of the construction footprint, they were not included in the Arborist Report.

proposed ditch, roots shall be cleanly pruned with a handsaw or sawzall.

f) Pruning shall be performed by personnel certified by the International Society of Arboriculture (ISA). All pruning shall adhere to ISA and American National Standards and Best Management Practices.

g) Should TPZ encroachment be necessary, the project contractor shall contact the project arborist for consultation and recommendations.

h) The project contractor shall keep TPZs free of all construction-related materials, debris, fill s oil, equipment, etc. The only acceptable material is mulch spread out beneath the trees.

i) Should any damage to the trees occur, the contractor shall promptly notify the project arborist to appropriately mitigate the damage.

f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan? ..... Less-Than-Significant-Impact

Discussion (f.)

The East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (ECCCHCP/NCCP) was prepared in 2007 and the City of Clayton became a signatory in January 2008. The ECCCHCP/NCCP is intended to provide a coordinated, regional approach to special-status species conservation and development regulation. A total of 28 species are covered under the ECCCHCP/NCCP. The ECCCHCP/NCCP provides streamlined permits from the USFWS and CDFW for covered species for new urban development projects and a variety of public infrastructure projects. Development fees within the ECCCHCP/NCCP area are assessed based on fee zones and land cover types.

A Planning Survey Report has been prepared for the proposed project in order to comply with and receive permit coverage under the ECCHCP/NCCP. Per the Planning Survey Report, the project site is located within Development Fee Zone 2. As noted previously, the site comprises two field-verified land cover types: 6.57 acres of annual grassland and 2.46 acres of ruderal grassland. The proposed project would be subject to pay all applicable fees according to the Fee Zone Map of the ECCCHCP/NCCP prior to construction.. Therefore, the project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan, and a ***less-than-significant*** impact would result from the proposed project.

5. CULTURAL RESOURCES.

Issues		Potentially Significant Impact	Less-Than-Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:					
a.	Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	□	□	X	□
b.	Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	□	X	□	□
c.	Disturb any human remains, including those interred outside of dedicated cemeteries.	□	X	□	□

a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?.....Less-Than-Significant

Discussion (a.)

The proposed project is primarily undeveloped and is absent of any existing structures. In addition, the site is not included in the Historical Sites listed in the City of Clayton General Plan or indicated in Exhibit V-3 of the General Plan Community Design Element. Furthermore, a records search of the California Historic Resources Information System (CHRIS) was performed by the Northwest Information Center (NWIC) for cultural resource site records and survey reports within the project area.[14] The NWIC concluded that the project site does not contain any recorded historic buildings or structures on any lists of historic resources. As such, the proposed project would not cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5; and a ***less-than-significant*** impact would occur.

b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5? ... Less-Than-Significant With Mitigation Incorporated

c. Disturb any human remains, including those interred outside of dedicated cemeteries? Less-Than-Significant With Mitigation Incorporated

Discussion (b. and c.)

A field investigation was conducted by ASI Archeology on the portion of the site proposed for development. No cultural or archeological resources were identified by the field investigation and the likelihood of discovering such artifacts is judged to be low except in the southern portion of the site which is relatively flat and where deposition of earthen material has occurred from higher elevations to the north. A Sacred Lands File search was conducted by the Native American Heritage Commission in 2017, which identified sacred sites in the project area, but no specific location data was provided.

[14] Northwest Information Center. *Re: Records search results for the proposed Oak Creek Canyon Project at APN 119-070-008 at the intersection of Marsh Creek Road and Diablo Parkway, Clayton, CA.* July 14, 2020.

Based on the above, the possibility exists that previously undiscovered buried archaeological resources and/or human remains could be present on-site, and accidental discovery could occur during construction of the project. Therefore, the proposed project could result in a ***potentially significant*** impact to such resources.

Mitigation Measure(s)

The following mitigation measures would reduce the above potential impact to a *less-than-significant* level.

Mitigation Measure 6. *Prior to the issuance of a grading permit, the grading plan shall include a requirement (via notation) indicating that if cultural resources, or human remains are encountered during site grading or other site work, all such work shall be halted immediately within 100 feet of the area of discovery and the contractor shall immediately notify the City of the discovery. In such case, the City, at the expense of the project applicant, shall retain the services of a qualified archaeologist for the purpose of recording, protecting, or curating the discovery as appropriate. The archaeologist shall be required to submit to the City for review and approval a report of the findings and method of curation or protection of the resources. Further grading or site work within the vicinity of the discovery, as identified by the qualified archaeologist, shall not be allowed until the preceding steps have been taken.*

Mitigation Measure 7. *Pursuant to State Health and Safety Code §7050.5(c) State Public Resources Code §5097.98, if human bone or bone of unknown origin is found during construction, all work shall stop within 100 feet of the vicinity of the find and the Contra Costa County Coroner shall be contacted immediately. If the remains are determined to be Native American, the Coroner shall notify the Native American Heritage Commission who shall notify the person believed to be the Most Likely Descendant (MLD). The MLD shall work with the contractor to develop a pr ogram for re-internment of the human remains and any associated artifacts. Additional work shall not take place in the immediate vicinity of the find, which shall be identified by the qualified archaeologist at the applicant's expense, until the preceding actions have been implemented.*

6. ENERGY

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

a. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation? .....Less-Than-Significant

b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency? .....Less-Than-Significant

Discussion (a. and b.)

The main forms of available energy supply are electricity, natural gas, and oil. A description of the 2019 California Green Building Standards Code (CAL Green Code) and the Building Energy Efficiency Standards, with which the proposed project would be required to comply, as well as discussions regarding the proposed project's potential effects related to energy demand during construction and operations are provided below.

California Green Building Standards Code

The 2019 CAL Green Code is a portion of the CBSC, otherwise known as the CAL Green Code (CCR Title 24, Part 11), which became effective on January 1, 2020.[15] The purpose of the CAL Green Code is to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices. The provisions of the code apply to the planning, design, operation, construction, use, and occupancy of every newly constructed building or structure throughout California. Requirements of the CAL Green Code include, but are not limited to, the following measures:

- Compliance with relevant regulations related to future installation of Electric Vehicle charging infrastructure in residential and non-residential structures;
- Indoor water use consumption is reduced through the establishment of maximum fixture water use rates;
- Outdoor landscaping must comply with the California Department of Water Resources' Model Water Efficient Landscape Ordinance (MWELO), or a local ordinance, whichever is more stringent, to reduce outdoor water use;

[15] California Building Standards Commission. *California Green Building Standards Code*. 2019.

- Diversion of 65 percent of construction and demolition waste from landfills; and
- Mandatory use of low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring, and particle board.
- For some single-family and low-rise residential development developed after January 1, 2020, mandatory on-site solar energy systems capable of producing 100 percent of the electricity demand created by the residence(s). Certain residential developments, including those developments that are subject to substantial shading, rendering the use of on-site solar photovoltaic systems infeasible, are exempted from the foregoing requirement.

Building Energy Efficiency Standards

The 2019 Building Energy Efficiency Standards is a portion of the CBSC, which expands upon energy efficiency measures from the 2016 Building Energy Efficiency Standards. The 2019 Building Energy Efficiency Standards are in effect for building permit applications submitted after January 1, 2020. The 2019 standards provide for additional efficiency improvements beyond the current 2016 standards. Non-residential buildings built in compliance with the 2019 standards are anticipated to use approximately 30 percent less energy compared to the 2016 standards, primarily due to lighting upgrades. For residential buildings, compliance with the 2019 standards will use approximately seven percent less energy due to energy efficiency measures compared to homes built under the 2016 standards. One of the improvements included within the 2019 Building Energy Efficiency Standards is the requirement that certain residential developments, including some single-family and low-rise residential developments, include on-site solar energy systems capable of producing 100 percent of the electricity demanded by the residences. Certain residential developments, including developments that are subject to substantial shading, rendering the use of on-site solar photovoltaic systems infeasible, are exempted from the foregoing requirement; however, such developments are subject to all other applicable portions of the 2019 Building Energy Efficiency Standards. Once rooftop solar electricity generation is factored in, homes built under the 2019 standards will use approximately 53 percent less energy than those under the 2016 standards.

Construction Energy Use

Construction of the proposed project would involve on-site energy demand and consumption related to use of oil in the form of gasoline and diesel fuel for construction worker vehicle trips, hauling and materials delivery truck trips, and operation of off-road construction equipment. In addition, diesel-fueled portable generators may be necessary to provide additional electricity demands for temporary on-site lighting, welding, and for supplying energy to areas of the site where energy supply cannot be met via a hookup to the existing electricity grid. Project construction is not anticipated to involve the use of natural gas appliances or equipment.

Even during the most intense period of construction, due to the different types of construction activities (e.g., site preparation, grading, building construction), only portions of the project site would be disturbed at a time, with operation of construction equipment occurring at different locations on the project site, rather than a single location. In addition, all construction equipment and operation thereof would be regulated per the CARB In-Use Off-Road Diesel Vehicle Regulation. The In-Use Off-Road Diesel Vehicle Regulation is

intended to reduce emissions from in-use, off-road, heavy-duty diesel vehicles in California by imposing limits on idling, requiring all vehicles to be reported to CARB, restricting the addition of older vehicles into fleets, and requiring fleets to reduce emissions by retiring, replacing, or repowering older engines, or installing exhaust retrofits. In addition, as a means of reducing emissions, construction vehicles are required to become cleaner through the use of renewable energy resources. The In-Use Off-Road Diesel Vehicle Regulation would therefore help to improve fuel efficiency for equipment used in construction of the proposed project. Technological innovations and more stringent standards are being researched, such as multi-function equipment, hybrid equipment, or other design changes, which could help to further reduce demand on oil and limit emissions associated with construction.

The CARB prepared the 2017 Climate Change Scoping Plan Update (2017 Scoping Plan),[16] which builds upon previous efforts to reduce GHG emissions and is designed to continue to shift the California economy away from dependence on fossil fuels. Appendix B of the 2017 Scoping Plan includes examples of local actions (municipal code changes, zoning changes, policy directions, and mitigation measures) that would support the State's climate goals. The examples provided include, but are not limited to, enforcing idling time restrictions for construction vehicles, utilizing existing grid power for electric energy rather than operating temporary gasoline/diesel-powered generators, and increasing use of electric and renewable fuel-powered construction equipment. The CARB In-Use Off-Road Diesel Vehicle Regulation described above, with which the proposed project must comply, would be consistent with the intention of the 2017 Scoping Plan and the recommended actions included in Appendix B of the 2017 Scoping Plan.

Based on the above, the temporary increase in energy use occurring during construction of the proposed project would not result in a significant increase in peak or base demands or require additional capacity from local or regional energy supplies. In addition, the proposed project would be required to comply with all applicable regulations related to energy conservation and fuel efficiency, which would help to reduce the temporary increase in demand.

Operational Energy Use

Following implementation of the proposed project, PG&E would provide electricity and natural gas to the project site. Energy use associated with operation of the proposed project would be typical of residential uses, requiring electricity and natural gas for interior and exterior building lighting, heating, ventilation, and air conditioning (HVAC), electronic equipment, machinery, refrigeration, appliances, security systems, and more. Maintenance activities during operations, such as landscape maintenance, would involve the use of electric or gas-powered equipment. In addition to on-site energy use, the proposed project would result in transportation energy use associated with vehicle trips generated by the proposed residential development.

The proposed project would be subject to all relevant provisions of the most recent update of the CBSC, including the CAL Green Code and the Building Energy Efficiency Standards. Adherence to the most recent CAL Green Code and the Building Energy

[16] California Air Resources Board. *The 2017 Climate Change Scoping Plan Update.* January 20, 2017.

Efficiency Standards would ensure that the proposed structures would consume energy efficiently through the incorporation of such features as efficient water heating systems, high performance attics and walls, and high efficacy lighting. In addition, California has set energy-use reduction goals targeting zero-net-energy use in all new homes by 2020. The CALGreen Code requires that new buildings use a combination of energy efficiency and distributed renewable energy generation to meet all annual energy needs. As such, the proposed residences would be constructed to rely on 100 percent renewable energy resources. Required compliance with the CBSC would ensure that the building energy use associated with the proposed project would not be wasteful, inefficient, or unnecessary.

With regard to transportation energy use, the proposed project would comply with all applicable regulations associated with vehicle efficiency and fuel economy. In addition, as discussed in Section 17, Transportation, of this IS/MND, the project area is currently provided transit service by the Central Contra Costa Transit Authority. The nearest bus stop relative to the project site is located at the Marsh Creek Road/Bigelow Street intersection, approximately 0.7-mile west of the site. Transit would provide access to several grocery stores, restaurants, banks, and schools within close proximity to the project site. The site's access to public transit and proximity to such uses would reduce VMT and, consequently, fuel consumption associated with the proposed project, thereby providing for increased pedestrian connectivity with the surrounding area and resulting in reduced vehicle use.

Conclusion

Based on the context above, construction and operation of the proposed project would not result in wasteful, inefficient, or unnecessary consumption of energy resources or conflict with or obstruct a State or local plan for renewable energy or energy efficiency. Thus, a ***less-than-significant*** impact would occur.

7. GEOLOGY AND SOILS.

Issues			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 based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	□	□	X	□
	ii.	Strong seismic ground shaking?	□	□	X	□
	iii.	Seismic-related ground failure, including liquefaction?	□	□	X	□
	iv.	Landslides?	□	X	□	□
b.	Result in substantial soil erosion or the loss of topsoil?		□	X	□	□
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?		□	X	□	□
d.	Be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994), creating substantial risks to life or property?		□	X		□
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?		□	□	□	X
f.	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?			X		

a-i. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving 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 based on other substantial evidence of a known fault? ..... Less-Than-Significant Impact

a-ii. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?..... Less-Than-Significant Impact

a-iii. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction? ..... Less-Than-Significant Impact

Discussion (a-i., a-ii, aiii.)

A Geotechnical Report was prepared for the proposed project by ENGEO, Inc.,[17] while a peer review of the Geotechnical Report was prepared by Alan Kropp & Associates, Inc.[18] (see Appendix C). According to the Geotechnical Report, the proposed project site is not located within an Alquist-Priolo Fault Zone; however, large earthquakes have historically occurred in the San Francisco Bay Area. The nearest active fault is the Greenville Fault, located approximately one mile southeast of the site. Other active faults in the region include the Concord, Calaveras, Cordelia, Green Valley, Hayward, and San Andreas faults. Given that none of the faults cross the project site, the potential for ground rupture is low.

An earthquake of moderate to high magnitude generated within the project region could cause considerable ground shaking at the site. Nonetheless, all structures proposed for the project would be designed in accordance with the requirements of the adopted edition of the California Building Code (CBC) in place at the time of construction. Structures built according to the seismic design provisions of current building codes should 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. Consequently, as the proposed project would comply with all applicable CBC recommendations, the project would not be anticipated to be substantially affected by ground shaking.

Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary loss of shear strength due to pore pressure build-up under the cyclic shear stresses associated with earthquakes. Per the Geotechnical Report, based on the material types and densities of materials present on-site, the risk of liquefaction is considered low to negligible.[19]

Therefore, the proposed project would not expose people or structures to substantial adverse effects including the risk of loss, injury, or death involving the rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zone Map, strong seismic ground shaking, and liquefaction, resulting in a ***less-than-significant*** impact.

[17] ENGEO Incorporated. Updated Geotechnical Report, Oak Creek Canyon, 5 Lots – Subdivision 6826, APN #119-070-008, Clayton, California. February 22, 2008.

[18] Alan Kropp & Associates, Inc. *RE: Geotechnical/Geological Peer Review, Oak Creek Canyon Project, Clayton, California.* February 25, 2020.

[19] ENGEO, *Updated Geotechnical Report, Oak Creek Canyon*, February 22, 2008, pg. 15.

a-iv. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related landslides? ..... Less-Than-Significant Impact With Mitigation Incorporated

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

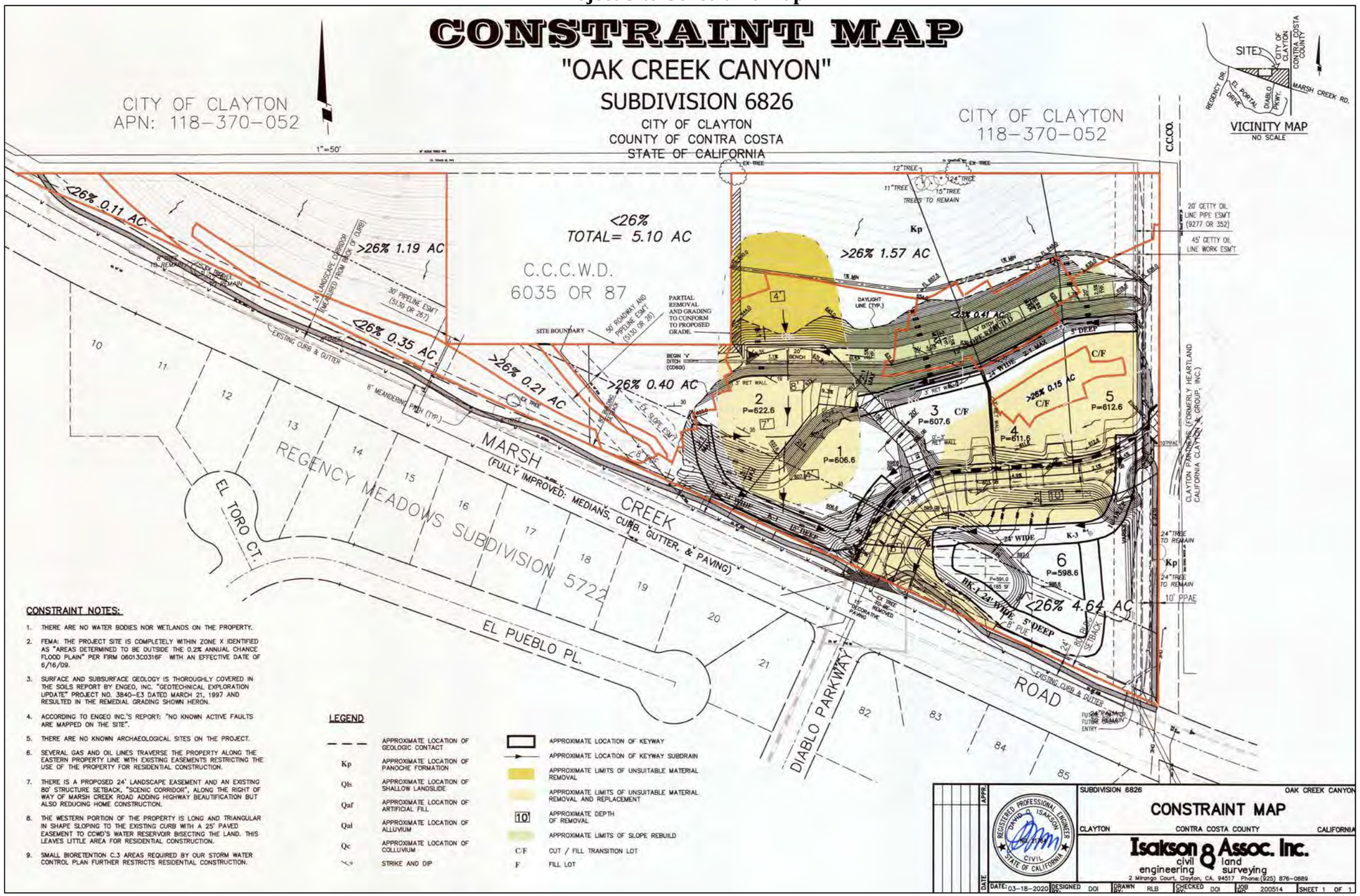
Discussion (a-iii. and c.)

The Geotechnical Report included an analysis of a postulated large deep-seated landslide feature previously mapped at the site by Nilsen (1975). ENGEO excavated Trenches T-1, T-2, and test pits TP-2, TP-3, and TP-4 near the limits of the previous postulated large slide. ENGEO encountered soil to a depth of up to eight feet in the trenches and test pits overlying bedrock units. To resolve peer review comments about whether or not there exists evidence of the postulated Nilsen landslide, ENGEO performed two exploratory trenches at the limits of the mapped feature. Both trenches encountered bedrock units of moderately weathered, and moderately to highly fractured claystone and siltstone interbedded with fine to medium grained, moderately to highly weathered sandstone typical of the Panoche Formation. The bedding encountered in the trenches generally coincides with bedding observed in ENGEOs' exploratory test pits throughout the subject property. ENGEO also observed continuous exposure of intact bedrock in both exploratory trenches. Based on the results of this supplemental exploration, ENGEO concluded that there is no evidence of the postulated large landslide feature mapped by Nilsen. Furthermore, during ENGEO's supplemental trenching work, the City of Clayton contract geologic peer reviewer, Mr. Jim Joyce, CEG, met with ENGEO's Certified Engineering Geologist to observe the locations of, and the conditions in, the exploratory trenches and test pits; it was concurred by both ENGEO and Mr. Joyce that the length and locations of the trenches and test pits were adequate to determine there was no evidence of the deep-seated landslide as previously postulated by Nilsen.[20]

ENGEO did identify a relatively shallow landslide involving soil landslide debris in the western swale, above Lots #1 and #2. ENGEO recommends that the surficial landslide and areas of colluvium mapped along slopes be overexcavated and removed, and replaced with properly drained engineered fill. Figure 14 generally indicates the areas of the site where on-site soils are unsuitable for development purposes. The Geotechnical Report includes several recommendations for soil engineering and foundation design to ensure that the shallow landslide debris does not pose adverse effects to on-site structures and future residents.

[20] ENGEO, *Updated Geotechnical Report, Oak Creek Canyon*, February 22, 2008, pg. 11.

Figure 14
Project Site Constraint Map



Lateral spreading is a failure within a nearly horizontal soil zone, commonly associated with liquefaction, which causes the overlying soil mass to move towards a free face or down a gentle slope. Because the potential for liquefaction is considered low, and the proposed development area is not adjacent to a free face, it is ENGEO's opinion that lateral spreading is unlikely.[21]

Subsidence occurs when the earth's surface sinks due to settlement of soils during earthquake shaking, excessive groundwater extraction, and/or loose soil conditions. Groundwater extraction would not occur at the site; groundwater was not encountered in the test pits or trenches at the time of excavation. During ENGEO's field explorations, layers of soft, medium stiff to stiff clay and silty clay were encountered to depths between approximately 4 and 13 feet below existing grades; these layers were typically encountered in the swales in the western and eastern portion of the site and in the alluvium and imported fills in the southeastern portion of the site. The fine-grained deposits in these areas appear to be potentially compressible and could result in measurable consolidation settlements. Compressible soils should be removed and replaced prior to fill placement in these areas.

Based on the above, in the absence of proper mitigation to remediate soils previously subject to shallow landslide, and those compressible soils that could result in subsidence, a ***potentially significant*** impact could occur as a result of the proposed project.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above potential impact to a *less-than-significant* level.

Mitigation Measure 8. *Prior to approval of the improvement plans for the project, all recommendations from the Geotechnical Report prepared for the project by ENGEO (2008) shall be incorporated into the improvement plans to the satisfaction of the City Engineer. In addition, the applicant shall retain a California Registered Geotechnical Engineer to perform field observations during grading to determine the depth of removal of compressible soils. Compliance with the recommendations of the Geotechnical Engineer shall be provided to the City Engineer.*

b. Would the project result in substantial soil erosion or the loss of topsoil? .. Less-Than-Significant With Mitigation Incorporated

Discussion (b.)

Construction of the proposed project would involve grading of the development footprint, including sloped portions of the project site, to accommodate the proposed site improvements. After grading, but prior to the overlaying of the ground surface with structures, topsoil of the disturbed portions of the site would be exposed, and the earth surfaces would be susceptible to erosion from wind and water. During the grading and excavation phases of construction, appropriate measures consistent with the Clayton Stormwater Management Ordinance and other applicable regulations (e.g., State Regional Water Quality Control Board National Pollutant Discharge Elimination System

[21] ENGEO, *Updated Geotechnical Report, Oak Creek Canyon*, February 22, 2008, pg. 16.

regulations) would be required to be implemented in order to control erosion on the site and minimize the impacts related to loss of topsoil. See Section 9, Hydrology and Water Quality, of this IS/MND for further discussion regarding the relationship of erosion to water quality. Because the proposed project could result in soil erosion or the loss of topsoil associated with grading and excavation of the project site during construction, a ***potentially significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above potential impact to a *less-than-significant* level.

Mitigation Measure 9. *Prior to the issuance of a grading permit, the project applicant shall prepare to the satisfaction of the City Engineer, an erosion control plan that utilizes standard construction practices to limit the erosion effects during construction of the proposed project. Actions should include, but are not limited to:*

a) Hydro-seeding;
b) Placement of erosion control measures within drainage ways and ahead of drop inlets;
c) The temporary lining (during construction activities) of drop inlets with "filter fabric";
d) The placement of straw wattles along slope contours;
e) Use of a designated equipment and vehicle "wash-out" location;
f) Use of siltation fences;
g) Use of on-site rock/gravel road at construction access points; and
h) Use of sediment basins and dust palliatives.

d. Be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994), creating substantial risks to life or property? ..... Less-Than-Significant Impact

Discussion (d.)

Expansive soils are subject to shrinking and swelling as a result of seasonal fluctuations in soil moisture content, potentially resulting in heaving and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations. Per the Geotechnical Report, the on-site soils were indicated to have a moderate to very high potential for expansion and shrink-swell behavior. However, building damage due to volume changes associated with expansive soils may be reduced through proper foundation design. In order to minimize potential risks associated with expansive soils, the Geotechnical Report provides specific recommendations related to foundation design. As noted above, under question 'aiv' and 'c', the project would be required to implement Mitigation Measure 8, which requires recommendations from the Geotechnical Report be incorporated into the project improvement plans. With implementation of Mitigation Measure 8, the proposed project would ensure that the recommendations within the Geotechnical Report related to

expansive soils are properly implemented during construction. Thus, the proposed project would not create substantial direct or indirect risks to life or property related to being located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994), and a ***less-than-significant*** impact would occur.

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

Discussion (e.)

The proposed residences would be connected to the City of Clayton's sewer system and would not require the installation or use of septic tanks. Therefore, the proposed project would have ***no impact*** regarding having soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems.

f. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? ..... Less-Than-Significant Impact

Discussion (f.)

The City's General Plan does not note the existence of any unique geologic features within the City. Consequently, implementation of the proposed project would not be anticipated to have the potential to result in direct or indirect destruction of unique geologic features. The City's General Plan does not indicate the presence of any paleontological resources within the City Planning Area.

In addition, the majority of the surrounding area is developed and paleontological resources are not known to have not been encountered in the vicinity. Thus, existing paleontological resources are not expected to occur on the site. Nonetheless, the potential exists for previously unknown paleontological resources to exist within the project site. Ground-disturbing activity such as grading, trenching, or excavating associated with implementation of the proposed project would have the potential to disturb or destroy such resources, if present. However, Mitigation Measures 6 and 7 require the appropriate actions be taken should any cultural resources, human remains, or bone of unknown origin be found within the project site during construction activities. With the implementation of Mitigation Measures 6 and 7, the proposed project would not result in the direct or indirect destruction of a unique paleontological resource, and a ***less-than-significant*** impact would occur.

8. GREENHOUSE GAS EMISSIONS

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

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

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

Discussion (a. and b.)

Emissions of greenhouse gases (GHGs) contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. Therefore, the cumulative global emissions of GHGs contributing to global climate change can be attributed to every nation, region, and city, and virtually every individual on earth. An individual project's GHG emissions are at a micro-scale level relative to global emissions and effects to global climate change; however, an individual project could result in a cumulatively considerable incremental contribution to a significant cumulative macro-scale impact. As such, impacts related to emissions of GHG are inherently considered cumulative impacts.

Implementation of the proposed project would cumulatively contribute to increases of GHG emissions. Estimated GHG emissions attributable to future development would be primarily associated with increases of carbon dioxide (CO_2) and, to a lesser extent, other GHG pollutants, such as methane (CH_4) and nitrous oxide (N_2O) associated with area sources, mobile sources or vehicles, utilities (electricity and natural gas), water usage, wastewater generation, and the generation of solid waste. The primary source of GHG emissions for the project would be mobile source emissions. The common unit of measurement for GHG is expressed in terms of annual metric tons of CO_2 equivalents ($MTCO_2e$/yr).

The proposed project is located within the jurisdictional boundaries of BAAQMD. The BAAQMD threshold of significance for project-level operational GHG emissions is 1,100 $MTCO_2e$/yr or 4.6 $MTCO_2e$/yr per service population (population + employees). BAAQMD's approach to developing a threshold of significance for GHG emissions is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions needed to move towards climate stabilization. If a project would generate GHG emissions

above the threshold level, the project would be considered to generate significant GHG emissions and conflict with applicable GHG regulations.

The proposed project's GHG emissions were quantified with CalEEMod using the same assumptions as presented in Section 3, Air Quality, of this IS/MND, and compared to the thresholds of significance noted above. The proposed project's required compliance with the 2019 California Building Energy Efficiency Standards Code was assumed in the modeling. In addition, the CO_2 intensity factor within the model was adjusted to reflect the PG&E's anticipated CO_2 emissions factor for the year 2023. All CalEEMod results are included in Appendix A to this IS/MND.

Construction GHG emissions are a one-time release and are, therefore, not typically expected to generate a significant contribution to global climate change. Neither the City nor BAAQMD have an adopted threshold of significance for construction-related GHG emissions, nor do they require quantification. Nonetheless, the proposed project's construction GHG emissions have been estimated. The CalEEMod emissions estimates prepared for the proposed project determined that unmitigated project construction would result in total emissions of 309.04 $MTCO_2e$ over the course of the construction period.

The estimated maximum annual GHG emissions related to operations of the proposed project are presented in Table 4 below. As shown in Table 4, the project's maximum annual unmitigated operation GHG emissions were estimated to be approximately 65.23 $MTCO_2e$/yr. Thus, implementation of the proposed project would result in operational emissions well below the BAAQMD's applicable 1,100 $MTCO_2e$/yr threshold of significance for GHG emissions. Even if the total construction emissions are added to the annual operations emissions, the sum would be 374.27 $MTCO_2e$, which remains below the BAAQMD threshold of significance.

Table 4
Operational GHG Emissions

Source	GHG Emissions ($MTCO_2e$/yr)
Area	0.83
Energy	10.55
Mobile	49.54
Waste	3.60
Water	0.73
Total Annual Operational GHG Emissions	**65.23**
BAAQMD Threshold	**1,100 $MTCO_2e$/yr**
Exceeds Threshold?	**NO**

Source: CalEEMod, June 2020 (see Appendix A).

Based on the above, the proposed project would not be considered to generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs; and impacts would be considered ***less than significant***.

9. HAZARDS AND HAZARDOUS MATERIALS.

Issues		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?	□	□	X	□
b.	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	□	X		□
c.	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	□	□	X	□
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?	□	□	□	X
e.	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	□	□	□	X
f.	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	□	□	X	□
g.	Expose people or structures, either directly or indirectly, to the risk of loss, injury or death involving wildland fires?	□	□	X	□

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

Discussion (a.)

The proposed project would consist of operations associated with the proposed residential uses. The residential uses would not involve the routine transport, use, or disposal of hazardous materials. Thus, during operations, the proposed project would not create any hazards to the public or the environment through routine transport, use, disposal, or reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment.

Construction activities would involve the use of heavy equipment, which would contain fuels, oils, and hydraulic fluid. In addition, various other products such as concrete, paints, and adhesives would likely be used on-site. However, the project contractor would be required to comply with all California Health and Safety Codes and local ordinances regulating the temporary handling, storage, and transportation of hazardous and toxic materials, as overseen by the California Environmental Protection Agency (EPA) and

Department of Toxic Substances Control (DTSC). Should an accidental release of hazardous materials occur during construction, the City (or City crews) and/or contractor, is required to notify the Contra Costa Fire Protection District (CCCFPD), who would then monitor the conditions and recommend appropriate remediation measures.

Based on the above, the proposed project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, and a ***less-than-significant*** impact would occur.

b. Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?..... Less-Than-Significant Impact With Mitigation Incorporated

Discussion (b.)

Several oil pipeline operation and maintenance easements owned by Getty Oil Company are situated parallel to the eastern project site boundary. Within the easements are a 20-inch vacant pipeline operated by Crimson and a 16-inch gas line operated by Phillips 66. Four active oil pipelines are located in Marsh Creek Road along the project site frontage. One is a 20-inch pipeline owned by Crimson Midstream, LLC. The other three lines along Marsh Creek Road consist of a 16-inch pipeline, a 20-inch pipeline, and a 24-inch pipeline operated by Coalinga-Avon.

Preliminary plans show the existing pipelines within the easements along the eastern boundary of the site and along Marsh Creek Road would not be disturbed by construction activities. The project does not include improvements to Marsh Creek Road that could impact the pipelines within the roadway. After occupation of the proposed residences, excavation activities directed by homeowners or contractors, specifically within Lots #5 and #6 located near the easements along eastern boundary of the site, could create potential risks for rupture of the on-site pipelines. Out of an abundance of caution, pipeline owners and operators should be contacted at such time construction drawings are being prepared to ensure that final subdivision design does not have the potential to create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment. Thus, a ***potentially significant*** impact could occur.

Mitigation Measure(s)

The following mitigation measures would reduce the above potential impact to a *less-than-significant* level.

Mitigation Measure 10. *Grading and construction plans and specifications for the project shall include the wording which specifies that construction contractors shall contact all pipeline operators (e.g., Shell, Conoco-Phillips) at least forty-eight (48) hours prior to start of construction activities to obtain detailed identification of underground oil pipes.*

Mitigation Measure 11. *Notification shall be provided on the deeds and California Department of Real Estate disclosure forms to future property owners regarding the presence of crude oil pipelines. The wording of the notification shall be approved by the Clayton Community Development Director and City Attorney.*

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? ..... Less-Than-Significant Impact

Discussion (c.)

The project site is not located within one-quarter mile of any school. The nearest school is the Diablo View Middle School, located approximately 0.35-mile northeast of the project site. Therefore, the proposed project would result in a ***less-than-significant*** impact associated with emitting hazardous emissions or handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of a school.

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? ..... No Impact

Discussion (d.)

The proposed project is not located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5,[22] and would not create a significant hazard to the public or the environment. Therefore, ***no impact*** would occur.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area? ..... No Impact

Discussion (e.)

The nearest airport to the proposed project site is the Buchanan Field Airport, located approximately 8.25 miles to the west of the site. Therefore, the proposed project site is not located within an airport land use plan or within the vicinity or a public or private airport. As such, the project would not result in a safety hazard for people residing or working in the project area, and ***no impact*** would occur.

[22] California Department of Toxic Substances Control. *EnviroStor*. Available at: https://www.envirostor.dtsc.ca.gov/public/. Accessed June 2020.

f. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? ..... Less-Than-Significant Impact

Discussion (f.)

The City of Clayton has an adopted Emergency Operations Plan, dated January 2012, which identifies the City's emergency planning, organizational, and response policies and procedures. The Emergency Operations Plan addresses how the City would respond to extraordinary events or disasters, including departmental Standard Operating Procedures. The primary exit routes out of the City to the north are Pine Hollow Road, Clayton Road, and Concord Boulevard. To the south, the primary exit route out of the City is Marsh Creek Road.

Although the proposed project would involve improvements to the Marsh Creek Road frontage, including a 24-foot landscape corridor and a six-foot meandering trail, the improvements would not significantly impede vehicle traffic in the event of a major evacuation. In addition, during project construction, all equipment and materials would be staged on-site and would not substantially interfere with existing roadway operations. Furthermore, the proposed on-site roadway would provide adequate emergency access to future residents of the proposed development. Therefore, the proposed project would result in a ***less-than-significant*** impact associated with impairing implementation of, or physically interfering with, an adopted emergency response plan or emergency evacuation plan.

g. Would the project expose people or structures, either directly or indirectly, to the risk of loss, injury or death involving wildland fires? ..... Less-Than-Significant Impact

Discussion (g.)

According to the Diablo Fire Safe Council, the City of Clayton is located within a wildland urban interface (WUI). The WUI is defined as an area in which wildlands and communities are sufficiently close to each other to present a credible risk of fire spreading from one to another.[23] Chapter 7A of the CBC includes specific requirements related to the design and construction of new buildings located within a WUI. For example, Chapter 7A specifies that a fire sprinkler system is required to be installed in order to protect against fire hazards in a WUI. In compliance with the CBC (specifically Section 903.2.1.3, Group A-3), the design of the residences would include automatic fire sprinklers, and fire alarm systems would be incorporated pursuant to California Fire Code (CFC) requirements. Such features would help to address fire situations within the site, which would reduce the demand for fire protection services from the project site. Fire services to the Clayton area are provided by the Contra Costa County Fire Protection District (CCCFPD), with the nearest station located approximately 1.6 miles east of the site by way of Marsh Creek Road and Clayton Road.

[23] Diablo Fire Safe Council. *Clayton Morgan Territory Wildfire Action Plan: Public Review Draft*. January 25, 2016.

The proposed residential units are required to be designed in compliance with all applicable State and local standards and recommendations for new development, such as the CCCFPD's requirements for providing a water supply system for fire protection, and providing adequate emergency and fire access. In addition, the project would be required to provide "defensible space" around on-site structures consistent with CCCFPD guidelines. Adequate provision of defensible space is enforced by the CCCFPD Exterior Hazard Control Division. Therefore, the proposed project would not expose people or structures, either directly or indirectly, to the risk of loss, injury or death involving wildland fires, and ***less-than-significant*** impact would occur.

10. HYDROLOGY AND WATER QUALITY

Issues			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 ground water quality?		□	□	X	□
b.	Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?		□	□	X	□
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;			X	
	ii.	Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;			X	
	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			X	
	iv.	Impede or redirect flood flows?			X	
d.	In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?		□	□	□	X
e.	Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?		□	□	X	□

The following discussions are primarily based on a Stormwater Control Plan (SWCP) prepared for the proposed project by Isakson & Associates.[24]

a. Would the project violate any water quality standards or waste discharge requirements? ..... Less-Than-Significant Impact

ciii. Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? ..... Less-Than-Significant Impact

Discussion (a. and ciii.)

Water quality and runoff issues associated with construction and operation of the proposed project are discussed in detail below.

[24] Isakson & Associates. *Stormwater Control Plan for Oak Creek Canyon, SUB 6826.* May 17, 2015.

Construction

During the early stages of construction activities, topsoil would be exposed due to grading and excavation of the site. After grading and prior to overlaying the ground surface with impervious surfaces and structures, the potential exists for wind and water erosion to discharge sediment and/or urban pollutants into stormwater runoff, which could adversely affect water quality downstream.

The State Water Resources Control Board (SWRCB) regulates stormwater discharges associated with construction activities where clearing, grading, or excavation results in a land disturbance of one or more acres. The City's National Pollutant Discharge Elimination System (NPDES) permit requires applicants to show proof of coverage under the State's General Construction Permit prior to receipt of any construction permits. The State's General Construction Permit requires a Storm Water Pollution Prevention Plan (SWPPP) to be prepared for the site. A SWPPP describes Best Management Practices (BMPs) to control or minimize pollutants from entering stormwater and must address both grading/erosion impacts and non-point source pollution impacts of the development project. Because the proposed project would disturb greater than one acre of land, the proposed project would be subject to the requirements of the State's General Construction Permit. Compliance with such requirements would minimize the potential for polluted runoff to leave the site during construction activities.

Operation

The proposed residential uses would not involve operations typically associated with the generation or discharge of polluted water. Thus, typical operations on the project site would not violate any water quality standards or waste discharge requirements, nor degrade water quality. However, addition of the impervious surfaces on the site would result in the generation of urban runoff, which could contain pollutants if the runoff comes into contact with vehicle fluids on parking surfaces and/or landscape fertilizers and herbicides. All municipalities within Contra Costa County (and the County itself) are required to develop more restrictive surface water control standards for new development projects as part of the renewal of the Countywide NPDES permit.

The City of Clayton has adopted the County C.3 Stormwater Standards, which require new development and redevelopment projects that create or alter 10,000 or more sf of impervious area to contain and treat all stormwater runoff from the project site. Given that the proposed project would create approximately 36,564 sf of impervious area, the proposed project would be subject to the requirements of the SWRCB and the Regional Water Quality Control Board (RWQCB), including the C.3 Standards, which are included in the City's NPDES General Permit. Compliance with such requirements would ensure that impacts to water quality standards or waste discharge requirements would not occur during operation of the proposed project.

The SWCP prepared for the proposed project conforms with the most recent Contra Costa Clean Water Program Stormwater C.3 Guidebook and verifies that the proposed project would comply with all City stormwater requirements. In compliance with the C.3 Guidebook, the proposed project would include a bio-retention basin, or Bio Retention Area BR1, located in the southeast portion of the project site, to the south of the proposed

roadway and to the west of Lot #6, near the site entrance (see Figure 9). Runoff from Lots #1 through #6, including pavement, rooftop and landscape/open areas, as well as a portion of the proposed roadway, would be directed to Bio Retention Area BR1 BR1 is comprised of an irregular shaped landscape area of approximately 5,185 sf. The basin would be sized to exceed the minimum volume requirement necessary to adequately handle all runoff from the proposed impervious surfaces and landscaping. The substantial portion of the site that would remain in open space would be self-treating.

The bio-retention basin would remove pollutants primarily by filtering runoff slowly through an active layer of soil. The process of stormwater moving through the soil layers would remove pollutants from the stormwater prior to subsurface infiltration or discharge to City infrastructure. The bio-retention basin would be designed and constructed according to criteria from the Contra Costa Clean Water Program Stormwater C.3 Guidebook. Specifically, the bio-retention basin would include 18-inch depth "loamy sand" soil mix with minimum long-term percolation rate of five inches per hour, and a perforated pipe under drain would be bedded near the top with holes facing downward. In addition, the bio-retention basin would include outflow orifices to slowly meter flows to an in-tract 48-inch City-maintained storm drain that would be constructed in the proposed roadway. Storms larger than the 10-year design storm would exit the bio-retention basin by way of overflow outlet structures and discharge directly to the aforementioned 48-inch drain. The bio-retention basin would be designed to accommodate runoff for treatment and hydro modification as specified in the C.3 manual.

Based on the above, the proposed project would comply with the requirements of the SWRCB and the RWQCB, and would meet or exceed C.3 Standards. Therefore, during operation, the project would comply with all relevant water quality standards and waste discharge requirements, and would not degrade water quality.

Conclusion

Based on the SWCP prepared for the proposed project, the project would comply with all applicable regulations during operation, does not involve uses associated with the generation or discharge of polluted water, and would be designed to adequately treat stormwater runoff from the site prior to discharge. Therefore, a ***less-than-significant*** impact would occur.

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

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

Discussion (b. and e.)

The Contra Costa Water District (CCWD) provides domestic water service to Clayton. The major source of CCWD water is the Sacramento River Contra Costa Water District Canal,

not pumped groundwater. The construction of six new residential buildings and associated improvements would result in a net increase in impervious surfaces; however, the surface area would not be large enough to significantly affect groundwater recharge. Additionally, the majority of the project site would remain in open space and the bioretention areas would allow for stormwater to infiltrate into the surrounding soil, thereby allowing the continued contribution to groundwater recharge at the site.

As such, the proposed project would not substantially deplete groundwater supplies or recharge at the site such that the project may impede sustainable groundwater management of the basin and would not conflict with an applicable groundwater management plan or water quality control plan. Thus, a ***less-than-significant*** impact would occur.

ci. 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 result in substantial erosion or siltation on- or off-site? ..... Less-Than-Significant Impact

cii. 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 substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite? ..... Less-Than-Significant Impact

ciii. 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 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?..... Less-Than-Significant Impact

Discussion (ci., cii., and ciii.)

As discussed above, runoff from the impervious areas of the site would be collected and conveyed to the proposed bio-retention basin. Per the SWCP, the bio-retention facilities would be designed to exceed the minimum volume needed to treat and control runoff from all proposed impervious surfaces. Therefore, despite the proposed project's increase in impermeable surfaces, the proposed project would not result in an increase in stormwater runoff leaving the site as compared to runoff that currently occurs. Furthermore, runoff entering the bio-retention basin would be able to partially infiltrate the soil in a similar manner to what currently occurs on the project site. The only expected runoff leaving the

site would occur in the case of heavy storms, where excess runoff not captured by the bio-retention basin would be discharged to the City's existing stormwater system. Consequently, runoff from the site would only occur in select circumstances, and the proposed project would not result in a net increase in the amount of runoff from the site. As a result, the capacity of existing stormwater drainage infrastructure would not be exceeded, and alterations to such infrastructure would not be needed.

In order to ensure that the proposed project's stormwater treatment facilities remain adequate, long-term maintenance would be required. Routine maintenance of the facilities is necessary to ensure that infiltration of water is unobstructed, erosion is prevented, and soils are held together by biologically active plant roots. Proper operation and maintenance of the stormwater management facilities would be the sole responsibility of the property owner. In accordance with Clayton Municipal Code Section 13.12.050, implementation of an approved SWCP and submittal of an approved Stormwater Control Operation and Maintenance Plan by the applicant shall be a condition precedent to a final building inspection or the issuance of a certificate of occupancy. All inspections and remedial actions would be logged in a Stormwater BMP Inspection and Maintenance Log.

Based on the above, the proposed project would not substantially alter the existing drainage pattern of the site or area in a manner which would result in erosion, siltation, or flooding on- or off-site, 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. Consequently, the proposed project would result in a ***less-than-significant*** impact.

civ. 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 create or contribute runoff water which would Impede or redirect flood flows?..... Less-Than-Significant Impact

Discussion (civ.)

Based on the FEMA Flood Insurance Rate Map (FIRM), (Map Number ID: 06013C0316F), the project site is within Zone X, which is described by FEMA as an area determined to be outside the 0.2 percent annual chance floodplain. In addition, dams or levees are not located upstream of the proposed project site; thus, flooding due to dam or levee failure would not occur. Because the project site is not within a 100-year floodplain, the proposed project would not place housing or structures within a 100-year floodplain or expose people or structures to risks involving flooding. Therefore, impacts would be ***less-than-significant***.

d. Would the project, in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation? ..... No Impact

Discussion (d.)

A seiche is defined as a wave generated by rapid displacement of water within a reservoir or lake, due to an earthquake that triggers land movement within the water body or land sliding into or beneath the water body. The project site is not located near a water body that is susceptible to seiche hazard. Furthermore, due to the distance from the project site to the nearest coastline the project site would not be subject to tsunami hazards. Therefore, the proposed project would not expose people or structures to a significant risk of loss, injury, or death involving seiche, tsunami, or mudflow, and ***no impact*** would occur.

11. LAND USE.

Issues		Potentially Significant Impact	Less-Than-Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:					
a.	Physically divide an established community?	□	□	X	□
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?	□	□	X	□

a. Would the project physically divide an established community? ..... Less-Than-Significant Impact

Discussion (a.)

The proposed project site is currently vacant and is absent of any housing or habitable structures. Currently, existing land uses in the project vicinity include single-family residences to the south and west, across Marsh Creek Road, and the water tank to the north. The proposed residences would be compatible with the existing residential development in the project area. Given that the proposed project would involve construction on a currently vacant site, and would not involve any features that would divide an established community. As such, the proposed project would not physically divide an established community, and ***no impact*** would occur.

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

Discussion (b.)

The proposed project includes a request to amend the General Plan and Marsh Creek Road Specific Plan land use designations for the site. The project site has been anticipated for five low density residential units since at least 2005, when the first tentative map was approved for the site. The requested amendments would only allow an increase of one residential unit, for a total of six. In addition, the proposed project would not conflict with any City policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect. For example, the proposed project would comply with the City of Clayton Noise Element, as demonstrated in Section 13 of the IS/MND. Additionally, as discussed in Section 4, Biological Resources, the proposed project would comply Chapter 15.70, Tree Protection, of the City's Municipal Code, and Marsh Creek Road Specific Plan policies related to encouraging tree preservation. As such, the project would not conflict with any applicable land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect, and a ***less-than-significant*** impact would occur.

12. MINERAL RESOURCES.

Issues		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?	□	□	□	X
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?	□	□	□	X

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

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? ..... No Impact

Discussion (a. and b.)

According to the Contra Costa County General Plan, the nearest mineral resource or mineral resource recovery site within the City of Clayton is the Cemex Quarry, located approximately 1.29 miles west of the project site. Because the project site is not within the immediate vicinity of the Cemex Quarry or any of the other identified areas of important mineral deposits, the project would not interfere with existing operations or access to such deposits. Therefore, the proposed project would have ***no impact*** to mineral resources.

13. NOISE.

Issues		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?	□	X		□
b.	Generation of excessive groundborne vibration or groundborne noise levels?	□	□	X	□
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 two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	□	□	X	□

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 With Mitigation Incorporated

Discussion (a.)

The following discussion is based on an Environmental Noise Assessment (ENA) prepared for the proposed project by Bollard Acoustical Consultants, Inc (see Appendix D).[25]

Clayton Noise Standards

For transportation noise sources (traffic, rail, aircraft) affecting new residential land uses, the Noise Element of the City of Clayton General Plan establishes an exterior noise level standard of 60 dB Ldn, applied at outdoor activity areas of the residential uses. The intent of this standard is to provide an acceptable exterior noise environment for outdoor activities. Additionally, the City of Clayton utilizes an interior transportation noise level standard of 45 dB Ldn or less within noise-sensitive residential dwellings. The intent of this interior noise limit is to provide a suitable environment for indoor communication and sleep.

Existing Ambient Noise Levels

The existing noise environment at the project site is primarily defined by traffic Marsh Creek Road. In order to quantify the ambient existing noise levels at the project site, a long-term, 48-hour noise level survey was conducted on the project site as part of the ENA (see

[25] Bollard Acoustical Consultants, Inc. *Environmental Noise Assessment, Oak Creek Canyon 6-Lot Subdivision, Clayton, California.* October 3, 2017.

Figure 15). The results of the noise level measurement survey are summarized in Table 5 below. As shown in the table, the measured ambient L_{dn} noise levels at the project site currently exceed the City's 60 dB L_{dn} exterior noise level standard.

Table 5
Summary of Ambient Noise Level Measurement

Site	Date	L_{dn} (dB)	Average Measured Hourly Noise Levels (dB)					
			Daytime (7 AM to 10 PM)			Nightime (10 PM to 7 AM)		
			L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
1	September 13-14, 2017	66	62	56	77	59	46	73
1	September 14-15, 2017	64	61	55	74	57	37	70

Source: Bollard Acoustical Consultants, Inc., 2017.

Construction Noise Analysis

During project construction, heavy equipment would be used for grading excavation, paving, and building construction, which would increase ambient noise levels when in use. Noise levels would vary depending on the type of equipment used, how the equipment is operated, and how well the equipment is maintained. Noise exposure at any single point outside the project site would vary depending on the proximity of construction activities to that point.

Standard construction equipment, such as graders, backhoes, loaders, and trucks, would be used for the proposed construction work. The range of maximum noise levels for various types of construction equipment at a distance of 50 feet is depicted in Table 6 below. The noise values represent maximum noise generation, or full power operation of the equipment. As one increases the distance between equipment, or increases separation of areas with simultaneous construction activity, dispersion and distance attenuation reduce the effects of combining separate noise sources.

The nearest sensitive receptors to the proposed project are single-family residences located approximately 100 feet to the south of the proposed project site, across Marsh Creek Road. As shown in Table 6, construction activities typically generate noise levels ranging from approximately 75 to 90 dB L_{max} at a reference distance of 50 feet from the construction activities. The noise levels from construction operations decrease at a rate of approximately 6 dB per doubling of distance from the source. As a result, maximum construction noise levels would range from 69 to 84 dB L_{max} at the nearest existing residences. In addition, typical residential construction provides a noise level reduction of approximately 25 dB with the windows closed, which would reduce the maximum noise levels within the off-site residences to approximately 44 to 59 dB L_{max}. Although construction activities would only occur for a limited duration, project construction activities could result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, though such levels would not likely substantially exceed existing ambient noise levels caused by local traffic on Marsh Creek Road. Nevertheless, impacts resulting from the 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 during construction could be potentially significant.

Figure 15
Project Area and Traffic Noise Measurement Locations

Bollard Acoustical Consultants, Inc., 2017.

Table 6 Construction Equipment Noise Emission Levels	
Equipment	**Typical Sound Level (dBA) 50 Feet from Source**
Air compressor	81
Backhoe	80
Compactor	82
Concrete mixer	85
Concrete ump	82
Concrete vibrator	76
Crane, mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jackhammer	88
Loader	85
Paver	89
Pneumatic tool	85
Pump	76
Roller	74
Saw	76
Source: Bollard Acoustical Consultants, Inc, 2017.	

Future Traffic Noise at the Project Site

This section evaluates the noise effects of Marsh Creek Road vehicular traffic onto future residences, which is considered an effect of the environment on the project. Impacts of the environment on a project (as opposed to impacts of a project on the environment) are beyond the scope of required California Environmental Quality Act (CEQA) review. "[T]he purpose of an EIR is to identify the significant effects of a project on the environment, not the significant effects of the environment on the project." (*Ballona Wetlands Land Trust v. City of Los Angeles,* (2011) 201 Cal.App.4th 455, 473 (*Ballona*).) The impacts discussed in this section relate to effects of existing environmental noise sources on future residents of the project (e.g. background traffic on surrounding streets). The California Supreme Court recently held that "CEQA does not generally require an agency to consider the effects of existing environmental conditions on a proposed project's future users or residents. What CEQA does mandate… is an analysis of how a project might exacerbate existing environmental hazards." (*California Building Industry Assn. v. Bay Area Air Quality Management Dist.* (2015) 62 Cal.4th 369, 392; see also *Mission Bay Alliance v. Office of Community Investment & Infrastructure* (2016) 6 Cal.App.5th 160, 197 ["identifying the effects on the project and its users of locating the project in a particular environmental setting is neither consistent with CEQA's legislative purpose nor required by the CEQA statutes"], quoting *Ballona*, *supra*, 201 Cal.App.4th at p. 474.) Therefore, for the purposes of the CEQA analysis, the relevant inquiry is not whether the proposed project's future residents will be exposed to preexisting environmental noise-related hazards, but instead whether project-generated noise will exacerbate the pre-existing conditions. Nonetheless, for informational purposes, this section considers both the proposed project's contribution to on- and off-site noise levels, as well as exposure of

future residents of the proposed project to potential hazards associated with the preexisting noise environment, in order to demonstrate General Plan compliance.

The ENA used the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) to predict future traffic noise levels at the outdoor activity areas associated with the proposed project. Future average daily traffic was conservatively estimated by assuming a doubling of traffic volumes relative to baseline conditions in effect when the ENA was performed. The results of the modeling are summarized in Table 7 below. The predicted future traffic noise levels presented account for the proposed six-foot noise barriers at Lots #1 and #2 (see Figure 12). As shown in the table, with the exception of Lot #6, future traffic noise levels at the proposed on-site outdoor activity areas would satisfy the City's 60 dB L_{dn} exterior noise level standard. Noise levels at Lot #6 would be approximately 65 dB L_{dn}.

Table 7
Predicted Future Traffic Noise Levels at Project Residences

	Lot #1	Lot #2	Lot #3	Lot #4	Lot #5	Lot #6
Setback distances from centerline of Marsh Creek Road (feet)						
Backyard Area	110	140	260	330	410	140
Building Facade	130	140	210	260	330	140
Predicted Future Traffic Noise Levels, L_{dn} (dB)						
Backyard Area	58	55	56	54	53	**65**
First-floor building facades	57	55	62	61	59	65
Second-floor building facades	68	68	65	N/A	62	N/A

Notes:

- At the backyards and 1st floor facades of Lots #1 and #2, the predicted traffic noise levels include the attenuation provided by the proposed six-foot tall noise barriers. Project topography was accounted for in the noise barrier calculations. Noise barrier offsets were not applied at unshielded upper floor facades.
- The noise level at second-floor building facades includes an offset of +3.0 dB to account for reduced ground absorption of noise at elevated positions.

Source: Bollard Acoustical Consultants, Inc. 2017.

According to the ENA, future Marsh Creek Road traffic noise levels are predicted to be 65 dB Ldn within the backyard of Lot #6, exceeding the City of Clayton exterior noise level standard of 60 dB Ldn by 5 dB. An analysis of noise barrier effectiveness was conducted for Lot #6 to determine the required noise barrier height to sufficiently reduce traffic noise levels below the City's exterior criteria. According to the ENA, an additional six-foot-tall solid noise barrier would be required at Lot #6 (see Figure 16) in order to reduce the exterior traffic noise levels at the nearest outdoor activity areas and first-floor building facades to acceptable levels. Installation of the recommended noise barrier would reduce traffic noise levels at the outdoor activity area of Lot #6 to 58 dB L_{dn}, which would satisfy the City's 60 dB L_{dn} exterior noise level standard.

As shown in Table 7, future exterior noise levels would be approximately 55 to 62 dB L_{dn} at the first-floor facades of the proposed buildings nearest to Marsh Creek Road. Due to reduced ground absorption at elevated positions and lack of shielding by the proposed and recommended noise barriers, noise levels at the second-floor facades would be approximately 62 to 68 dB L_{dn}. In order to satisfy the City's 45 dB L_{dn} interior noise level standard, minimum noise reductions of 17 and 23 dB would be required of the first- and

upper-floor building facades, respectively. Per the ENA, standard residential construction typically results in an exterior to interior noise reduction of about 25 dB with windows closed and approximately 15 dB with windows open. Therefore, standard construction practices would be adequate for both first-floor and elevated upper-floor facades of all residences in the development. The City of Clayton will require the project applicant to note the noise barrier measurement on project improvement plans as a condition of approval. The noise barrier shall be constructed of masonry or pre-cast panels and installed at the locations specified in Figure 16 of this IS/MND. The final design of the noise barrier shall be approved by the Building Official prior to building permit issuance. Therefore, with the required condition of approval noted above, traffic noise at the proposed single-family residences would not conflict with the City's applicable interior or exterior noise thresholds. Overall, future traffic noise at the proposed sensitive receptors would be less-than-significant.

Future Traffic Noise at Existing Sensitive Receptors

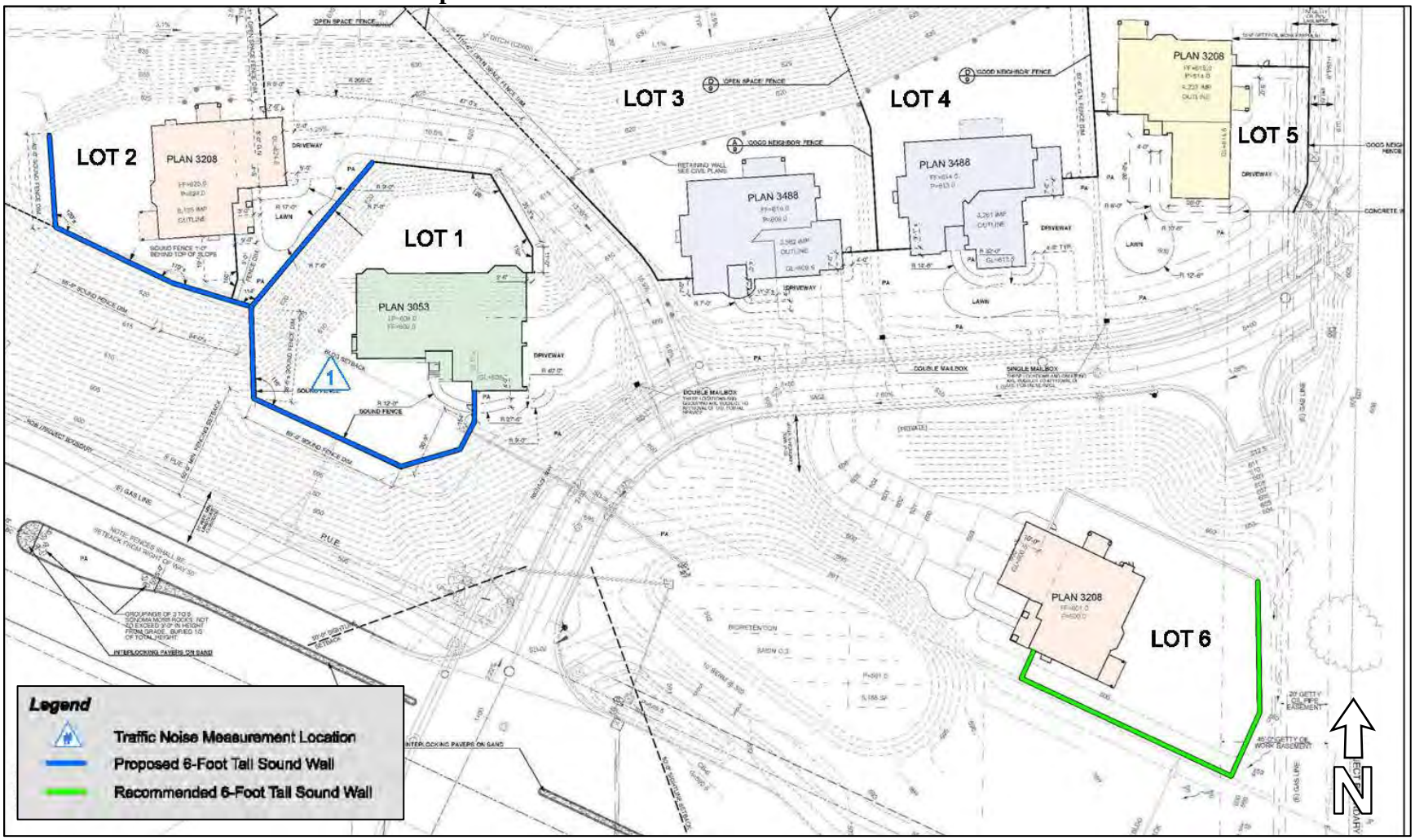
To assess noise level increases on local roadways associated with project-generated traffic, trips associated with the proposed project were added to baseline traffic on Marsh Creek Road. Per the ENA, the proposed six single-family residences would generate approximately 60 average daily trips (ADT). Assuming a vehicle speed of 50 miles per hour, 60 vehicle trips, and a distance of 100 feet from the centerline of Marsh Creek Road, the project-generated trips would result in a traffic noise level of increase of less than 0.1 dB L_{dn}. The Federal Interagency Committee on Noise (FICON) considers a traffic noise level increase from 1.5 to 5 dB to be significant, depending upon the ambient noise level. In addition, traffic noise level increases of less than 1 dB are considered to be well below the threshold of perception, and would be considered inaudible. Because the project-generated 0.1 dB L_{dn} increase is below even the lowest FICON threshold of 1.5 dB, the project-related increase in traffic noise levels would be imperceptible at existing residences located south of Marsh Creek Road and would be considered less than significant.

As such, the project-generated traffic noise level increases would not represent a substantial increase in ambient noise levels in the area and would not affect any existing nearby residences or other sensitive uses in the area.

Conclusion

Based on the above, traffic generated by the proposed project would not substantially increase traffic noise levels on Marsh Creek Road. As such, the proposed project would not result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. In addition, with construction of the recommended noise barrier, future residents of the proposed single-family home at Lot #6 would not be exposed to noise levels in excess of the 60 dB L_{dn} exterior noise level standard established in the City's General Plan.

Figure 16
Proposed and Recommended Noise Barrier Locations



Bollard Acoustical Consultants, Inc., 2017.

However, the proposed project could result in the 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 during construction. Therefore, considering the potential for construction activities to result in temporary increases in noise levels in the project area, a ***potentially significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would ensure that the above potential impact is reduced to a *less-than-significant* level.

Mitigation Measure 12. *During grading and construction, the project contractor shall ensure that the following measures are implemented, consistent with the recommendations in the Environmental Noise and Analysis prepared for the proposed project:*

a) Grading and construction activities shall be limited to the daytime hours between 7:00 AM to 5:00 PM Monday through Friday, as specified in Section 15.01.101 of the Clayton Municipal Code. Any such work beyond said hours and days shall be strictly prohibited unless previously specifically authorized in writing by the City Engineer or designee or by project conditions of approval;

b) All noise-producing project equipment and vehicles using internal-combustion engines shall be equipped with manufacturers-recommended mufflers and be maintained in good working condition;

c) All mobile or fixed noise-producing equipment used on the project site that are regulated for noise output by a federal, State, or local agency shall comply with such regulations while in operation on-site;

d) Electrically powered equipment shall be used instead of pneumatic or internal combustion-powered equipment, where feasible;

e) Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors; and

f) Construction site and access road speed limits shall be established and enforced during the construction period.

The requirements above shall be included, via notation, on the final grading plan submitted for review and approval by the Community Development Director prior to grading permit issuance.

b. Would the project result in generation of excessive groundborne vibration or groundborne noise levels? ..... Less-Than-Significant Impact

Discussion (b.)

Similar to noise, vibration involves a source, a transmission path, and a receiver. However, noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration depends on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities (PPV) in inches per second (in/sec). Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of PPV.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 8, which was developed by Caltrans, shows the vibration levels that would normally be required to result in damage to structures. As shown in the table, the threshold for architectural damage to structures is 0.20 in/sec PPV and continuous vibrations of 0.10 in/sec PPV, or greater, would likely cause annoyance to sensitive receptors.

The proposed project would only cause elevated vibration levels during construction, as the proposed project would not involve any uses or operations that would generate substantial groundborne vibration. Although noise and vibration associated with construction of the project would add to the noise and vibration environment in the immediate project vicinity, construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours. Because the proposed project would not cause continuous, long-term vibrations, the project would not be expected to result in extended annoyance to the nearby sensitive receptors.

The primary vibration-generating activities associated with the proposed project would occur during grading, placement of utilities, and construction of foundations. Table 9 shows the typical vibration levels produced by construction equipment at various distances. The most substantial source of groundborne vibrations associated with project construction would be the use of vibratory compactors.

Table 8 Effects of Vibration on People and Buildings			
PPV		**Human Reaction**	**Effect on Buildings**
in/sec	**mm/sec**		
0.15 to 0.30	0.006 to 0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10 to 15	0.4 to 0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage
Source: Caltrans. Transportation Related Earthborne Vibrations. TAV-02-01-R9601. February 20, 2002.			

Table 9 Vibration Levels for Various Construction Equipment		
Type of Equipment	**PPV at 25 feet (in/sec)**	**PPV at 50 feet (in/sec)**
Large Bulldozer	0.089	0.029
Loaded Trucks	0.076	0.025
Small Bulldozer	0.003	0.000
Auger/drill Rigs	0.089	0.029
Jackhammer	0.035	0.011
Vibratory Hammer	0.070	0.023
Vibratory Compactor/roller	0.210	0.070
Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006.		

The nearest existing building is located approximately 100 feet south of the project site boundary, across Marsh Creek Road. At a distance of 100 feet, the PPV from even the most vibration-intensive equipment would be substantially diminished, and below the 0.2 PPV threshold for building damage. While the CCWD water tank is located in closer proximity, it is still greater than 50 feet from proposed construction areas, and thus, not at risk from vibration damage. Furthermore, construction is temporary and construction equipment would operate intermittently throughout the course of a day, would be restricted to daytime hours per the City of Clayton Municipal Code Section 15.01.101, and would likely only occur over portions of the improvement area at a time. Therefore, persons are not predicted to be exposed to excessive vibration or groundborne noise levels associated with the proposed project, and a ***less-than-significant*** impact would occur.

c. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? ..... Less-Than-Significant Impact

Discussion (c.)

The nearest airport to the proposed project site is the Buchanan Field Airport, located approximately 8.25 miles to the west of the site. Aircraft-related noise, if audible at the project site, would be extremely minimal. Therefore, the proposed project would not expose people residing or working in the project area to excessive noise levels associated with air traffic and a ***less-than-significant*** impact would occur.

14. POPULATION AND HOUSING.

ISSUES		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 (e.g., through projects in an undeveloped area or extension of major infrastructure)?	□	□	X	□
b.	Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	□	□	□	X

a. Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (e.g., through projects in an undeveloped area or extension of major infrastructure)? ..... Less-Than-Significant Impact

Discussion (a.)

The proposed project would include the development of six single-family homes, and, thus, would induce population growth. Using the Department of Finance average persons per household value for the City of Clayton of 2.72, the proposed project's addition of six residential units would result in approximately 14 new residents.[26] The Department of Finance estimates the 2019 population of Clayton, based on the 2010 Census, to be approximately 10,897.[27] The increase in population would constitute a 0.17 percent increase in in the City's population. A 0.17 percent increase in population would not be considered substantial growth. It should be noted that population growth itself does not constitute an environmental impact; rather, increased demands on the physical environment resulting from increases in population are considered environmental impacts. Physical environmental effects associated with development of the proposed project area are evaluated throughout this IS/MND. For example, as discussed in Section 19, Utilities and Service Systems, of this IS/MND, adequate utility infrastructure would be available to support the proposed project. Consequently, a ***less-than-significant*** impact would occur in regard to the project inducing substantial population growth.

[26] California Department of Finance. *E-5 Population and Housing Estimates for Cities, Counties, and the State, 2011-2019, with 2010 Benchmark.* Available at: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/. Accessed June 2020.

[27] *Ibid.*

b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? ..... No Impact

Discussion (b.)

The project site is currently vacant and absent of housing or other habitable structures. As such, implementation of the proposed project would not displace substantial numbers of housing or people, necessitating the construction of replacement housing elsewhere, and ***no impact*** would occur.

15. PUBLIC SERVICES.

Issues		Potentially Significant Impact	Less-Than-Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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:					
a.	Fire protection?	□	□	X	□
b.	Police protection?	□	□	X	□
c.	Schools?	□	□	X	□
d.	Parks?	□	□	X	□
e.	Other public facilities?	□	□	X	□

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 fire protection? ..... Less-Than-Significant Impact

b. Police protection? ..... Less-Than-Significant Impact

Discussion (a. and b.)

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 nearest fire station is located at 6500 Center Street, approximately 1.6 miles north of the project site by way of Marsh Creek Road. Police protection services would be provided for the project by the City of Clayton Police Department. The Police Department is located at 6000 Heritage Trail, which is approximately two miles from the proposed project site.

The threshold for the impact, as identified in Appendix G of the CEQA Guidelines, is related to whether the project would result in substantial adverse physical impacts associated with the provision of new or physically altered fire or police facilities, the construction of which could cause significant environmental impacts in order to maintain acceptable service ratios or performance objectives. In the court case *City of Hayward v. Board of Trustees of the California State University,* the First District Court of Appeal affirmed that the focus of CEQA analysis should be limited to physical environmental impacts related to a project.[28] The court held that, "The need for additional fire protection services is not an *environmental* impact that CEQA requires a Project Proponent to mitigate."

[28] First District Court of Appeal. *City of Hayward v. Board of Trustees of the California State University*. (November 30 ,2015) 242 Cal.App.4th 833.

Given the relatively modest amount of development included in the proposed project (six units), the project would not substantially increase demand for fire and police protection services such that construction of a new facility or expansion of an existing facility would be required. Furthermore, the amendments being requested would only result in one additional single-family residential unit, beyond what has been anticipated for the project site in the City's planning efforts. Moreover, the City of Clayton Municipal Code Chapter 3.18 establishes development fees to off-set any potential impacts on fire services from new developments. The developer is required to pay the fire protection fee prior to the issuance of an occupancy permit for each unit.

Because the project would not necessitate 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 or police protection, a ***less-than-significant*** impact would result.

c. Schools?..... Less-Than-Significant Impact

Discussion (c.)

The City of Clayton is located within the Mt. Diablo Unified School District (MDUSD). Mt. Diablo Elementary and Diablo View Middle Schools serve the City of Clayton.

Because the proposed project would involve the construction of six residential units, the project could add students to the MDUSD. However, the construction of six new residential units would not create a significant number of new K-12 students. Furthermore, Senate Bill (SB) 50 requires the payment of impact fees to avoid potential impacts to school facilities. According to SB 50, payment of the necessary school impact fees for the project would be considered full and satisfactory CEQA mitigation. Proposition 1A/SB 50 prohibits local agencies from using the inadequacy of school facilities as a basis for denying or conditioning approvals of any "[…] legislative or adjudicative act […] involving […] the planning, use, or development of real property" (Government Code 65996[b]). Because the project applicant would be required to pay school impact fees to the MDUSD, the proposed project would have a ***less-than-significant*** impact on schools in the area.

d. Parks?..... Less-Than-Significant Impact

Discussion (d.)

The proposed project would include six residential units, and, thus, would result in a relatively modest increase in demand for parks and recreational facilities. The project site is located adjacent to several nearby City parks, including the Clayton Community Park, which would likely be used by future project residents. In addition, Mount Diablo State Park is located to the south of the site. Section 16.12 of the City of Clayton Municipal Code requires all new subdivisions to dedicate land, pay a fee in-lieu thereof, or both for park or recreational purposes. For projects with 50 parcels or less, such as the proposed project, the subdivider must pay a fee equal to the land value of the portion of the local park required to serve the needs of the project residents. Payment of in-lieu fees would help to fund recreational facilities within the City. Therefore, the proposed project would result in a ***less-than-significant*** impact to park facilities.

e. Other public facilities? ..... Less-Than-Significant Impact

Discussion (e.)

The proposed project would increase demands for other general governmental services, including, but not limited to, libraries and general City maintenance services. However, given the limited amount of development proposed (six single-family units), such demands would not be substantial. With payment of the required development impact fees by the project applicant, the proposed project would result in a ***less-than-significant*** impact in regard to such public facilities.

16. RECREATION.

Issues		Potentially Significant Impact	Less-Than-Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:					
a.	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	□	□	X	□
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?	□	□	X	□

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

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

Discussion (a. and b.)

The project site is located adjacent to several nearby City parks, including the Clayton Community Park, which would likely be used by future project residents. In addition, Mount Diablo State Park is located to the south of the site. As discussed in Section 15, Public Services, of this IS/MND, the proposed project would be subject to the payment of an in-lieu fee in accordance with the City of Clayton Municipal Code Section 16.12. The payment of fees would be used to upgrade and maintain existing facilities, as well as provide for future facilities. Furthermore, the proposed project would only include six residential lots. As such, the low number of anticipated residents would not significantly deteriorate existing facilities or require the construction of new facilities. Therefore, given that the proposed project would be subject to the payment of the City's in-lieu fee, the project would not increase the use of existing parks or recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated and the project would not include or require the construction or expansion of recreational facilities. Thus, a ***less-than-significant*** impact would occur.

17. TRANSPORTATION.

Issues		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?	□	□	X	□
b.	Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	□	□	X	□
c.	Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	□	□	□	X
d.	Result in inadequate emergency access?	□	□	X	□

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

Discussion (a.)

Primary access to the proposed project site would be provided by a new roadway that would extend northeastward through the site from the existing Marsh Creek Road/Diablo Parkway intersection.

The Institute of Traffic Engineer's (ITE) *Trip Generation Handbook* was used to estimate weekday AM, PM, and daily trip generation forecasts for the proposed project.[29] As shown in Table 10, implementation of the proposed project would be expected result in 57 new daily vehicle trips, with approximately five new AM and six new PM peak hour vehicle trips.

Table 10
Weekday Project Trip Generation Rates and Estimates

		Daily	AM Peak Hour				PM Peak Hour			
Units	Rate	Trips	Rate	In	Out	Total	Rate	In	Out	Total
6	9.52	57	0.75	1	3	5	1.00	4	2	6

Note: AM and PM Peak Hour total trips may not match combined 'In' and 'Out' trips due to rounding.

Source: Institute of Transportation Engineers, 2012.

According to the Contra Costa Transportation Authority (CCTA) Congestion Management Plan (CMP), any land development application generating less than 100 peak hour trips is not required to prepare a study of its traffic impacts on the CMP network.[30] Because the proposed project would generate substantially less than 100 peak hour trips, preparation of a traffic study is not required.

[29] Institute of Transportation Engineers. *Trip Generation Handbook, 9th Edition*. September 2012.

[30] Contra Costa Transportation Authority. *2019 Update of the Contra Costa Congestion Management Program* [pg. 72]. Adopted December 18, 2019.

The project area is currently provided transit service by the Central Contra Costa Transit Authority. The nearest bus stop relative to the project site is located at the Marsh Creek Road/Bigelow Street intersection, approximately 0.7-mile west of the site. The construction of six single-family residences would not result in the need for expanded bus service in Clayton. The project does not include changes to existing bicycle infrastructure, or changes that would conflict with the use of bicycle facilities as an alternative means of transportation.

With regard to pedestrian facilities, the project would include the construction of a six-foot wide detached meandering trail along the project frontage at Marsh Creek Road. The trail would connect to an existing sidewalk located west of the project site, allowing for greater pedestrian connectivity in the project area.

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. In addition, the project applicant would be required to pay off-site arterial street improvement impact fees to the City to offset congestion issues on local arterial roadways. Therefore, the proposed project would not conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities and a ***less-than-significant*** impact would occur.

b. Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)? ..... No Impact

Discussion (b.)

Section 15064.3 of the CEQA Guidelines provides specific considerations for evaluating a project's transportation impacts. Per Section 15064.3, analysis of vehicle miles traveled (VMT) attributable to a project is the most appropriate measure of transportation impacts.

Per Section 15064.3(3), a lead agency may analyze a project's VMT qualitatively based on the availability of transit, proximity to destinations, etc. While changes to driving conditions that increase intersection delay are an important consideration for traffic operations and management, LOS methodology does not fully describe environmental effects associated with fuel consumption, emissions, and public health. Section 15064.3(3) changes the focus of transportation impact analysis in CEQA from measuring impact to drivers to measuring the impact of driving.

The Governor's Office of Planning and Research prepared the *Technical Advisory on Evaluating Transportation Impacts in CEQA* in December of 2018. As noted therein, lead agencies may screen out VMT impacts using project size, maps, transit availability, and provision of affordable housing. Many local agencies have developed screening thresholds to indicate when detailed analysis is needed. Absent substantial evidence indicating that a project would generate a potentially significant level of VMT, or inconsistency with a Sustainable Communities Strategy or general plan, projects that generate or attract fewer than 110 trips per day generally may be assumed to cause a less-than-significant impact. Given that that the proposed project would generate approximately 57 ADT, the project would not result in a significant amount of VMT.

Furthermore, as noted in question 'a' above, the project site would be served by the Central Contra Costa Transit Authority, with bus stops provided to the west of the project site. In addition, development of the proposed project would increase connectivity to the nearby neighborhoods and include pedestrian infrastructure within the project site. For example, the proposed project would include construction of a six-foot wide meandering trail along the Marsh Creek Road frontage that would connect to an existing sidewalk to the west of the project site. In addition, the project site is located in close proximity to nearby schools, such as Diablo View Middle School to the west. By providing pedestrian and bicycle connectivity between the proposed residential units and the surrounding neighborhoods, the VMT associated with the proposed project would be minimized. Therefore, the proposed project would not conflict or be inconsistent with CEQA Guidelines Section 15064.3(b), and a ***less-than-significant*** impact would occur.

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

d. Would the project result in inadequate emergency access? ..... Less-Than-Significant Impact

Discussion (c. and d.)

The proposed project does not include changes to existing roadways or the introduction of any design features that would be considered hazardous. The proposed project would provide an access point at Marsh Creek Road, which would provide sufficient emergency access to the site. As such, the project would not substantially increase hazards due to design features or incompatible uses, and emergency access to the site would be adequate. Therefore, the project would result in a ***less-than-significant*** impact.

18. TRIBAL CULTURAL RESOUCES

Issues		Potentially Significant Impact	Less-Than-Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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:					
a.	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).	□	□	X	□
b.	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 Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	□	□	X	□

a. 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)? ..... Less-Than-Significant Impact

b. 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 Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe? ..... Less-Than-Significant Impact

Discussion (a. and b.)

As discussed in Section 5, Cultural Resources, of this IS/MND, the project site does not contain any existing permanent structures or any other known resources listed or eligible for list in the California Register of Historical Resources, or in a local register oforical resources as defined in Public Resources Code Section 5020.1(k), and does not contain known resources that could be considered historic pursuant to the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. Tribal cultural resources are generally defined by Public Resources Code 21074 as sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe. In compliance with Assembly Bill 52 (AB 52) consultation requirements, the City of Clayton sent notification letters to those tribes who had previously requested notification of projects in the City. Responses from such tribes have not been received to date. In addition, in compliance with Senate Bill 18 (SB 18), consultation letters have been sent out to the appropriate Native American tribes who are affiliated with the project area, as

provided by the NAHC. Responses from the tribes have not been received to date. In the absence of information supplied by the tribes, the City relied on other sources of information to determine whether the project could cause a substantial adverse change in the significance of a tribal cultural resource.

A Sacred Lands File search, performed by the NAHC for the immediate project area, failed to indicate the presence of Native American cultural resources in the project area. Additionally, a search of the CHRIS was completed at the NWIC. As discussed in Section 6, Cultural Resources, of this IS/MND, the CHRIS search did not identify any cultural resources on the site. Given the negative results of the NAHC sacred lands file search, and the CHRIS search, as well as the City's compliance with AB 52, tribal cultural resources are not expected to occur within the site. Furthermore, with implementation of Mitigation Measure 6 and 7, the proposed project would not result in a substantial adverse change in the significance of a tribal cultural resource. Thus, a ***less-than-significant*** impact to tribal cultural resources would occur.

19. UTILITIES AND SERVICE SYSTEMS.

Issues		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 storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	□	□	X	□
b.	Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?	□	□	X	□
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?	□	□	X	□
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?	□	□	X	□
e.	Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	□	□	X	□

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

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

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

Discussion (a., b., and c.)

Electricity, natural gas, telecommunications, water, and sanitary sewer services would be provided by way of new connections to existing infrastructure in the immediate project area. Brief discussions of water, sewer service, stormwater drainage, electrical, natural gas, and telecommunications that would serve the proposed project are included below.

Water

Potable water service for the project is required and would be made available by Contra Costa Water District (CCWD) upon completion of financial arrangements and installation of all necessary water facilities to meet the requirements of residential use and fire protection, in accordance with current CCWD and CCCFPD standards. The project would include the connection of an eight-inch water line to an existing water line within Marsh Creek Road.

According to the CCWD's 2015 Urban Water Management Plan, the CCWD does not anticipated any supply deficits in normal years or single-dry years.[31] In future years, multiple dry-year conditions may result in supply shortfalls of up to approximately 30,000 acre-feet per year (af/yr), which equates to approximately 15 percent of the water demand. The CCWD's water supply reliability goal is to meet 100 percent of demand in normal years and a minimum of 85 percent of demand during a drought. Any potential supply shortfalls experienced during dry year conditions would be met through combination of a short-term conservation program or short-term water purchases. CCWD's currently available and planned supplies would be sufficient to meet the District's goal and estimated water demands during average, single-dry, and multiple-dry year conditions during the next 25 years. Given that the CCWD UWMP takes into account future buildout of the service area, and the proposed project's residential density is consistent with what has been anticipated for the site, the increase in water demand associated with the proposed project has generally been anticipated in the UWMP.

Given that the project would be consistent with site's existing land use and zoning designations, increases in demand for water supplies associated with buildout of the site have been previously anticipated by the City. In addition, the project design would be required to adhere to State Building Code standards for water conservation, such as low-flow plumbing fixtures, as well as the City's water-conserving guidelines for landscaping, as set forth in Chapter 17.80 of the Municipal Code. Therefore, the proposed project would not require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, and the project would have sufficient water supplies available to serve the project from existing resources.

Sewer Service

The wastewater collection system within the City of Clayton is owned by Clayton and maintained by the City of Concord. Concord has a contract with Central Contra Costa Sanitary District (CCCSD) to treat wastewater. The CCCSD treatment plant currently treats an average of 45 million gallons per day (MGD). The CCCSD treatment plant's permitted physical capacity is 54 MGD. According to the Growth Management Element of the City of Clayton's General Plan, the plant's maximum capacity of 54 MGD is projected to accommodate buildout until the year 2040.[32, 33] Sewer infrastructure to serve the proposed

[31] Contra Costa Water District. *2015 Urban Water Management Plan for the Contra Costa Water District.* June 2016.

[32] City of Clayton. *City of Clayton General Plan Section XI: Growth Management Element* [pg. 16]. Available at: https://ci.clayton.ca.us/community-development/planning/long-range-planning/. Accessed June 2020.

[33] Email communication with Russell B. Leavitt. Engineering Assistant III. Central Contra Costa Sanitary District.

project would be extended within the on-site roadway from existing sewer lines located in Marsh Creek Road. Specifically, an eight-inch sanitary sewer line would be extended from an existing manhole within Marsh Creek Road and routed to the proposed lots.

Given the CCCSD treatment plant's current surplus capacity, and the fact that the project would result in a minimal increase in the demand for wastewater treatment capacity, adequate capacity exists to accommodate the slight increase in sewer demand that would be created by the proposed residential development. Therefore, the proposed project would not exceed treatment requirements of the RWQCB, and the CCCSD would be capable of serving the project's projected demand in addition to the CCCSD's existing commitments.

Stormwater Systems

Development of the proposed project would result in an increase in impervious surfaces on the project site, which would alter the existing drainage pattern of the site. Runoff from pavement and rooftop areas from Lots #1 through #6 and pavement from the proposed roadway would drain to the bioretention basin west of Lot #6 (see Figure 9). Runoff from undeveloped areas of the project site would primarily be self-treating.

While the proposed project would alter the existing drainage pattern of the site, as discussed in the Hydrology and Water Quality section of this IS/MND, the project would be required to comply with C.3 Standards and include appropriate site design measures, source controls, and hydraulically-sized stormwater treatment measures. As a result, no net increase in stormwater drainage runoff from the site would be expected. In the absence of an increase in storm water drainage leaving the site, the proposed project would not require the construction of new off-site stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

Other Utilities

Electricity, natural gas, and telecommunications utilities would be provided by way of connections to existing infrastructure located within the immediate project vicinity. PG&E would provide electricity and natural gas services to the project site. The proposed project would not require major upgrades to, or extension of, existing infrastructure. Thus, impacts to electricity, natural gas, and telecommunications infrastructure would be less than significant.

Conclusion

Based on the above, the project would result in a ***less-than-significant*** impact related to 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.

May 04, 2016.

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

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

Discussion (d. and e.)

Solid waste from the City of Clayton is disposed of at Keller Canyon County landfill. Keller Canyon Landfill covers 2,600 acres of land; 244 acres are permitted for disposal. The site currently handles 2,500 tons of waste per day, although the permit for the site allows up to 3,500 tons of waste per day to be managed at the facility. According to the California Department of Resources Recycling and Recovery (CalRecycle), the Keller Canyon Landfill has a remaining capacity of 63,408,410 cubic yards out of a total permitted capacity of 75,018,280 or 85 percent remaining capacity.[34] As such, adequate capacity exists to accommodate the relatively modest amount of waste that would be generated by the six proposed single-family residences.

It should be noted that the City is required by AB 939 to ensure that it achieves and maintains the diversion and recycling mandates of the State. Construction of the project would comply with the construction and demolition debris recycling requirements of Chapter 15.80 of the City's Municipal Code, which requires that a waste management plan be prepared for both demolition and new construction. The waste management plan must address all materials that would not be acceptable for disposal in the sanitary landfill. Therefore, as the project is required to comply with the City's Municipal Code, and sufficient capacity exists at the Keller Canyon Landfill, implementation of the proposed project would result in a ***less-than-significant*** impact related to solid waste services.

[34] California Department of Resources Recycling and Recovery (CalRecycle). *Facility/Site Summary Details: Keller Canyon Landfill (07-AA-0032)*. Available at: https://www2.calrecycle.ca.gov/swfacilities/Directory/07-AA-0032. Accessed June 2020.

20. WILDFIRE.

Issues		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?	□	□	X	□
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?	□	□	X	□
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?	□	□	X	□
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?	□	□	X	□

a. Substantially impair an adopted emergency response plan or emergency evacuation plan? ..... Less-Than-Significant Impact

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? ..... Less-Than-Significant Impact

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? ..... Less-Than-Significant Impact

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? ..... Less-Than-Significant Impact

Discussion (a., b., c., and d.)

According to the CAL FIRE Fire and Resource Assessment Program, the project site is not located within or near a state responsibility area or lands classified as a Very High Fire Hazard Severity Zone (VHFHSZ).[35] The nearest VHFHSZ is approximately 0.6-mile south of the project site. However, according to the Diablo Fire Safe Council, the City of Clayton

[35] California Department of Forestry and Fire Protection. *Contra Costa County, Very High Fire Hazard Severity Zones in LRA*. January 7, 2009.

is located within a WUI. The WUI is defined as an area in which wildlands and communities are sufficiently close to each other to present a credible risk of fire spreading from one to another.[36] Fire services to the Clayton area are provided by the CCCFPD, with the nearest station to the site located on Center Street, approximately 1.35 miles northwest of the project site. The risk of wildfire to the project site is reduced by the proposed project's location near existing development to the south. Additionally, the development of the project site from annual grasses, trees, and shrubs to residential land uses may reduce the project site's fire hazard to surrounding residences.

The proposed residential units are required to be designed in compliance with all applicable State and local standards and recommendations for new development, such as the CCCFPD's requirements for providing a water supply system for fire protection, and providing adequate emergency and fire access. In addition, Chapter 7A of the CBC includes specific requirements related to the design and construction of new buildings located within a WUI. For example, Chapter 7A specifies that a fire sprinkler system is required to be installed in order to protect against fire hazards in a WUI. In compliance with the CBC (specifically Section 903.2.1.3, Group A-3), the design of the residences would include automatic fire sprinklers, and fire alarm systems would be incorporated pursuant to CFC requirements. Such features would help to address fire situations within the site, which would reduce the demand for fire protection services from the project site.

Based on the above, the proposed project would not be subject to risks related to wildfires, and a ***less-than-significant*** impact would occur.

[36] Diablo Fire Safe Council. *Clayton Morgan Territory Wildfire Action Plan: Public Review Draft*. January 25, 2016.

21. MANDATORY FINDINGS OF SIGNIFICANCE.

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

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 Impact

Discussion (a.)

As discussed in Section 4, Biological Resources, of this IS/MND, while a limited potential exists for western burrowing owl and birds protected by the MBTA to occur on-site, implementation of Mitigation Measure 1 through Mitigation Measure 4 would ensure that any impacts related to special-status species would be reduced to a less-than-significant level.

In addition, the project site does not contain any on-site structures or known historic or prehistoric resources. Implementation of the proposed project is not anticipated to have the potential to result in impacts related to historic or prehistoric resources. Nevertheless, Mitigation Measure 6 and Mitigation Measure 7 would ensure that in the event that prehistoric resources are discovered within the project site, such resources would be protected in compliance with the requirements of CEQA and other State standards.

Considering the above, the proposed project would not degrade the quality of the environment, substantially reduce or impact the habitat of fish or wildlife species, cause fish or wildlife populations to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory. Therefore, a ***less-than-significant*** impact would occur.

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 Impact

Discussion (b.)

The proposed project, in conjunction with other development within the City of Clayton, could incrementally contribute to cumulative impacts in the area. However, as demonstrated in this IS/MND, all potential environmental impacts that could occur as a result of project implementation would be reduced to a less-than-significant level through compliance with the mitigation measures included in this IS/MND, as well as applicable General Plan policies, Municipal Code standards, and other applicable local and State regulations.

All cumulative impacts related to air quality, noise, and transportation are either less than significant after mitigation or less than significant and do not require mitigation. Given the scope of the project, any incremental effects would not be considerable relative to the effects of all past, current, and probably future projects. In addition, although the project requests amendments to the General Plan and Marsh Creek Road Specific Plan, residential development of the site has been anticipated, and development of one additional residential unit beyond that which has been anticipated in the City's planning documents (i.e., 5 residential units versus 6 units) would not result in greater impacts compared to development of the site under current projections. Therefore, when viewed in conjunction with other closely related past, present, or reasonably foreseeable future projects, development of the proposed project would not result in a cumulatively considerable contribution to cumulative impacts, and the project's incremental contribution to cumulative impacts would be ***less than significant***.

c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? ..... Less-Than-Significant Impact

Discussion (c.)

As described in this IS/MND, the proposed project would comply with all applicable General Plan policies, Municipal Code standards, other applicable local and State regulations, and mitigation measures included herein. In addition, as discussed in Section 7, Geology and Soils, Section 9, Hazards and Hazardous Materials, and Section 13, Noise, of this IS/MND, the proposed project would not cause substantial effects to human beings,

including effects related to exposure to hazardous materials and noise, after mitigation. Therefore, the proposed project would result in a ***less-than-significant*** impact.

VIII. STAFF AND SOURCES

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Appendix A

CalEEMod Modeling Results

Oak Creek Canyon Project - Unmitigated

Bay Area AQMD Air District, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Air Compressors	Diesel	No Change	0	1	No Change	0.00
Excavators	Diesel	No Change	0	1	No Change	0.00
Cranes	Diesel	No Change	0	1	No Change	0.00
Forklifts	Diesel	No Change	0	3	No Change	0.00
Graders	Diesel	No Change	0	1	No Change	0.00
Pavers	Diesel	No Change	0	2	No Change	0.00
Rollers	Diesel	No Change	0	2	No Change	0.00
Rubber Tired Dozers	Diesel	No Change	0	4	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	No Change	0	10	No Change	0.00
Generator Sets	Diesel	No Change	0	1	No Change	0.00
Paving Equipment	Diesel	No Change	0	2	No Change	0.00
Welders	Diesel	No Change	0	1	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Air Compressors	2.11200E-002	1.46910E-001	1.78030E-001	2.90000E-004	8.94000E-003	8.94000E-003	0.00000E+000	2.50219E+001	2.50219E+001	1.70000E-003	0.00000E+000	2.50643E+001
Cranes	3.47800E-002	4.05360E-001	1.68600E-001	4.90000E-004	1.65200E-002	1.52000E-002	0.00000E+000	4.34662E+001	4.34662E+001	1.40600E-002	0.00000E+000	4.38177E+001
Excavators	3.44000E-003	3.23000E-002	4.90800E-002	8.00000E-005	1.57000E-003	1.44000E-003	0.00000E+000	6.80650E+000	6.80650E+000	2.20000E-003	0.00000E+000	6.86153E+000
Forklifts	3.71700E-002	3.39950E-001	3.42590E-001	4.50000E-004	2.38600E-002	2.19500E-002	0.00000E+000	3.94817E+001	3.94817E+001	1.27700E-002	0.00000E+000	3.98009E+001
Generator Sets	3.45300E-002	3.06000E-001	3.60940E-001	6.40000E-004	1.60600E-002	1.60600E-002	0.00000E+000	5.53903E+001	5.53903E+001	2.79000E-003	0.00000E+000	5.54601E+001
Graders	6.79000E-003	8.88700E-002	2.65100E-002	1.00000E-004	2.82000E-003	2.59000E-003	0.00000E+000	8.73189E+000	8.73189E+000	2.82000E-003	0.00000E+000	8.80249E+000
Pavers	4.90000E-004	5.19000E-003	5.81000E-003	1.00000E-005	2.50000E-004	2.30000E-004	0.00000E+000	8.25650E-001	8.25650E-001	2.70000E-004	0.00000E+000	8.32320E-001
Paving Equipment	3.80000E-004	3.88000E-003	5.08000E-003	1.00000E-005	1.90000E-004	1.80000E-004	0.00000E+000	7.15690E-001	7.15690E-001	2.30000E-004	0.00000E+000	7.21480E-001
Rollers	3.80000E-004	3.85000E-003	3.76000E-003	1.00000E-005	2.40000E-004	2.20000E-004	0.00000E+000	4.61010E-001	4.61010E-001	1.50000E-004	0.00000E+000	4.64740E-001
Rubber Tired Dozers	2.35400E-002	2.46850E-001	9.08500E-002	1.90000E-004	1.19800E-002	1.10200E-002	0.00000E+000	1.68876E+001	1.68876E+001	5.46000E-003	0.00000E+000	1.70242E+001
Tractors/Loaders/ Backhoes	5.74100E-002	5.81560E-001	7.04710E-001	9.70000E-004	3.38800E-002	3.11700E-002	0.00000E+000	8.52500E+001	8.52500E+001	2.75700E-002	0.00000E+000	8.59393E+001
Welders	2.91900E-002	1.47040E-001	1.68030E-001	2.50000E-004	7.08000E-003	7.08000E-003	0.00000E+000	1.84456E+001	1.84456E+001	2.37000E-003	0.00000E+000	1.85048E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Air Compressors	2.11200E-002	1.46910E-001	1.78030E-001	2.90000E-004	8.94000E-003	8.94000E-003	0.00000E+000	2.50219E+001	2.50219E+001	1.70000E-003	0.00000E+000	2.50643E+001
Cranes	3.47800E-002	4.05360E-001	1.68600E-001	4.90000E-004	1.65200E-002	1.52000E-002	0.00000E+000	4.34662E+001	4.34662E+001	1.40600E-002	0.00000E+000	4.38176E+001
Excavators	3.44000E-003	3.23000E-002	4.90800E-002	8.00000E-005	1.57000E-003	1.44000E-003	0.00000E+000	6.80649E+000	6.80649E+000	2.20000E-003	0.00000E+000	6.86152E+000
Forklifts	3.71700E-002	3.39950E-001	3.42590E-001	4.50000E-004	2.38600E-002	2.19500E-002	0.00000E+000	3.94816E+001	3.94816E+001	1.27700E-002	0.00000E+000	3.98008E+001
Generator Sets	3.45300E-002	3.06000E-001	3.60940E-001	6.40000E-004	1.60600E-002	1.60600E-002	0.00000E+000	5.53903E+001	5.53903E+001	2.79000E-003	0.00000E+000	5.54600E+001
Graders	6.79000E-003	8.88700E-002	2.65100E-002	1.00000E-004	2.82000E-003	2.59000E-003	0.00000E+000	8.73188E+000	8.73188E+000	2.82000E-003	0.00000E+000	8.80248E+000
Pavers	4.90000E-004	5.19000E-003	5.81000E-003	1.00000E-005	2.50000E-004	2.30000E-004	0.00000E+000	8.25650E-001	8.25650E-001	2.70000E-004	0.00000E+000	8.32320E-001
Paving Equipment	3.80000E-004	3.88000E-003	5.08000E-003	1.00000E-005	1.90000E-004	1.80000E-004	0.00000E+000	7.15690E-001	7.15690E-001	2.30000E-004	0.00000E+000	7.21470E-001
Rollers	3.80000E-004	3.85000E-003	3.76000E-003	1.00000E-005	2.40000E-004	2.20000E-004	0.00000E+000	4.61010E-001	4.61010E-001	1.50000E-004	0.00000E+000	4.64740E-001
Rubber Tired Dozers	2.35400E-002	2.46850E-001	9.08500E-002	1.90000E-004	1.19800E-002	1.10200E-002	0.00000E+000	1.68876E+001	1.68876E+001	5.46000E-003	0.00000E+000	1.70242E+001
Tractors/Loaders/Backhoes	5.74100E-002	5.81560E-001	7.04700E-001	9.70000E-004	3.38800E-002	3.11700E-002	0.00000E+000	8.52499E+001	8.52499E+001	2.75700E-002	0.00000E+000	8.59392E+001
Welders	2.91900E-002	1.47040E-001	1.68030E-001	2.50000E-004	7.08000E-003	7.08000E-003	0.00000E+000	1.84456E+001	1.84456E+001	2.37000E-003	0.00000E+000	1.85048E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Air Compressors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.19895E-006	1.19895E-006	0.00000E+000	0.00000E+000	1.19692E-006
Cranes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.15032E-006	1.15032E-006	0.00000E+000	0.00000E+000	1.14109E-006
Excavators	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.46918E-006	1.46918E-006	0.00000E+000	0.00000E+000	1.45740E-006
Forklifts	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.26641E-006	1.26641E-006	0.00000E+000	0.00000E+000	1.00500E-006
Generator Sets	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.26376E-006	1.26376E-006	0.00000E+000	0.00000E+000	1.26217E-006
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.14523E-006	1.14523E-006	0.00000E+000	0.00000E+000	1.13604E-006
Pavers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Paving Equipment	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.38604E-005
Rollers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.18430E-006	1.18430E-006	0.00000E+000	0.00000E+000	1.17480E-006
Tractors/Loaders/Backhoes	0.00000E+000	0.00000E+000	1.41902E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.17302E-006	1.17302E-006	0.00000E+000	0.00000E+000	1.16361E-006
Welders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.08427E-006	1.08427E-006	0.00000E+000	0.00000E+000	1.08080E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction		PM2.5 Reduction			
No	Replace Ground Cover of Area Disturbed	PM10 Reduction		PM2.5 Reduction			
No	Water Exposed Area	PM10 Reduction		PM2.5 Reduction		Frequency (per day)	
No	Unpaved Road Mitigation	Moisture Content %		Vehicle Speed (mph)	0.00		

No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Architectural Coating	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Grading	Fugitive Dust	0.09	0.05	0.09	0.05	0.00	0.00
Grading	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Paving	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Paving	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Site Preparation	Fugitive Dust	0.05	0.02	0.05	0.02	0.00	0.00
Site Preparation	Roads	0.00	0.00	0.00	0.00	0.00	0.00

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.13	2.13	3.13	0.00	2.13
Hearth	95.09	26.14	98.05	100.00	97.87	97.87	100.00	0.00	29.10	99.31	0.00	31.31
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.69	0.97	1.46	1.82	2.22	2.38	0.00	1.85	1.85	1.14	0.00	1.85
Natural Gas	46.81	47.26	47.37	40.00	47.69	47.69	0.00	47.25	47.25	50.00	47.06	47.25
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	20.00	14.21	15.73	20.03	19.35	17.70
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting: Suburban Center

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	-0.01	0.13		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			

Yes	Neighborhood Enhancements	Improve Pedestrian Network	2.00	Project Site and Connecting Off-Site		
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.02			
No	Parking Policy Pricing	Limit Parking Supply	0.00			
No	Parking Policy Pricing	Unbundle Parking Costs	0.00			
No	Parking Policy Pricing	On-street Market Pricing	0.00			
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00			
No	Transit Improvements	Expand Transit Network	0.00			
No	Transit Improvements	Increase Transit Frequency	0.00			
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.02			
No	Commute	Implement Trip Reduction Program				
No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"	4.50			
No	Commute	Workplace Parking Charge				
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program	10.00			
	Commute	Commute Subtotal	0.00			

No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.02			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
Yes	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	100.00
No	Use Low VOC Paint (Residential Exterior)	150.00
No	Use Low VOC Paint (Non-residential Interior)	100.00
No	Use Low VOC Paint (Non-residential Exterior)	150.00
No	Use Low VOC Paint (Parking)	150.00
No	% Electric Lawnmower	0.00
No	% Electric Leafblower	0.00
No	% Electric Chainsaw	0.00

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
Yes	Exceed Title 24	53.00	
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy	0.00	0.00
No	Use Reclaimed Water	0.00	0.00
No	Use Grey Water	0.00	
Yes	Install low-flow bathroom faucet	32.00	
Yes	Install low-flow Kitchen faucet	18.00	
Yes	Install low-flow Toilet	20.00	
Yes	Install low-flow Shower	20.00	
No	Turf Reduction	0.00	
No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape	0.00	0.00

Solid Waste Mitigation

Mitigation Measures	Input Value

Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

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1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	6.00	Dwelling Unit	9.03	30,306.00	17

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	4			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	257.69	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor adjusted per PG&E RPS projections.

Land Use - Acreage and square footage adjusted per site plan.

Construction Phase - Phase timing based on applicant-provided information.

Grading - Based on applicant-provided information.

Woodstoves - Applicant noted that houses would include natural gas fireplaces.

Vehicle Trips - Based on ITE 9th ed. trip rate for Single Family Homes (210)

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Water Mitigation -

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Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	196.00
tblConstructionPhase	NumDays	230.00	196.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	NumDays	20.00	2.00
tblConstructionPhase	NumDays	10.00	5.00
tblConstructionPhase	PhaseEndDate	6/22/2022	3/7/2022
tblConstructionPhase	PhaseEndDate	4/27/2022	2/21/2022
tblConstructionPhase	PhaseEndDate	6/9/2021	6/11/2021
tblConstructionPhase	PhaseEndDate	5/25/2022	5/21/2021
tblConstructionPhase	PhaseEndDate	5/12/2021	4/7/2021
tblConstructionPhase	PhaseStartDate	5/26/2022	6/7/2021
tblConstructionPhase	PhaseStartDate	6/10/2021	5/24/2021
tblConstructionPhase	PhaseStartDate	5/13/2021	5/1/2021
tblConstructionPhase	PhaseStartDate	4/28/2022	5/20/2021
tblConstructionPhase	PhaseStartDate	4/29/2021	4/1/2021
tblFireplaces	NumberGas	1.50	6.00
tblFireplaces	NumberNoFireplace	0.48	0.00
tblFireplaces	NumberWood	2.58	0.00
tblGrading	AcresOfGrading	15.00	4.30
tblLandUse	LandUseSquareFeet	10,800.00	30,306.00
tblLandUse	LotAcreage	1.95	9.03
tblProjectCharacteristics	CO2IntensityFactor	641.35	257.69
tblVehicleTrips	ST_TR	9.91	9.52
tblVehicleTrips	SU_TR	8.62	9.52

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.3787	2.0036	1.7798	2.9900e-003	0.1418	0.1070	0.2488	0.0758	0.1005	0.1763	0.0000	258.9484	258.9484	0.0622	0.0000	260.5029
2022	0.0856	0.3153	0.3374	5.6000e-004	4.0000e-004	0.0165	0.0169	1.1000e-004	0.0156	0.0157	0.0000	48.2769	48.2769	0.0104	0.0000	48.5370
Maximum	**0.3787**	**2.0036**	**1.7798**	**2.9900e-003**	**0.1418**	**0.1070**	**0.2488**	**0.0758**	**0.1005**	**0.1763**	**0.0000**	**258.9484**	**258.9484**	**0.0622**	**0.0000**	**260.5029**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.3787	2.0036	1.7798	2.9900e-003	0.1418	0.1070	0.2488	0.0758	0.1005	0.1763	0.0000	258.9481	258.9481	0.0622	0.0000	260.5026
2022	0.0856	0.3153	0.3374	5.6000e-004	4.0000e-004	0.0165	0.0169	1.1000e-004	0.0156	0.0157	0.0000	48.2769	48.2769	0.0104	0.0000	48.5369
Maximum	**0.3787**	**2.0036**	**1.7798**	**2.9900e-003**	**0.1418**	**0.1070**	**0.2488**	**0.0758**	**0.1005**	**0.1763**	**0.0000**	**258.9481**	**258.9481**	**0.0622**	**0.0000**	**260.5026**

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

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	4-1-2021	6-30-2021	0.8255	0.8255
2	7-1-2021	9-30-2021	0.7679	0.7679
3	10-1-2021	12-31-2021	0.7680	0.7680
4	1-1-2022	3-31-2022	0.4131	0.4131
		Highest	0.8255	0.8255

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1427	1.3900e-003	0.0589	5.0000e-005		2.6000e-003	2.6000e-003		2.6000e-003	2.6000e-003	0.3075	0.8218	1.1293	1.5200e-003	1.0000e-005	1.1714
Energy	9.4000e-004	8.0400e-003	3.4200e-003	5.0000e-005		6.5000e-004	6.5000e-004		6.5000e-004	6.5000e-004	0.0000	14.9802	14.9802	8.2000e-004	3.0000e-004	15.0908
Mobile	0.0130	0.0575	0.1476	5.5000e-004	0.0491	4.5000e-004	0.0495	0.0132	4.2000e-004	0.0136	0.0000	50.4297	50.4297	1.7500e-003	0.0000	50.4734
Waste						0.0000	0.0000		0.0000	0.0000	1.4494	0.0000	1.4494	0.0857	0.0000	3.5907
Water						0.0000	0.0000		0.0000	0.0000	0.1240	0.3481	0.4721	0.0128	3.1000e-004	0.8836
Total	**0.1566**	**0.0670**	**0.2099**	**6.5000e-004**	**0.0491**	**3.7000e-003**	**0.0528**	**0.0132**	**3.6700e-003**	**0.0169**	**1.8809**	**66.5797**	**68.4606**	**0.1025**	**6.2000e-004**	**71.2100**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1411	1.1600e-003	0.0448	1.0000e-005		3.0000e-004	3.0000e-004		3.0000e-004	3.0000e-004	0.0000	0.8218	0.8218	8.0000e-005	1.0000e-005	0.8280
Energy	5.0000e-004	4.2400e-003	1.8000e-003	3.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004	0.0000	10.4623	10.4623	7.2000e-004	2.2000e-004	10.5456
Mobile	0.0129	0.0570	0.1454	5.4000e-004	0.0481	4.4000e-004	0.0486	0.0129	4.1000e-004	0.0133	0.0000	49.4969	49.4969	1.7300e-003	0.0000	49.5401
Waste						0.0000	0.0000		0.0000	0.0000	1.4494	0.0000	1.4494	0.0857	0.0000	3.5907
Water						0.0000	0.0000		0.0000	0.0000	0.0992	0.2986	0.3978	0.0102	2.5000e-004	0.7272
Total	**0.1545**	**0.0624**	**0.1921**	**5.8000e-004**	**0.0481**	**1.0800e-003**	**0.0492**	**0.0129**	**1.0500e-003**	**0.0140**	**1.5486**	**61.0796**	**62.6282**	**0.0984**	**4.8000e-004**	**65.2316**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.33**	**6.85**	**8.50**	**10.77**	**2.02**	**70.81**	**6.82**	**2.05**	**71.39**	**17.09**	**17.67**	**8.26**	**8.52**	**4.02**	**22.58**	**8.40**

3.0 Construction Detail

Construction Phase

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Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	4/1/2021	4/7/2021	5	5	
2	Grading	Grading	5/1/2021	6/11/2021	5	30	
3	Building Construction	Building Construction	5/24/2021	2/21/2022	5	196	
4	Paving	Paving	5/20/2021	5/21/2021	5	2	
5	Architectural Coating	Architectural Coating	6/7/2021	3/7/2022	5	196	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4.3

Acres of Paving: 0

Residential Indoor: 61,370; Residential Outdoor: 20,457; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Excavators	1	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	2.00	1.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0452	0.0000	0.0452	0.0248	0.0000	0.0248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.7200e-003	0.1012	0.0529	1.0000e-004		5.1100e-003	5.1100e-003		4.7000e-003	4.7000e-003	0.0000	8.3589	8.3589	2.7000e-003	0.0000	8.4265
Total	**9.7200e-003**	**0.1012**	**0.0529**	**1.0000e-004**	**0.0452**	**5.1100e-003**	**0.0503**	**0.0248**	**4.7000e-003**	**0.0295**	**0.0000**	**8.3589**	**8.3589**	**2.7000e-003**	**0.0000**	**8.4265**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	1.0100e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3006	0.3006	1.0000e-005	0.0000	0.3008
Total	**1.4000e-004**	**1.0000e-004**	**1.0100e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**9.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3006**	**0.3006**	**1.0000e-005**	**0.0000**	**0.3008**

3.2 Site Preparation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0452	0.0000	0.0452	0.0248	0.0000	0.0248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.7200e-003	0.1012	0.0529	1.0000e-004		5.1100e-003	5.1100e-003		4.7000e-003	4.7000e-003	0.0000	8.3589	8.3589	2.7000e-003	0.0000	8.4265
Total	**9.7200e-003**	**0.1012**	**0.0529**	**1.0000e-004**	**0.0452**	**5.1100e-003**	**0.0503**	**0.0248**	**4.7000e-003**	**0.0295**	**0.0000**	**8.3589**	**8.3589**	**2.7000e-003**	**0.0000**	**8.4265**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	1.0100e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3006	0.3006	1.0000e-005	0.0000	0.3008
Total	**1.4000e-004**	**1.0000e-004**	**1.0100e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**9.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3006**	**0.3006**	**1.0000e-005**	**0.0000**	**0.3008**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0926	0.0000	0.0926	0.0499	0.0000	0.0499	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0344	0.3711	0.2379	4.4000e-004		0.0174	0.0174		0.0160	0.0160	0.0000	39.0806	39.0806	0.0126	0.0000	39.3965
Total	**0.0344**	**0.3711**	**0.2379**	**4.4000e-004**	**0.0926**	**0.0174**	**0.1100**	**0.0499**	**0.0160**	**0.0659**	**0.0000**	**39.0806**	**39.0806**	**0.0126**	**0.0000**	**39.3965**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.9000e-004	4.8000e-004	5.0500e-003	2.0000e-005	1.7800e-003	1.0000e-005	1.7900e-003	4.7000e-004	1.0000e-005	4.8000e-004	0.0000	1.5030	1.5030	3.0000e-005	0.0000	1.5038
Total	**6.9000e-004**	**4.8000e-004**	**5.0500e-003**	**2.0000e-005**	**1.7800e-003**	**1.0000e-005**	**1.7900e-003**	**4.7000e-004**	**1.0000e-005**	**4.8000e-004**	**0.0000**	**1.5030**	**1.5030**	**3.0000e-005**	**0.0000**	**1.5038**

3.3 Grading - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0926	0.0000	0.0926	0.0499	0.0000	0.0499	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0344	0.3711	0.2379	4.4000e-004		0.0174	0.0174		0.0160	0.0160	0.0000	39.0805	39.0805	0.0126	0.0000	39.3965
Total	**0.0344**	**0.3711**	**0.2379**	**4.4000e-004**	**0.0926**	**0.0174**	**0.1100**	**0.0499**	**0.0160**	**0.0659**	**0.0000**	**39.0805**	**39.0805**	**0.0126**	**0.0000**	**39.3965**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.9000e-004	4.8000e-004	5.0500e-003	2.0000e-005	1.7800e-003	1.0000e-005	1.7900e-003	4.7000e-004	1.0000e-005	4.8000e-004	0.0000	1.5030	1.5030	3.0000e-005	0.0000	1.5038
Total	**6.9000e-004**	**4.8000e-004**	**5.0500e-003**	**2.0000e-005**	**1.7800e-003**	**1.0000e-005**	**1.7900e-003**	**4.7000e-004**	**1.0000e-005**	**4.8000e-004**	**0.0000**	**1.5030**	**1.5030**	**3.0000e-005**	**0.0000**	**1.5038**

3.4 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1521	1.3946	1.3260	2.1500e-003		0.0767	0.0767		0.0721	0.0721	0.0000	185.3098	185.3098	0.0447	0.0000	186.4275
Total	**0.1521**	**1.3946**	**1.3260**	**2.1500e-003**		**0.0767**	**0.0767**		**0.0721**	**0.0721**	**0.0000**	**185.3098**	**185.3098**	**0.0447**	**0.0000**	**186.4275**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.5000e-004	8.3600e-003	2.0900e-003	2.0000e-005	5.2000e-004	2.0000e-005	5.4000e-004	1.5000e-004	2.0000e-005	1.7000e-004	0.0000	2.0748	2.0748	1.0000e-004	0.0000	2.0773
Worker	4.9000e-004	3.4000e-004	3.5900e-003	1.0000e-005	1.2600e-003	1.0000e-005	1.2700e-003	3.4000e-004	1.0000e-005	3.4000e-004	0.0000	1.0688	1.0688	2.0000e-005	0.0000	1.0694
Total	**7.4000e-004**	**8.7000e-003**	**5.6800e-003**	**3.0000e-005**	**1.7800e-003**	**3.0000e-005**	**1.8100e-003**	**4.9000e-004**	**3.0000e-005**	**5.1000e-004**	**0.0000**	**3.1435**	**3.1435**	**1.2000e-004**	**0.0000**	**3.1467**

3.4 Building Construction - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1521	1.3946	1.3260	2.1500e-003		0.0767	0.0767		0.0721	0.0721	0.0000	185.3096	185.3096	0.0447	0.0000	186.4273
Total	**0.1521**	**1.3946**	**1.3260**	**2.1500e-003**		**0.0767**	**0.0767**		**0.0721**	**0.0721**	**0.0000**	**185.3096**	**185.3096**	**0.0447**	**0.0000**	**186.4273**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.5000e-004	8.3600e-003	2.0900e-003	2.0000e-005	5.2000e-004	2.0000e-005	5.4000e-004	1.5000e-004	2.0000e-005	1.7000e-004	0.0000	2.0748	2.0748	1.0000e-004	0.0000	2.0773
Worker	4.9000e-004	3.4000e-004	3.5900e-003	1.0000e-005	1.2600e-003	1.0000e-005	1.2700e-003	3.4000e-004	1.0000e-005	3.4000e-004	0.0000	1.0688	1.0688	2.0000e-005	0.0000	1.0694
Total	**7.4000e-004**	**8.7000e-003**	**5.6800e-003**	**3.0000e-005**	**1.7800e-003**	**3.0000e-005**	**1.8100e-003**	**4.9000e-004**	**3.0000e-005**	**5.1000e-004**	**0.0000**	**3.1435**	**3.1435**	**1.2000e-004**	**0.0000**	**3.1467**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0307	0.2811	0.2945	4.8000e-004		0.0146	0.0146		0.0137	0.0137	0.0000	41.7105	41.7105	9.9900e-003	0.0000	41.9604
Total	**0.0307**	**0.2811**	**0.2945**	**4.8000e-004**		**0.0146**	**0.0146**		**0.0137**	**0.0137**	**0.0000**	**41.7105**	**41.7105**	**9.9900e-003**	**0.0000**	**41.9604**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-005	1.7800e-003	4.4000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	4.0000e-005	0.0000	0.4622	0.4622	2.0000e-005	0.0000	0.4628
Worker	1.0000e-004	7.0000e-005	7.4000e-004	0.0000	2.8000e-004	0.0000	2.9000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.2317	0.2317	0.0000	0.0000	0.2318
Total	**1.5000e-004**	**1.8500e-003**	**1.1800e-003**	**0.0000**	**4.0000e-004**	**0.0000**	**4.1000e-004**	**1.1000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.6939**	**0.6939**	**2.0000e-005**	**0.0000**	**0.6946**

3.4 Building Construction - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0307	0.2811	0.2945	4.8000e-004		0.0146	0.0146		0.0137	0.0137	0.0000	41.7105	41.7105	9.9900e-003	0.0000	41.9603
Total	**0.0307**	**0.2811**	**0.2945**	**4.8000e-004**		**0.0146**	**0.0146**		**0.0137**	**0.0137**	**0.0000**	**41.7105**	**41.7105**	**9.9900e-003**	**0.0000**	**41.9603**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-005	1.7800e-003	4.4000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	4.0000e-005	0.0000	0.4622	0.4622	2.0000e-005	0.0000	0.4628
Worker	1.0000e-004	7.0000e-005	7.4000e-004	0.0000	2.8000e-004	0.0000	2.9000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.2317	0.2317	0.0000	0.0000	0.2318
Total	**1.5000e-004**	**1.8500e-003**	**1.1800e-003**	**0.0000**	**4.0000e-004**	**0.0000**	**4.1000e-004**	**1.1000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.6939**	**0.6939**	**2.0000e-005**	**0.0000**	**0.6946**

3.5 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.2600e-003	0.0129	0.0147	2.0000e-005		6.8000e-004	6.8000e-004		6.2000e-004	6.2000e-004	0.0000	2.0024	2.0024	6.5000e-004	0.0000	2.0185
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.2600e-003**	**0.0129**	**0.0147**	**2.0000e-005**		**6.8000e-004**	**6.8000e-004**		**6.2000e-004**	**6.2000e-004**	**0.0000**	**2.0024**	**2.0024**	**6.5000e-004**	**0.0000**	**2.0185**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	3.0000e-005	3.4000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1002	0.1002	0.0000	0.0000	0.1003
Total	**5.0000e-005**	**3.0000e-005**	**3.4000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1002**	**0.1002**	**0.0000**	**0.0000**	**0.1003**

3.5 Paving - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.2600e-003	0.0129	0.0147	2.0000e-005		6.8000e-004	6.8000e-004		6.2000e-004	6.2000e-004	0.0000	2.0024	2.0024	6.5000e-004	0.0000	2.0185
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.2600e-003**	**0.0129**	**0.0147**	**2.0000e-005**		**6.8000e-004**	**6.8000e-004**		**6.2000e-004**	**6.2000e-004**	**0.0000**	**2.0024**	**2.0024**	**6.5000e-004**	**0.0000**	**2.0185**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	3.0000e-005	3.4000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1002	0.1002	0.0000	0.0000	0.1003
Total	**5.0000e-005**	**3.0000e-005**	**3.4000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1002**	**0.1002**	**0.0000**	**0.0000**	**0.1003**

3.6 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1633					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0164	0.1145	0.1363	2.2000e-004		7.0600e-003	7.0600e-003		7.0600e-003	7.0600e-003	0.0000	19.1494	19.1494	1.3100e-003	0.0000	19.1823
Total	**0.1797**	**0.1145**	**0.1363**	**2.2000e-004**		**7.0600e-003**	**7.0600e-003**		**7.0600e-003**	**7.0600e-003**	**0.0000**	**19.1494**	**19.1494**	**1.3100e-003**	**0.0000**	**19.1823**

Unmitigated Construction Off-Site

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

3.6 Architectural Coating - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1633					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0164	0.1145	0.1363	2.2000e-004		7.0600e-003	7.0600e-003		7.0600e-003	7.0600e-003	0.0000	19.1494	19.1494	1.3100e-003	0.0000	19.1822
Total	**0.1797**	**0.1145**	**0.1363**	**2.2000e-004**		**7.0600e-003**	**7.0600e-003**		**7.0600e-003**	**7.0600e-003**	**0.0000**	**19.1494**	**19.1494**	**1.3100e-003**	**0.0000**	**19.1822**

Mitigated Construction Off-Site

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

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0501					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7000e-003	0.0324	0.0417	7.0000e-005		1.8800e-003	1.8800e-003		1.8800e-003	1.8800e-003	0.0000	5.8725	5.8725	3.8000e-004	0.0000	5.8820
Total	**0.0548**	**0.0324**	**0.0417**	**7.0000e-005**		**1.8800e-003**	**1.8800e-003**		**1.8800e-003**	**1.8800e-003**	**0.0000**	**5.8725**	**5.8725**	**3.8000e-004**	**0.0000**	**5.8820**

Unmitigated Construction Off-Site

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

3.6 Architectural Coating - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0501					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7000e-003	0.0324	0.0417	7.0000e-005		1.8800e-003	1.8800e-003		1.8800e-003	1.8800e-003	0.0000	5.8725	5.8725	3.8000e-004	0.0000	5.8820
Total	**0.0548**	**0.0324**	**0.0417**	**7.0000e-005**		**1.8800e-003**	**1.8800e-003**		**1.8800e-003**	**1.8800e-003**	**0.0000**	**5.8725**	**5.8725**	**3.8000e-004**	**0.0000**	**5.8820**

Mitigated Construction Off-Site

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

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0129	0.0570	0.1454	5.4000e-004	0.0481	4.4000e-004	0.0486	0.0129	4.1000e-004	0.0133	0.0000	49.4969	49.4969	1.7300e-003	0.0000	49.5401
Unmitigated	0.0130	0.0575	0.1476	5.5000e-004	0.0491	4.5000e-004	0.0495	0.0132	4.2000e-004	0.0136	0.0000	50.4297	50.4297	1.7500e-003	0.0000	50.4734

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	57.12	57.12	57.12	131,925	129,286
Total	57.12	57.12	57.12	131,925	129,286

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.578638	0.038775	0.193686	0.110919	0.015677	0.005341	0.018293	0.026358	0.002641	0.002200	0.005832	0.000891	0.000749

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	5.5530	5.5530	6.2000e-004	1.3000e-004	5.6071
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	5.6741	5.6741	6.4000e-004	1.3000e-004	5.7294
NaturalGas Mitigated	5.0000e-004	4.2400e-003	1.8000e-003	3.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004	0.0000	4.9093	4.9093	9.0000e-005	9.0000e-005	4.9385
NaturalGas Unmitigated	9.4000e-004	8.0400e-003	3.4200e-003	5.0000e-005		6.5000e-004	6.5000e-004		6.5000e-004	6.5000e-004	0.0000	9.3061	9.3061	1.8000e-004	1.7000e-004	9.3615

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	174391	9.4000e-004	8.0400e-003	3.4200e-003	5.0000e-005		6.5000e-004	6.5000e-004		6.5000e-004	6.5000e-004	0.0000	9.3061	9.3061	1.8000e-004	1.7000e-004	9.3615
Total		**9.4000e-004**	**8.0400e-003**	**3.4200e-003**	**5.0000e-005**		**6.5000e-004**	**6.5000e-004**		**6.5000e-004**	**6.5000e-004**	**0.0000**	**9.3061**	**9.3061**	**1.8000e-004**	**1.7000e-004**	**9.3615**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	91996.5	5.0000e-004	4.2400e-003	1.8000e-003	3.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004	0.0000	4.9093	4.9093	9.0000e-005	9.0000e-005	4.9385
Total		**5.0000e-004**	**4.2400e-003**	**1.8000e-003**	**3.0000e-005**		**3.4000e-004**	**3.4000e-004**		**3.4000e-004**	**3.4000e-004**	**0.0000**	**4.9093**	**4.9093**	**9.0000e-005**	**9.0000e-005**	**4.9385**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	48543.4	5.6741	6.4000e-004	1.3000e-004	5.7294
Total		**5.6741**	**6.4000e-004**	**1.3000e-004**	**5.7294**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	47507.5	5.5530	6.2000e-004	1.3000e-004	5.6071
Total		**5.5530**	**6.2000e-004**	**1.3000e-004**	**5.6071**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1411	1.1600e-003	0.0448	1.0000e-005		3.0000e-004	3.0000e-004		3.0000e-004	3.0000e-004	0.0000	0.8218	0.8218	8.0000e-005	1.0000e-005	0.8280
Unmitigated	0.1427	1.3900e-003	0.0589	5.0000e-005		2.6000e-003	2.6000e-003		2.6000e-003	2.6000e-003	0.3075	0.8218	1.1293	1.5200e-003	1.0000e-005	1.1714

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0213					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1184					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.6300e-003	8.8000e-004	0.0144	5.0000e-005		2.3500e-003	2.3500e-003		2.3500e-003	2.3500e-003	0.3075	0.7490	1.0565	1.4500e-003	1.0000e-005	1.0969
Landscaping	1.3400e-003	5.1000e-004	0.0446	0.0000		2.5000e-004	2.5000e-004		2.5000e-004	2.5000e-004	0.0000	0.0728	0.0728	7.0000e-005	0.0000	0.0745
Total	**0.1427**	**1.3900e-003**	**0.0589**	**5.0000e-005**		**2.6000e-003**	**2.6000e-003**		**2.6000e-003**	**2.6000e-003**	**0.3075**	**0.8218**	**1.1293**	**1.5200e-003**	**1.0000e-005**	**1.1714**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0213					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1184					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	8.0000e-005	6.5000e-004	2.8000e-004	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	0.7490	0.7490	1.0000e-005	1.0000e-005	0.7535
Landscaping	1.3400e-003	5.1000e-004	0.0446	0.0000		2.5000e-004	2.5000e-004		2.5000e-004	2.5000e-004	0.0000	0.0728	0.0728	7.0000e-005	0.0000	0.0745
Total	**0.1411**	**1.1600e-003**	**0.0448**	**0.0000**		**3.0000e-004**	**3.0000e-004**		**3.0000e-004**	**3.0000e-004**	**0.0000**	**0.8218**	**0.8218**	**8.0000e-005**	**1.0000e-005**	**0.8280**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.3978	0.0102	2.5000e-004	0.7272
Unmitigated	0.4721	0.0128	3.1000e-004	0.8836

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.390924 / 0.246452	0.4721	0.0128	3.1000e-004	0.8836
Total		**0.4721**	**0.0128**	**3.1000e-004**	**0.8836**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.312739 / 0.246452	0.3978	0.0102	2.5000e-004	0.7272
Total		**0.3978**	**0.0102**	**2.5000e-004**	**0.7272**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	1.4494	0.0857	0.0000	3.5907
Unmitigated	1.4494	0.0857	0.0000	3.5907

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	7.14	1.4494	0.0857	0.0000	3.5907
Total		**1.4494**	**0.0857**	**0.0000**	**3.5907**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	7.14	1.4494	0.0857	0.0000	3.5907
Total		**1.4494**	**0.0857**	**0.0000**	**3.5907**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Oak Creek Canyon Project - Unmitigated

Bay Area AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	6.00	Dwelling Unit	9.03	30,306.00	17

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	4			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	257.69	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor adjusted per PG&E RPS projections.

Land Use - Acreage and square footage adjusted per site plan.

Construction Phase - Phase timing based on applicant-provided information.

Grading - Based on applicant-provided information.

Woodstoves - Applicant noted that houses would include natural gas fireplaces.

Vehicle Trips - Based on ITE 9th ed. trip rate for Single Family Homes (210)

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	196.00
tblConstructionPhase	NumDays	230.00	196.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	NumDays	20.00	2.00
tblConstructionPhase	NumDays	10.00	5.00
tblConstructionPhase	PhaseEndDate	6/22/2022	3/7/2022
tblConstructionPhase	PhaseEndDate	4/27/2022	2/21/2022
tblConstructionPhase	PhaseEndDate	6/9/2021	6/11/2021
tblConstructionPhase	PhaseEndDate	5/25/2022	5/21/2021
tblConstructionPhase	PhaseEndDate	5/12/2021	4/7/2021
tblConstructionPhase	PhaseStartDate	5/26/2022	6/7/2021
tblConstructionPhase	PhaseStartDate	6/10/2021	5/24/2021
tblConstructionPhase	PhaseStartDate	5/13/2021	5/1/2021
tblConstructionPhase	PhaseStartDate	4/28/2022	5/20/2021
tblConstructionPhase	PhaseStartDate	4/29/2021	4/1/2021
tblFireplaces	NumberGas	1.50	6.00
tblFireplaces	NumberNoFireplace	0.48	0.00
tblFireplaces	NumberWood	2.58	0.00
tblGrading	AcresOfGrading	15.00	4.30
tblLandUse	LandUseSquareFeet	10,800.00	30,306.00
tblLandUse	LotAcreage	1.95	9.03
tblProjectCharacteristics	CO2IntensityFactor	641.35	257.69
tblVehicleTrips	ST_TR	9.91	9.52
tblVehicleTrips	SU_TR	8.62	9.52

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.6448	43.8309	34.6922	0.0612	18.2141	2.2137	20.2595	9.9699	2.0635	11.8517	0.0000	5,870.2694	5,870.2694	1.6480	0.0000	5,909.4828
2022	4.0966	17.1254	18.2452	0.0303	0.0232	0.8910	0.9142	6.3100e-003	0.8432	0.8495	0.0000	2,879.6540	2,879.6540	0.6319	0.0000	2,895.4511
Maximum	**6.6448**	**43.8309**	**34.6922**	**0.0612**	**18.2141**	**2.2137**	**20.2595**	**9.9699**	**2.0635**	**11.8517**	**0.0000**	**5,870.2694**	**5,870.2694**	**1.6480**	**0.0000**	**5,909.4828**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.6448	43.8309	34.6922	0.0612	18.2141	2.2137	20.2595	9.9699	2.0635	11.8517	0.0000	5,870.2694	5,870.2694	1.6480	0.0000	5,909.4828
2022	4.0966	17.1254	18.2452	0.0303	0.0232	0.8910	0.9142	6.3100e-003	0.8432	0.8495	0.0000	2,879.6540	2,879.6540	0.6319	0.0000	2,895.4511
Maximum	**6.6448**	**43.8309**	**34.6922**	**0.0612**	**18.2141**	**2.2137**	**20.2595**	**9.9699**	**2.0635**	**11.8517**	**0.0000**	**5,870.2694**	**5,870.2694**	**1.6480**	**0.0000**	**5,909.4828**

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

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.9412	0.1436	1.8813	5.1300e-003		0.2302	0.2302		0.2302	0.2302	32.1877	149.1266	181.3143	0.1542	2.7200e-003	185.9784
Energy	5.1500e-003	0.0440	0.0187	2.8000e-004		3.5600e-003	3.5600e-003		3.5600e-003	3.5600e-003		56.2097	56.2097	1.0800e-003	1.0300e-003	56.5437
Mobile	0.0821	0.3065	0.8444	3.1900e-003	0.2803	2.4700e-003	0.2827	0.0750	2.3000e-003	0.0773		323.0556	323.0556	0.0107		323.3224
Total	**1.0284**	**0.4941**	**2.7445**	**8.6000e-003**	**0.2803**	**0.2362**	**0.5165**	**0.0750**	**0.2361**	**0.3110**	**32.1877**	**528.3919**	**560.5796**	**0.1659**	**3.7500e-003**	**565.8445**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.7940	0.1218	0.5445	7.7000e-004		0.0121	0.0121		0.0121	0.0121	0.0000	149.1266	149.1266	3.7000e-003	2.7200e-003	150.0289
Energy	2.7200e-003	0.0232	9.8800e-003	1.5000e-004		1.8800e-003	1.8800e-003		1.8800e-003	1.8800e-003		29.6524	29.6524	5.7000e-004	5.4000e-004	29.8286
Mobile	0.0816	0.3036	0.8310	3.1300e-003	0.2747	2.4200e-003	0.2771	0.0735	2.2600e-003	0.0757		317.0724	317.0724	0.0105		317.3352
Total	**0.8783**	**0.4486**	**1.3854**	**4.0500e-003**	**0.2747**	**0.0164**	**0.2911**	**0.0735**	**0.0163**	**0.0898**	**0.0000**	**495.8514**	**495.8514**	**0.0148**	**3.2600e-003**	**497.1927**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**14.60**	**9.21**	**49.52**	**52.91**	**2.00**	**93.04**	**43.64**	**2.00**	**93.11**	**71.15**	**100.00**	**6.16**	**11.55**	**91.09**	**13.07**	**12.13**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	4/1/2021	4/7/2021	5	5	
2	Grading	Grading	5/1/2021	6/11/2021	5	30	
3	Building Construction	Building Construction	5/24/2021	2/21/2022	5	196	
4	Paving	Paving	5/20/2021	5/21/2021	5	2	
5	Architectural Coating	Architectural Coating	6/7/2021	3/7/2022	5	196	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4.3

Acres of Paving: 0

Residential Indoor: 61,370; Residential Outdoor: 20,457; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Excavators	1	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	2.00	1.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0579	0.0338	0.4421	1.4300e-003	0.1479	9.3000e-004	0.1488	0.0392	8.6000e-004	0.0401		142.5527	142.5527	3.1900e-003		142.6324
Total	**0.0579**	**0.0338**	**0.4421**	**1.4300e-003**	**0.1479**	**9.3000e-004**	**0.1488**	**0.0392**	**8.6000e-004**	**0.0401**		**142.5527**	**142.5527**	**3.1900e-003**		**142.6324**

3.2 Site Preparation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0579	0.0338	0.4421	1.4300e-003	0.1479	9.3000e-004	0.1488	0.0392	8.6000e-004	0.0401		142.5527	142.5527	3.1900e-003		142.6324
Total	**0.0579**	**0.0338**	**0.4421**	**1.4300e-003**	**0.1479**	**9.3000e-004**	**0.1488**	**0.0392**	**8.6000e-004**	**0.0401**		**142.5527**	**142.5527**	**3.1900e-003**		**142.6324**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1741	0.0000	6.1741	3.3266	0.0000	3.3266			0.0000			0.0000
Off-Road	2.2903	24.7367	15.8575	0.0296		1.1599	1.1599		1.0671	1.0671		2,871.9285	2,871.9285	0.9288		2,895.1495
Total	**2.2903**	**24.7367**	**15.8575**	**0.0296**	**6.1741**	**1.1599**	**7.3340**	**3.3266**	**1.0671**	**4.3938**		**2,871.9285**	**2,871.9285**	**0.9288**		**2,895.1495**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0482	0.0282	0.3685	1.1900e-003	0.1232	7.8000e-004	0.1240	0.0327	7.1000e-004	0.0334		118.7939	118.7939	2.6600e-003		118.8603
Total	**0.0482**	**0.0282**	**0.3685**	**1.1900e-003**	**0.1232**	**7.8000e-004**	**0.1240**	**0.0327**	**7.1000e-004**	**0.0334**		**118.7939**	**118.7939**	**2.6600e-003**		**118.8603**

3.3 Grading - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1741	0.0000	6.1741	3.3266	0.0000	3.3266			0.0000			0.0000
Off-Road	2.2903	24.7367	15.8575	0.0296		1.1599	1.1599		1.0671	1.0671	0.0000	2,871.9285	2,871.9285	0.9288		2,895.1495
Total	**2.2903**	**24.7367**	**15.8575**	**0.0296**	**6.1741**	**1.1599**	**7.3340**	**3.3266**	**1.0671**	**4.3938**	**0.0000**	**2,871.9285**	**2,871.9285**	**0.9288**		**2,895.1495**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0482	0.0282	0.3685	1.1900e-003	0.1232	7.8000e-004	0.1240	0.0327	7.1000e-004	0.0334		118.7939	118.7939	2.6600e-003		118.8603
Total	**0.0482**	**0.0282**	**0.3685**	**1.1900e-003**	**0.1232**	**7.8000e-004**	**0.1240**	**0.0327**	**7.1000e-004**	**0.0334**		**118.7939**	**118.7939**	**2.6600e-003**		**118.8603**

3.4 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	3.1000e-003	0.1033	0.0244	2.7000e-004	6.7700e-003	2.2000e-004	6.9900e-003	1.9500e-003	2.1000e-004	2.1600e-003		28.8959	28.8959	1.3600e-003		28.9298
Worker	6.4300e-003	3.7600e-003	0.0491	1.6000e-004	0.0164	1.0000e-004	0.0165	4.3600e-003	1.0000e-004	4.4500e-003		15.8392	15.8392	3.5000e-004		15.8480
Total	**9.5300e-003**	**0.1071**	**0.0735**	**4.3000e-004**	**0.0232**	**3.2000e-004**	**0.0235**	**6.3100e-003**	**3.1000e-004**	**6.6100e-003**		**44.7350**	**44.7350**	**1.7100e-003**		**44.7778**

3.4 Building Construction - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	3.1000e-003	0.1033	0.0244	2.7000e-004	6.7700e-003	2.2000e-004	6.9900e-003	1.9500e-003	2.1000e-004	2.1600e-003		28.8959	28.8959	1.3600e-003		28.9298
Worker	6.4300e-003	3.7600e-003	0.0491	1.6000e-004	0.0164	1.0000e-004	0.0165	4.3600e-003	1.0000e-004	4.4500e-003		15.8392	15.8392	3.5000e-004		15.8480
Total	**9.5300e-003**	**0.1071**	**0.0735**	**4.3000e-004**	**0.0232**	**3.2000e-004**	**0.0235**	**6.3100e-003**	**3.1000e-004**	**6.6100e-003**		**44.7350**	**44.7350**	**1.7100e-003**		**44.7778**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	2.8900e-003	0.0979	0.0229	2.7000e-004	6.7700e-003	1.9000e-004	6.9600e-003	1.9500e-003	1.9000e-004	2.1300e-003		28.6145	28.6145	1.3000e-003		28.6469
Worker	5.9900e-003	3.3700e-003	0.0453	1.5000e-004	0.0164	1.0000e-004	0.0165	4.3600e-003	9.0000e-005	4.4500e-003		15.2579	15.2579	3.2000e-004		15.2659
Total	**8.8800e-003**	**0.1013**	**0.0682**	**4.2000e-004**	**0.0232**	**2.9000e-004**	**0.0235**	**6.3100e-003**	**2.8000e-004**	**6.5800e-003**		**43.8724**	**43.8724**	**1.6200e-003**		**43.9127**

3.4 Building Construction - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	2.8900e-003	0.0979	0.0229	2.7000e-004	6.7700e-003	1.9000e-004	6.9600e-003	1.9500e-003	1.9000e-004	2.1300e-003		28.6145	28.6145	1.3000e-003		28.6469
Worker	5.9900e-003	3.3700e-003	0.0453	1.5000e-004	0.0164	1.0000e-004	0.0165	4.3600e-003	9.0000e-005	4.4500e-003		15.2579	15.2579	3.2000e-004		15.2659
Total	**8.8800e-003**	**0.1013**	**0.0682**	**4.2000e-004**	**0.0232**	**2.9000e-004**	**0.0235**	**6.3100e-003**	**2.8000e-004**	**6.5800e-003**		**43.8724**	**43.8724**	**1.6200e-003**		**43.9127**

3.5 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2556	12.9191	14.6532	0.0228		0.6777	0.6777		0.6235	0.6235		2,207.2109	2,207.2109	0.7139		2,225.0573
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2556**	**12.9191**	**14.6532**	**0.0228**		**0.6777**	**0.6777**		**0.6235**	**0.6235**		**2,207.2109**	**2,207.2109**	**0.7139**		**2,225.0573**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0482	0.0282	0.3685	1.1900e-003	0.1232	7.8000e-004	0.1240	0.0327	7.1000e-004	0.0334		118.7939	118.7939	2.6600e-003		118.8603
Total	**0.0482**	**0.0282**	**0.3685**	**1.1900e-003**	**0.1232**	**7.8000e-004**	**0.1240**	**0.0327**	**7.1000e-004**	**0.0334**		**118.7939**	**118.7939**	**2.6600e-003**		**118.8603**

3.5 Paving - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2556	12.9191	14.6532	0.0228		0.6777	0.6777		0.6235	0.6235	0.0000	2,207.2109	2,207.2109	0.7139		2,225.0573
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2556**	**12.9191**	**14.6532**	**0.0228**		**0.6777**	**0.6777**		**0.6235**	**0.6235**	**0.0000**	**2,207.2109**	**2,207.2109**	**0.7139**		**2,225.0573**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0482	0.0282	0.3685	1.1900e-003	0.1232	7.8000e-004	0.1240	0.0327	7.1000e-004	0.0334		118.7939	118.7939	2.6600e-003		118.8603
Total	**0.0482**	**0.0282**	**0.3685**	**1.1900e-003**	**0.1232**	**7.8000e-004**	**0.1240**	**0.0327**	**7.1000e-004**	**0.0334**		**118.7939**	**118.7939**	**2.6600e-003**		**118.8603**

3.6 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	2.1769					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	**2.3958**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**		**281.4481**	**281.4481**	**0.0193**		**281.9309**

Unmitigated Construction Off-Site

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

3.6 Architectural Coating - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	2.1769					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	**2.3958**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**	**0.0000**	**281.4481**	**281.4481**	**0.0193**		**281.9309**

Mitigated Construction Off-Site

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

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	2.1769					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**2.3815**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

Unmitigated Construction Off-Site

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

3.6 Architectural Coating - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	2.1769					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**2.3815**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

Mitigated Construction Off-Site

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

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0816	0.3036	0.8310	3.1300e-003	0.2747	2.4200e-003	0.2771	0.0735	2.2600e-003	0.0757		317.0724	317.0724	0.0105		317.3352
Unmitigated	0.0821	0.3065	0.8444	3.1900e-003	0.2803	2.4700e-003	0.2827	0.0750	2.3000e-003	0.0773		323.0556	323.0556	0.0107		323.3224

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	57.12	57.12	57.12	131,925	129,286
Total	57.12	57.12	57.12	131,925	129,286

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.578638	0.038775	0.193686	0.110919	0.015677	0.005341	0.018293	0.026358	0.002641	0.002200	0.005832	0.000891	0.000749

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	2.7200e-003	0.0232	9.8800e-003	1.5000e-004		1.8800e-003	1.8800e-003		1.8800e-003	1.8800e-003		29.6524	29.6524	5.7000e-004	5.4000e-004	29.8286
NaturalGas Unmitigated	5.1500e-003	0.0440	0.0187	2.8000e-004		3.5600e-003	3.5600e-003		3.5600e-003	3.5600e-003		56.2097	56.2097	1.0800e-003	1.0300e-003	56.5437

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	477.782	5.1500e-003	0.0440	0.0187	2.8000e-004		3.5600e-003	3.5600e-003		3.5600e-003	3.5600e-003		56.2097	56.2097	1.0800e-003	1.0300e-003	56.5437
Total		**5.1500e-003**	**0.0440**	**0.0187**	**2.8000e-004**		**3.5600e-003**	**3.5600e-003**		**3.5600e-003**	**3.5600e-003**		**56.2097**	**56.2097**	**1.0800e-003**	**1.0300e-003**	**56.5437**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	0.252045	2.7200e-003	0.0232	9.8800e-003	1.5000e-004		1.8800e-003	1.8800e-003		1.8800e-003	1.8800e-003		29.6524	29.6524	5.7000e-004	5.4000e-004	29.8286
Total		**2.7200e-003**	**0.0232**	**9.8800e-003**	**1.5000e-004**		**1.8800e-003**	**1.8800e-003**		**1.8800e-003**	**1.8800e-003**		**29.6524**	**29.6524**	**5.7000e-004**	**5.4000e-004**	**29.8286**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.7940	0.1218	0.5445	7.7000e-004		0.0121	0.0121		0.0121	0.0121	0.0000	149.1266	149.1266	3.7000e-003	2.7200e-003	150.0289
Unmitigated	0.9412	0.1436	1.8813	5.1300e-003		0.2302	0.2302		0.2302	0.2302	32.1877	149.1266	181.3143	0.1542	2.7200e-003	185.9784

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1169					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.6486					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1608	0.1379	1.3862	5.1000e-003		0.2275	0.2275		0.2275	0.2275	32.1877	148.2353	180.4230	0.1533	2.7200e-003	185.0657
Landscaping	0.0149	5.7100e-003	0.4951	3.0000e-005		2.7400e-003	2.7400e-003		2.7400e-003	2.7400e-003		0.8913	0.8913	8.6000e-004		0.9127
Total	**0.9412**	**0.1436**	**1.8813**	**5.1300e-003**		**0.2302**	**0.2302**		**0.2302**	**0.2302**	**32.1877**	**149.1266**	**181.3143**	**0.1542**	**2.7200e-003**	**185.9784**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1169					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.6486					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0136	0.1161	0.0494	7.4000e-004		9.3900e-003	9.3900e-003		9.3900e-003	9.3900e-003	0.0000	148.2353	148.2353	2.8400e-003	2.7200e-003	149.1162
Landscaping	0.0149	5.7100e-003	0.4951	3.0000e-005		2.7400e-003	2.7400e-003		2.7400e-003	2.7400e-003		0.8913	0.8913	8.6000e-004		0.9127
Total	**0.7940**	**0.1218**	**0.5445**	**7.7000e-004**		**0.0121**	**0.0121**		**0.0121**	**0.0121**	**0.0000**	**149.1266**	**149.1266**	**3.7000e-003**	**2.7200e-003**	**150.0289**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Oak Creek Canyon Project - Unmitigated

Bay Area AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	6.00	Dwelling Unit	9.03	30,306.00	17

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	4			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	257.69	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor adjusted per PG&E RPS projections.

Land Use - Acreage and square footage adjusted per site plan.

Construction Phase - Phase timing based on applicant-provided information.

Grading - Based on applicant-provided information.

Woodstoves - Applicant noted that houses would include natural gas fireplaces.

Vehicle Trips - Based on ITE 9th ed. trip rate for Single Family Homes (210)

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Oak Creek Canyon Project - Unmitigated - Bay Area AQMD Air District, Winter

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	196.00
tblConstructionPhase	NumDays	230.00	196.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	NumDays	20.00	2.00
tblConstructionPhase	NumDays	10.00	5.00
tblConstructionPhase	PhaseEndDate	6/22/2022	3/7/2022
tblConstructionPhase	PhaseEndDate	4/27/2022	2/21/2022
tblConstructionPhase	PhaseEndDate	6/9/2021	6/11/2021
tblConstructionPhase	PhaseEndDate	5/25/2022	5/21/2021
tblConstructionPhase	PhaseEndDate	5/12/2021	4/7/2021
tblConstructionPhase	PhaseStartDate	5/26/2022	6/7/2021
tblConstructionPhase	PhaseStartDate	6/10/2021	5/24/2021
tblConstructionPhase	PhaseStartDate	5/13/2021	5/1/2021
tblConstructionPhase	PhaseStartDate	4/28/2022	5/20/2021
tblConstructionPhase	PhaseStartDate	4/29/2021	4/1/2021
tblFireplaces	NumberGas	1.50	6.00
tblFireplaces	NumberNoFireplace	0.48	0.00
tblFireplaces	NumberWood	2.58	0.00
tblGrading	AcresOfGrading	15.00	4.30
tblLandUse	LandUseSquareFeet	10,800.00	30,306.00
tblLandUse	LotAcreage	1.95	9.03
tblProjectCharacteristics	CO2IntensityFactor	641.35	257.69
tblVehicleTrips	ST_TR	9.91	9.52
tblVehicleTrips	SU_TR	8.62	9.52

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.6483	43.8393	34.6689	0.0611	18.2141	2.2137	20.2595	9.9699	2.0635	11.8517	0.0000	5,858.9244	5,858.9244	1.6477	0.0000	5,898.1355
2022	4.0971	17.1270	18.2455	0.0303	0.0232	0.8910	0.9142	6.3100e-003	0.8432	0.8495	0.0000	2,877.7214	2,877.7214	0.6320	0.0000	2,893.5205
Maximum	**6.6483**	**43.8393**	**34.6689**	**0.0611**	**18.2141**	**2.2137**	**20.2595**	**9.9699**	**2.0635**	**11.8517**	**0.0000**	**5,858.9244**	**5,858.9244**	**1.6477**	**0.0000**	**5,898.1355**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.6483	43.8393	34.6689	0.0611	18.2141	2.2137	20.2595	9.9699	2.0635	11.8517	0.0000	5,858.9244	5,858.9244	1.6477	0.0000	5,898.1355
2022	4.0971	17.1270	18.2455	0.0303	0.0232	0.8910	0.9142	6.3100e-003	0.8432	0.8495	0.0000	2,877.7214	2,877.7214	0.6320	0.0000	2,893.5205
Maximum	**6.6483**	**43.8393**	**34.6689**	**0.0611**	**18.2141**	**2.2137**	**20.2595**	**9.9699**	**2.0635**	**11.8517**	**0.0000**	**5,858.9244**	**5,858.9244**	**1.6477**	**0.0000**	**5,898.1355**

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

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.9412	0.1436	1.8813	5.1300e-003		0.2302	0.2302		0.2302	0.2302	32.1877	149.1266	181.3143	0.1542	2.7200e-003	185.9784
Energy	5.1500e-003	0.0440	0.0187	2.8000e-004		3.5600e-003	3.5600e-003		3.5600e-003	3.5600e-003		56.2097	56.2097	1.0800e-003	1.0300e-003	56.5437
Mobile	0.0707	0.3222	0.8483	2.9900e-003	0.2803	2.4800e-003	0.2827	0.0750	2.3200e-003	0.0773		302.5564	302.5564	0.0109		302.8281
Total	**1.0170**	**0.5099**	**2.7484**	**8.4000e-003**	**0.2803**	**0.2362**	**0.5165**	**0.0750**	**0.2361**	**0.3111**	**32.1877**	**507.8926**	**540.0804**	**0.1661**	**3.7500e-003**	**545.3502**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.7940	0.1218	0.5445	7.7000e-004		0.0121	0.0121		0.0121	0.0121	0.0000	149.1266	149.1266	3.7000e-003	2.7200e-003	150.0289
Energy	2.7200e-003	0.0232	9.8800e-003	1.5000e-004		1.8800e-003	1.8800e-003		1.8800e-003	1.8800e-003		29.6524	29.6524	5.7000e-004	5.4000e-004	29.8286
Mobile	0.0702	0.3190	0.8364	2.9300e-003	0.2747	2.4400e-003	0.2771	0.0735	2.2800e-003	0.0758		296.9408	296.9408	0.0107		297.2087
Total	**0.8668**	**0.4640**	**1.3908**	**3.8500e-003**	**0.2747**	**0.0165**	**0.2911**	**0.0735**	**0.0163**	**0.0898**	**0.0000**	**475.7198**	**475.7198**	**0.0150**	**3.2600e-003**	**477.0662**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**14.76**	**8.99**	**49.40**	**54.17**	**2.00**	**93.04**	**43.64**	**2.00**	**93.10**	**71.14**	**100.00**	**6.33**	**11.92**	**90.98**	**13.07**	**12.52**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	4/1/2021	4/7/2021	5	5	
2	Grading	Grading	5/1/2021	6/11/2021	5	30	
3	Building Construction	Building Construction	5/24/2021	2/21/2022	5	196	
4	Paving	Paving	5/20/2021	5/21/2021	5	2	
5	Architectural Coating	Architectural Coating	6/7/2021	3/7/2022	5	196	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4.3

Acres of Paving: 0

Residential Indoor: 61,370; Residential Outdoor: 20,457; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Excavators	1	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	2.00	1.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0613	0.0418	0.4137	1.3200e-003	0.1479	9.3000e-004	0.1488	0.0392	8.6000e-004	0.0401		131.3166	131.3166	2.9700e-003		131.3909
Total	**0.0613**	**0.0418**	**0.4137**	**1.3200e-003**	**0.1479**	**9.3000e-004**	**0.1488**	**0.0392**	**8.6000e-004**	**0.0401**		**131.3166**	**131.3166**	**2.9700e-003**		**131.3909**

3.2 Site Preparation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0613	0.0418	0.4137	1.3200e-003	0.1479	9.3000e-004	0.1488	0.0392	8.6000e-004	0.0401		131.3166	131.3166	2.9700e-003		131.3909
Total	**0.0613**	**0.0418**	**0.4137**	**1.3200e-003**	**0.1479**	**9.3000e-004**	**0.1488**	**0.0392**	**8.6000e-004**	**0.0401**		**131.3166**	**131.3166**	**2.9700e-003**		**131.3909**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1741	0.0000	6.1741	3.3266	0.0000	3.3266			0.0000			0.0000
Off-Road	2.2903	24.7367	15.8575	0.0296		1.1599	1.1599		1.0671	1.0671		2,871.9285	2,871.9285	0.9288		2,895.1495
Total	**2.2903**	**24.7367**	**15.8575**	**0.0296**	**6.1741**	**1.1599**	**7.3340**	**3.3266**	**1.0671**	**4.3938**		**2,871.9285**	**2,871.9285**	**0.9288**		**2,895.1495**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0511	0.0348	0.3447	1.1000e-003	0.1232	7.8000e-004	0.1240	0.0327	7.1000e-004	0.0334		109.4305	109.4305	2.4800e-003		109.4924
Total	**0.0511**	**0.0348**	**0.3447**	**1.1000e-003**	**0.1232**	**7.8000e-004**	**0.1240**	**0.0327**	**7.1000e-004**	**0.0334**		**109.4305**	**109.4305**	**2.4800e-003**		**109.4924**

3.3 Grading - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1741	0.0000	6.1741	3.3266	0.0000	3.3266			0.0000			0.0000
Off-Road	2.2903	24.7367	15.8575	0.0296		1.1599	1.1599		1.0671	1.0671	0.0000	2,871.9285	2,871.9285	0.9288		2,895.1495
Total	**2.2903**	**24.7367**	**15.8575**	**0.0296**	**6.1741**	**1.1599**	**7.3340**	**3.3266**	**1.0671**	**4.3938**	**0.0000**	**2,871.9285**	**2,871.9285**	**0.9288**		**2,895.1495**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0511	0.0348	0.3447	1.1000e-003	0.1232	7.8000e-004	0.1240	0.0327	7.1000e-004	0.0334		109.4305	109.4305	2.4800e-003		109.4924
Total	**0.0511**	**0.0348**	**0.3447**	**1.1000e-003**	**0.1232**	**7.8000e-004**	**0.1240**	**0.0327**	**7.1000e-004**	**0.0334**		**109.4305**	**109.4305**	**2.4800e-003**		**109.4924**

3.4 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	3.2900e-003	0.1042	0.0280	2.7000e-004	6.7700e-003	2.3000e-004	7.0000e-003	1.9500e-003	2.2000e-004	2.1700e-003		28.1627	28.1627	1.4700e-003		28.1994
Worker	6.8100e-003	4.6400e-003	0.0460	1.5000e-004	0.0164	1.0000e-004	0.0165	4.3600e-003	1.0000e-004	4.4500e-003		14.5907	14.5907	3.3000e-004		14.5990
Total	**0.0101**	**0.1089**	**0.0740**	**4.2000e-004**	**0.0232**	**3.3000e-004**	**0.0235**	**6.3100e-003**	**3.2000e-004**	**6.6200e-003**		**42.7534**	**42.7534**	**1.8000e-003**		**42.7984**

3.4 Building Construction - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	3.2900e-003	0.1042	0.0280	2.7000e-004	6.7700e-003	2.3000e-004	7.0000e-003	1.9500e-003	2.2000e-004	2.1700e-003		28.1627	28.1627	1.4700e-003		28.1994
Worker	6.8100e-003	4.6400e-003	0.0460	1.5000e-004	0.0164	1.0000e-004	0.0165	4.3600e-003	1.0000e-004	4.4500e-003		14.5907	14.5907	3.3000e-004		14.5990
Total	**0.0101**	**0.1089**	**0.0740**	**4.2000e-004**	**0.0232**	**3.3000e-004**	**0.0235**	**6.3100e-003**	**3.2000e-004**	**6.6200e-003**		**42.7534**	**42.7534**	**1.8000e-003**		**42.7984**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	3.0600e-003	0.0987	0.0263	2.6000e-004	6.7700e-003	2.0000e-004	6.9700e-003	1.9500e-003	1.9000e-004	2.1400e-003		27.8839	27.8839	1.4000e-003		27.9189
Worker	6.3600e-003	4.1600e-003	0.0422	1.4000e-004	0.0164	1.0000e-004	0.0165	4.3600e-003	9.0000e-005	4.4500e-003		14.0558	14.0558	3.0000e-004		14.0632
Total	**9.4200e-003**	**0.1028**	**0.0685**	**4.0000e-004**	**0.0232**	**3.0000e-004**	**0.0235**	**6.3100e-003**	**2.8000e-004**	**6.5900e-003**		**41.9397**	**41.9397**	**1.7000e-003**		**41.9822**

3.4 Building Construction - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	3.0600e-003	0.0987	0.0263	2.6000e-004	6.7700e-003	2.0000e-004	6.9700e-003	1.9500e-003	1.9000e-004	2.1400e-003		27.8839	27.8839	1.4000e-003		27.9189
Worker	6.3600e-003	4.1600e-003	0.0422	1.4000e-004	0.0164	1.0000e-004	0.0165	4.3600e-003	9.0000e-005	4.4500e-003		14.0558	14.0558	3.0000e-004		14.0632
Total	**9.4200e-003**	**0.1028**	**0.0685**	**4.0000e-004**	**0.0232**	**3.0000e-004**	**0.0235**	**6.3100e-003**	**2.8000e-004**	**6.5900e-003**		**41.9397**	**41.9397**	**1.7000e-003**		**41.9822**

3.5 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2556	12.9191	14.6532	0.0228		0.6777	0.6777		0.6235	0.6235		2,207.2109	2,207.2109	0.7139		2,225.0573
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2556**	**12.9191**	**14.6532**	**0.0228**		**0.6777**	**0.6777**		**0.6235**	**0.6235**		**2,207.2109**	**2,207.2109**	**0.7139**		**2,225.0573**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0511	0.0348	0.3447	1.1000e-003	0.1232	7.8000e-004	0.1240	0.0327	7.1000e-004	0.0334		109.4305	109.4305	2.4800e-003		109.4924
Total	**0.0511**	**0.0348**	**0.3447**	**1.1000e-003**	**0.1232**	**7.8000e-004**	**0.1240**	**0.0327**	**7.1000e-004**	**0.0334**		**109.4305**	**109.4305**	**2.4800e-003**		**109.4924**

3.5 Paving - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2556	12.9191	14.6532	0.0228		0.6777	0.6777		0.6235	0.6235	0.0000	2,207.2109	2,207.2109	0.7139		2,225.0573
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2556**	**12.9191**	**14.6532**	**0.0228**		**0.6777**	**0.6777**		**0.6235**	**0.6235**	**0.0000**	**2,207.2109**	**2,207.2109**	**0.7139**		**2,225.0573**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0511	0.0348	0.3447	1.1000e-003	0.1232	7.8000e-004	0.1240	0.0327	7.1000e-004	0.0334		109.4305	109.4305	2.4800e-003		109.4924
Total	**0.0511**	**0.0348**	**0.3447**	**1.1000e-003**	**0.1232**	**7.8000e-004**	**0.1240**	**0.0327**	**7.1000e-004**	**0.0334**		**109.4305**	**109.4305**	**2.4800e-003**		**109.4924**

3.6 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	2.1769					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	**2.3958**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**		**281.4481**	**281.4481**	**0.0193**		**281.9309**

Unmitigated Construction Off-Site

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

3.6 Architectural Coating - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	2.1769					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	**2.3958**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**	**0.0000**	**281.4481**	**281.4481**	**0.0193**		**281.9309**

Mitigated Construction Off-Site

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

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	2.1769					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**2.3815**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

Unmitigated Construction Off-Site

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

3.6 Architectural Coating - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	2.1769					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**2.3815**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

Mitigated Construction Off-Site

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

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0702	0.3190	0.8364	2.9300e-003	0.2747	2.4400e-003	0.2771	0.0735	2.2800e-003	0.0758		296.9408	296.9408	0.0107		297.2087
Unmitigated	0.0707	0.3222	0.8483	2.9900e-003	0.2803	2.4800e-003	0.2827	0.0750	2.3200e-003	0.0773		302.5564	302.5564	0.0109		302.8281

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	57.12	57.12	57.12	131,925	129,286
Total	57.12	57.12	57.12	131,925	129,286

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.578638	0.038775	0.193686	0.110919	0.015677	0.005341	0.018293	0.026358	0.002641	0.002200	0.005832	0.000891	0.000749

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	2.7200e-003	0.0232	9.8800e-003	1.5000e-004		1.8800e-003	1.8800e-003		1.8800e-003	1.8800e-003		29.6524	29.6524	5.7000e-004	5.4000e-004	29.8286
NaturalGas Unmitigated	5.1500e-003	0.0440	0.0187	2.8000e-004		3.5600e-003	3.5600e-003		3.5600e-003	3.5600e-003		56.2097	56.2097	1.0800e-003	1.0300e-003	56.5437

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	477.782	5.1500e-003	0.0440	0.0187	2.8000e-004		3.5600e-003	3.5600e-003		3.5600e-003	3.5600e-003		56.2097	56.2097	1.0800e-003	1.0300e-003	56.5437
Total		**5.1500e-003**	**0.0440**	**0.0187**	**2.8000e-004**		**3.5600e-003**	**3.5600e-003**		**3.5600e-003**	**3.5600e-003**		**56.2097**	**56.2097**	**1.0800e-003**	**1.0300e-003**	**56.5437**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	0.252045	2.7200e-003	0.0232	9.8800e-003	1.5000e-004		1.8800e-003	1.8800e-003		1.8800e-003	1.8800e-003		29.6524	29.6524	5.7000e-004	5.4000e-004	29.8286
Total		**2.7200e-003**	**0.0232**	**9.8800e-003**	**1.5000e-004**		**1.8800e-003**	**1.8800e-003**		**1.8800e-003**	**1.8800e-003**		**29.6524**	**29.6524**	**5.7000e-004**	**5.4000e-004**	**29.8286**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.7940	0.1218	0.5445	7.7000e-004		0.0121	0.0121		0.0121	0.0121	0.0000	149.1266	149.1266	3.7000e-003	2.7200e-003	150.0289
Unmitigated	0.9412	0.1436	1.8813	5.1300e-003		0.2302	0.2302		0.2302	0.2302	32.1877	149.1266	181.3143	0.1542	2.7200e-003	185.9784

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1169					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.6486					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1608	0.1379	1.3862	5.1000e-003		0.2275	0.2275		0.2275	0.2275	32.1877	148.2353	180.4230	0.1533	2.7200e-003	185.0657
Landscaping	0.0149	5.7100e-003	0.4951	3.0000e-005		2.7400e-003	2.7400e-003		2.7400e-003	2.7400e-003		0.8913	0.8913	8.6000e-004		0.9127
Total	**0.9412**	**0.1436**	**1.8813**	**5.1300e-003**		**0.2302**	**0.2302**		**0.2302**	**0.2302**	**32.1877**	**149.1266**	**181.3143**	**0.1542**	**2.7200e-003**	**185.9784**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1169					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.6486					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0136	0.1161	0.0494	7.4000e-004		9.3900e-003	9.3900e-003		9.3900e-003	9.3900e-003	0.0000	148.2353	148.2353	2.8400e-003	2.7200e-003	149.1162
Landscaping	0.0149	5.7100e-003	0.4951	3.0000e-005		2.7400e-003	2.7400e-003		2.7400e-003	2.7400e-003		0.8913	0.8913	8.6000e-004		0.9127
Total	**0.7940**	**0.1218**	**0.5445**	**7.7000e-004**		**0.0121**	**0.0121**		**0.0121**	**0.0121**	**0.0000**	**149.1266**	**149.1266**	**3.7000e-003**	**2.7200e-003**	**150.0289**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix B

Biological Resources Reports and Arborist Report

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: Oak Creek Canyon Development	
PROJECT TYPE: ☒ Residential ☐ Commercial ☐ Transportation ☐ Utility ☐ Other	
PROJECT DESCRIPTION (BRIEF): Development of 6 single family residential units	
PROJECT ADDRESS/LOCATION: Marsh Creek Road at Diablo Parkway, Clayton, CA	
PARCEL/PROJECT SIZE (ACRES): Project Size: 9.03 acres	
PROJECT APN(S): 119-070-008	
APPLICATION SUBMITTAL DATE:	**FINAL PSR DATE:** (City/County/Conservancy use)
LEAD PLANNER: Mindy Gentry, 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: Discovery Builders, Incorporated	
AUTHORIZED AGENT'S NAME AND TITLE: Louis Parsons, President	
PHONE NO.: 925-682-6419	**APPLICANT'S E-MAIL:** lparsons@discoverybuilders.com
MAILING ADDRESS: 4061 Port Chicago Highway, Concord, CA 94520	

BIOLOGIST INFORMATION[1]	
BIOLOGICAL/ENVIRONMENTAL FIRM: Swaim Biological, Incorporated	
CONTACT NAME AND TITLE: Leslie Koenig, Senior Biologist	
PHONE NO.: 916-849-0513	**CONTACT'S E-MAIL:** lkoenig@swaimbio.com
MAILING ADDRESS: 4435 First St. PMB 312, Livermore, CA 94551	

[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	In progress	
☐ 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).

Table 1: Land Cover Types and Impacts

Land Cover Type	Permanent Impacts	Temporary Impacts	*Proposed for HCP/NCCP Dedication on the Parcel (Requires Conservancy Approval)* *Stream Setback*	*Preserve System Dedication*
Grassland				
Annual Grassland	6.57			
Alkali Grassland				
Ruderal	2.46			
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				
Aqueduct				
Turf				
Landfill				
TOTAL IMPACTS	9.03			

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]		

Please provide details of impacts to stream features:

Stream Name: Unnamed drainage – Jurisdictional determination needed

Watershed: Suisun Bay HUC-8-18050001

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	TBD	
☐ ≤ 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.

The Project Site is shown on the Final ECCHCP/NCCP Land Cover map as future urban land cover type and also falls within the Initial Urban Development Area. A planning survey determined the Project Site contains 6.57 acres of annual grassland land cover and 2.46 acres of ruderal land cover. The planning survey results determined ruderal land cover was present on the lower portion of the site during the planning survey. On the upper portion of the Project Site annual grassland habitat was present including wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*) mixed with non-native plants including yellow star thistle (*Centaurea solstitialis*) and purple star thistle (*Centaurea calcitrapa*). See Figure 3 for the field verified land cover types.

Two black locust trees (*Robinia pseudoacacia*) and one Mexican fan palm tree (*Washingtonia robusta*) are present on the Project Site. There are three additional black locust trees on the parcel that is adjacent to Marsh Creek Road. The Contra Costa Water District Property has many trees and shrubs surrounding the perimeter including *Eucalyptus* sp, pine trees (*Pinus* sp.), and Peruvian pepper trees (*Schinus molle*). On the northern most border of the parcel are several oak trees (*Quercus* sp.) and mixed oaks are present on the neighboring parcels.

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 wetlands were observed during planning surveys on the Project Site, therefore no jurisdictional wetlands or waters are anticipated to be impacted by project activities. There is an unnamed, historical, ephemeral drainage present to the east. The jurisdictional nature of this unnamed drainage will be confirmed through consultation with the resource agencies. Upon completion of the consultation with the resource agencies, the results will be provided to the City of Clayton.

[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).

6) 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.				

7) 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.

8) 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.

Below is a summary describing the results of the planning surveys for all species identified in Table 2a.

San Joaquin kit fox (*Vulpes macrotis mutica*)
The Project Site is located within the modeled suitable core habitat of San Joaquin kit fox. However, indications of use by San Joaquin kit fox – including large keyhole-shaped burrows, tracks, scat, prey remains or fur were not observed during the planning surveys. No burrows of suitable size to accommodate the San Joaquin kit fox (greater than five inches in diameter for a minimum of one foot underground) were observed within the Project Site or within 250 feet of the Project Site. While annual grassland is present within the Project Site, the proximity to residential housing developments directly south of the Project Site provides low potential for use by San Joaquin kit fox. The nearest CNDDB observation is 3.6 miles away and is from 1992. Due to the low potential for use by San Joaquin kit fox and the lack of suitable burrows identified during the planning surveys, no potential breeding or denning habitat is present and therefore no additional surveys are conservation measures are required.

Western burrowing owl (*Athene cunicularia*)
The area is located within the modeled suitable habitat of western burrowing owl. However, no burrows of suitable size to support the species (four inches or greater in diameter) were observed during the planning survey within the Project Site or within 500 feet of the Project Site. California ground squirrels (*Spermophilus beecheyi)* were observed as well as active ground squirrel burrows within the Project Site and surrounding parcels. The potential for western burrowing owls on the property is limited by the lack of suitable burrows, however, there is moderate to high potential for the burrowing owl to use to the Project Site for foraging and low to moderate potential for the owl to use the Project Site for nesting. The two nearest CNDDB observations are both 4.8 miles away from 1989 and 1991. Preconstruction surveys and avoidance and minimization measures (if necessary) will be completed for western burrowing owl as described below in Section IV.2 and in Attachment A.

Golden eagle (*Aquila chrysaetos*)
The Project Site is located within the modeled suitable habitat of the golden eagle. No trees providing suitable nesting habitat are present within the Project Site, however, large oaks to the north of the Project Site could serve as potential nest sites. No active or inactive nests were observed during the planning survey. The suitability of the nest sites surrounding the property are marginal as golden eagles do not generally nest near urban habitat. Preconstruction surveys and avoidance and minimization measures (if necessary) will be completed for golden eagles as described below in Section IV.2 and in Attachment A.

Swainson's hawk (*Buteo swainsoni*)
The Project Site is not located within the modeled suitable habitat of the Swainson's hawk. No trees providing suitable nesting habitat are present within the Project Site, however, the riparian corridor of Mount Diablo Creek to the south could serve as potential nest sites. There is not extensive foraging habitat present in the form of agricultural fields or pasture, however, there are some small agricultural fields located to the east that could serve as marginal foraging habitat. No active or inactive nests were observed during the planning survey. Preconstruction surveys and avoidance and minimization measures (if necessary) will be completed for Swainson's hawks as described below in Section IV.2 and in Attachment A.

References:

California Department of Fish and Wildlife (CDFW). 2017. California Natural Diversity Database query for the Tassajara, Diablo, Antioch South, and Clayton U.S. Geological Survey 7.5-minute quadrangles. October 2017.

Jones & Stokes. 2007. Final East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan. Retrieved October 2017, from http://www.co.contra-costa.ca.us/depart/cd/water/hcp/archive/final-hcp- rev/final_hcp_nccp.html

9) 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. In order to complete all the necessary covered and no-take plant surveys, spring, summer, and fall surveys may be required.

Table 2b. Covered and No-Take Plant Species

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".

10) 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).

Planning surveys were conducted in October 2017. Research has been conducted to select special-status plant species with the potential to be found within the Project Site. Sources consulted include CNDDB, Table 2b above and the California Native Plant Society Inventory of Rare and Endangered Plants. Rare plant species were identified that occur in annual grassland settings. This list was further refined by comparing geographic range and habitat preferences for each species with the geographic location and habitat types found within the Project Site. Five of the seven species listed in Table 2b are determined to require rare plant surveys. Surveys will be conducted during the appropriate bloom period for each species in 2018 and this information will be provided to the City of Clayton. The species that require rare plant surveys include big tarplant (*Blepharizonia plumose*), round-leaved filaree (*California macrophylla*), Mt. Diablo fairy lantern (*Calochortus pulchellus*), diamond petaled poppy (*Eschscholzia rhombipetala*), large flowered fiddleneck (*Amsinckia grandiflora*), and showy madia (*Madia radiata*).

Adobe navarretia (*Navarretia nigelliformis* ssp. *nigelliformis*) was determined to not have potential to occur on the Project Site as it requires vernally mesic habitat conditions which are not present. Brewer's dwarf flax (*Hesperolinon breweri*) was determined to not have potential to occur on the Project Site as it grows in rocky soils on serpentine, sandstone or volcanic substrates which are not present.

References:

Calflora. 2017. Calflora: Information on California plants for education, research and conservation. Retrieved from http://www.calflora.org/.

California Department of Fish and Wildlife (CDFW). 2017. California Natural Diversity Database query for the Tassajara, Diablo, Antioch South, and Clayton U.S. Geological Survey 7.5-minute quadrangles. October 2017.

California Native Plant Society (CNPS), Rare Plant Program. 2017. Inventory of Rare and Endangered Plants (online edition, v8-03 0.39). Sacramento, CA. Retrieved October 2017, from http://www.rareplants.cnps.org

Jones & Stokes. 2007. Final East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan. Retrieved October 2017, from http://www.co.contra-costa.ca.us/depart/cd/water/hcp/archive/final-hcp-rev/final_hcp_nccp.html

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
☐ 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

[10] The requirements in this table are not comprehensive; they are detailed in the next section on the following page.

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.

SWAINSON'S HAWK

Preconstruction Survey

Prior to any ground disturbance related to covered activities that occurs during the nesting season (March 15 – September 15), a qualified biologist will conduct a preconstruction survey no more than 1 month prior to construction to establish whether Swainson's hawk nests within 1,000 feet of the project site are occupied. If potentially occupied nests within 1,000 feet are off the project site, then their occupancy will be determined by observation from public roads or by observations of Swainson's hawk activity (e.g., foraging) near the project site. If nests are occupied, minimization measures and construction monitoring are required (see below).

Avoidance and Minimization and Construction Monitoring

During the nesting season (March 15–September 15), covered activities within 1,000 feet of occupied nests or nests under construction will be prohibited to prevent nest abandonment. 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 used, the Implementing Entity will coordinate with CDFW/USFWS to determine the appropriate buffer size.
If young fledge prior to September 15, covered activities can proceed normally. If the active nest site is shielded from view and noise from the project site by other development, topography, or other features, the project applicant can apply to the Implementing Entity for a waiver of this avoidance measure. Any waiver must also be approved by USFWS and CDFW. While the nest is occupied, activities outside the buffer can take place.
All active nest trees will be preserved on site, if feasible. Nest trees, including non-native trees, lost to covered activities will be mitigated by the project proponent according to the requirements below.

Mitigation for Loss of Nest Trees

The loss of non-riparian Swainson's hawk nest trees will be mitigated by the project proponent by:

- If feasible on-site, planting 15 saplings for every tree lost with the objective of having at least 5 mature trees established for every tree lost according to the requirements listed below.

AND either

1) Pay the Implementing Entity an additional fee to purchase, plant, maintain, and monitor 15 saplings on the HCP/NCCP Preserve System for every tree lost according to the requirements listed below, OR
2) The project proponent will plant, maintain, and monitor 15 saplings for every tree lost at a site to be approved by the Implementing Entity (e.g., within an HCP/NCCP Preserve or existing open space linked to HCP/NCCP preserves), according to the requirements listed below.

The following requirements will be met for all planting options:

- Tree survival shall be monitored at least annually for 5 years, then every other year until year 12. All trees lost during the first 5 years will be replaced. Success will be reached at the end of 12 years if at least 5 trees per tree lost survive without supplemental irrigation or protection from herbivory. Trees must also survive for at least three years without irrigation.
- Irrigation and fencing to protect from deer and other herbivores may be needed for the first several years to ensure maximum tree survival.
- Native trees suitable for this site should be planted. When site conditions permit, a variety of native trees will be planted for each tree lost to provide trees with different growth rates, maturation, and life span, and to provide a variety of tree canopy structures for Swainson's hawk. This variety will help to ensure that nest trees will be available in the short term (5-10 years for cottonwoods and willows) and in the long term (e.g., Valley oak, sycamore). This will also minimize the temporal loss of nest trees.
- Riparian woodland restoration conducted as a result of covered activities (i.e., loss of riparian woodland) can be used to offset the nest tree planting requirement above, if the nest trees are riparian species.
- Whenever feasible and when site conditions permit, trees should be planted in clumps together or with existing trees to provide larger areas of suitable nesting habitat and to create a natural buffer between nest trees and adjacent development (if plantings occur on the development site).
- Whenever feasible, plantings on the site should occur closest to suitable foraging habitat outside the UDA.
- Trees planted in the HCP/NCCP preserves or other approved offsite location will occur within the known range of Swainson's hawk in the inventory area and as close as possible to high-quality foraging habitat.

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.**

A total of 9.03 acres will be developed as part of the Project. The Project Site occurs in the HCP/NCCP Zone 2 of the Fee Zone map. The current development fee calculation in Attachment D includes impacts to the grassland and ruderal habitats and are calculated at the 2018 rates.

Upon receiving verification of any jurisdictional waters the fee calculator may be updated as necessary.

Final fees will be paid prior to the initiation of construction. If the fee schedule changes prior to construction the fees will be recalculated in accordance with the current Fee Calculator.

ATTACHMENT A: PROJECT DESCRIPTION

ATTACHMENT A: PROJECT DESCRIPTION

Project Description

Discovery Builders, Incorporated plans to develop a portion of a vacant parcel at the Oak Creek Canyon Residential Development (Project Site) located in the City of Clayton, California. The proposed project includes the development of 6 single family residential units, landscaping, one new private road and stormwater management infrastructure. The Project Site is located in the East Contra Costa County Habitat Conservation Plan/Natural Communities Conservation Plan (HCP/NCCP) Zone 2 and is therefore eligible to be covered by the HCP/NCCP permit. The Project Site is shown on the Final ECCHCP/NCCP Land Cover map as future urban land cover type although planning surveys determined a mix of ruderal and annual grassland land cover. The Project Site occurs within the Initial Urban Development Area.

The Project Site will be accessed off of Marsh Creek Road. One new private road, Sage Lane, will be built to allow for access to the home sites. All construction and staging will occur within the Project Site. Underground wet and dry utilities including water, sewer, storm drain, electrical, cable, fiber optics, and natural gas will be installed as well.

Project Location

The 9.03 acre Project Site is located on Marsh Creek Road in Clayton, CA. The project will occur on parcel 119-070-008. The Project Site is bounded by annual grassland to the north and east. Contra Costa Water District owns 1.68 acres adjacent to the parcel and maintains an access easement through the parcel. Marsh Creek Road serves as the southwestern boundary.

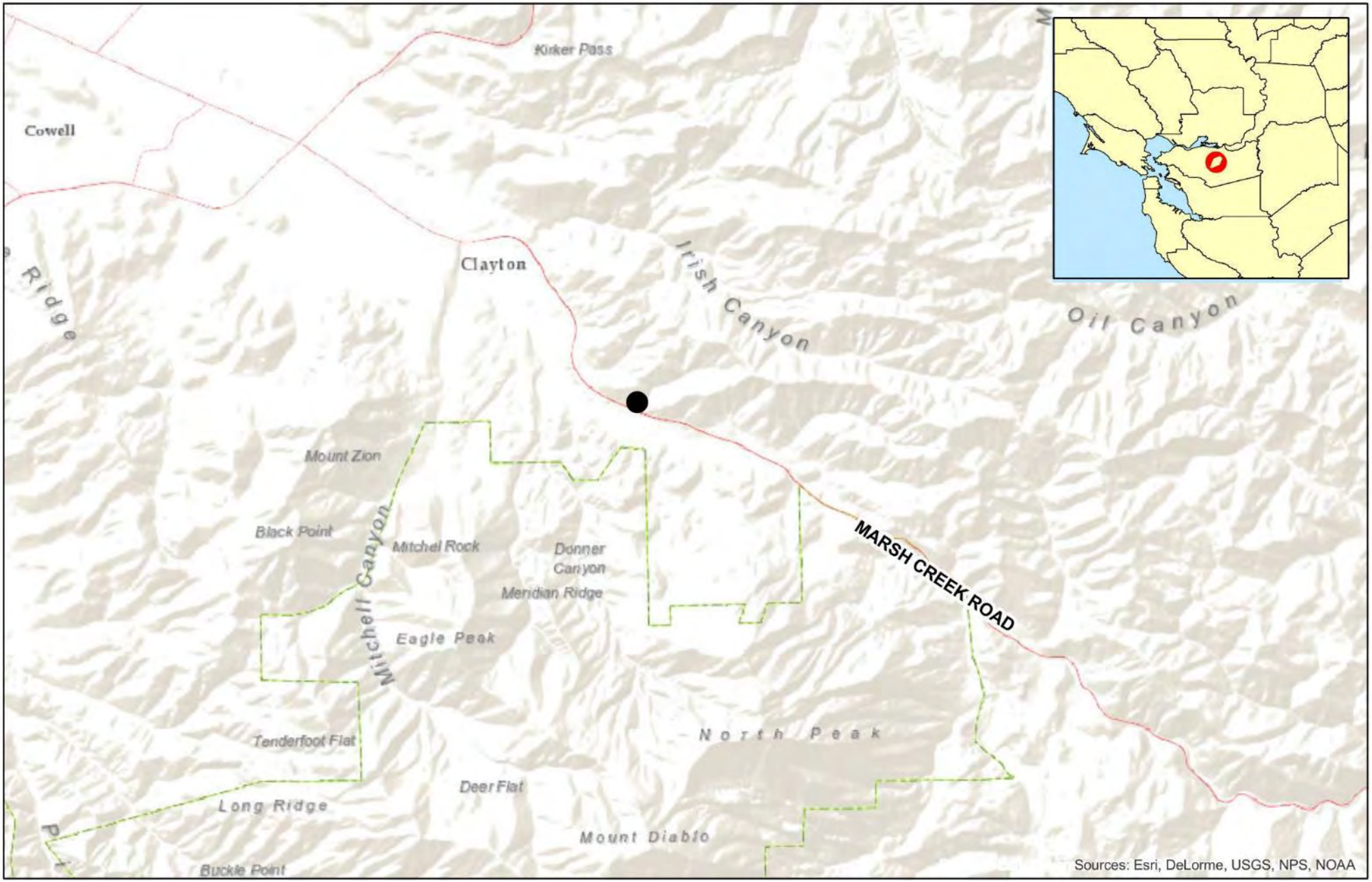
General Best Management Practices and Avoidance and Minimization Measures

- Applicable measures from the Provision C.3 Amendments of the Contra Costa County Clean Water Program's amended NPDES Permit will be incorporated into construction documents and the Stormwater Pollution Prevention Plan developed for the Project Site.
- Pre-construction surveys and appropriate Avoidance and Minimization Measures for the following species will be required to comply with the ECCC HCP/NCCP guidelines. Survey methods, reporting requirements and construction measures if necessary are included in Attachment C.
    - Western burrowing owl (*Athene cunicularia*)
    - Golden eagle (*Aquila chrysaetos*)
    - Swainson's hawk (*Buteo swainsoni*)
    - Nesting passerines and raptors.

Construction Schedule

Work activities are anticipated to occur in summer 2018 through summer 2019.

ATTACHMENT B: FIGURES



● Project Location

N

0 0.5 1 2 Miles

Oak Creek Canyon Residential Development
Figure 1. Proximity Map

SBI
Swaim Biological Inc.

Oak Creek Canyon Residental Development
Figure 2 Project Site Plans

Project Boundary
Annual Grassland
Ruderal Land Cover

N

0 0.015 0.03 0.06 Miles

Oak Creek Canyon Residential Development
Figure 3. Field Verified Land Cover Map

SBI
Swaim Biological Inc.

FIGURE 4. Representative Photographs of the Oak Creek Canyon Project Site

Photo 1. Project Site looking south towards Marsh Creek Road showing mixed annual grassland and ruderal land covers. Red line shows the approximate parcel boundary to the east and south.

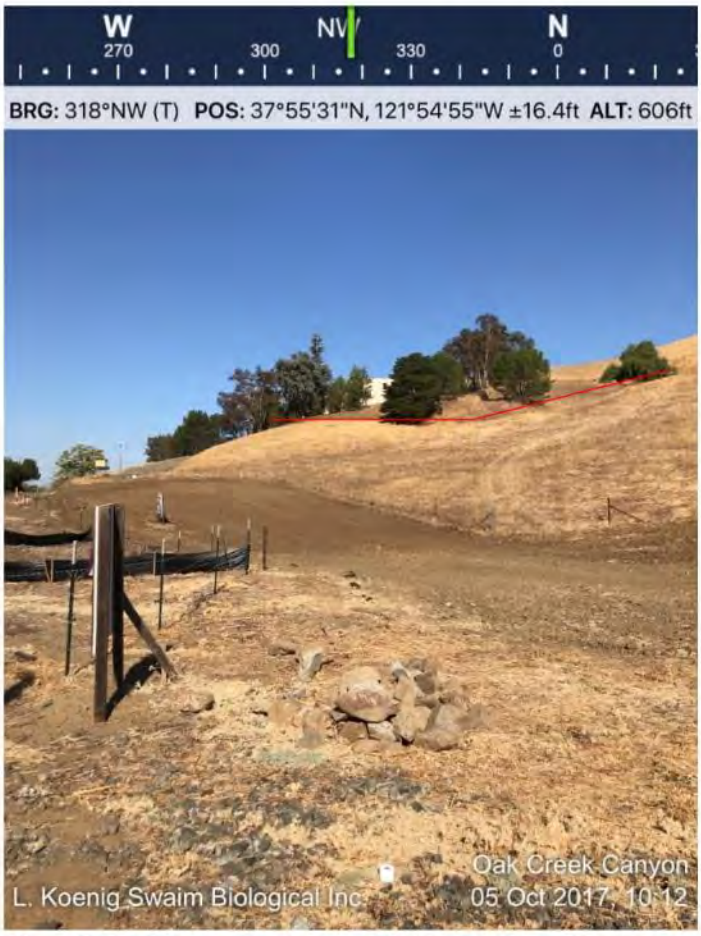


Photo 2. Looking northwest towards Contra Costa Water District property. Showing mixed annual grassland and ruderal land covers. Red line shows approximate parcel boundary, fenceline on lower left is southern parcel boundary.

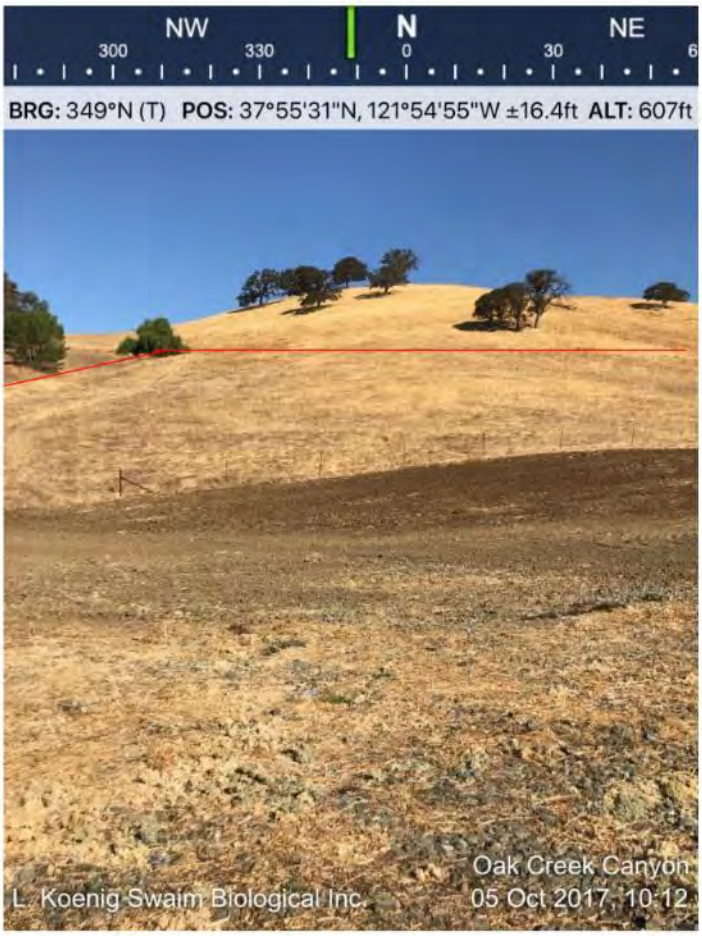


Photo 3: Showing ruderal, annual grassland. Oaks are on adjacent parcel to north. Red line shows approximate parcel boundary.

Photo 4: Project Site looking east with Marsh Creek Road on the right, showing ruderal and annual grassland land cover. Red line shows the approximate parcel boundary to the east and south.

Photo 5. Ground squirrel burrows

Photo 6. Gopher activity

Photo 6: Black locust on west end of property, adjacent to Marsh Creek Road and parcel boundary

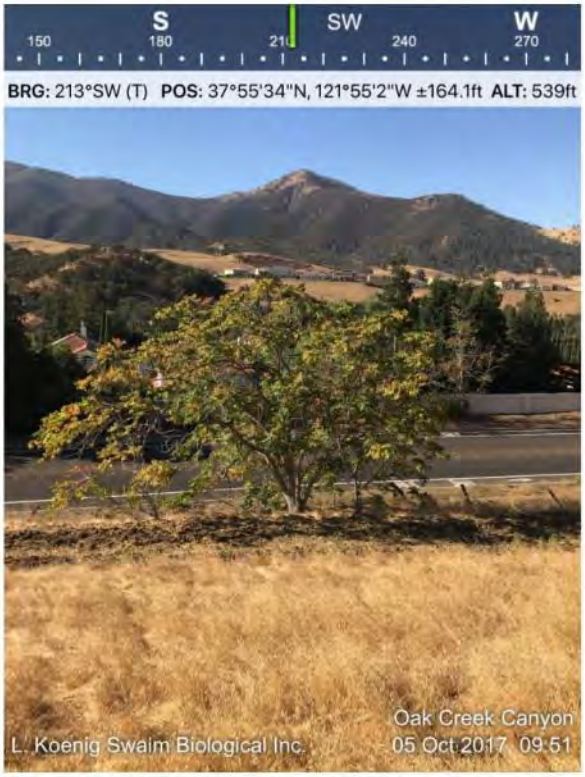


Photo 7: Black locust on west end of property, adjacent to Marsh Creek Road and parcel boundary.

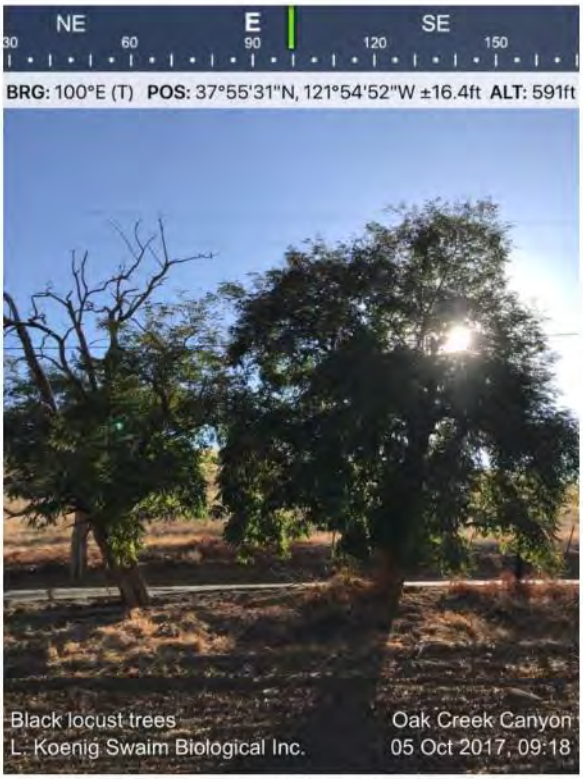


Photo 8: Black locusts on other side of the fenceline that serves as the approximate parcel boundary.

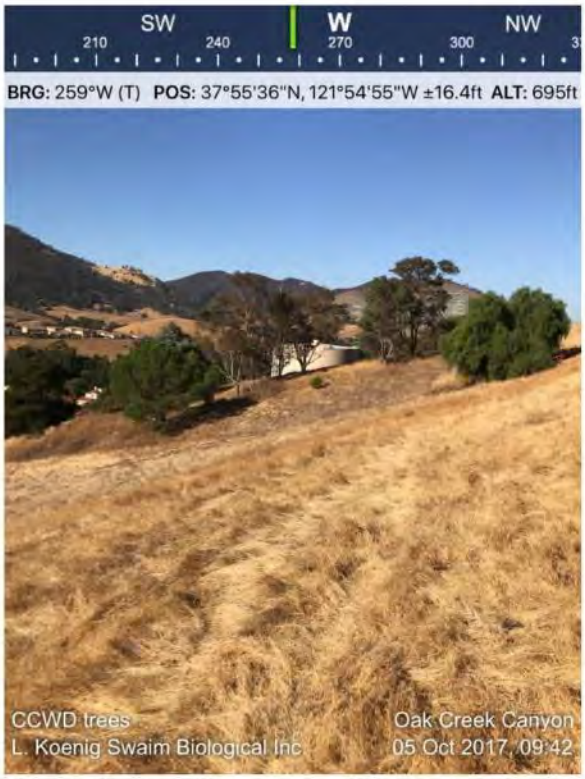
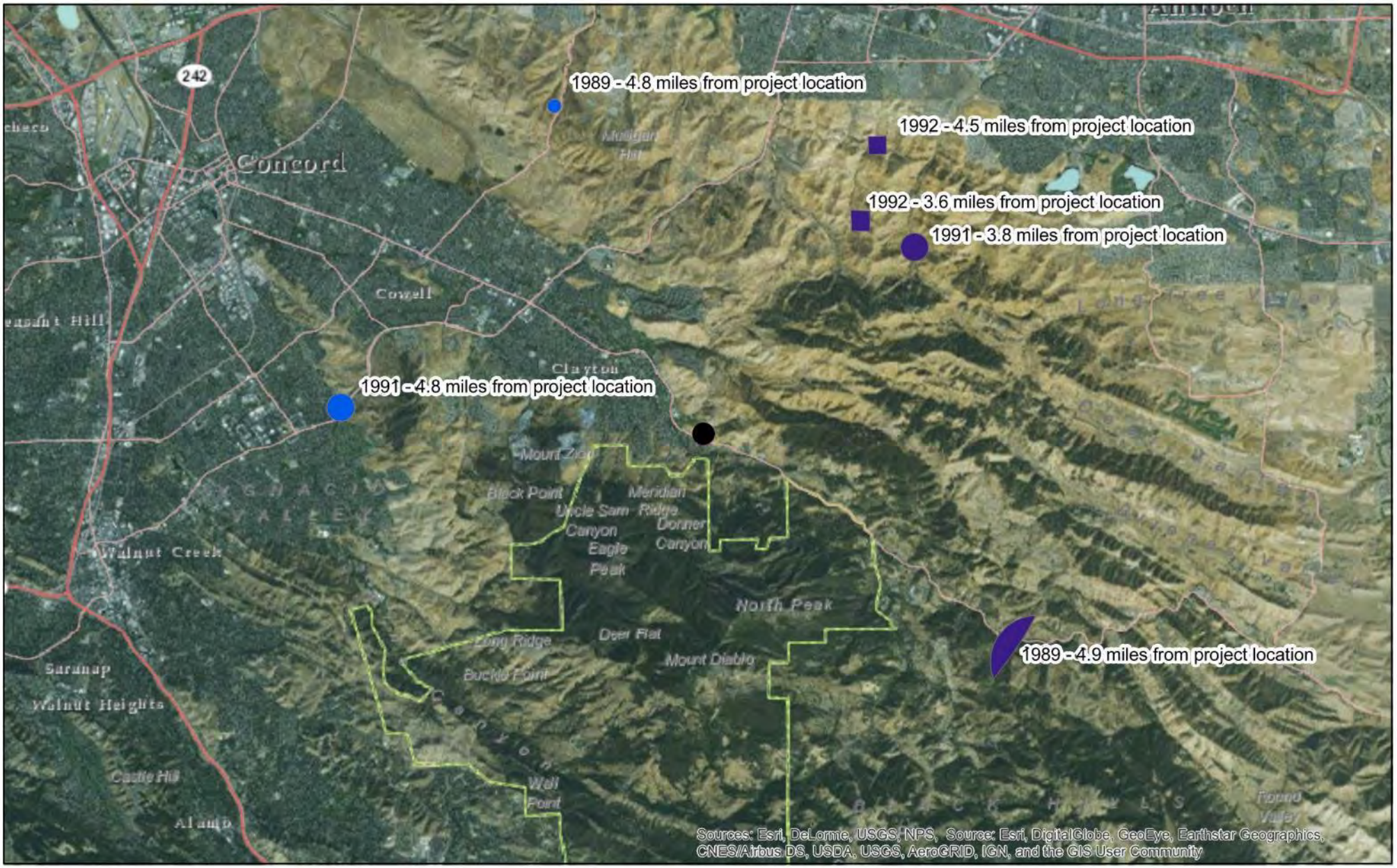


Photo 9: Trees on Contra Costa Water District Property



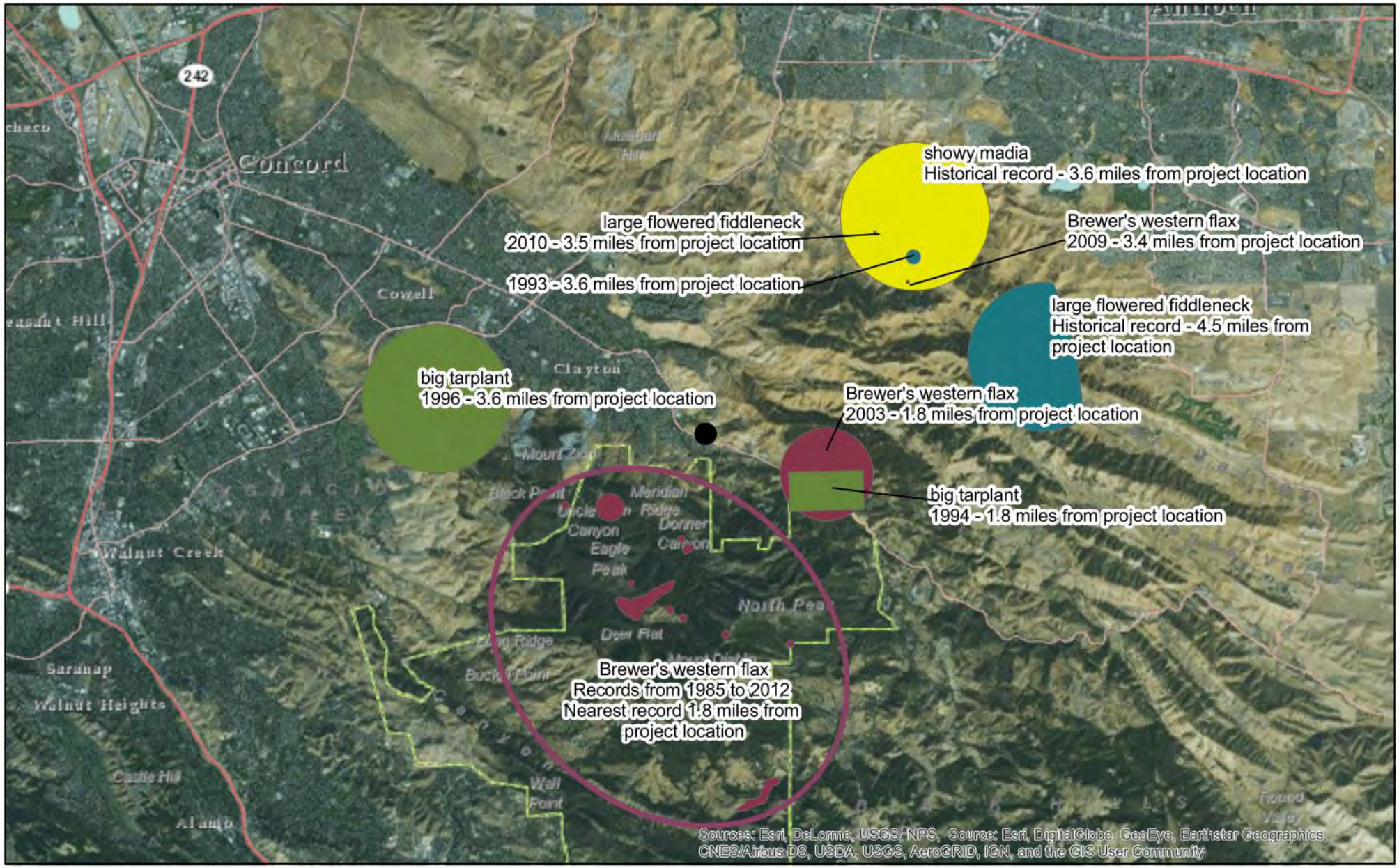
Project Location
San Joaquin kit fox
burrowing owl

N

0 0.75 1.5 3 Miles

Oak Creek Canyon Residential Development
Figure 5. Planning Survey Species Habitat Map
Map 1 of 4

SBI
Swaim Biological Inc.



- Project Location
- Brewer's western flax
- big tarplant
- large-flowered fiddleneck
- showy golden madia

N

0 0.75 1.5 3 Miles

Oak Creek Canyon Residential Development
Figure 5. Planning Survey Species Habitat Map
Covered and No Take Plants Records
Map 2 of 4

SBI
Swaim Biological Inc.

Project Boundary
Burrowing owl 500 foot buffer
Burrowing owl habitat

Burrowing owl habitat was only surveyed within parcel boundaries shown on map.

N

Oak Creek Canyon Residential Development
Figure 5. Planning Survey Species Habitat Map
Planning Survey Confirmed Habitat
Western Burrowing Owl
Map 3 of 4

0 0.05 0.1 0.2 Miles

SBI

Project Boundary

San Joaquin kit fox 250 foot buffer

San Joaquin kit fox habitat was only surveyed within parcel boundaries shown on map.

No potential breeding or denning habitat was observed.

N

0 0.05 0.1 0.2 Miles

Oak Creek Canyon Residential Development
Figure 5. Planning Survey Species Habitat Map
Planning Survey Confirmed Habitat
San Joaquin Kit Fox
Map 4 of 4

SBI

ATTACHMENT C: PROJECT COMPLIANCE TO HCP CONDITIONS

ATTACHMENT C: PROJECT COMPLIANCE TO HCP/NCCP CONDITIONS

Conservation Measures 1.10 and 1.11 are applicable for the Oak Creek Canyon Residential Development Project. The following sections discuss these conservation measures and how they will be complied with.

Conservation Measure 1.10. Maintain Hydrologic Conditions and Minimize Erosion

In order to comply with Measure 1.10, applicable measures from the Provision C.3 Amendments of the Contra Costa County Clean Water Program's amended NPDES Permit will be incorporated into construction documents and the Stormwater Pollution Prevention Plan developed for the Project Site. There are no streams, wetlands or jurisdictional waters present on or near the Project Site.

Conservation Measure 1.11. Avoid Direct Impacts on Extremely Rare Plants, Fully Protected Wildlife Species, or Migratory Birds.

The required planning surveys for wildlife species and migratory birds were conducted by biologist Leslie Koenig on October 5, 2017. The sections below summarize applicable conservation measures.

Rare Plant Species

Planning surveys were conducted in October 2017, however, due to the timing, rare plant surveys were not conducted for plant species with the potential to occur on the Project Site. Surveys will be conducted during the appropriate bloom period for each species in 2018 and the results and any necessary conservation measures will be provided as an addendum to this Application and Planning Survey Report. The species that require rare plant surveys include big tarplant (*Blepharizonia plumose*), round-leaved filaree (*California macrophylla*), diamond petaled poppy (*Eschscholzia rhombipetala*), large flowered fiddleneck (*Amsinckia grandiflora*), and showy madia (*Madia radiata*).

Fully Protected Wildlife Species

Three wildlife species that have potential to occur in the vicinity of the project are listed as fully protected (as defined under Sections 3511 and 4700 of the California Fish and Game Code). These are white-tailed kite (*Elanus leucurus*), peregrine falcon (*Falco peregrinus*), and golden eagle (*Aquila chrysaetos*). The golden eagle is also an HCP/NCCP covered species. All three species forage widely throughout the ECCC HCP/NCCP inventory area but nest in discrete locations. To ensure there will be no take of these species, pre-construction surveys will take place following the requirements in the ECCC HCP/NCCP and within Section IV of the Application Form and Planning Survey Report. If any nests associated with these species are determined to be active during the pre-construction surveys, the appropriate no-work buffer will be set up around the nest. Work will not proceed until the young fledge, the nest fails, or a reduced buffer is determined to be necessary around the nest.

Migratory Birds

The three trees present on the property and adjacent trees present on the surrounding properties could serve as nesting locations for common and sensitive passerine and raptor species. To comply with the federal Migratory Bird Treaty Act pre-construction surveys will be conducted and construction avoidance measures will be implemented if necessary. The survey requirements and Avoidance and Minimization Measure (AMM) included below will be implemented to protect migratory birds.

- If work is scheduled to take place between February 1 and August 31, a pre-construction nesting bird survey will be conducted by a qualified biologist within 14 days of construction, covering a radius of 250 feet for non-listed raptors and 100 feet for non-listed passerines at all locations. If an active bird nest is found within these buffers, species-specific measures shall be prepared by a qualified biologist and implemented to prevent abandonment of the active nest. At a minimum, grading in the vicinity of a nest shall be postponed until the young birds have fledged. If an active nest is present, a minimum exclusion buffer of 100 feet shall be maintained during construction, depending on the species and location. The perimeter of the nest setback zone shall be fenced or adequately demarcated with stakes and flagging at 20-foot intervals, and construction personnel and activities restricted from the area. A survey report by a qualified biologist verifying that no active nests are present, or that the young have fledged, shall be submitted prior to initiation of grading in the nest-setback zone. The qualified biologist shall serve as a biological monitor during those periods when construction activities occur near active nest areas to ensure that no inadvertent impacts on these nests occur.

Other Sensitive Wildlife Species

The required planning surveys were also conducted for wildlife that has the potential to occur in the habitats surrounding the project area. In addition to the species discussed above, western burrowing owl (*Athene cunicularia*) and Swainson's hawk (*Buteo swainsoni*) will require conservation measures to avoid impacts. The pre-construction surveys and AMMs included in Section IV of the Application Form and Planning Survey Report will be implemented for the western burrowing owl and Swainson's hawk.

ATTACHMENT D: FEE CALCULATOR(S)

ECCC HCP/NCCP 2018 Fee Calculator Worksheet
Permanent Impacts

PROJECT APPLICANT: Discovery Builders, Incorporated

PROJECT NAME: Oak Creek Canyon Residential Development

APN(s): 119-070-008

JURISDICTION: City of Clayton

DATE: May 15, 2018

DEVELOPMENT FEE		**ACREAGE PERMANENTLY IMPACTED (TABLE 1)[1]**		**2018 FEE PER ACRE (SUBJECT TO CHANGE)[2]**		
See appropriate ordinance or HCP/NCCP Figure 9-1 to determine Fee Zone	Fee Zone 1		x	$15,724.46	=	$0.00
	Fee Zone 2	9.03	x	$31,448.92	=	$283,983.75
	Fee Zone 3		x	$7,862.89	=	$0.00
				Development Fee Total	=	**$283,983.75**

WETLAND MITIGATION FEE	**ACREAGE PERMANENTLY IMPACTED (TABLE 1)[1]**		**2018 FEE PER ACRE (SUBJECT TO CHANGE)[2]**		
Riparian woodland / scrub		x	$78,682.52	=	$0.00
Perennial Wetland		x	$107,670.82	=	$0.00
Seasonal Wetland		x	$233,286.78	=	$0.00
Alkali Wetland		x	$220,863.22	=	$0.00
Ponds		x	$117,333.59	=	$0.00
Aquatic (open water)		x	$59,356.99	=	$0.00
Slough / Channel		x	$133,898.33	=	$0.00
STREAMS	**LINEAR FEET PERMANENTLY IMPACTED (TABLE 1)**		**2018 FEE PER LINEAR FT (SUBJECT TO CHANGE)[2]**		
Streams 25 feet wide or less		x	$641.48	=	$0.00
Streams greater than 25 feet wide		x	$966.28	=	$0.00
			Wetland Mitigation Fee Total	=	**$0.00**

FEE REDUCTION[3]		
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		$283,983.75
Wetland Mitigation Fee Total	+	$0.00
Fee Subtotal	=	**$283,983.75**
Contribution to Recovery	+	
TOTAL AMOUNT TO BE PAID	=	**$283,983.75**

[1] City/County planning staff will consult the land cover map in the Final HCP/NCCP and will reduce the acreage subject to the Development Fee by the acreage of the subject property that was identified in the Final HCP/NCCP as urban, turf, landfill or aqueduct land cover.

[2] Development Fees are adjusted annually 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. The Conservancy conducted the 2013 periodic fee audit required by the HCP/NCCP. Action by the County and participating cities is pending, which could result in adjustments to some or all fees in 2018.

[3] Fee reductions must be reviewed and approved by the Conservancy.

ATTACHMENT E: WETLAND DELINEATION (if applicable)

To be provided to City of Clayton upon completion of wetland delineation.

BIOLOGICAL RESOURCES ASSESSMENT FOR THE

OAK CREEK CANYON RESIDENTIAL DEVELOPMENT

CONTRA COSTA COUNTY, CALIFORNIA

Prepared for:

Discovery Builders, Inc.
4061 Port Chicago Highway, Suite H
Concord, CA 94520

Prepared by:

Swaim Biological Incorporated
4435 First St. PMB 312
Livermore, CA 94551

SBI
Swaim Biological Inc.

May 2018

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Figures

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Attachments

Abbreviations Used

CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
ECCHCP/NCCP	East Contra Costa County Habitat Conservation Plan/Natural Communities Conservation Plan
FESA	Federal Endangered Species Act
MBTA	Migratory Bird Treaty Act
USFWS	United States Fish and Wildlife Service
WBWG	Western Bat Working Group

1.0 Introduction

The following biological resources assessment report describes a detailed assessment of potential sensitive natural resources located within and/or immediately adjacent to the Liberty Residential Development Project Site (Project Site). This assessment includes a literature review, site reconnaissance characterizing existing conditions, impact analysis and development of proposed mitigation measures.

2.0 Project Location

The 9.03 acre Project Site is located on Marsh Creek Road in Clayton, CA (Figure 1). The project will occur on a portion of parcel 119-070-008. The Project Site is bounded by annual grassland to the north and east. Contra Costa Water District owns 1.68 acres adjacent to the project site and maintains an access easement through the parcel. Marsh Creek Road serves as the southwestern boundary. The Project Site is located within the East Contra Costa Habitat Conservation Plan/Natural Communities Conservation Plan (ECCHCP/NCCP) Development Fee Zone 2 and a Planning Survey Report and Application was completed for the Project to meet compliance with the HCP/NCCP.

3.0 Methods

The analysis presented in this report included a review of existing information regarding biological resource conditions known to occur in the project region followed by field surveys to evaluate conditions at the Project Site.

3.1 Literature Review and Database Queries

Existing biological resource conditions within and adjacent to the Project Site were investigated prior to conducting field surveys. A query of federally listed wildlife species for the Project Site, was obtained from the USFWS's Sacramento Endangered Species Office IPac website. The list generated is provided in Appendix B. Additional information about the locations of known occurrences of sensitive species in the vicinity of the Project Site was compiled from the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) within 5 miles of the Project Site and by searching within the six U.S. Geological Survey 7.5-minute quadrangles that surround the Project Site (Appendix C, Figure 3, Table 1). The California Rare Plant Inventory was searched for special status plant species within the six U.S. Geological Survey 7.5-minute quadrangles that surround the Project Site (Appendix D, Figure 4, Table 1).

3.2 Field Surveys

Visual reconnaissance surveys of the project area were conducted by biologist Leslie Koenig on October 5, 2017 and May 9, 2018. During the field survey the biologist walked the entire Project Site in meandering transects to evaluate biological resource conditions at the site.

3.3 Species Considered for Analysis

The potential for wildlife species to occur within the assessment area was classified as high, moderate, low, or absent using the guidelines described below. Table 1 includes descriptions of the special status wildlife species that were identified through research and database queries along with their potential to occur in the assessment area.

High: The potential for a species to occur was considered high when the project was located within the range of the species, recorded observations were identified within normal movement distance of the project, and suitable habitat was present within the project area.

Moderate: The potential for a species to occur was considered moderate when the project was located within the range of the species, recorded observations were identified nearby but outside normal movement distance of the project, and habitat within the project area was suitable. Alternatively, the potential was classified as moderate when recorded observations were identified within normal movement distance of the project but habitat in the project area was limited or of marginal quality.

Low: The potential for a species to occur was considered low when the project was within the range of the species, but no recorded observations within normal movement distance were identified, and habitat within the project area was limited or of marginal quality. Alternatively, the potential was classified as low when the project was located at the edge of the range of a species and recorded observations were extremely rare, but habitat in the project area was suitable.

4.0 Existing Environmental Setting

4.1 Vegetation Communities and Plant Species Observed

The Project Site is characterized as mixed disturbed ruderal and annual grassland habitats. The field survey determined the Project Site contains 6.57 acres of annual grassland land cover and 2.46 acres of ruderal land cover (Figure 2). The survey determined the lower portion of the Project Site recently disked. As a result of the disking, no ground cover was present on that portion of the site during the field survey. On the upper portion of the Project Site annual grassland habitat was present including wild oat (*Avena fatua*) and ripgut brome (*Bromus diandrus*) mixed with non-native plants including yellow star thistle (*Centaurea solstitialis*) and purple star thistle (*Centaurea calcitrapa*).

Two black locust trees (*Robinia pseudoacacia*) and one Mexican fan palm tree (*Washingtonia robusta*) are present on the Project Site. There are three additional black locust trees on the parcel adjacent to Marsh Creek Road. The Contra Costa Water District Property has many trees and shrubs surrounding the perimeter including *Eucalyptus* sp, pine trees (*Pinus* sp.), and Peruvian pepper trees (*Schinus molle*). On the northern most border of the parcel are several oak trees (*Quercus* sp.) and mixed oaks are present on the neighboring parcel.

4.2 Jurisdictional Wetland Resources

No wetlands regulated by the US Army Corps of Engineers or the Regional Water Quality Board were observed within the Project Site during surveys. There is an unnamed, historical, ephemeral drainage to the east (Figure 2). The jurisdictional nature of this unnamed drainage will be confirmed through consultation with the resource agencies.

4.2 General Wildlife Species Observed

General wildlife species documented during the assessment include many bird species as detailed in Table 1 below. California ground squirrel (*Otospermophilus beecheyi*) burrows and evidence of pocket gophers (*Thomomys bottae*) were also observed on the Project Site. No other wildlife were observed during surveys.

Table 1. Bird Species Observed during Field Survey

Common Name	Scientific Name
California scrub jay	*Aphelocoma californica*
oak titmouse	*Baeolophus inornatus*
red-tailed hawk	*Buteo jamaicensis*
Anna's hummingbird	*Calypte anna*
rock pigeon	*Columba livia*
house finch	*Haemorhous mexicanus*
acorn woodpecker	*Melanerpes formicivorus*
northern mockingbird	*Mimus polyglottos*
black capped chickadee	*Poecile atricapillus*
black phoebe	*Sayornis nigricans*
Say's phoebe	*Sayornis saya*
mourning dove	*Zenaida macroura*

5.0 Sensitive Biological Resources

The following discussion describes the sensitive biological resources that have the potential to be present within the Project Site based on the literature review results. Sensitive biological resources include habitats and/or individual plant and animal species that have special recognition by federal, state or local conservation agencies. For purposes of this analysis, special-status animal species are defined as animals that are protected under the California and Federal Endangered Species Acts (CESA and FESA) or other regulations, and species that are considered rare by the scientific community. Special-status plant species are defined as plants that are protected under the CESA and FESA or listed as rare by CDFW and the California Native Plant Society (CNPS). Special-status species include:

- Animals and plants listed or proposed for listing as threatened or endangered under the CESA (Fish and Game Code §2050 et seq.; 14 CCR §670.1et seq.) or the FESA (50 CFR 17.11);
- Animals and plants that are candidates for possible future listing as threatened or endangered under the FESA (50 CFR 17; FR Vol. 64, No. 205, pages 57533-57547, October 25, 1999); and under the CESA (California Fish and Game Code §2068);
- Animals that meet the definition of endangered, rare, or threatened under the California Environmental Quality Act (CEQA) (14 CCR §15380) that may include species not found on either State or Federal Endangered Species lists;
- Animals that are designated as "species of special concern" by CDFW (2016);
- Animal species that are designated as “fully protected” under California (Fish and Game Code 3511, 4700, 5050, and 5515).
- Animal species that are designated as “covered” species under the ECCHCP/NCCP

- Bat Species that are designated on the Western Bat Working Group's (WBWG) Regional Bat Species Priority Matrix as: "Red or High." These species are considered to be "imperiled or are at high risk of imperilment."
- Plants that are listed by CNPS Rare Plant Program as rank 1A – plants presumed extirpated in California and either rare or extinct elsewhere, 1B – plants rare, threatened or endangered in California or elsewhere, 2A – plants presumed extirpated in California but common elsewhere, 2B – plants rare, threatened or endangered in California by common elsewhere, 3 – plants about which more is needed and 4 – plants of limited distribution.
- Plants that are listed by the ECCHCP/NCCP as "covered" or "no take" species.

A total of 28 special status wildlife species and 54 special status plant species were identified through the literature review and database queries as having the potential to occur (Table 2, Figure 3 and 4). Of these, seven plant species and one wildlife species were determined to have a moderate potential to occur within the Project Site. Species with a moderate potential to occur are discussed in further detail below. The complete list of plant and wildlife species with the potential to occur within the assessment area are included in Table 2.

Special Status Wildlife

Western burrowing owl (*Athene cunicularia*)
State Species of Special Concern

The western burrowing owl is designated by CDFW as a Species of Special Concern. Burrowing owls are found in open arid and semiarid habitats with short or sparse vegetation, including grasslands, deserts, agricultural fields, ruderal areas and open, landscaped areas. They are dependent on mammals such as the California ground squirrel that dig underground burrows, which the owls occupy. Some burrowing owls have adapted to urban landscapes, and in some instances, open lots, roadsides, and landscaped areas can provide suitable habitat. Breeding typically occurs from March to August but can begin as early as February and can last into December.

The Project Site is located within the ECCHCP/NCCP modeled suitable habitat for the western burrowing owl. The two nearest CNDDB observations are both 4.8 miles away from 1989 and 1991. The project site contains a mix of annual grassland and disturbed grassland which provides potential suitable breeding and foraging habitat for the owl. California ground squirrel burrows were observed during surveys, however, no burrows of suitable size to support the species (four inches or greater in diameter) were observed during field surveys conducted on the parcel within 500 feet of the Project Site.

Nesting Birds
Protected under Migratory Bird Treaty Act

The three trees present on the property and on adjacent parcels could serve as nesting locations for common and sensitive passerine and raptor species if work occurs during the nesting season (February 1-August 31).

Special Status Plants

Large flowered fiddleneck (*Amsinckia grandiflora*)

Federally endangered, State Candidate Endangered, California Native Plant Society 1B.1, ECCHCP/NCCP No Take Species

Large flowered fiddleneck is an annual herb that generally blooms from April to May. The plant occurs in grasslands and on clay and loamy soils (USFWS 1997). It is a very rare plant with all known natural occurring populations extirpated in Contra Costa County.

The annual grassland present and mapped Capay clay and Los Osos clay-loam soil types (NRCS 2017) provide appropriate potential habitat for large flowered fiddleneck at the Project Site.

Big tarplant (*Blepharizonia plumose*)

California Native Plant Society 1B.1, ECCHCP/NCCP Covered Species.

Big tarplant is an herbaceous annual that grows to between 1 and 3 feet tall. Seedlings appear in early spring by the plants do not begin to bloom until mid-summer. The blooming period, during which the plants produce many heads with white flowers, general occurs between August and October. Big tarplant occurs in annual grassland on clay to clay-loam soils below 1,500 feet. In Contra Costa County, the occurrences are primarily on soils of the Altamont series (Jones and Stokes, 2007).

The Project Site is within ECCHCP/NCCP modeled suitable low potential habitat. The annual grassland present and mapped soil types provide appropriate potential habitat for big tarplant.

Round-leaved filaree (*California macrophylla)*

California Native Plant Society 1B.2, ECCHCP/NCCP Covered Species

Round-leaved filaree is an annual herb that generally blooms between March and May producing small (1 cm) white flowers. Round-leaved filaree occurs in grasslands on friable clay soils (CNPS 2017). It most often occurs in foothill locations at elevations between 200 and 2,000 feet, but is has been collected from locations as low as 30 feet and as high as 4,000 feet (Jones and Stokes, 2007).

The Project Site is within ECCHCP/NCCP modeled primary habitat. The annual grassland present and mapped clay soil types provide appropriate potential habitat for round-leaved filaree.

Mt. Diablo fairy lantern (*Calochortus pulchellus*)

California Native Plant Society 1B.2, ECCHCP/NCCP Covered Species

Mt. Diablo fairy lantern is a bulbiferous perennial herb that blooms from April through June (CNPS 2017). It grows on grassy slopes and openings in chaparral and oak woodland communities.

The Project Site is within ECCHCP/NCCP modeled suitable habitat. The annual grassland present and proximity to mixed oak woodland on neighboring parcels provides appropriate potential habitat for Mt. Diablo fairy lantern.

Diamond-petaled poppy (*Eschscholzia rhombipetala*)
California Native Plant Society 1B.1, ECCHCP/NCCP No Take Species

Diamond-petaled poppy is an annual herb that blooms from March to April. It is a very rare plant that is only known to occur in San Luis Obispo and Alameda Counties (USFWS 1998). The Project Site's annual grassland and mapped clay soil types provide appropriate potential habitat for diamond-petaled poppy.

Showy golden madia (*Madia radiata*)
California Native Plant Society 1B.1, ECCHCP/NCCP Covered Species

Showy golden madia is an annual herb that blooms from March to May. It grows in grasslands and oak woodlands on heavy clay soils (CNPS 2017). The Project Site is within ECCHCP/NCCP modeled primary habitat. The Project Site's annual grassland and mapped clay soil types provide appropriate potential habitat for showy golden madia.

6.0 Mitigation and Recommended Avoidance and Minimization Measures

Mitigation for impacts to special status plant and animal species is addressed through the ECCHCP/NCCP development fee for the project. Per the Planning Survey Report and Application completed for the project, a development fee will be paid to offset impacts to the loss of annual grassland and ruderal habitats associated with the development project.

The following measures are required by the ECCHCP/NCCP for projects to avoid and/or minimize the risk of potential impacts to listed species and their habitats. To comply with the ECCHCP/NCCP requirements, the federal Migratory Bird Treaty Act and to minimize impacts to special status species and jurisdictional waters, the following conservation measures for species listed above are recommended.

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.

Nesting Birds

If work is scheduled to take place between February 1 and August 31, a pre-construction nesting bird survey will be conducted by a qualified biologist within 14 days of construction, covering a radius of 250 feet for non-listed raptors and 100 feet for non-listed passerines at all locations. If an active bird nest is found within these buffers, species-specific measures shall be prepared by a qualified biologist and implemented to prevent abandonment of the active nest. At a minimum, grading in the vicinity of a nest shall be postponed until the young birds have fledged. If an active nest is present, a minimum exclusion buffer of 100 feet shall be maintained during construction, depending on the species and location. The perimeter of the nest setback zone shall be fenced or adequately demarcated with stakes and flagging at 20-foot intervals, and construction personnel and activities restricted from the area. A survey report by a qualified biologist verifying that no active nests are present, or that the young have fledged, shall be submitted prior to initiation of grading in the nest-setback zone. The qualified biologist shall serve as a biological monitor

during those periods when construction activities occur near active nest areas to ensure that no inadvertent impacts on these nests occur.

Special Status Plant Species

Surveys for rare plant species should be conducted using approved CDFW/USFWS methods during the appropriate season for identification of the species described above with moderate potential to occur at the Project Site.

If during surveys ECCHCP/NCCP covered or no take species are found, the location, extent and condition of all occurrences will be documented in a survey report and submitted to the City of Clayton. CNDDB California Native Species Field Survey Forms for all covered or no-take plants encountered on the site will also be completed and submitted to the City of Clayton and CNDDB.

Results of surveys will inform project design. In order to comply with the ECCHCP/NCCP, Project activities will avoid all impacts on extremely rare no take species and will implement plant salvage when impacted covered plant species are unavoidable. Conservation measures described in the ECCHCP/NCCP will be adhered to. If a rare plant is found that is not covered by the ECCHCP/NCCP, appropriate conservation measures similar to those required by the ECCHCP/NCCP will be developed on a plant by plant basis and in accordance with CDFW and CNPS.

Jurisdictional Waters

A verified wetland delineation following guidance provided by the U.S. Army Corps of Engineers, California Department of Fish and Wildlife, and Regional Water Quality Control Board, will need to be completed to confirm if there is a jurisdictional feature present on the property.

7.0 Conclusions

The results of this analysis indicate that based on field surveys and review of available scientific literature, the western burrowing owl (*Athene cunicularia*), nesting bird species and seven special status plant species: large flowered fiddleneck (*Amsinckia grandiflora*), big tarplant (*Blepharizonia plumose*), round-leaved filaree (*California macrophylla*), Mt. Diablo fairy lantern (*Calochortus pulchellus*), Diamond-petaled poppy (*Eschscholzia rhombipetala*), and Showy golden madia (*Madia radiata*) have the potential to occur within or immediately adjacent to the Project Site.

Impacts to western burrowing owls, nesting raptors and other birds can be avoided by conducting appropriately-timed preconstruction nesting surveys and implementing protection measures, if necessary. Rare plant surveys will be conducted during the appropriate bloom period for each plant and if rare plants are observed on the Project Site, appropriate design and conservation measures will be developed to address impacts on special status plant species. A verified wetland delineation will determine if there are jurisdictional waters present on site.

8.0 References

California Department of Fish and Wildlife (CDFW). 2017. California Natural Diversity Database query for the Tassajara, Diablo, Antioch South, and Clayton U.S. Geological Survey 7.5-minute quadrangles. October 2017.

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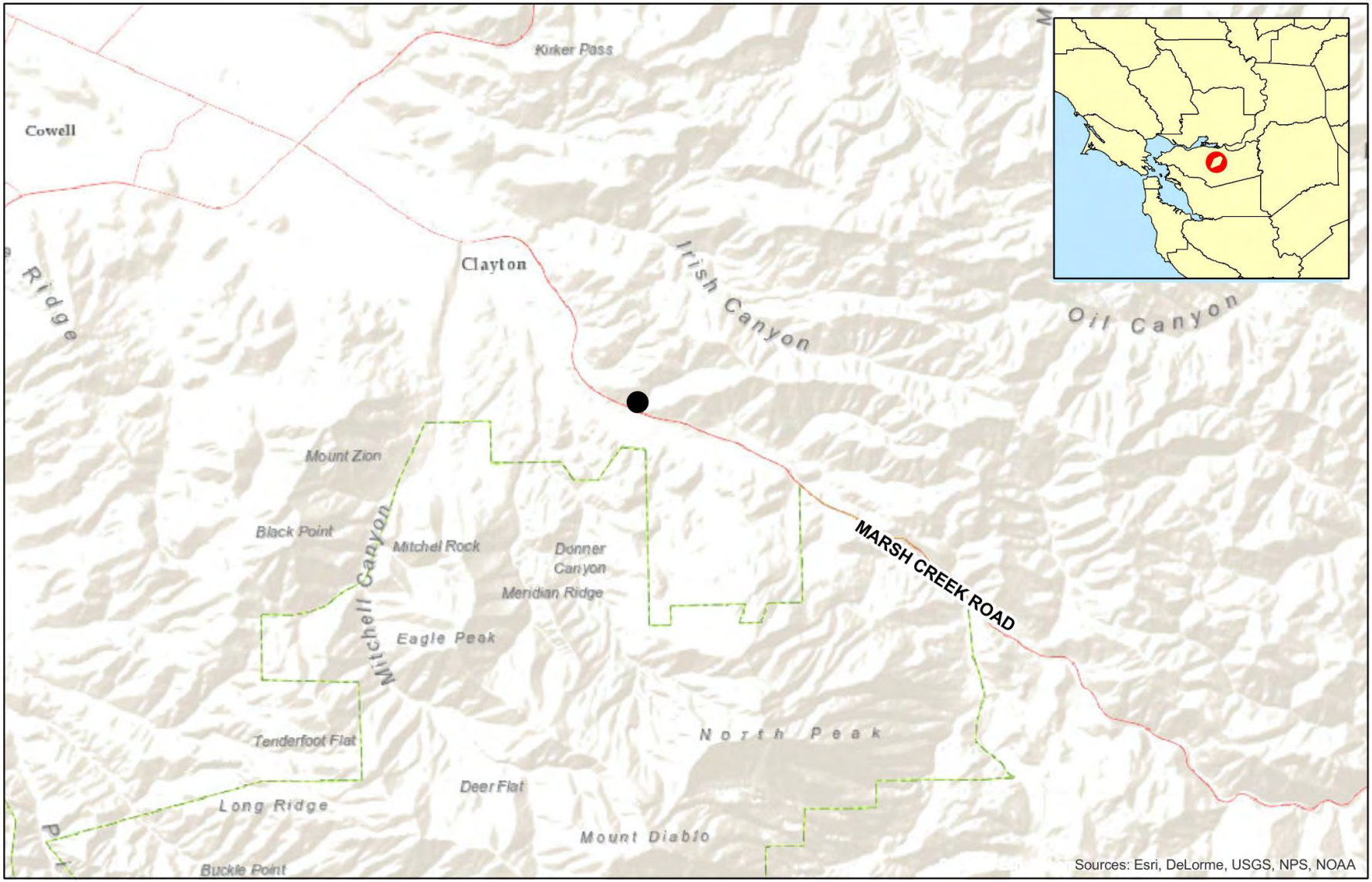
USFWS. 1997. Large-Flowered Fiddleneck (*Amsinckia grandiflora*) Recovery Plan. Region 1, Portland Oregon. https://ecos.fws.gov/docs/recovery_plan/970929a.pdf

USFWS. 1998. Recovery Plan for Upland Species of the San Joaquin Valley, California. Region 1, Portland Oregon. https://ecos.fws.gov/docs/recovery_plans/1998/980930a.pdf



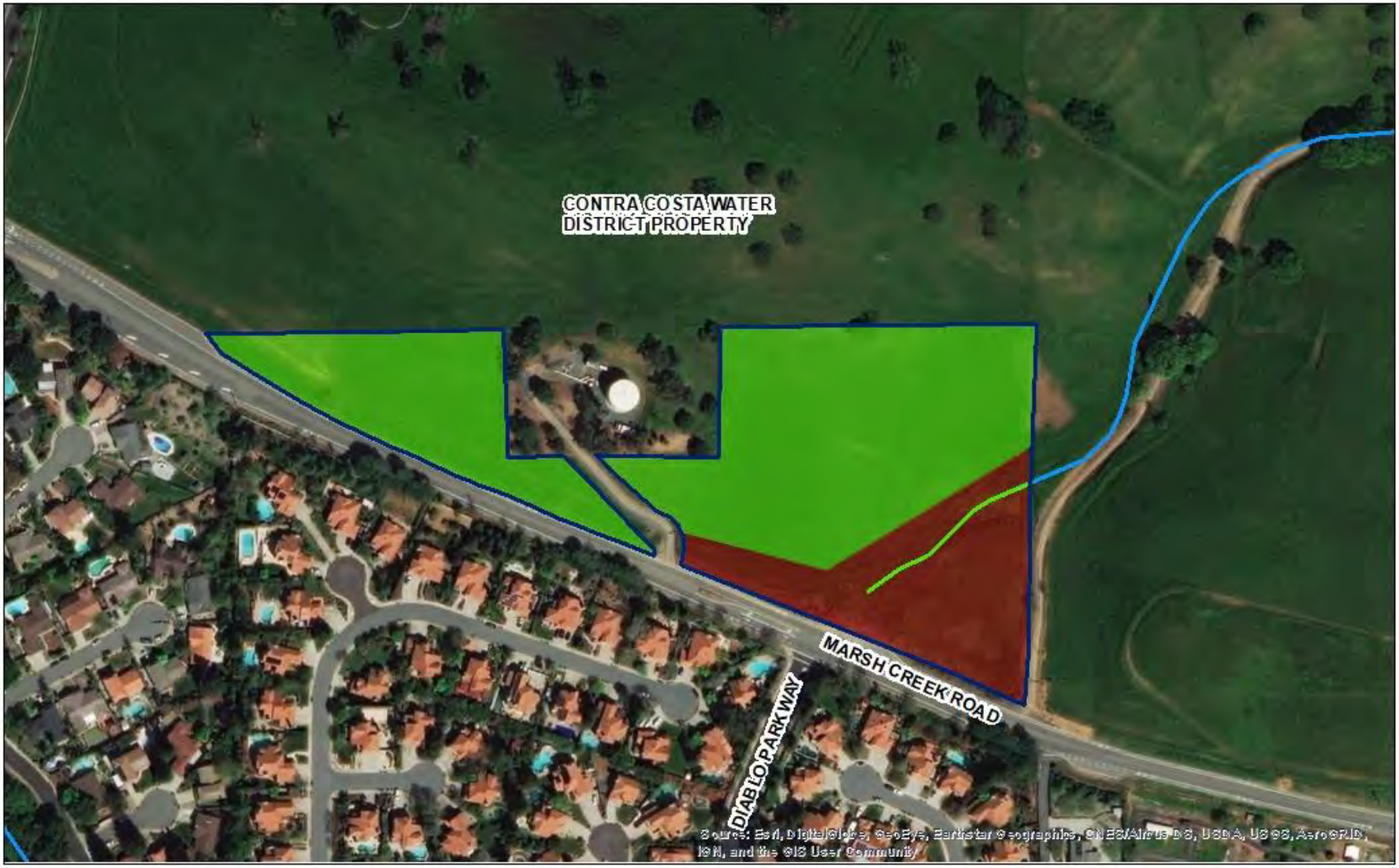
● Project Location

N

0 0.5 1 2 Miles

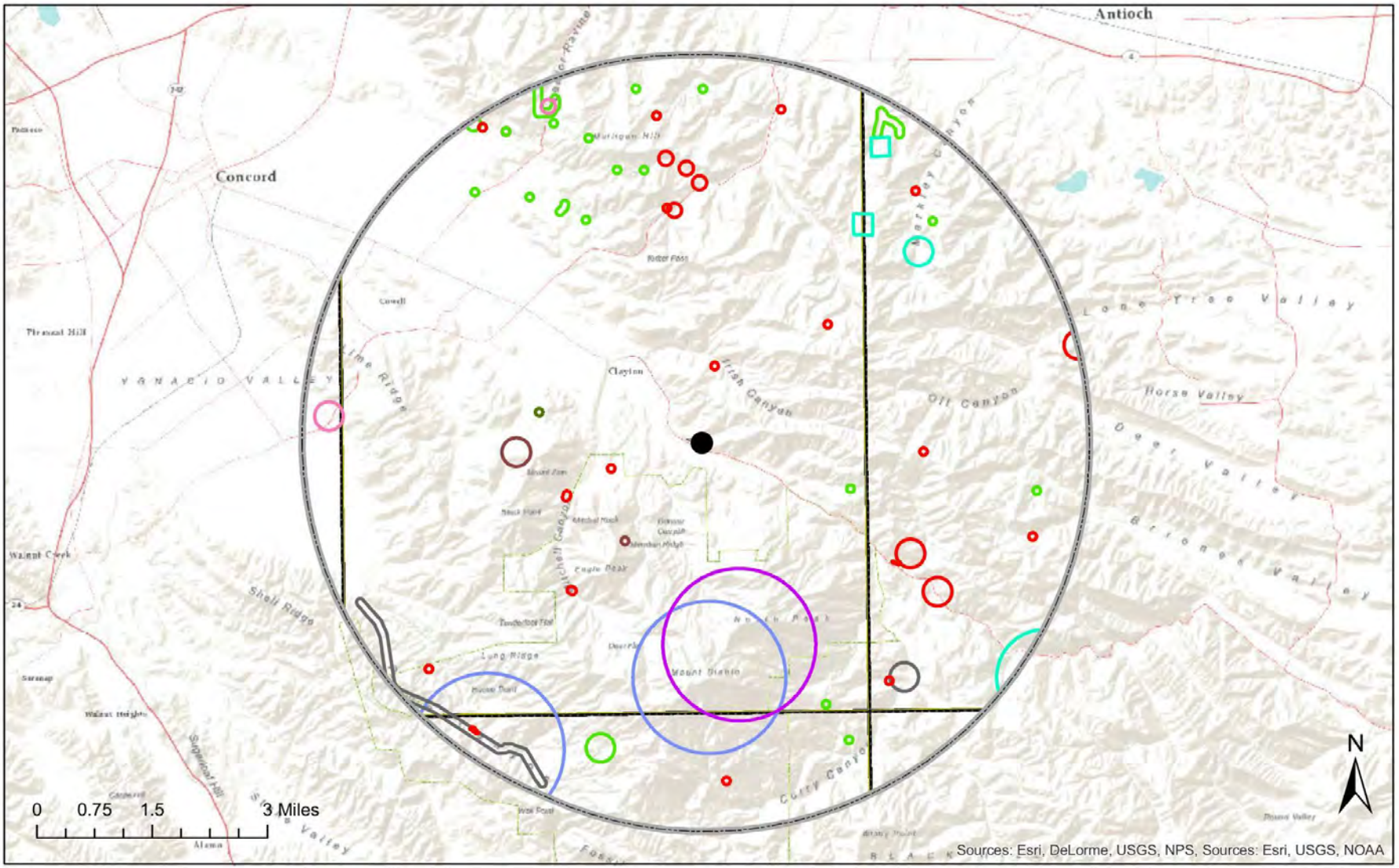
Oak Creek Canyon Residential Development
Figure 1. Proximity Map

SBI Swaim Biological Inc.



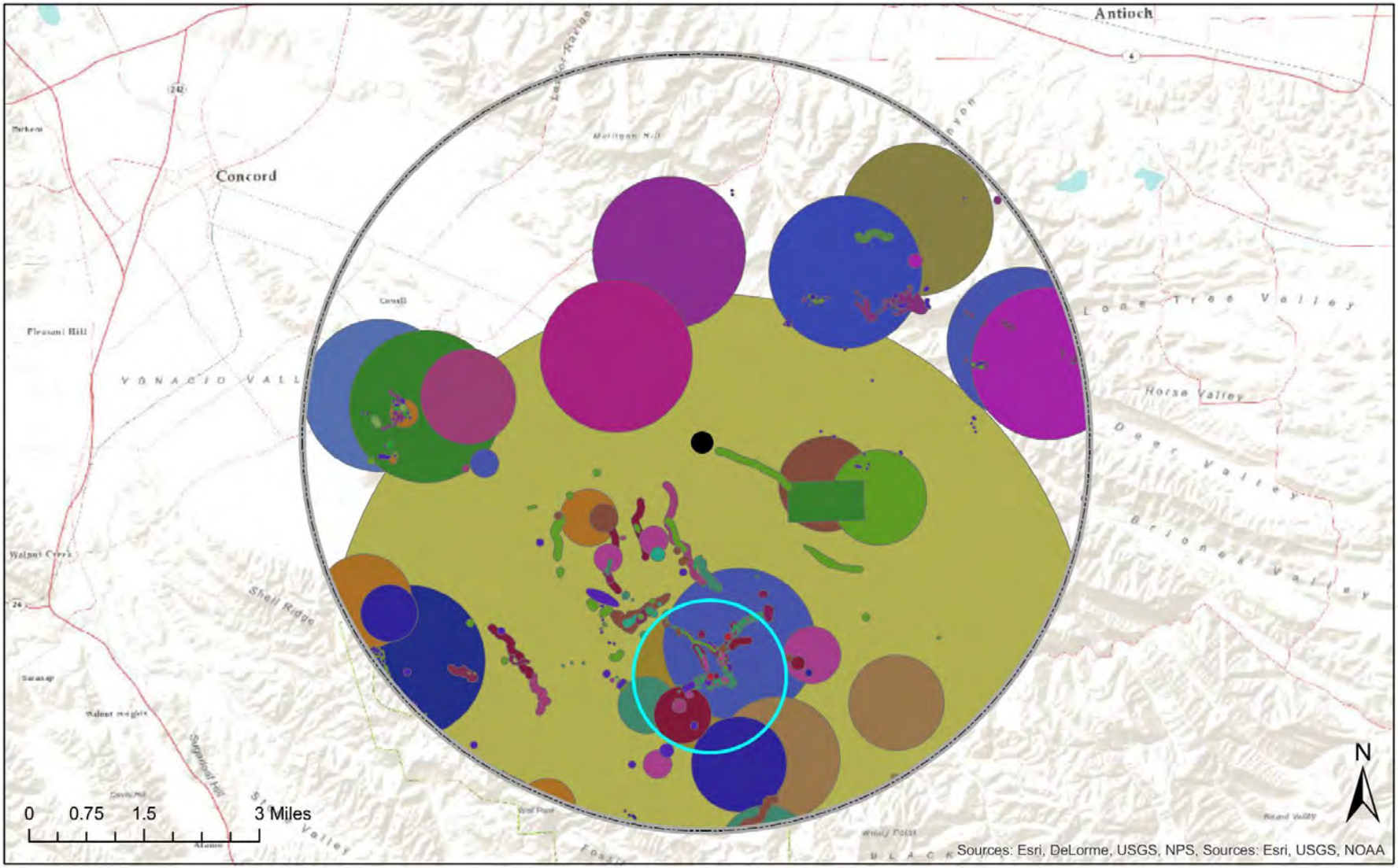
Oak Creek Canyon Residential Development
Figure 2. Land Cover and Jurisdictional Waters Map

SBI
Swaim Biological Inc.



Oak Creek Canyon Residential Development Figure 3. CNDDB Animal Records 5 miles

SBI Swaim Biological Inc.



- Project Location
- 5 Mile Buffer
- Antioch Dunes evening-primrose
- Brewer's western flax
- Contra Costa manzanita
- Diablo helianthella
- Hall's bush-mallow
- Hospital Canyon larkspur
- Jepson's coyote-thistle
- Lime Ridge eriastrum
- Lime Ridge navarretia
- Mt. Diablo bird's-beak
- Mt. Diablo buckwheat
- Mt. Diablo fairy-lantern
- Mt. Diablo jewelflower
- Mt. Diablo manzanita
- Mt. Diablo phacelia
- Toren's grimmia
- big tarplant
- caper-fruited tropidocarpum
- chaparral harebell
- chaparral ragwort
- coastal triquetrella
- large-flowered fiddleneck
- most beautiful jewelflower
- oval-leaved viburnum
- rock sanicle
- round-leaved filaree
- shining navarretia
- showy golden madia
- slender silver moss
- slender-leaved pondweed
- woodland woollythreads

Oak Creek Canyon Residential Development Figure 4. CNDDB Plant Records 5 miles

SBI Swaim Biological Inc.

Table 2. List of Species with Potential to Occur.

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Invertebrates							
Callophrys mossii bayensis	San Bruno elfin butterfly	FE				Occurs in coastal grassy mountainous areas near San Francisco Bay. Located on steep northfacing slopes above 500' elevation that contain populations of host plant; Sedum spathulifolium. Uses a variety of nectar plants occurring in upper elevation grasslands and scrub.	None. No habitat suitable to support this species is present.
Crustaceans							
Branchinecta lynchi	vernal pool fairy shrimp	FT				Vernal pools and ditches in the Central Valley.	None. No habitat suitable to support this species is present.
Lepidurus packardi	vernal pool tadpole shrimp	FE				Vernal pools and ditches in the Central Valley.	None. No habitat suitable to support this species is present.
Fishes							
Hypomesus transpacificus	Delta Smelt	FT	SE			Endemic to California; occurs only in the brackish and freshwaters of the Sacramento-San Joaquin River Delta. Exhibits seasonal migration within the estuary, moving upstream before spawning.	None. No habitat suitable to support this species is present.
Oncorhynchus mykiss irideus	Steelhead	FT				Anadromous. Tributary streams to Suisun Marsh including Suisun Creek; Green Valley Creek; and an unnamed tributary to Cordelia Slough (commonly referred to as Red Top Creek). Adults need access to natal streams; eggs and fry need cool water with adequate dissolved oxygen; clean gravel; juveniles migrate out to the ocean.	None. No habitat suitable to support this species is present.

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Amphibians							
Ambystoma californiense	California tiger salamander	FT	ST			Occurs in grassland or open woodland habitats, where it lives in vacant or mammal-occupied burrows, and occasionally in other underground retreats, throughout most of the year. Eggs are laid on submerged stems and leaves, usually in shallow ephemeral or semi permanent pools and ponds that fill during heavy winter rains, sometimes in permanent ponds	Low. Ground squirrel burrows present during survey. Project is within HCP modeled suitable upland habitat. Nearest potential breeding site within normal movement distances (up to 1.3 miles) is 0.5 miles away but Marsh Creek Road serves as a barrier. No suitable breeding habitat on site but site provides suitable upland habitat.
Rana boylii	foothill yellow-legged frog		SCT			Rocky streams and rivers with rocky substrate and open; sunny banks; in forests; chaparral; and woodlands.	Not Expected. No habitat suitable to support this species is present.
Rana draytonii	California red-legged frog	FT		SSC		Requires slow moving or still water for juvenile development. Occurs in freshwater marshes; stock ponds; and riparian habitats. May aestivate in rodent burrows or cracks during dry periods.	Low. Project is within HCP modeled suitable upland habitat. The unnamed stream that runs adjacent to the property is modeled as potential breeding habitat. No suitable breeding or moist refugia habitat on site.
Reptiles							
Anniella pulchra	Northern California legless lizard			SSC		Occurs in moist warm loose soil with plant cover. Occurs in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks.	Not Expected. No habitat suitable to support this species is present.

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Emys leucurus	western pond turtle			SSC		Marshes, streams, rivers, ponds, and lakes	Not Expected. No habitat suitable to support this species is present. Project is 0.25 miles from HCP modeled suitable core habitat, however Marsh Creek Road serves as a barrier and no breeding habitat or moist refugia habitat is present.
Masticophis lateralis euryxanthus	Alameda Whipsnake	FT	ST			Alameda whipsnakes are typically found in chaparral—northern coastal sage scrub and coastal sage. Rock outcrops are an important feature of Alameda whipsnake habitat because they provide retreat opportunities for whipsnakes and promote lizard populations.	Low. Project site is within HCP modeled suitable movement habitat and core habitat is 1 mile away.
Phrynosoma blainvillii	coast horned lizard			SSC		Inhabits open areas of sandy soil and low vegetation in valleys, foothills and semiarid mountains. Found in grasslands, coniferous forests, woodlands, and chaparral, with open areas and patches of loose soil. Often found in lowlands along sandy washes with scattered shrubs and along dirt roads, and frequently found near ant hills.	Not Expected. No habitat suitable to support this species is present.

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Thamnophis gigas	giant garter snake	FT	ST			Associated with aquatic habitats. Often occurs in or near agricultural wetlands and other waterways such as irrigation and drainage canals; sloughs; ponds; small lakes; low gradient streams; rice fields; freshwater marshes; and adjacent uplands in the Central Valley.	Not Expected. No habitat suitable to support this species is present.
Birds							
Agelaius tricolor	tricolored blackbird		SCE			Emergent wetlands; grasslands; and agricultural fields. Breeds near fresh water; preferably in emergent wetlands in cattails or tules; but also in thickets of willow; wild rose; blackberry; or tall herbaceous species.	Not Expected. No habitat suitable to support this species is present. Site is HCP modeled primary foraging habitat. No breeding habitat present on or adjacent to project site.
Aquila chrysaetos	golden eagle			FP		Open country; in prairies; tundra; open coniferous forest and barren areas; especially in hilly or mountainous regions. Typically nest on cliff ledges and in trees around large bodies of water.	Low. Suitable foraging habitat is present in and surrounding the Project Site. Site is HCP modeled suitable habitat. Potential nest trees can be found on surrounding parcel to the north.

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Athene cunicularia	western burrowing owl			SSC		Open, dry annual or perennial grasslands with low-growing vegetation and on the margins of disturbed/developed habitats. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Moderate. Suitable foraging habitat is present. Site is within HCP modeled suitable habitat. Active ground squirrel burrows were observed during surveys. A portion of the site is regularly disked for fire control so habitat potential is limited to the annual grassland on and adjacent to the project site.
Buteo swainsoni	Swainson's hawk		ST			Nests in scattered trees or along riparian systems adjacent to agricultural fields or pastures; which are their primary foraging areas. Preferred nest trees are valley oak; cottonwood; willow; sycamore; and walnut.	Not Expected. No habitat suitable to support this species is present.
Circus cyaneus	northern harrier			SSC		Sloughs; wet meadows; marshlands; swamps; prairies; plains; grasslands; and shrublands; large forest openings; open; low woody or herbaceous vegetation for nesting and hunting; nest on ground.	Low. Suitable foraging habitat is present in the Project Site and surrounding grasslands. Nesting habitat is not present.
Elanus leucurus	white-tailed kite			FP		Open grasslands; meadows; or marshes for foraging close to isolated; dense topped trees for nesting and perching.	Low. Suitable foraging habitat is present in and surrounding the Project Site. Potential nest trees can be found on surrounding parcels to the north, east and west.

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Falco peregrinus	peregrine falcon			FP		Can be found foraging in any open habitat, but with a greater likelihood along barrier islands, mudflats, coastlines, lake edges, and mountain chains. Require open landscapes with cliffs (or skyscrapers) for nest sites.	Low. Suitable foraging habitat is present in the Project Site and surrounding grasslands. Nesting habitat is not present.
Rallus obsoletus	Ridgway's rail (formerly California clapper rail)	FE	SE			Salt-water and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay.	Not Expected. No habitat suitable to support this species is present.
Sterna antillarum browni	California least tern	FE	SE	FP		Abandoned salt ponds and along estuarine shores in San Francisco Bay. Feeds primarily in shallow estuaries or lagoons where small fish are abundant. Nests on barren to sparsely vegetated site near water; usually on sandy or gravelly substrate.	Not Expected. No habitat suitable to support this species is present.
Mammals							
Antrozous pallidus	pallid bat			SSC		Mostly found in desert habitat. Favors rocky outcroppings for roosting, but have been recorded in open farmland, rock piles, mines, hollow trees, and buildings.	Low. No suitable roosting habitat available. Limited foraging habitat.
Corynorhinus townsendii	Townsend's big-eared bat			SSC		Hibernates in caves, lava tubes, and mines. May form large maternal colonies.	Low. No suitable roosting habitat available. Limited foraging habitat.
Lasiurus blossevillii	western red bat			SSC		Riparian areas dominated by walnuts, oaks, willows, cottonwoods, and sycamores. Only roost in tree foliage.	Low. Nearest riparian area is approximately 0.5 mile away. No suitable roosting habitat available. Limited foraging habitat

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat			SSC		Chaparral, oak woodlands. Frequently build houses in poison oak understory.	Not Expected. No habitat suitable to support this species is present. No woodrat houses observed
Taxidea taxus	American badger			SSC		Open grasslands, desert scrub, brushy areas	Low. Suitable habitat is present but no burrows of the appropriate size for denning were observed during surveys.
Vulpes macrotis mutica	San Joaquin kit fox	FE	ST			desert scrub, chaparral, and grasslands	Low. Suitable habitat is present but no burrows of the appropriate size for denning were observed during surveys.
Plants							
Amsinckia grandiflora	large-flowered fiddleneck	FE	SE		1B.1	Cismontane woodland, Valley and foothill grassland	Moderate. Suitable annual grassland habitat with clay soils is present.
Androsace elongata ssp. acuta	California androsace				4.2	Chaparral, Foothill Woodland, Northern Coastal Scrub, Coastal Sage Scrub	Not Expected. No habitat suitable to support this species is present.
Anomobryum julaceum	slender silver moss				4.2	Damp rock and soil outcrops. Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest	Not Expected. No habitat suitable to support this species is present.
Arabis blepharophylla	coast rockcress				4.3	Broadleafed upland forest, Coastal bluff scrub, Coastal prairie, Coastal scrub	Not Expected. No habitat suitable to support this species is present.
Arctostaphylos auriculata	Mt. Diablo manzanita				1B.3	Chaparral (sandstone), Cismontane woodland	Not Expected. No habitat suitable to support this species is present.

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Arctostaphylos manzanita ssp. laevigata	Contra Costa manzanita				1B.2	Chaparral (rocky)	Not Expected. No habitat suitable to support this species is present.
Atriplex cordulata var. cordulata	heartscale				1B.2	Saline or alkaline. Chenopod scrub, Meadows and seeps, Valley and foothill grassland (sandy)	Not Expected. No saline or sandy soils suitable to support this species is present.
Atriplex coronata var. coronata	crownscale				4.2	Alkaline, often clay. Chenopod scrub, Valley and foothill grassland, Vernal pools	Low. Annual grassland and clay soils present however alkaline soils, and wet grassland/vernal habitat were not observed.
Atriplex depressa	brittlescale				1B.2	Alkaline, clay. Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland, Vernal pools	Low. Annual grassland and clay soils present however alkaline soils, and wet grassland/vernal habitat were not observed.
Blepharizonia plumosa	big tarplant				1B.1	Usually clay. Valley and foothill grassland	Moderate. Suitable annual grassland habitat with clay soils is present.
Calandrinia breweri	Brewer's calandrinia				4.2	Chaparral, Coastal scrub	Not Expected. No habitat suitable to support this species is present.
California macrophylla	round-leaved filaree				1B.2	Cismontane woodland, Valley and foothill grassland	Moderate. Suitable annual grassland habitat with clay soils is present.
Calochortus pulchellus	Mt. Diablo fairy-lantern				1B.2	Chaparral, Cismontane woodland, Riparian woodland, Valley and foothill grassland	Moderate. Suitable annual grassland habitat with clay soils is present.
Calochortus umbellatus	Oakland star-tulip				4.2	Strong serpentinite affinity, Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland	Low. Annual grassland present but no serpentinite habitat was observed.

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Campanula exigua	chaparral harebell				1B.2	Chaparral (rocky, usually serpentinite)	Not Expected. No habitat suitable to support this species is present.
Centromadia parryi ssp. congdonii	Congdon's tarplant				1B.1	Valley and foothill grassland (alkaline)	Low. Annual grassland is present however alkaline soils were not observed on site.
Collomia diversifolia	serpentine collomia				4.3	Chaparral, Cismontane woodland	Not Expected. No habitat suitable to support this species is present.
Convolvulus simulans	small-flowered morning-glory				4.2	Clay, serpentinite seeps. Chaparral (openings), Coastal scrub, Valley and foothill grassland	Not Expected. No serpentinite habitat or seeps suitable to support this species was observed.
Cordylanthus nidularius	Mt. Diablo bird's-beak		SR		1B.1	Chaparral (serpentinite)	Not Expected. No habitat suitable to support this species is present.
Cryptantha hooveri	Hoover's cryptantha				1A	Inland dunes, Valley and foothill grassland (sandy)	Not Expected. No sanding habitat suitable to support this species is present.
Delphinium californicum ssp. interius	Hospital Canyon larkspur				1B.2	Chaparral (openings), Cismontane woodland (mesic), Coastal scrub	Not Expected. No habitat suitable to support this species is present.
Dirca occidentalis	western leatherwood				1B.2	Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Cismontane woodland, North Coast coniferous forest, Riparian forest, Riparian woodland	Not Expected. No habitat suitable to support this species is present.
Eriastrum ertterae	Lime Ridge eriastrum				1B.1	Chaparral (openings or edges)	Not Expected. No habitat suitable to support this species is present.

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Eriogonum truncatum	Mt. Diablo buckwheat				1B.1	Chaparral, Coastal scrub, Valley and foothill grassland, sandy	Low. Annual grassland is present however sandy habitats were not observed on site.
Eriophyllum jepsonii	Jepson's woolly sunflower				4.3	Chaparral, Cismontane woodland, Coastal scrub	Not Expected. No habitat suitable to support this species is present.
Eryngium jepsonii	Jepson's coyote thistle				1B.2	Clay, Valley and foothill grassland, Vernal pools	Low. Clay soils and grassland are present however wet grassland/vernal habitats were not observed on site.
Eschscholzia rhombipetala	diamond-petaled California poppy				1B.1	Valley and foothill grassland (clay)	Moderate. Suitable annual grassland habitat with clay soils is present.
Extriplex joaquinana	San Joaquin spearscale				1B.2	Alkaline. Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland	Low. Annual grassland present but alkaline habtiat and wet grassland supporting seeps were not observed.
Fritillaria agrestis	stinkbells				4.2	Chaparral, Valley Grassland, Foothill Woodland, wetland-riparian. Strong affinity to serpentine soil.	Low. Annual grassland present but no serpentinite habitat was observed.
Fritillaria liliacea	fragrant fritillary				1B.2	Often serpentinite. Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland	Low. Annual grassland present but no serpentinite habitat was observed.
Galium andrewsii ssp. gatense	phlox-leaf serpentine bedstraw				4.2	Chaparral, Cismontane woodland, Lower montane coniferous forest	Not Expected. No habitat suitable to support this species is present.
Grimmia torenii	Toren's grimmia				1B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest	Not Expected. No habitat suitable to support this species is present.

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Helianthella castanea	Diablo helianthella				1B.2	Usually rocky, anoxal soils. Broadleafed upland forest, Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland, Valley and foothill grassland	Low. Annual grassland present but rocky, anoxal soils were not observed.
Hesperolinon breweri	Brewer's western flax				1B.2	Usually serpentinite. Chaparral, Cismontane woodland, Valley and foothill grassland	Low. Annual grassland present but no serpentinite habitat was observed.
Lasthenia conjugens	Contra Costa goldfields	FE			1B.1	Mesic. Cismontane woodland, Playas (alkaline), Valley and foothill grassland, Vernal pools	Low. Annual grassland present however wet grassland/vernal habitat were not observed.
Madia radiata	showy golden madia				1B.1	Cismontane woodland, Valley and foothill grassland	Moderate. Suitable annual grassland habitat with clay soils is present.
Malacothamnus hallii	Hall's bush-mallow				1B.2	Chaparral, Coastal scrub	Not Expected. No habitat suitable to support this species is present.
Monardella antonina ssp. antonina	San Antonio Hills monardella				3	Chaparral, Cismontane woodland	Not Expected. No habitat suitable to support this species is present.
Monolopia gracilens	woodland woolythreads				1B.2	Serpetinite. Broadleafed upland forest (openings), Chaparral (openings), Cismontane woodland, North Coast coniferous forest (openings), Valley and foothill grassland	Low. Annual grassland present but no serpentinite habitat was observed.
Navarretia gowenii	Lime Ridge navarretia				1B.1	Chaparral	Not Expected. No habitat suitable to support this species is present.
Navarretia heterandra	Tehama navarretia				4.3	Valley and foothill grassland (mesic), Vernal pools	Low. Annual grassland present however wet grassland/vernal habitat were not observed.

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Navarretia nigelliformis ssp. nigelliformis	adobe navarretia				4.2	Valley and foothill grassland vernally mesic, Vernal pools sometimes	Low. Annual grassland present however wet grassland/vernal habitat were not observed.
Navarretia nigelliformis ssp. radians	shining navarretia				1B.2	Cismontane woodland, Valley and foothill grassland, Vernal pools	Low. Annual grassland present however wet grassland/vernal habitat were not observed.
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	FE	FE		1B.1	Inland dunes	Not Expected. No habitat suitable to support this species is present.
Phacelia phacelioides	Mt. Diablo phacelia				1B.2	Chaparral, Cismontane woodland	Not Expected. No habitat suitable to support this species is present.
Ranunculus lobbii	Lobb's aquatic buttercup				4.2	Mesic. Cismontane woodland, North Coast coniferous forest, Valley and foothill grassland, Vernal pools	Low. Annual grassland present however wet grassland/vernal habitat were not observed.
Sanicula saxatilis	rock sanicle		SR		1B.2	Rocky, talus. Broadleafed upland forest, Chaparral, Valley and foothill grassland	Low. Annual grassland present however rocky/talus habitat was not observed.
Senecio aphanactis	chaparral ragwort				2B.2	Chaparral, Cismontane woodland, Coastal scrub	Not Expected. No habitat suitable to support this species is present.
Streptanthus albidus ssp. peramoenus	most beautiful jewelflower				1B.2	Serpentinite. Chaparral, Cismontane woodland, Valley and foothill grassland	Low. Annual grassland present however serpetinite habitat was not observed.
Streptanthus hispidus	Mt. Diablo jewelflower				1B.3	Rocky. Chaparral, Valley and foothill grassland	Low. Annual grassland present however rocky/chaparral habitat was not observed.

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Stuckenia filiformis ssp. alpina	slender-leaved pondweed				2B.2	Marshes and swamps (assorted shallow freshwater)	Not Expected. No habitat suitable to support this species is present.
Triquetrella californica	coastal triquetrella				1B.2	Coastal bluff scrub, Coastal scrub	Not Expected. No habitat suitable to support this species is present.
Tropidocarpum capparideum	caper-fruited tropidocarpum				1B.1	Valley and foothill grassland (alkaline hills)	Low. Alkaline grassland not observed during surveys.
Viburnum ellipticum	oval-leaved viburnum				2B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest	Not Expected. No habitat suitable to support this species is present.

*Status:
Federal Endangered Species Act (FESA) Designations: (FE) Federally Endangered, (FT) Federally Threatened, (FPE) Federally Proposed for listing as Endangered, (FPT) Federally Proposed for listing as Threatened, (FPD) Federally proposed for delisting, (FC) Federal candidate species
California Endangered Species Act (CESA) Designations: (SE) State Endangered, (ST) State Threatened, (SCE) Candidate Endangered, (SCT) Candidate Threatened, (SR) State Rare.
California Department of Fish and Wildlife (CDFW) Designations:(SSC) Species of Special Concern, (FP) Fully Protected Species
California Native Plant Society (CNPS) Rare Plant Rank: (1A) Presumed extinct in California; (1B) Rare, threatened, or endangered in California and elsewhere; (2) Rare, threatened, or endangered in California, but more common elsewhere; (3) More information is needed; (4) Limited distribution, watch list
Threat Rank: 0.1 Seriously threatened in California (more than 80% of occurrences threatened / high degree and immediacy of threat); 0.2 Fairly threatened in California (20 to 80% occurrences threatened/moderate degree and immediacy of threat); 0.3 Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

**Species list developed from CNDDB Records, IPaC species list and CNPS Rare Plant Inventory. All sources accessed October 2017.

ATTACHMENT A. Representative Photographs of the Oak Creek Canyon Project Site

Photo 1. Project Site looking south towards Marsh Creek Road showing mixed annual grassland and ruderal land covers. Red line shows the approximate parcel boundary to the east and south.

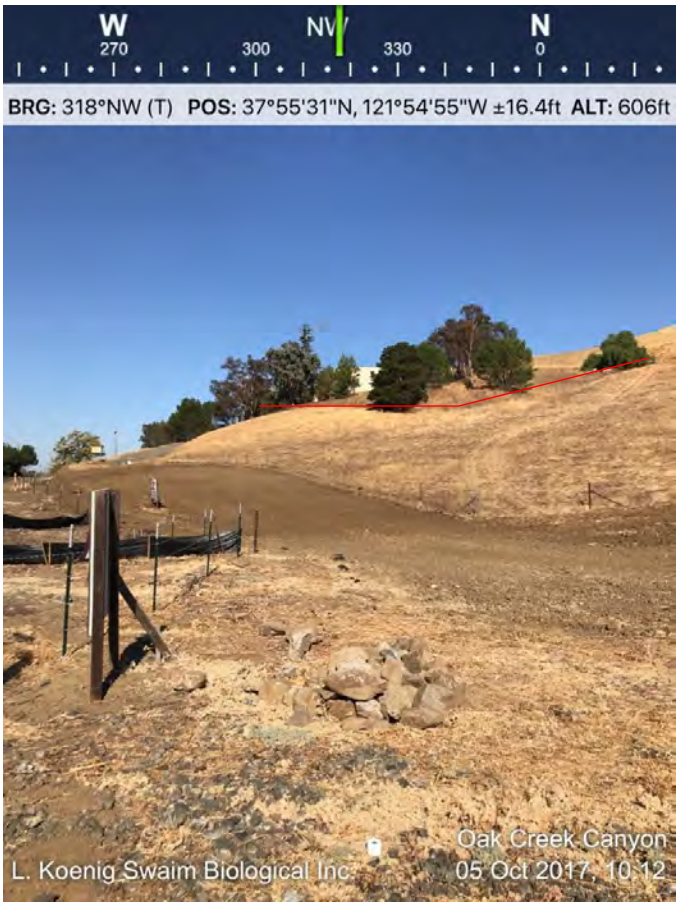


Photo 2. Looking northwest towards Contra Costa Water District property. Showing mixed annual grassland and ruderal land covers. Red line shows approximate parcel boundary, fenceline on lower left is southern parcel boundary.

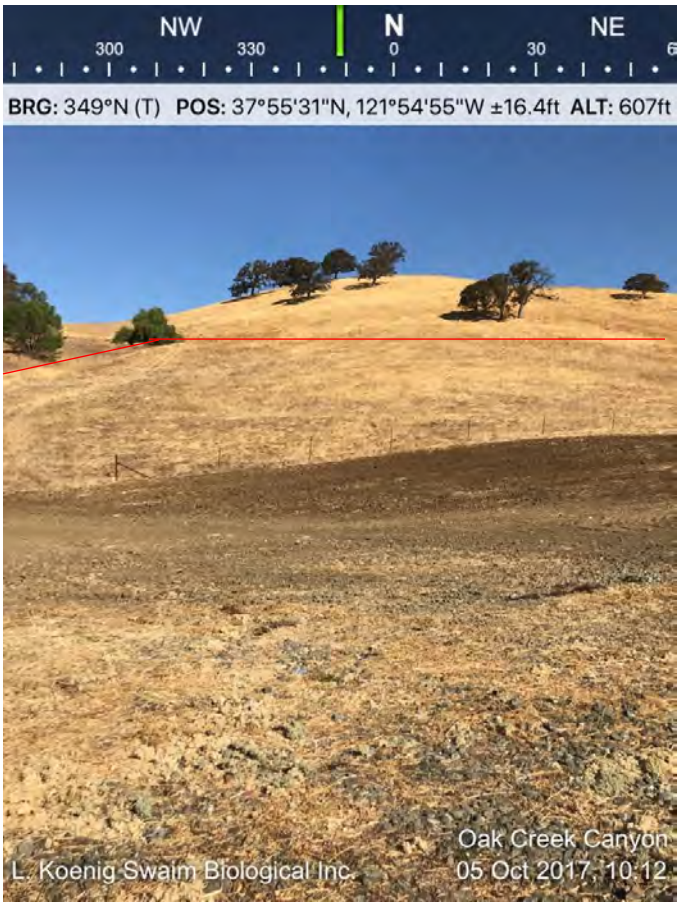


Photo 3: Showing ruderal, annual grassland. Oaks are on adjacent parcel to north. Red line shows approximate parcel boundary.

Photo 4: Project Site looking east with Marsh Creek Road on the right, showing ruderal and annual grassland land cover. Red line shows the approximate parcel boundary to the east and south.

Photo 5. Ground squirrel burrows

Photo 6. Gopher activity

Photo 6: Black locust on west end of property, adjacent to Marsh Creek Road and parcel boundary

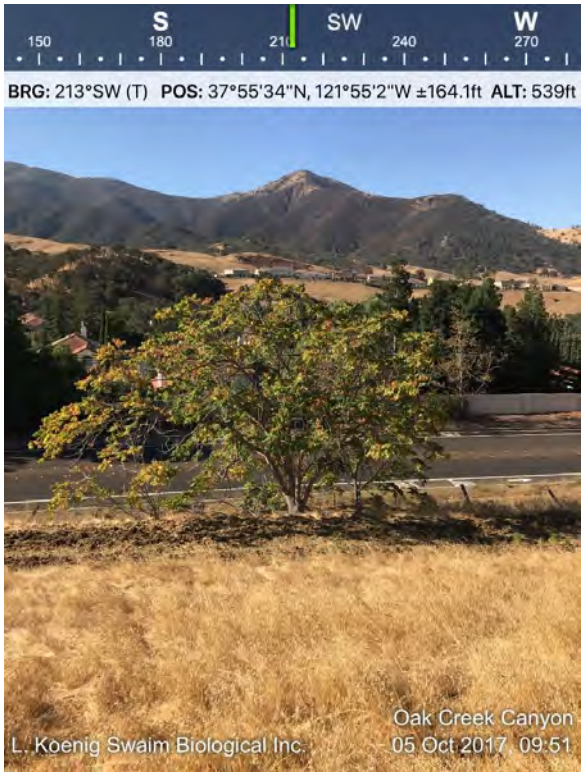


Photo 7: Black locust on west end of property, adjacent to Marsh Creek Road and parcel boundary.

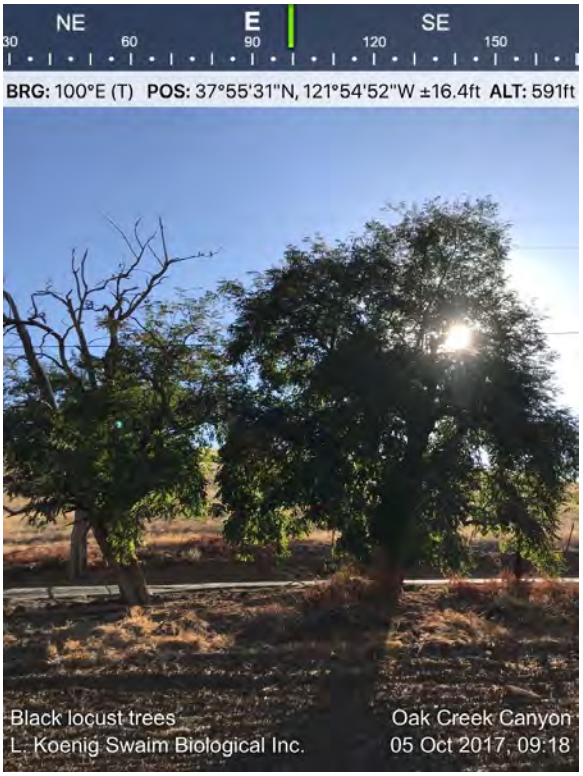


Photo 8: Black locusts on other side of the fenceline that serves as the approximate parcel boundary.

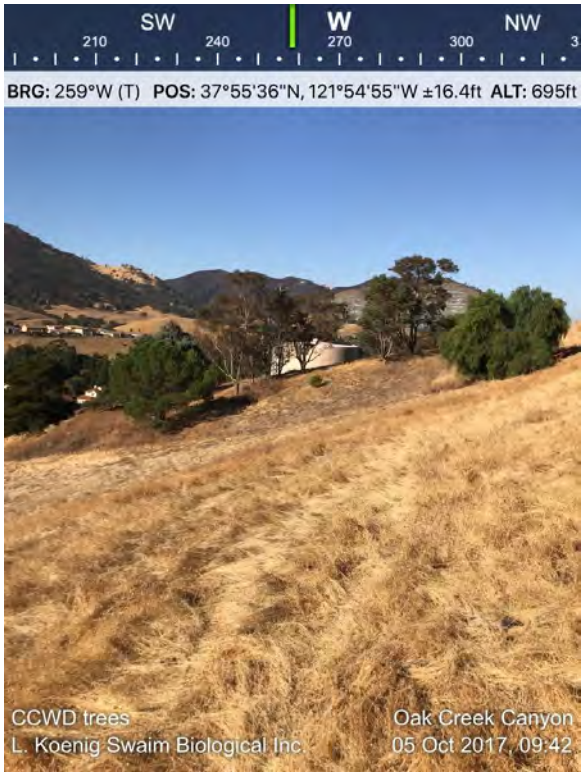


Photo 9: Trees on Contra Costa Water District Property

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Contra Costa County, California

Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
San Joaquin Kit Fox Vulpes macrotis mutica No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2873	Endangered

Birds

NAME	STATUS
California Clapper Rail Rallus longirostris obsoletus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4240	Endangered
California Least Tern Sterna antillarum browni No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8104	Endangered

Reptiles

NAME	STATUS
Alameda Whipsnake (=striped Racer) Masticophis lateralis euryxanthus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5524	Threatened
Giant Garter Snake Thamnophis gigas No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander Ambystoma californiense There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened
Steelhead Oncorhynchus (=Salmo) mykiss There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/1007	Threatened

Insects

NAME	STATUS
San Bruno Elfin Butterfly Callophrys mossii bayensis There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3394	Endangered

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp Branchinecta lynchi There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/498	Threatened

Flowering Plants

NAME	STATUS
Antioch Dunes Evening-primrose Oenothera deltoides ssp. howellii There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5970	Endangered
Large-flowered Fiddleneck Amsinckia grandiflora There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5558	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service[3]. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured. Any person or organization who plans or conducts activities that

may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are USFWS Birds of Conservation Concern that might be affected by activities in this location. The list does not contain every bird you may find in this location, nor is it guaranteed that all of the birds on the list will be found on or near this location. To get a better idea of the specific locations where certain species have been reported and their level of occurrence, please refer to resources such as the E-bird data mapping tool (year-round bird sightings by birders and the general public) and Breeding Bird Survey (relative abundance maps for breeding birds). Although it is important to try to avoid and minimize impacts to all birds, special attention should be given to the birds on the list below. To get a list of all birds potentially present in your project area, visit the E-bird Explore Data Tool.

NAME	BREEDING SEASON
Allen's Hummingbird Selasphorus sasin https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Black Oystercatcher Haematopus bachmani https://ecos.fws.gov/ecp/species/9591	Breeds Apr 15 to Oct 31
Black Rail Laterallus jamaicensis https://ecos.fws.gov/ecp/species/7717	Breeds Mar 1 to Sep 15
Black Skimmer Rynchops niger https://ecos.fws.gov/ecp/species/5234	Breeds May 20 to Sep 15
Black Turnstone Arenaria melanocephala	Breeds elsewhere
Black-chinned Sparrow Spizella atrogularis https://ecos.fws.gov/ecp/species/9447	Breeds Apr 15 to Jul 31
Burrowing Owl Athene cunicularia https://ecos.fws.gov/ecp/species/9737	Breeds Mar 15 to Aug 31
California Thrasher Toxostoma redivivum	Breeds Jan 1 to Jul 31
Clark's Grebe Aechmophorus clarkii	Breeds Jan 1 to Dec 31
Common Yellowthroat Geothlypis trichas sinuosa https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31
Costa's Hummingbird Calypte costae https://ecos.fws.gov/ecp/species/9470	Breeds Jan 15 to Jun 10
Lawrence's Goldfinch Carduelis lawrencei https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Lewis's Woodpecker Melanerpes lewis https://ecos.fws.gov/ecp/species/9408	Breeds Apr 20 to Sep 30
Long-billed Curlew Numenius americanus https://ecos.fws.gov/ecp/species/5511	Breeds elsewhere

Marbled Godwit Limosa fedoa https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Nuttall's Woodpecker Picoides nuttallii https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20
Oak Titmouse Baeolophus inornatus https://ecos.fws.gov/ecp/species/9656	Breeds Mar 15 to Jul 15
Red Knot Calidris canutus ssp. roselaari https://ecos.fws.gov/ecp/species/8880	Breeds elsewhere
Rufous Hummingbird selasphorus rufus https://ecos.fws.gov/ecp/species/8002	Breeds elsewhere
Short-billed Dowitcher Limnodromus griseus https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Snowy Plover Charadrius nivosus nivosus	Breeds Mar 5 to Sep 15
Song Sparrow Melospiza melodia maxillaris https://ecos.fws.gov/ecp/species/7716	Breeds Feb 20 to Sep 5
Spotted Towhee Pipilo maculatus clementae https://ecos.fws.gov/ecp/species/4243	Breeds Apr 15 to Jul 20
Tricolored Blackbird Agelaius tricolor https://ecos.fws.gov/ecp/species/3910	Breeds Mar 15 to Aug 10
Whimbrel Numenius phaeopus https://ecos.fws.gov/ecp/species/9483	Breeds elsewhere
Willet Tringa semipalmata	Breeds elsewhere
Wrentit Chamaea fasciata	Breeds Mar 15 to Aug 10
Yellow-billed Magpie Pica nuttalli https://ecos.fws.gov/ecp/species/9726	Breeds Apr 1 to Jul 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in your project's counties during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

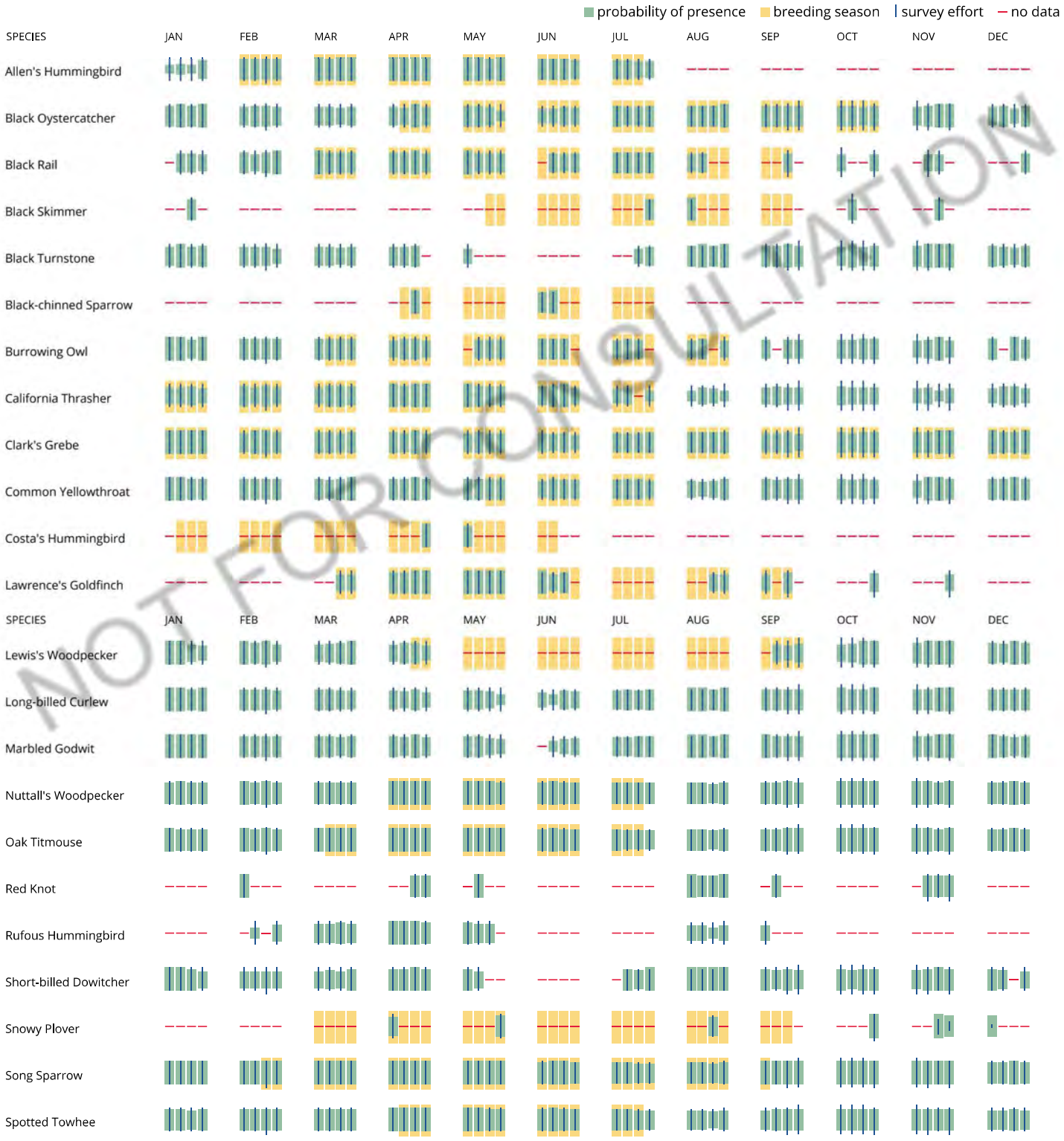
Breeding Season (▪)
Yellow bars denote when the bird breeds in the Bird Conservation Region(s) in which your project lies. If there are no yellow bars shown for a bird, it does not breed in your project area.

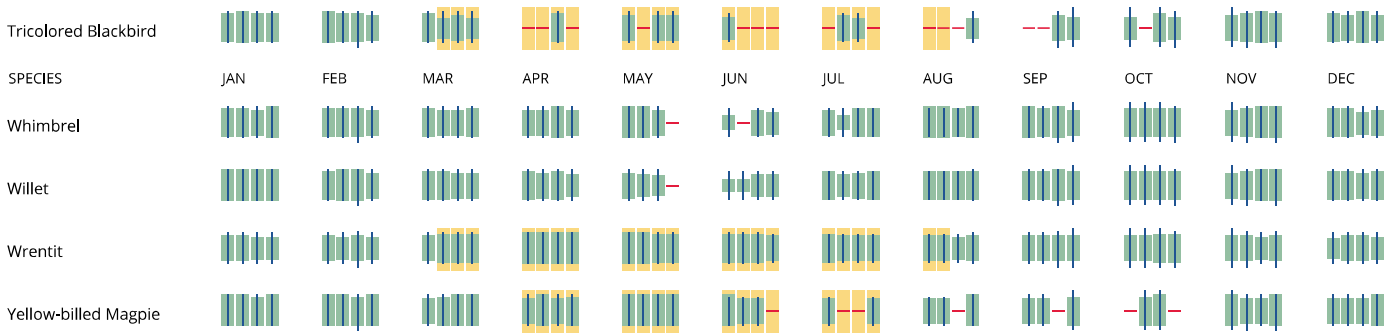
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the counties of your project area. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Such measures are particularly important when birds are most likely to occur in the project area. To see when birds are most likely to occur in your project area, view the Probability of Presence Summary. Special attention should be made to look for nests and avoid nest destruction during the breeding season. The best information about when birds are breeding can be found in Birds of North America (BNA) Online under the "Breeding Phenology" section of each species profile. Note that accessing this information may require a subscription. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) that might be affected by activities in your project location. These birds are of priority concern because it has been determined that without additional conservation actions, they are likely to become candidates for listing under the Endangered Species Act (ESA).

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets. The AKN list represents all birds reported to be occurring at some level throughout the year in the counties in which your project lies. That list is then narrowed to only the Birds of Conservation Concern for your project area.

Again, the Migratory Bird Resource list only includes species of particular priority concern, and is not representative of all birds that may occur in your project area. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird entry on your migratory bird species list indicates a breeding season, it is probable the bird breeds in your project's counties at some point within the time-frame specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Facilities

Wildlife refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Attachment C: CNDDB Rare Find Report

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Tassajara (3712177) OR Diablo (3712178) OR Antioch South (3712187) OR Clayton (3712188))

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Agelaius tricolor tricolored blackbird	G2G3 S1S2	None Candidate Endangered	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_EN-Endangered NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	314 759	951 S:5	0	1	2	0	0	2	4	1	5	0	0
Ambystoma californiense California tiger salamander	G2G3 S2S3	Threatened Threatened	CDFW_WL-Watch List IUCN_VU-Vulnerable	50 1,950	1157 S:83	4	39	6	0	2	32	27	56	81	0	2
Amsinckia grandiflora large-flowered fiddleneck	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_UCBBG-UC Berkeley Botanical Garden	1,150 1,800	8 S:4	0	0	0	0	3	1	3	1	1	0	3
Andrena blennospermatis Blennosperma vernal pool andrenid bee	G2 S2	None None		900 900	15 S:1	0	0	0	0	0	1	1	0	1	0	0
Anniella pulchra northern California legless lizard	G3 S3	None None	CDFW_SSC-Species of Special Concern USFS_S-Sensitive	450 450	102 S:1	1	0	0	0	0	0	0	1	1	0	0
Anomobryum julaceum slender silver moss	G5? S2	None None	Rare Plant Rank - 4.2		13 S:1	0	0	0	0	0	1	0	1	1	0	0
Antrozous pallidus pallid bat	G5 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	170 780	409 S:4	0	0	0	0	0	4	4	0	4	0	0
Aquila chrysaetos golden eagle	G5 S3	None None	BLM_S-Sensitive CDF_S-Sensitive CDFW_FP-Fully Protected CDFW_WL-Watch List IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	155 1,360	312 S:5	4	1	0	0	0	0	2	3	5	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Arctostaphylos auriculata Mt. Diablo manzanita	G2 S2	None None	Rare Plant Rank - 1B.3	600 1,850	17 S:17	2	5	5	0	0	5	11	6	17	0	0
Arctostaphylos manzanita ssp. laevigata Contra Costa manzanita	G5T2 S2	None None	Rare Plant Rank - 1B.2	500 2,000	10 S:10	0	1	1	0	0	8	7	3	10	0	0
Athene cunicularia burrowing owl	G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	57 888	1941 S:21	6	6	6	3	0	0	3	18	21	0	0
Atriplex depressa brittlescale	G2 S2	None None	Rare Plant Rank - 1B.2	160 210	61 S:2	0	0	1	0	0	1	1	1	2	0	0
Blepharizonia plumosa big tarplant	G2 S2	None None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	300 1,000	47 S:14	1	6	2	0	1	4	5	9	13	1	0
Bombus caliginosus obscure bumble bee	G4? S1S2	None None	IUCN_VU-Vulnerable	3,150 3,150	181 S:1	0	0	0	0	0	1	1	0	1	0	0
Bombus crotchii Crotch bumble bee	G3G4 S1S2	None None		50 2,000	233 S:2	0	0	0	0	0	2	2	0	2	0	0
Bombus occidentalis western bumble bee	G2G3 S1	None None	USFS_S-Sensitive XERCES_IM-Imperiled	350 2,000	282 S:4	0	0	0	0	0	4	4	0	4	0	0
Branchinecta lynchi vernal pool fairy shrimp	G3 S3	Threatened None	IUCN_VU-Vulnerable	220 330	756 S:5	0	0	3	0	0	2	1	4	5	0	0
Buteo regalis ferruginous hawk	G4 S3S4	None None	CDFW_WL-Watch List IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	400 640	107 S:2	1	0	1	0	0	0	0	2	2	0	0
Buteo swainsoni Swainson's hawk	G5 S3	None Threatened	BLM_S-Sensitive IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	50 2,000	2431 S:6	1	2	2	0	0	1	1	5	6	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
California macrophylla round-leaved filaree	G4 S4	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden SB_SBBG-Santa Barbara Botanic Garden	170 600	204 S:8	0	1	0	0	2	5	4	4	6	2	0
Callophrys mossii bayensis San Bruno elfin butterfly	G4T1 S1	Endangered None	XERCES_CI-Critically Imperiled	2,000 2,000	10 S:1	0	0	0	0	0	1	1	0	1	0	0
Calochortus pulchellus Mt. Diablo fairy-lantern	G2 S2	None None	Rare Plant Rank - 1B.2	495 3,000	40 S:31	3	9	4	1	0	14	12	19	31	0	0
Campanula exigua chaparral harebell	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	1,500 3,200	32 S:5	1	1	0	0	0	3	4	1	5	0	0
Centromadia parryi ssp. congdonii Congdon's tarplant	G3T2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	425 800	93 S:16	2	6	4	1	1	2	2	14	15	1	0
Circus cyaneus northern harrier	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	900 900	53 S:1	1	0	0	0	0	0	1	0	1	0	0
Cordylanthus nidularius Mt. Diablo bird's-beak	G1 S1	None Rare	Rare Plant Rank - 1B.1 BLM_S-Sensitive	1,600 2,400	2 S:2	0	1	0	0	0	1	0	2	2	0	0
Corynorhinus townsendii Townsend's big-eared bat	G3G4 S2	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	700 3,790	626 S:2	0	0	0	0	0	2	2	0	2	0	0
Cryptantha hooveri Hoover's cryptantha	GH SH	None None	Rare Plant Rank - 1A		4 S:1	0	0	0	0	1	0	1	0	0	1	0
Delphinium californicum ssp. interius Hospital Canyon larkspur	G3T3 S3	None None	Rare Plant Rank - 1B.2	630 3,300	28 S:6	1	2	0	0	0	3	1	5	6	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Dipodomys heermanni berkeleyensis Berkeley kangaroo rat	G3G4T1 S1	None None		3,200 3,200	7 S:1	0	0	0	0	0	1	1	0	1	0	0
Efferia antiochi Antioch efferian robberfly	G1G2 S1S2	None None		350 350	4 S:1	0	0	0	0	0	1	1	0	1	0	0
Elanus leucurus white-tailed kite	G5 S3S4	None None	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_LC-Least Concern	600 600	164 S:1	0	1	0	0	0	0	1	0	1	0	0
Emys marmorata western pond turtle	G3G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable USFS_S-Sensitive	290 1,980	1246 S:16	2	5	2	0	0	7	7	9	16	0	0
Eremophila alpestris actia California horned lark	G5T4Q S4	None None	CDFW_WL-Watch List IUCN_LC-Least Concern	600 680	93 S:2	0	2	0	0	0	0	2	0	2	0	0
Eriastrum ertterae Lime Ridge eriastrum	G1 S1	None None	Rare Plant Rank - 1B.1	700 900	2 S:2	0	0	0	0	0	2	0	2	2	0	0
Eriogonum truncatum Mt. Diablo buckwheat	G1 S1	None None	Rare Plant Rank - 1B.1	350 1,150	7 S:6	1	0	0	0	1	4	4	2	5	1	0
Eryngium jepsonii Jepson's coyote-thistle	G2 S2	None None	Rare Plant Rank - 1B.2	775 1,000	19 S:2	0	0	0	0	0	2	0	2	2	0	0
Extriplex joaquinana San Joaquin spearscale	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	160 730	109 S:11	1	2	3	2	2	1	4	7	9	1	1
Falco mexicanus prairie falcon	G5 S4	None None	CDFW_WL-Watch List IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	1,535 1,860	458 S:5	5	0	0	0	0	0	0	5	5	0	0
Falco peregrinus anatum American peregrine falcon	G4T4 S3S4	Delisted Delisted	CDF_S-Sensitive CDFW_FP-Fully Protected USFWS_BCC-Birds of Conservation Concern	1,581 1,581	55 S:1	0	0	0	0	0	1	0	1	1	0	0

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California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Fritillaria liliacea fragrant fritillary	G2 S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	850 850	81 S:2	0	1	0	0	0	1	1	1	2	0	0
Grimmia torenii Toren's grimmia	G2 S2	None None	Rare Plant Rank - 1B.3	3,025 3,805	13 S:2	0	0	0	0	0	2	0	2	2	0	0
Helianthella castanea Diablo helianthella	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	580 3,500	107 S:47	6	17	10	1	0	13	12	35	47	0	0
Helminthoglypta nickliniana bridgesi Bridges' coast range shoulderband	G3T1 S1S2	None None	IUCN_DD-Data Deficient	1,950 1,950	6 S:1	0	0	0	0	0	1	1	0	1	0	0
Hesperolinon breweri Brewer's western flax	G2? S2?	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	650 2,900	25 S:18	2	5	0	0	0	11	8	10	18	0	0
Lasiurus blossevillii western red bat	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern WBWG_H-High Priority	15 15	125 S:1	0	0	0	0	0	1	0	1	1	0	0
Lasthenia conjugens Contra Costa goldfields	G1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_UCBBG-UC Berkeley Botanical Garden	50 50	33 S:1	0	0	0	0	1	0	1	0	0	0	1
Lepidurus packardi vernal pool tadpole shrimp	G4 S3S4	Endangered None	IUCN_EN-Endangered	330 330	320 S:1	0	0	1	0	0	0	0	1	1	0	0
Linderiella occidentalis California linderiella	G2G3 S2S3	None None	IUCN_NT-Near Threatened	160 260	433 S:5	0	0	0	0	0	5	2	3	5	0	0
Lytta molesta molestan blister beetle	G2 S2	None None		400 400	17 S:1	0	0	0	0	0	1	1	0	1	0	0
Madia radiata showy golden madia	G2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	250 250	51 S:2	0	0	0	0	0	2	2	0	2	0	0
Malacothamnus hallii Hall's bush-mallow	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	600 1,500	36 S:7	1	0	0	1	1	4	4	3	6	1	0
Masticophis lateralis euryxanthus Alameda whipsnake	G4T2 S2	Threatened Threatened		305 3,785	160 S:45	15	6	0	0	1	23	14	31	44	1	0

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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Monolopia gracilens woodland woollythreads	G3 S3	None None	Rare Plant Rank - 1B.2	1,500 3,000	57 S:5	0	0	0	0	0	5	2	3	5	0	0
Navarretia gowenii Lime Ridge navarretia	G1 S1	None None	Rare Plant Rank - 1B.1	600 1,000	3 S:2	0	0	0	0	0	2	0	2	2	0	0
Navarretia nigelliformis ssp. radians shining navarretia	G4T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	260 1,700	72 S:3	0	0	1	0	0	2	0	3	3	0	0
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	G5T2T3 S2S3	None None	CDFW_SSC-Species of Special Concern	756 1,600	21 S:2	1	0	0	0	0	1	0	2	2	0	0
Oenothera deltoides ssp. howellii Antioch Dunes evening-primrose	G5T1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden		10 S:1	0	0	0	0	0	1	1	0	1	0	0
Perognathus inornatus San Joaquin Pocket Mouse	G2G3 S2S3	None None	BLM_S-Sensitive IUCN_LC-Least Concern	500 750	122 S:3	1	2	0	0	0	0	3	0	3	0	0
Phacelia phacelioides Mt. Diablo phacelia	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	2,000 3,400	16 S:6	0	1	0	1	0	4	5	1	6	0	0
Phrynosoma blainvillii coast horned lizard	G3G4 S3S4	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	1,224 1,462	758 S:2	1	1	0	0	0	0	0	2	2	0	0
Puccinellia simplex California alkali grass	G3 S2	None None	Rare Plant Rank - 1B.2		71 S:1	0	0	0	0	1	0	1	0	0	1	0
Rana boylii foothill yellow-legged frog	G3 S3	None Candidate Threatened	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened USFS_S-Sensitive	1,130 1,130	1230 S:1	0	0	0	0	0	1	1	0	1	0	0
Rana draytonii California red-legged frog	G2G3 S2S3	Threatened None	CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	130 2,175	1410 S:94	9	42	11	3	1	28	28	66	93	1	0
Sanicula saxatilis rock sanicle	G2 S2	None Rare	Rare Plant Rank - 1B.2 BLM_S-Sensitive	2,200 3,400	7 S:3	0	2	1	0	0	0	1	2	3	0	0

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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Senecio aphanactis chaparral ragwort	G3 S2	None None	Rare Plant Rank - 2B.2	1,000 1,000	82 S:1	0	0	0	0	0	1	1	0	1	0	0
Serpentine Bunchgrass Serpentine Bunchgrass	G2 S2.2	None None		1,300 2,000	22 S:2	0	1	0	0	0	1	2	0	2	0	0
Streptanthus albidus ssp. peramoenus most beautiful jewelflower	G2T2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive	700 2,400	96 S:3	0	2	0	0	0	1	2	1	3	0	0
Streptanthus hispidus Mt. Diablo jewelflower	G2 S2	None None	Rare Plant Rank - 1B.3	820 3,200	8 S:8	0	4	3	1	0	0	5	3	8	0	0
Stuckenia filiformis ssp. alpina slender-leaved pondweed	G5T5 S3	None None	Rare Plant Rank - 2B.2	600 600	21 S:1	0	0	0	0	0	1	1	0	1	0	0
Taxidea taxus American badger	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	179 800	542 S:8	1	2	2	0	0	3	4	4	8	0	0
Triquetrella californica coastal triquetrella	G2 S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	3,849 3,849	13 S:1	0	0	0	0	0	1	1	0	1	0	0
Tropidocarpum capparideum caper-fruited tropidocarpum	G1 S1	None None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive	400 540	18 S:2	0	0	0	0	0	2	2	0	2	0	0
Valley Needlegrass Grassland Valley Needlegrass Grassland	G3 S3.1	None None			45 S:1	0	0	0	0	0	1	1	0	1	0	0
Viburnum ellipticum oval-leaved viburnum	G4G5 S3?	None None	Rare Plant Rank - 2B.3	1,200 1,500	38 S:4	1	0	0	0	0	3	3	1	4	0	0
Vulpes macrotis mutica San Joaquin kit fox	G4T2 S2	Endangered Threatened		220 800	982 S:11	2	4	0	0	0	5	11	0	11	0	0

CNPS California Native Plant Society

Plant List

Inventory of Rare and Endangered Plants

53 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3712188, 3712187 3712178 and 3712177;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Amsinckia grandiflora	large-flowered fiddleneck	Boraginaceae	annual herb	(Mar)Apr-May	1B.1	S1	G1
Androsace elongata ssp. acuta	California androsace	Primulaceae	annual herb	Mar-Jun	4.2	S3S4	G5?T3T4
Anomobryum julaceum	slender silver moss	Bryaceae	moss		4.2	S2	G5?
Arabis blepharophylla	coast rockcress	Brassicaceae	perennial herb	Feb-May	4.3	S4	G4
Arctostaphylos auriculata	Mt. Diablo manzanita	Ericaceae	perennial evergreen shrub	Jan-Mar	1B.3	S2	G2
Arctostaphylos manzanita ssp. laevigata	Contra Costa manzanita	Ericaceae	perennial evergreen shrub	Jan-Mar(Apr)	1B.2	S2	G5T2
Atriplex cordulata var. cordulata	heartscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G3T2
Atriplex coronata var. coronata	crownscale	Chenopodiaceae	annual herb	Mar-Oct	4.2	S3	G4T3
Atriplex depressa	brittlescale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
Blepharizonia plumosa	big tarplant	Asteraceae	annual herb	Jul-Oct	1B.1	S2	G2
Calandrinia breweri	Brewer's calandrinia	Montiaceae	annual herb	(Jan)Mar-Jun	4.2	S4	G4
California macrophylla	round-leaved filaree	Geraniaceae	annual herb	Mar-May	1B.2	S4	G4
Calochortus pulchellus	Mt. Diablo fairy-lantern	Liliaceae	perennial bulbiferous herb	Apr-Jun	1B.2	S2	G2
Calochortus umbellatus	Oakland star-tulip	Liliaceae	perennial bulbiferous herb	Mar-May	4.2	S4	G4
Campanula exigua	chaparral harebell	Campanulaceae	annual herb	May-Jun	1B.2	S2	G2
Centromadia parryi ssp. congdonii	Congdon's tarplant	Asteraceae	annual herb	May-Oct(Nov)	1B.1	S2	G3T2
Collomia diversifolia	serpentine collomia	Polemoniaceae	annual herb	May-Jun	4.3	S4	G4
Convolvulus simulans	small-flowered morning-glory	Convolvulaceae	annual herb	Mar-Jul	4.2	S4	G4
Cordylanthus nidularius	Mt. Diablo bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Aug	1B.1	S1	G1
Cryptantha hooveri	Hoover's cryptantha	Boraginaceae	annual herb	Apr-May	1A	SH	GH
	Hospital Canyon	Ranunculaceae	perennial herb	Apr-Jun	1B.2	S3	G3T3

Delphinium californicum ssp. interius	larkspur						
Dirca occidentalis	western leatherwood	Thymelaeaceae	perennial deciduous shrub	Jan-Mar(Apr)	1B.2	S2	G2
Eriastrum ertterae	Lime Ridge eriastrum	Polemoniaceae	annual herb	Jun-Jul	1B.1	S1	G1
Eriogonum truncatum	Mt. Diablo buckwheat	Polygonaceae	annual herb	Apr-Sep(Nov-Dec)	1B.1	S2	G2
Eriophyllum jepsonii	Jepson's woolly sunflower	Asteraceae	perennial herb	Apr-Jun	4.3	S3	G3
Eryngium jepsonii	Jepson's coyote thistle	Apiaceae	perennial herb	Apr-Aug	1B.2	S2?	G2?
Eschscholzia rhombipetala	diamond-petaled California poppy	Papaveraceae	annual herb	Mar-Apr	1B.1	S1	G1
Extriplex joaquinana	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
Fritillaria agrestis	stinkbells	Liliaceae	perennial bulbiferous herb	Mar-Jun	4.2	S3	G3
Fritillaria liliacea	fragrant fritillary	Liliaceae	perennial bulbiferous herb	Feb-Apr	1B.2	S2	G2
Galium andrewsii ssp. gatense	phlox-leaf serpentine bedstraw	Rubiaceae	perennial herb	Apr-Jul	4.2	S3	G5T3
Grimmia torenii	Toren's grimmia	Grimmiaceae	moss		1B.3	S2	G2
Helianthella castanea	Diablo helianthella	Asteraceae	perennial herb	Mar-Jun	1B.2	S2	G2
Hesperolinon breweri	Brewer's western flax	Linaceae	annual herb	May-Jul	1B.2	S2?	G2?
Madia radiata	showy golden madia	Asteraceae	annual herb	Mar-May	1B.1	S2	G2
Malacothamnus hallii	Hall's bush-mallow	Malvaceae	perennial evergreen shrub	(Apr)May-Sep(Oct)	1B.2	S2	G2
Monardella antonina ssp. antonina	San Antonio Hills monardella	Lamiaceae	perennial rhizomatous herb	Jun-Aug	3	S1S3	G4T1T3Q
Monolopia gracilens	woodland woolythreads	Asteraceae	annual herb	(Feb)Mar-Jul	1B.2	S3	G3
Navarretia gowenii	Lime Ridge navarretia	Polemoniaceae	annual herb	May-Jun	1B.1	S1	G1
Navarretia heterandra	Tehama navarretia	Polemoniaceae	annual herb	Apr-Jun	4.3	S4	G4
Navarretia nigelliformis ssp. nigelliformis	adobe navarretia	Polemoniaceae	annual herb	Apr-Jun	4.2	S3	G4T3
Navarretia nigelliformis ssp. radians	shining navarretia	Polemoniaceae	annual herb	(Mar)Apr-Jul	1B.2	S2	G4T2
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	Onagraceae	perennial herb	Mar-Sep	1B.1	S1	G5T1
Phacelia phacelioides	Mt. Diablo phacelia	Hydrophyllaceae	annual herb	Apr-May	1B.2	S2	G2
Ranunculus lobbii	Lobb's aquatic buttercup	Ranunculaceae	annual herb (aquatic)	Feb-May	4.2	S3	G4
Sanicula saxatilis	rock sanicle	Apiaceae	perennial herb	Apr-May	1B.2	S2	G2
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	Jan-Apr(May)	2B.2	S2	G3
Streptanthus albidus ssp. peramoenus	most beautiful jewelflower	Brassicaceae	annual herb	(Mar)Apr-Sep(Oct)	1B.2	S2	G2T2

Streptanthus hispidus	Mt. Diablo jewelflower	Brassicaceae	annual herb	Mar-Jun	1B.3	S2	G2
Stuckenia filiformis ssp. alpina	slender-leaved pondweed	Potamogetonaceae	perennial rhizomatous herb (aquatic)	May-Jul	2B.2	S3	G5T5
Triquetrella californica	coastal triquetrella	Pottiaceae	moss		1B.2	S2	G2
Tropidocarpum capparideum	caper-fruited tropidocarpum	Brassicaceae	annual herb	Mar-Apr	1B.1	S1	G1
Viburnum ellipticum	oval-leaved viburnum	Adoxaceae	perennial deciduous shrub	May-Jun	2B.3	S3?	G4G5

Suggested Citation

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RARE PLANT SURVEY REPORT

for the **OAK CREEK CANYON RESIDENTIAL DEVELOPMENT**

CONTRA COSTA COUNTY, CALIFORNIA

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October 2018

INTRODUCTION

Swaim Biological, Incorporated (SBI) was contracted by Discovery Builders, Inc. (DBI) to conduct floristic surveys for the Oak Creek Canyon Residential Development Project (project) in Clayton, Contra Costa County, CA. The project is within the East Contra Costa County Habitat Conservation Plan (ECCC HCP) area. Floristic surveys encompassed all special-status plant species with potential to occur, including large-flowered fiddleneck (*Amsinckia grandiflora*), big tarplant (*Blepharizonia plumosa*), round-leaved filaree (*California macrophylla*), Mt. Diablo fairy lantern (*Calochortus pulchellus*), diamond-petaled California poppy (*Eschscholzia rhombipetala*), and showy golden madia (*Madia radiata*). The surveys were conducted in four distinct survey efforts to account for varying blooming periods. No special-status plants were observed during these surveys. This document describes the environmental conditions, methods, and results of these surveys.

SURVEY AREA

The 9-acre survey parcel is located on Marsh Creek Road in Clayton, CA (**Figure 1**). The project will occur on a portion of parcel 119-070-008. Contra Costa Water District owns 1.68 acres adjacent to the project site and maintains an access easement through the parcel. Marsh Creek Road serves as the southwestern boundary.

Environmental Setting

The project is located in the Clayton 7.5-minute U.S. Geological Survey quadrangle, north of Mount Diablo, and slightly north of Mount Diablo Creek which roughly follows the contour of Marsh Creek Road.

Topography

The terrain consists of steep rolling grasslands and peripheral oak savannah/woodland at elevations between 600 and 700 feet.

Hydrology

The survey parcel is sited within a watershed measuring approximately 0.3-square mile in area, with an unnamed ephemeral drainage traversing the eastern portion (**Figure 2**). Topographic maps imply that the drainage is spring-fed, or at least ponds uphill, with ponded water visible in satellite imagery in 2008. Within the survey area, no ponded water is visible in satellite imagery and no ponded water was observed during surveys, though dense growth of facultative Italian rye grass (*Festuca perennis*) and lesser amounts of facultative beardless wild rye (*Elymus triticoides*) were observed during the April 2018 survey and redoxomorphic features were observed in the soils during the August 2018

survey. The onsite drainage culvert conveying flows beneath Marsh Creek Road measures approximately 36 inches in diameter (see **Appendix D, Site Photos**).

Soil

Three soil types occur in the study area (USDA 2017):

- *Capay clay (CaC)*—1 to 15 percent slopes; MLRA 17. Consists of clayey alluvium derived from sedimentary rock and is found in the concave treads and toeslopes of stream terraces. The upper 18 inches of a typical soil profile is clay. Soils are nonsaline to very slightly saline. Soils are not hydric but the available water storage in the soil profile is high.
- *Los Osos clay loam (LhF)*—30 to 50 percent slopes, MLRA 15. Consists of residuum weathered from sandstone and shale and is found in both concave and convex sideslopes, backslopes, and flanks of hillslopes. The upper 10 inches of a typical soil profile is clay loam, with the next 8 inches being clay. Soils are not hydric and the available water storage in the soil profile is low.
- *Perkins gravelly loam (PaC)—2 to 9 percent slopes.* Consists of alluvium soils derived from igneous and sedimentary rock and is found in the linear treads of terraces. The upper 18 inches of a typical soil profile is gravelly loam. Soils are not hydric but the available water storage in the soil profile is moderate.

Vegetation

Three vegetation communities occur in or adjacent to the survey area:

- *Nonnative Annual Grassland*—found in the majority of the survey area. Dominated by slender wild oat (*Avena barbata*), wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceous*), foxtail brome (*Bromus madritensis*), foxtail barley (*Hordeum murinum*), and yellow star thistle (*Centaurea solstitialis*).
- *Ruderal*—found in the ephemeral drainage/wash area of the southwest corner. Dominated by Italian rye, beardless wild rye, black mustard (*Brassica nigra*), fennel (*Foeniculum vulgare*), wild radish (*Raphanus sativus*), fiddle dock (*Rumex pulcher*), and charlock (*Sinapis arvensis*).
- *Oak savannah/woodland* –found peripheral to the survey area. Dominated by oaks that are possibly hybrids of blue oak (*Quercus douglasii*) and valley oak (*Q. lobata*).

METHODS

Floristic surveys followed protocols described in the following guidelines:

- *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (California Department of Fish and Wildlife [CDFW], 2018);
- *CNPS Botanical Survey Guidelines* (California Native Plant Society [CNPS], 2001); and
- *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants* (U.S. Fish and Wildlife Service [USFWS], (1996).

Background Research

Desktop Consultation

Prior to surveys, background research was conducted to determine the potential for special-status species to occur within the study area. Consulted sources included the California Natural Diversity Database [CNDDB] (CDFW, 2018); California Native Plant Society's Online Inventory of Rare and Endangered Plants (CNPS, 2018); and the botanical list compiled for *ECCC HCP Planning Survey Report Form, Table 2b* for projects occurring in annual grassland settings (Jones & Stokes 2007). **Figure 3** identifies CNDDB records of special-status plants within 5 miles of the survey area.

Refined Target Species List

The list of the ECC HCP rare plants is provided in **Appendix A** along with an assessment of their potential to occur on the project site based on known habitat conditions. SBI refined this list to target specific survey dates by comparing the known geographic range and habitat preferences for each species with the geographic location and habitat type found within the survey area. The refined list identified six (6) California Rare Plant Rank (CRPR) and ECC HCP Covered and No Take plant species that require focused surveys: large-flowered fiddleneck (*Amsinckia grandiflora,* ECC HCP No Take species), big tarplant (*Blepharizonia plumosa*, ECC HCP Covered species), round-leaved filaree (*California macrophylla*, ECC HCP Covered species), Mt. Diablo fairy lantern (*Calochortus pulchellus,* ECC HCP Covered species), diamond-petaled California poppy (*Eschscholzia rhombipetala*, ECC HCP No Take species), and showy golden madia (*Madia radiata*, ECC HCP Covered species).

Reference Site Visits and Herbarium Specimens

No reference sites for these species were visited in 2018. Ms. Dvorak is familiar with big tarplant (having visited reference sites in 2017 and 2016), round-leaved filaree (observed circa 2009), and Mt. Diablo fairy lantern (observed 2016). She has previously observed big tarplant at Lawrence Livermore National Laboratories' Experimental Test Site (Site 300) in Alameda and San Joaquin Counties, located approximately 15 miles east of the City of Livermore on the eastern slope of the Coast Ranges. Site 300 is a 7,000-acre grassland habitat where big tarplant is present and often found abundantly (Paterson and Woollett, 2014). She has previously observed round-leaved filaree in the grasslands surrounding Dyer Reservoir, a California Department of Water Resources reservoir located in eastern Alameda County, California. She has previously observed Mt. Diablo fairy lantern on Mt. Diablo, Contra Costa County.

Surveys

Four rounds of floristic surveys were determined appropriate to encompass the blooming periods of target species, and thus a single survey was conducted each month in April, June August, and early October. Ms. Dvorak and Ms. Pexton surveyed the proposed project area on the following dates in 2018: April 20, June 18, August 21, and October 2. Surveyors walked parallel transects spaced approximately 15 feet apart to ensure 100 percent visual coverage. All plants encountered, whether live or dead, were identified to the most specific taxonomic level possible.

Timing for the first round of surveys in April corresponded with the blooming period for large-flowered fiddleneck, round-leaved filaree, Mt. Diablo fairy lantern, diamond-petaled California poppy, and showy madia. Timing for the second round of surveys in June corresponded with the blooming period for Mt. Diablo fairy lantern and could have also detected early growth of big tarplant or late senescence of large-flowered fiddleneck, round-leaved filaree, diamond-petaled California poppy, and showy madia. Timing for the third round of surveys in August corresponded with the early half of the blooming period of big tarplant (July through October) and a final survey on October 2nd corresponded with the late half of the blooming period.

Showy madia and diamond-petaled California poppy are two species that are extremely rare/nearly extinct and are known to occur in only a few locations distant from the project area. Thus, floristic surveys were more tailored to the blooming periods of other species, although surveys were conducted during the appropriate bloom periods to observe all ECC HCP plant species. Surveys were also timed to detect all lesser-potential species identified in **Appendix B.**

RESULTS

No special-status plants were observed during 2018 surveys. A list of all identified plants observed in the survey area is provided in **Appendix C**. The first survey, conducted in April, included an inventory checklist of all identifiable plants whether alive or dead. Subsequent surveys only identified living plants on the inventory checklist, unless an identifiable dead plant was a new addition to the overall inventory and/or was potentially special-status.

SURVEY LIMITATIONS

Portions of the hillside grasslands were grazed during April, June, and August surveys. The southwestern drainage/wash portion of the survey area was disced during the June and August and October surveys and nearly devoid of vegetation. Thus, plants that may have been present and blooming prior to grazing and discing would not have been visible to the floristic surveyors, potentially creating false negative survey results.

The 2018 rainy season, extending from October 1, 2017 through September 30, 2018, is currently at 60% of average as reported from the nearest station in Fairfield, CA, and 73 percent of normal as reported from the nearest station in Livermore (NOAA, 2018). The previous year exceeded 30-year rainfall normals by nearly 10 inches, and the previous year also exceeded normal rainfall by 0.58 inches (PRISM, 2017). Prior to that, rainfall was below-average since 2012. Annual rainfall conditions may accelerate, delay, or reduce the length of the growing season or blooming period, potentially creating false negative survey results.

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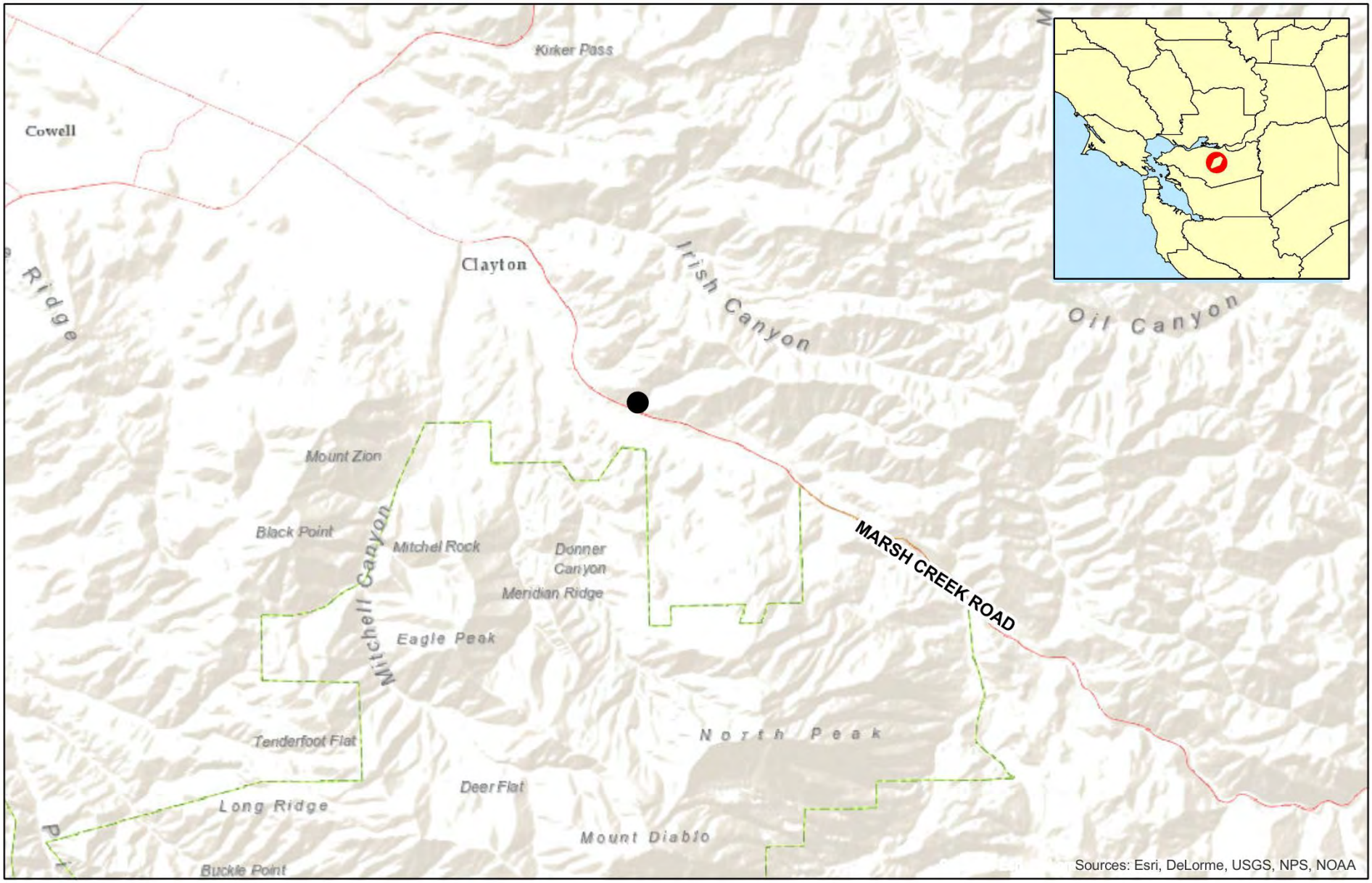

● Project Location

N

0 0.5 1 2 Miles

Oak Creek Canyon Residential Development
Figure 1. Proximity Map

SBI
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Oak Creek Canyon Residential Development
Figure 2. Land Cover and Jurisdictional Waters Map

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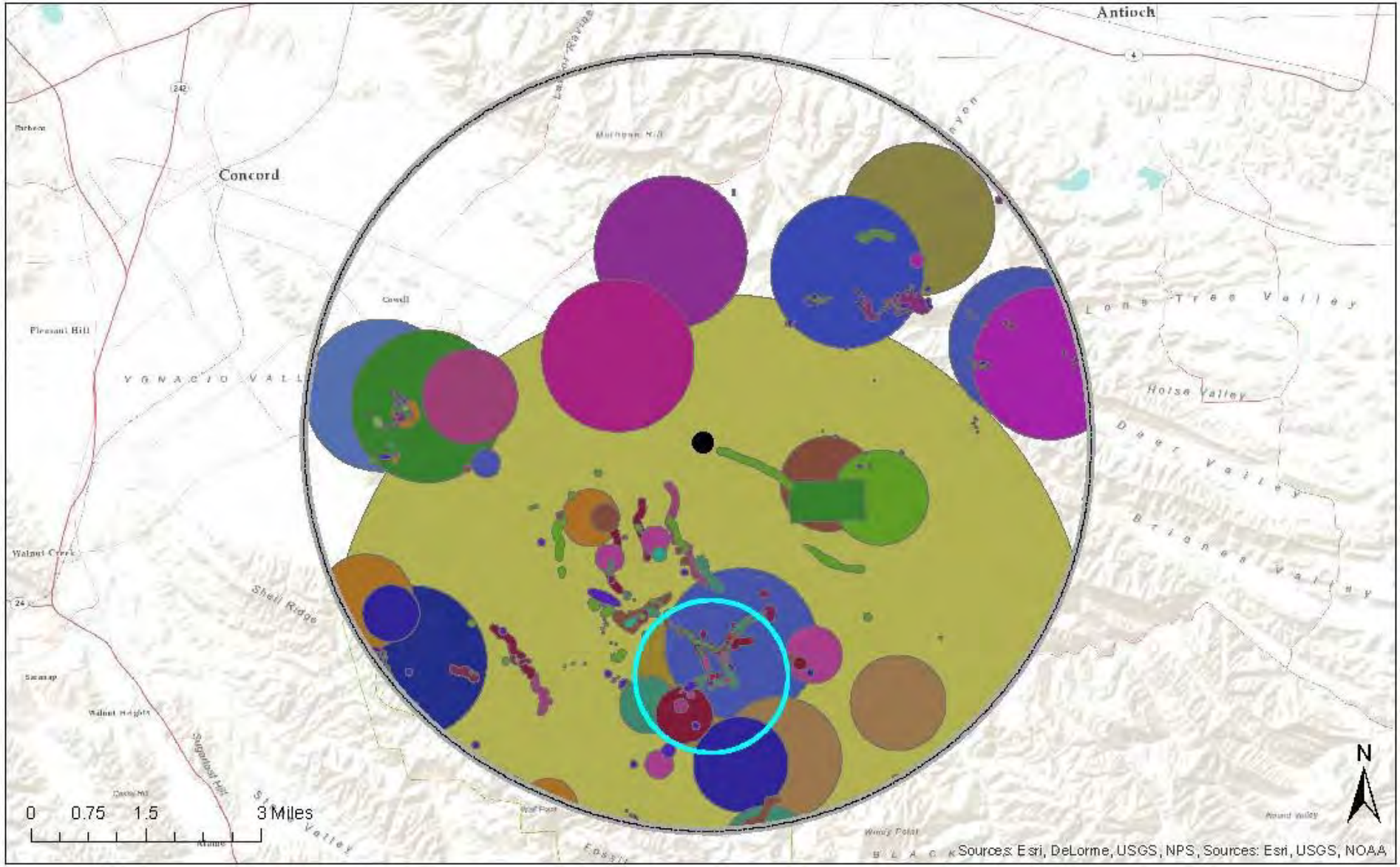


- Project Location
- 5 Mile Buffer
- Antioch Dunes evening-primrose
- Brewer's western flax
- Contra Costa manzanita
- Diablo helianthella
- Hall's bush-mallow
- Hospital Canyon larkspur
- Jepson's coyote-thistle
- Lime Ridge eriastrum
- Lime Ridge navarretia
- Mt. Diablo bird's-beak
- Mt. Diablo buckwheat
- Mt. Diablo fairy-lantern
- Mt. Diablo jewelflower
- Mt. Diablo manzanita
- Mt. Diablo phacelia
- Toren's grimmia
- big tarplant
- caper-fruited tropidocarpum
- chaparral harebell
- chaparral ragwort
- coastal triquetrella
- large-flowered fiddleneck
- most beautiful jewelflower
- oval-leaved viburnum
- rock sanicle
- round-leaved filaree
- shining navarretia
- showy golden madia
- slender silver moss
- slender-leaved pondweed
- woodland woollythreads

Oak Creek Canyon Residential Development
Figure 3. CNDDB Plant Records 5 miles

SBI

APPENDIX A. East Contra Costa County Habitat Conservation Plan special status plant species

Scientific Name	Common Name	Status[1]	ECC HCP Covered (C) or No-Take (N)	Associated land cover type [2]	Typical Habitat or Physical Conditions if known [2]	Typical Blooming Period	Suitable Land Cover Type Present	2018 Survey Results
Amsinckia grandiflora	large-flowered fiddleneck	FE; SE; 1B.1	N	Annual grassland	Generally found in clay soil	April to May	Yes, surveys required	Not observed during appropriately-timed rare plant surveys
Arctostaphylos auriculata	Mt. Diablo manzanita	1B.3	C	Chaparral and scrub	Elevations generally between 700 and 1,860 feet; restricted to the eastern and northern flanks of Mt. Diablo and the vicinity of Black Diamond Mines	January to March	No, surveys not required	Not observed, no suitable habitat present
Astragalus tener var. *tener*	alkali milk-vetch	1B.2	N	Alkali grassland Alkali wetland Annual grassland Seasonal wetland	Generally found in vernally moist habitat in soils with a slight to strongly elevated pH	March to June	Yes, surveys required	Not observed during appropriately-timed rare plant surveys
Atriplex depressa	brittlescale	1B.2	C	Alkali grassland Alkali wetland	Restricted to soils of the Pescadero or Solano soil series; generally found in southeastern region of plan area	May to October	No, surveys not required	Not observed, no suitable habitat present
Blepharizonia plumosa	big tarplant	1B.1	C	Annual grassland	Elevation below 1500 feet most often on Altamont Series or Complex soils	July to October	Yes, surveys required	Not observed during appropriately-timed rare plant surveys.
California macrophylla	round-leaved filaree	---	C	Annual grassland	Occurs in grasslands on friable clay soils, most often in foothill locations at elevations between 200 and 2,000 feet.	March to May	Yes, surveys required	Not observed during appropriately-timed rare plant surveys.
Calochortus pulchellus	Mt. Diablo fairy-lantern	1B.2	C	Annual grassland Chaparral and scrub Oak savanna Oak woodland	Elevations generally between 650 and 2,600 feet	April to June	No, surveys not required	Not observed, no suitable habitat present
Delphinium recurvatum	recurved larkspur	1B.2	C	Alkali grassland Alkali wetland		March to June	No, surveys not required	Not observed, no suitable habitat present

APPENDIX A. East Contra Costa County Habitat Conservation Plan special status plant species

Scientific Name	Common Name	Status[1]	ECC HCP Covered (C) or No-Take (N)	Associated land cover type [2]	Typical Habitat or Physical Conditions if known [2]	Typical Blooming Period	Suitable Land Cover Type Present	2018 Survey Results
Eriogonum truncatum	Mt. Diablo buckwheat	1B.1	N	Annual grassland Chaparral and scrub	Ecotone of grassland and chaparral/scrub	April to September	No, surveys not required	Not observed, no suitable habitat present
Eschscholzia rhombipetala	diamond-petaled California poppy	1B.1	N	Annual grassland	Annual grasslands in clay soils. A very rare plant known only to occur in San Luis Obispo and Alameda Counties.	March to April	Yes, surveys required	Not observed during appropriately-timed rare plant surveys
Extriplex joaquinana	San Joaquin spearscale	1B.2	C	Alkali grassland Alkali wetland	Meadows in valley grassland and shadscale scrub	April to October	No, surveys not required	Not observed, no suitable habitat present
Helianthella castanea	Diablo helianthella	1B.2	C	Chaparral and scrub Oak savanna Oak woodland	Elevations generally above 650 feet	March to June	No, surveys not required	Not observed, no suitable habitat present
Hesperolinon breweri	Brewer's dwarf flax	1B.2	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	May to July	No, surveys not required	Not observed, no suitable habitat present
Lasthenia conjugens	Contra Costa goldfields	FE; 1B.1	N	Alkali grassland Alkali wetland Annual grassland Seasonal wetland	Generally found in vernal pools	March to June	No, surveys not required	Not observed, no suitable habitat present
Madia radiata	Showy madia	1B.1	C	Annual grassland Oak savanna Oak woodland	Primarily occupies open grassland or grassland on edge of oak woodland	March to May	Yes, surveys required	Not observed during appropriately-timed rare plant surveys
Tropidocarpum capparideum	caper-fruited tropidocarpum	1B.1	N	Alkali grassland	Alkali soils in low hills	March to April	No, surveys not required	Not observed, no suitable habitat present

[1]Federal Endangered Species Act (FESA) Designations: (FE) Federally Endangered
California Endangered Species Act (CESA) Designations: (SE) State Endangered
California Native Plant Society (CNPS) Rare Plant Rank: (1A) Presumed extinct in California; (1B) Rare, threatened, or endangered in California and elsewhere; (2) Rare, threatened, or endangered in California, but more common elsewhere; (3) More information is needed; (4) Limited distribution, watch list; Threat Rank: 0.1 Seriously threatened in California (more than 80% of occurrences threatened / high degree and immediacy of threat); 0.2 Fairly threatened in California (20 to 80% occurrences threatened/moderate degree and immediacy of threat); 0.3 Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

[2] Source for habitat and land cover types: East Contra Costa County HCP Planning Survey Report Form July 2015, Table 2b; Calflora and Jepson eFlora

APPENDIX B. CNDDB and Calflora-reported plants within 5 miles of the survey area

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Amsinckia grandiflora	large-flowered fiddleneck	FE	SE		1B.1	Cismontane woodland, Valley and foothill grassland	Moderate. Suitable annual grassland habitat with clay soils is present.
Androsace elongata ssp. acuta	California androsace				4.2	Chaparral, Foothill Woodland, Northern Coastal Scrub, Coastal Sage Scrub	Not Expected. No habitat suitable to support this species is present.
Anomobryum julaceum	slender silver moss				4.2	Damp rock and soil outcrops. Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest	Not Expected. No habitat suitable to support this species is present.
Arabis blepharophylla	coast rockcress				4.3	Broadleafed upland forest, Coastal bluff scrub, Coastal prairie, Coastal scrub	Not Expected. No habitat suitable to support this species is present.
Arctostaphylos auriculata	Mt. Diablo manzanita				1B.3	Chaparral (sandstone), Cismontane woodland	Not Expected. No habitat suitable to support this species is present.
Arctostaphylos manzanita ssp. laevigata	Contra Costa manzanita				1B.2	Chaparral (rocky)	Not Expected. No habitat suitable to support this species is present.
Atriplex cordulata var. cordulata	heartscale				1B.2	Saline or alkaline. Chenopod scrub, Meadows and seeps, Valley and foothill grassland (sandy)	Not Expected. No saline or sandy soils suitable to support this species is present.
Atriplex coronata var. coronata	crownscale				4.2	Alkaline, often clay. Chenopod scrub, Valley and foothill grassland, Vernal pools	Low. Annual grassland and clay soils present however alkaline soils, and wet grassland/vernal habitat were not observed.

APPENDIX B. CNDDB and Calflora-reported plants within 5 miles of the survey area

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Atriplex depressa	brittlescale				1B.2	Alkaline, clay. Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland, Vernal pools	Low. Annual grassland and clay soils present however alkaline soils and vegetation were not observed.
Blepharizonia plumosa	big tarplant				1B.1	Usually clay. Valley and foothill grassland	Moderate. Suitable annual grassland habitat with clay soils is present.
Calandrinia breweri	Brewer's calandrinia				4.2	Chaparral, Coastal scrub	Not Expected. No habitat suitable to support this species is present.
California macrophylla	round-leaved filaree				1B.2	Cismontane woodland, Valley and foothill grassland	Moderate. Suitable annual grassland habitat with clay soils is present.
Calochortus pulchellus	Mt. Diablo fairy-lantern				1B.2	Chaparral, Cismontane woodland, Riparian woodland, Valley and foothill grassland	Moderate. Suitable annual grassland habitat with clay soils is present.
Calochortus umbellatus	Oakland star-tulip				4.2	Strong serpentinite affinity, Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland	Low. Annual grassland present but no serpentinite habitat was observed.
Campanula exigua	chaparral harebell				1B.2	Chaparral (rocky, usually serpentinite)	Not Expected. No habitat suitable to support this species is present.
Centromadia parryi ssp. congdonii	Congdon's tarplant				1B.1	Valley and foothill grassland (alkaline)	Low. Annual grassland is present however alkaline soils were not observed on site.

APPENDIX B. CNDDB and Calflora-reported plants within 5 miles of the survey area

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Collomia diversifolia	serpentine collomia				4.3	Chaparral, Cismontane woodland	Not Expected. No habitat suitable to support this species is present.
Convolvulus simulans	small-flowered morning-glory				4.2	Clay, serpentinite seeps. Chaparral (openings), Coastal scrub, Valley and foothill grassland	Not Expected. No serpentinite habitat or seeps suitable to support this species was observed.
Cordylanthus nidularius	Mt. Diablo bird's-beak		SR		1B.1	Chaparral (serpentinite)	Not Expected. No habitat suitable to support this species is present.
Cryptantha hooveri	Hoover's cryptantha				1A	Inland dunes, Valley and foothill grassland (sandy)	Not Expected. No sandy habitat suitable to support this species is present.
Delphinium californicum ssp. interius	Hospital Canyon larkspur				1B.2	Chaparral (openings), Cismontane woodland (mesic), Coastal scrub	Not Expected. No habitat suitable to support this species is present.
Dirca occidentalis	western leatherwood				1B.2	Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Cismontane woodland, North Coast coniferous forest, Riparian forest, Riparian woodland	Not Expected. No habitat suitable to support this species is present.
Eriastrum ertterae	Lime Ridge eriastrum				1B.1	Chaparral (openings or edges)	Not Expected. No habitat suitable to support this species is present.
Eriogonum truncatum	Mt. Diablo buckwheat				1B.1	Chaparral, Coastal scrub, Valley and foothill grassland, sandy	Low. Annual grassland is present however sandy habitats were not observed on site.

APPENDIX B. CNDDB and Calflora-reported plants within 5 miles of the survey area

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Eriophyllum jepsonii	Jepson's woolly sunflower				4.3	Chaparral, Cismontane woodland, Coastal scrub	Not Expected. No habitat suitable to support this species is present.
Eryngium jepsonii	Jepson's coyote thistle				1B.2	Clay, Valley and foothill grassland, Vernal pools	Low. Clay soils and grassland are present however wet grassland/vernal habitats are comprised of dense non-native annual grasses and forbs.
Eschscholzia rhombipetala	diamond-petaled California poppy				1B.1	Valley and foothill grassland (clay)	Moderate. Suitable annual grassland habitat with clay soils is present.
Extriplex joaquinana	San Joaquin spearscale				1B.2	Alkaline. Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland	Low. Annual grassland present but alkaline habitat was not observed.
Fritillaria agrestis	stinkbells				4.2	Chaparral, Valley Grassland, Foothill Woodland, wetland-riparian. Strong affinity to serpentine soil.	Low. Annual grassland present but no serpentinite habitat was observed.
Fritillaria liliacea	fragrant fritillary				1B.2	Often serpentinite. Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland	Low. Annual grassland present but no serpentinite habitat was observed.
Galium andrewsii ssp. gatense	phlox-leaf serpentine bedstraw				4.2	Chaparral, Cismontane woodland, Lower montane coniferous forest	Not Expected. No habitat suitable to support this species is present.
Grimmia torenii	Toren's grimmia				1B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest	Not Expected. No habitat suitable to support this species is present.

APPENDIX B. CNDDB and Calflora-reported plants within 5 miles of the survey area

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Helianthella castanea	Diablo helianthella				1B.2	Usually rocky, anoxal soils. Broadleafed upland forest, Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland, Valley and foothill grassland	Low. Annual grassland present but rocky, anoxal soils were not observed.
Hesperolinon breweri	Brewer's western flax				1B.2	Usually serpentinite. Chaparral, Cismontane woodland, Valley and foothill grassland	Low. Annual grassland present but no serpentinite habitat was observed.
Lasthenia conjugens	Contra Costa goldfields	FE			1B.1	Mesic. Cismontane woodland, Playas (alkaline), Valley and foothill grassland, Vernal pools	Low. Annual grassland present however wet grassland/vernal habitats are comprised of dense non-native annual grasses and forbs.
Madia radiata	showy golden madia				1B.1	Cismontane woodland, Valley and foothill grassland	Moderate. Suitable annual grassland habitat with clay soils is present.
Malacothamnus hallii	Hall's bush-mallow				1B.2	Chaparral, Coastal scrub	Not Expected. No habitat suitable to support this species is present.
Monardella antonina ssp. antonina	San Antonio Hills monardella				3	Chaparral, Cismontane woodland	Not Expected. No habitat suitable to support this species is present.
Monolopia gracilens	woodland woolythreads				1B.2	Serpetinite. Broadleafed upland forest (openings), Chaparral (openings), Cismontane woodland, North Coast coniferous forest (openings), Valley and foothill grassland	Low. Annual grassland present but no serpentinite habitat was observed.

APPENDIX B. CNDDB and Calflora-reported plants within 5 miles of the survey area

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Navarretia gowenii	Lime Ridge navarretia				1B.1	Chaparral	Not Expected. No habitat suitable to support this species is present.
Navarretia heterandra	Tehama navarretia				4.3	Valley and foothill grassland (mesic), Vernal pools	Low. Annual grassland present wet grassland/vernal habitats are comprised of dense non-native annual grasses and forbs.
Navarretia nigelliformis ssp. nigelliformis	adobe navarretia				4.2	Valley and foothill grassland vernally mesic, Vernal pools sometimes	Low. Annual grassland present wet grassland/vernal habitats are comprised of dense non-native annual grasses and forbs.
Navarretia nigelliformis ssp. radians	shining navarretia				1B.2	Cismontane woodland, Valley and foothill grassland, Vernal pools	Low. Annual grassland present wet grassland/vernal habitats are comprised of dense non-native annual grasses and forbs.
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	FE	FE		1B.1	Inland dunes	Not Expected. No habitat suitable to support this species is present.
Phacelia phacelioides	Mt. Diablo phacelia				1B.2	Chaparral, Cismontane woodland	Not Expected. No habitat suitable to support this species is present.
Ranunculus lobbii	Lobb's aquatic buttercup				4.2	Mesic. Cismontane woodland, North Coast coniferous forest, Valley and foothill grassland, Vernal pools	Low. Annual grassland present wet grassland/vernal habitats are comprised of dense non-native annual grasses and forbs.

APPENDIX B. CNDDB and Calflora-reported plants within 5 miles of the survey area

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		
Sanicula saxatilis	rock sanicle		SR		1B.2	Rocky, talus. Broadleafed upland forest, Chaparral, Valley and foothill grassland	Low. Annual grassland present however rocky/talus habitat was not observed.
Senecio aphanactis	chaparral ragwort				2B.2	Chaparral, Cismontane woodland, Coastal scrub	Not Expected. No habitat suitable to support this species is present.
Streptanthus albidus ssp. peramoenus	most beautiful jewelflower				1B.2	Serpentinite. Chaparral, Cismontane woodland, Valley and foothill grassland	Low. Annual grassland present however serpetinite habitat was not observed.
Streptanthus hispidus	Mt. Diablo jewelflower				1B.3	Rocky. Chaparral, Valley and foothill grassland	Low. Annual grassland present however rocky/chaparral habitat was not observed.
Stuckenia filiformis ssp. alpina	slender-leaved pondweed				2B.2	Marshes and swamps (assorted shallow freshwater)	Not Expected. No habitat suitable to support this species is present.
Triquetrella californica	coastal triquetrella				1B.2	Coastal bluff scrub, Coastal scrub	Not Expected. No habitat suitable to support this species is present.
Tropidocarpum capparideum	caper-fruited tropidocarpum				1B.1	Valley and foothill grassland (alkaline hills)	Low. Alkaline grassland not observed during surveys.
Viburnum ellipticum	oval-leaved viburnum				2B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest	Not Expected. No habitat suitable to support this species is present.

*Status:
Federal Endangered Species Act (FESA) Designations: (FE) Federally Endangered, (FT) Federally Threatened, (FPE) Federally Proposed for listing as Endangered, (FPT) Federally Proposed for listing as Threatened, (FPD) Federally proposed for delisting, (FC) Federal candidate species

APPENDIX B. CNDDB and Calflora-reported plants within 5 miles of the survey area

Scientific Name**	Common Name	Status*				Habitat	Potential for Occurrence
		FESA	CESA	CDFW	CNPS		

California Endangered Species Act (CESA) Designations: (SE) State Endangered, (ST) State Threatened, (SCE) Candidate Endangered, (SCT) Candidate Threatened, (SR) State Rare.
California Department of Fish and Wildlife (CDFW) Designations:(SSC) Species of Special Concern, (FP) Fully Protected Species
California Native Plant Society (CNPS) Rare Plant Rank: (1A) Presumed extinct in California; (1B) Rare, threatened, or endangered in California and elsewhere; (2) Rare, threatened, or endangered in California, but more common elsewhere; (3) More information is needed; (4) Limited distribution, watch list
Threat Rank: 0.1 Seriously threatened in California (more than 80% of occurrences threatened / high degree and immediacy of threat); 0.2 Fairly threatened in California (20 to 80% occurrences threatened/moderate degree and immediacy of threat); 0.3 Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

**Species list developed from CNDDB Records, IPaC species list and CNPS Rare Plant Inventory. All sources accessed October 2017.

APPENDIX C. Plants observed in the survey area

Discovery Builders - Oak Creek Canyon Plant Inventory							
Native (N) or Introduced (I)	Scientific Name	Common Name	Family	Survey 1	Survey 2	Survey 3	Survey 4
				20-Apr-18	21-Jun-18	21-Aug-18	2-Oct-18
N	*Amaranthus blitoides*	prostrate pigweed	Amaranthaceae		X	X	X
N	*Amsinckia intermedia*	common fiddleneck	Boraginaceae	X			
N	*Amsinckia menziesii*	Menzie's fiddleneck	Boraginaceae	X			
N	*Asclepias fascicularis*	narrowleaf milkweed	Apocynaceae			X	
I	*Avena barbata*	slender wild oat	Poaceae	X			
I	*Avena fatua*	wild oat	Poaceae	X	X		
I	*Bellardia trixago*	Mediterranean lineseed	Scrophulariaceae		X	X	
I	*Brassica nigra*	black mustard	Brassicaceae	X	X	X	X
I	*Brassica rapa*	field mustard	Brassicaceae	X	X		
I	*Bromus catharticus*	rescue grass	Poaceae	X			
I	*Bromus diandrus*	ripgut brome	Poaceae	X	X		
I	*Bromus hordeaceus*	soft chess	Poaceae	X	X		
I	*Bromus japonicus?*	hairy chess	Poaceae		X		
I	*Bromus madritensis*	foxtail brome	Poaceae	X	X		
N	*Calystegia malacophylla*	morning glory	Convulvalaceae	X			
N	*Calystegia purpurata ssp. purpurata*	smooth western morning glory	Convolvulaceae		X		
I	*Carduus pycnocephalus*	Italian thistle	Asteraceae	X	X		X
I	*Carduus tenuiflorus*	Slender-flowered thistle	Asteraceae	X	X		
N	*Castilleja exserta*	purple owl's clover	Orobanchaceae	X			
I	*Centaurea calcitrapa*	purple star thistle	Asteraceae				X
I	*Centaurea iberica*	Iberian knapweed	Asteraceae		X		
I	*Centaurea melitensis*	tocalote	Asteraceae	X	X	X	X
I	*Centaurea solstitialis*	yellow star thistle	Asteraceae		X	X	
I	*Centromadia fitchii*	spikeweed	Asteraceae			X	
I	*Chondrilla juncea*	skeletonweed	Asteraceae			X	X
I	*Cichorium intybus*	chicory	Asteraceae		X		
I	*Cirsium vulgare*	bull thistle	Asteraceae		X		
I	*Convolvulus arvensis*	field bind weed	Convolvulaceae	X	X	X	X
N	*Croton setiger*	turkey-mullein	Euphorbiaceae		X	X	X
I	*Cynara cardunculus*	cardoon	Asteraceae		X		
I	*Elymus ponticus*	tall wheat grass	Poaceae		X		

APPENDIX C. Plants observed in the survey area

Discovery Builders - Oak Creek Canyon Plant Inventory							
Native (N) or Introduced (I)	Scientific Name	Common Name	Family	Survey 1	Survey 2	Survey 3	Survey 4
				20-Apr-18	21-Jun-18	21-Aug-18	2-Oct-18
N	*Elymus triticoides*	beardless wild rye	Poaceae		X	X	
N	*Epilobium sp.*	willowherb	Onagraceae	X	X	X	X
I	*Erodium botrys*	longbeak stork's bill	Geraniacae	X	X		
I	*Erodium cicutarium*	redstem filaree	Geraniacae	X	X	X	X
I	*Erodium moschatum*	white stemmed filaree	Geraniacae	X			
I	*Euphorbia prostrata*	protrate sandmat	Euphorbiaceae			X	X
N	*Euphorbia serpyllifolia ssp. serpyllifolia*	spurge	Euphorbiaceae		X		
I	*Festuca perennis*	Italian rye grass	Poaceae	X	X		
I	*Foeniculum vulgare*	fennel	Apiaceae	X	X	X	X
I	*Fraxinus uhdei (?)*	Shamel ash	Oleaceae	X	X	X	X
I	*Gastridium phleoides*	nit grass	Poaceae	X			
I	*Geranium dissectum*	cutleaf geranium	Geraniacae	X			
I	*Hedypnois cretica*	cretanweed	Asteraceae	X			
I	*Hirschfeldia incana*	short-podded mustard	Brassicaceae		X		
I	*Hordeum marinum*	seaside barley	Poaceae	X			
I	*Hordeum murinum*	foxtail barley	Poaceae	X	X		
I	*Hordeum vulgare*	cultivated, common barley	Poaceae	X			
I	*Hypochaeris glabra*	smooth cat's ear	Asteraceae	X			
I	*Lactuca saligna*	willow lettuce	Asteraceae			X	
I	*Lactuca serriola*	prickly lettuce	Asteraceae	X	X		
I	*Lactuca virosa*	poison wild lettuce	Asteraceae		X	X	X
N	*Lupinus microcarpus*	chick lupine	Fabaceae	X			
I	*Medicago polymorpha*	bur clover	Fabaceae	X			
I	*Medicago sativa*	alfalfa	Fabaceae	X			
I	*Plantago lanceolata*	long leaf plantain	Plantaginaceae	X			
N	*Quercus douglasii*	blue oak	Fagaceae	X	X	X	X
I	*Raphanus sativus*	wild radish	Brassicaceae	X	X	X	X
I	*Robinia pseudoacacia*	black locust	Fabaceae	X	X	X	X
I	*Rumex crispus*	curly dock	Polygonaceae	X	X		
I	*Rumex pulcher*	fiddle dock	Polygonaceae		X	X	X
I	*Salsola tragus*	tumbleweed	Chenopodiaceae		X	X	X

APPENDIX C. Plants observed in the survey area

Discovery Builders - Oak Creek Canyon Plant Inventory							
Native (N) or Introduced (I)	Scientific Name	Common Name	Family	Survey 1	Survey 2	Survey 3	Survey 4
				20-Apr-18	21-Jun-18	21-Aug-18	2-Oct-18
N	*Sambucus sp.*	elderberry	Adoxaceae	X	X	X	X
I	*Schinus molle*	Peruvian pepper tree	Anacardiaceae	X	X	X	X
I	*Senecio glomeratus*	cutleaf burnweed	Asteraceae			X	
I	*Silybum marianum*	milk thistle	Asteraceae	X			
I	*Sinapis arvensis*	charlock	Brassicaceae	X	X		
I	*Sisymbrium altissimum*	tumble mustard	Brassicaceae		X		
I	*Sonchus asper*	prickly sow thistle	Asteraceae	X	X		
I	*Sonchus oleraceus*	common sowthistle	Asteraceae	X			
I	*Tribulus terrestris*	puncture vine	Zygophyllaceae		X		
N	*Trichostema lanceolatum*	vinegar weed	Lamiaceae		X	X	X
I	*Trifolium hirtum*	rose clover	Fabaceae	X			
N	*Umbellularia californica*	California bay laurel	Lauracea	X	X	X	X
I	*Urospermum picriodes*	Bristly tail seed	Asteraceae		X		
N/I	*Washingtonia filifera*	California fan palm	Palmaceae	X	X	X	X
I	*Xanthium spinosum*	spiny cocklebur	Asteraceae		X	X	X

APPENDIX D. Site Photos

Photo 1. Southwest corner. April 21, 2018. Capay clay soils. Ephemeral wash.

Photo 2. Southwest corner. April 20, 2018. Yellow mustard blooming in ephemeral wash.

APPENDIX D. Site Photos

Photo 3. View looking up the ephemeral wash. June 21, 2018. Disced.

Photo 4. View looking up the ephemeral wash. August 21, 2018. Disced.

APPENDIX D. Site Photos

Photo 4. View looking up the ephemeral wash. October 2, 2018. Disced.

Photo 5. Southwest corner from upper hillslope. June 21, 2018. Hillslope is Los Osos clay loam.

APPENDIX D. Site Photos

Photo 6. Southwest corner. August 21, 2018. Capay clay soils. Ephemeral wash.

Photo 7. Ephemeral drainage. June 21, 2018. Disced. Culvert to the left with silt fencing.

Photo 8. Ephemeral drainage. August 21, 2018. Disced. Culvert to the left with silt fencing.

Photo 9. Lower hillslope parallel to Marsh Creek Road. April 20, 2018. Perkins gravelly loam.

APPENDIX D. Site Photos

Photo 10. Disked lower hillslope parallel to Marsh Creek Road. June 21, 2018. Perkins gravelly loam.

Photo 11. Disked lower hillslope parallel to Marsh Creek Road. October 2, 2018. Perkins gravelly loam.

APPENDIX D. Site Photos

Photo 11. Main survey area on hillslopes. April 20, 2018. Los Osos clay loam.

Photo 12. Main survey area on hillslopes. June 21, 2018. Los Osos clay loam.

Photo 13. Main survey area on hillslopes east of water tank. June 21, 2018. Los Osos clay loam.

Photo 14. Main survey area on hillslopes east of water tank. August 21, 2018. Los Osos clay loam.

Photo 15. Main survey area on hillslopes east of water tank. August 21, 2018. Los Osos clay loam and Perkins gravelly loam.

Photo 15. Main survey area on hillslopes east of water tank. August 21, 2018. Los Osos clay loam.

DISCOVERY BUILDERS INC.

4061 Port Chicago Highway Suite H
Concord, CA 94520
(925) 682-6419 Phone
(925) 689-2047 Fax

TRANSMITTAL

TO: City of Clayton
60 Heritage Trail
Clayton, CA 94517-1250

DATE: 12-13-2019

ATTENTION: David Woltering

RE: Oak Creek Canyon

WE ARE FORWARDING THE FOLLOWING:

QUANTITY	DATE	DESCRIPTION
3 sets		Arborist Report 10-10-2019
3 sets		24 x 36 Arborist Tree Protection Plan
3 sets		Applicant response letter to city staff comment letter dated 8-14-2019

DELIVERED VIA: Hand delivered by Kevin English

US MAIL

TRANSMITTED AS INDICATED BELOW:

FOR YOUR USE

COMMENTS:

Kevin English
Director of Forward Planning & Land Acquisitions

Cc:

TRAVERSO TREE SERVICE
WHEN IT HAS TO BE DONE RIGHT

October 10, 2019

West Coast Homebuilders, Inc.
4061 Port Chicago Hwy Suite H
Concord, CA 94520
Attn: Kevin English
925-682-6419 | kenglish@discoverybuilders.com

Re: Arborist Report for Oak Creek Canyon, Marsh Creek Road & Diablo Parkway, Clayton

Dear Kevin,

This arborist report addresses the proposed subdivison for the property at Marsh Creek Road & Diablo Parkway, APN 119-070-008. Per the City of Clayton's Tree Protection Ordinance Chapter 15.70, the scope of work includes:

- Tag, identify and measure trees with a single trunk or multiple trunks with a cumulative diameter of 6" or greater at 4.5' above grade, on or overhanging the property within 50' of proposed improvements.
- Note trees that are considered protected per city ordinance, defined as any tree of the following species: Ash (*Fraxinus dipetala*), Bay (*Umbellularia californica*), Box Elder (*Acer negundo*), Buckeye (*Aesculus californica*), Cherry (*Prunus emarginata, P. illicifolia, P. subcordata*), Cottonwood (*Populus fremontii*), Elderberry (*Sambucus mexicana*), Hop Tree (*Ptelea crenulata*), Madrone (*Arbutus menziesii*), Maple (*Acer macrophyllum*), Oak (*Quercus agrifolia, Q. chrysolepis, Q. douglasii, Q. kelloggii, Q. lobata, Q. wislizeni*), Sycamore (*Platanus racemosa*), Walnut (*Juglans hindsii)*
- Identify dripline locations and tree numbers on site plan.
- Assess individual tree health and structural condition.
- Assess proposed improvements for potential encroachment.
- Based on proposed encroachment, tree health, structure, and species susceptibility, make recommendations for preservation.

Project Summary

The property is an undeveloped hilly site at the outskirts of Clayton (Figure 1). Current vegetation is consistent with the native hillsides of our region, consisting of annual grasses, weeds, with scattered trees. Existing improvements include asphalt paving, curbs & gutters, and water lines from the Contra Costa County Water District (CCCWD) property to the street.

A new subdivision will be constructed on the east half of the property, in addition to a new path parallel to Marsh Creek Road. Proposed V & J ditches may also affect two trees on the water district property.

Figure 1. The property is vacant and relatively clear of trees.

I included twenty-one (21) trees in my tree inventory. None are considered protected trees per city ordinance, though there are native oaks located in the CCCWD property and on the hillside far above the proposed subdivision. It is my opinion that nine (9) trees will need to be removed to accommodate the proposed project (Figure 2), seven (7) of which are notoriously weedy trees of heaven. The remaining twelve (12) trees can be retained given that the protection measures within this report are followed.

Figure 2. Two black locusts will need to be removed for a proposed path.

Assumptions & Limitations
This report is based on my site visit on 9/30/19, and vesting tentative map by Isakson & Associates, Inc. dated 9/5/19. It was assumed that the trees and proposed improvements were accurately surveyed. Off-site trees were not surveyed, so I approximately located them on the tree protection plan based on visual estimates of their locations.

The health and structure of the trees were assessed visually from ground level. No drilling, root excavation, or aerial inspections were performed. Internal or non-detectable defects may exist and could lead to part or whole tree failures. Due to the dynamic nature of trees and their environment, it is not possible for arborists to guarantee that trees will not fail in the future.

Tree Inventory & Assessment Table
#s: Each tree was given a number from #41-61 (off-site trees were not physically tagged). Their locations are given in the tree protection plan.
DBH (Diameter at Breast Height): Trunk diameters in inches were calculated from the circumference measured at 4.5' above average grade.

Health & Structural Condition Rating
Dead: Dead or declining past chance of recovery.
Poor (P): Stunted or declining canopy, poor foliar color, possible disease or insect issues. Severe structural defects that may or may not be correctable. Usually not a reliable specimen for preservation.
Fair (F): Fair to moderate vigor. Minor structural defects that can be corrected. More susceptible to construction impacts than a tree in good condition.
Good (G): Good vigor and color, with no obvious problems or defects. Generally more resilient to impacts.
Very Good (VG): Exceptional specimen with excellent vigor and structure. Unusually nice.

Age
Young (Y): Within the first 20% of expected life span. High resiliency to encroachment.
Mature (M): Between 20% - 80% of expected life span. Moderate resiliency to encroachment.
Overmature (OM): In >80% of expected life span. Low resiliency to encroachment.

DE: Dripline Encroachment (X indicates encroachment)
CI: Anticipated Construction Impact (L = Low, M = Moderate, H = High)

#	Species	DBH	Health	Structure	Dripline N	Dripline E	Dripline S	Dripline W	Age	DE	CI	Comments	Action
41	Black locust (*Robinia pseudoacacia*)	6	P	P	8	8	8	10	OM	X	H	4 of 5 stems dead. Major decay in remaining stem; girdled by barbed wire. 6" west of existing asphalt. Proposed path up to trunk.	Remove.
42	Black locust	14, 17	G-F	F-P	10	0	15	15	M	X	H	Co-dominant trunks. Sided for power line clearance. Barbed wire girdling stem. Asphalt road right up to trunk; trunk flare buried. Decay between stems. Proposed path up top trunk.	Remove.
43	Mexican fan palm (*Washingtonia robusta*)	20	G	G	4	4	4	4	Y	X	M	DBH estimated due to dense skirt of dead fronds. Trunk pushing against fence. 10' clear trunk. Proposed path 2' from trunk.	Provide 2' additional clearance from path; install temporary protection fencing.
44	Tree of heaven (*Ailanthus altissima*)	8.5, 12.5, 7, 6	F-P	F-P	15	18	18	15	M	X	H	Multiple stems at 2'. Barbed wire girdling smallest stem. Wire fence engulfed in lower trunk. 7' from proposed path. Notoriously weedy species.	Remove. Treat stumps with systemic herbicide.
45	Tree of heaven	4, 4	F	F	15	15	0	0	Y		L-M	Co-dominant stems at 1'. Stunted growth. Notoriously weedy species. 5' from proposed path.	
46	Tree of heaven	6, 5, 6	F	F	10	15	10	10	M	X	H	Co-dominant stems at 3' with included bark. Barbed wire starting to embed into trunk. Notoriously weedy species. In proposed path.	
47	Tree of heaven	5, 6.5	F	P	0	20	0	0	Y	X	H	Recent large branch failure at attachment point. Notoriously weedy species. 2' from proposed path.	
48	Tree of heaven	3.5, 4.5	F	F-P	18S				Y	X	H	Co-dominant trunks. All canopy to S. Notoriously weedy species. In proposed path.	
49	Tree of heaven	15.5	F	VP	20	20	20	20	M	X	M-H	Co-dominant stems at 3.5' with severe included bark; again at 5' with serious included bark. Notoriously weedy species. 5' from proposed path.	
50	Tree of heaven	10.5, 10	F	F-P	15	0	18	10	M	X	H	Co-dominant stems at 1.5'; one with large failure of secondary co-dominant stem. Notoriously weedy species. In proposed path.	

#	Species	DBH	Health	Structure	Dripline N	Dripline E	Dripline S	Dripline W	Age	DE	CI	Comments	Action
51	Eucalyptus (*Eucalyptus* sp.)	2.5, 4, 2	F	F	0	6	8	6	Y		L	Off-site, no tag, DBH estimated; not surveyed. Foliage half brown half chewed. Phototropic lean. Clear of construction.	None.
52	Eucalyptus	6, 3	G-F	F	0	8	10	10	Y		L	Off-site, no tag, DBH estimated; not surveyed. Trunk cankers. Clear of construction.	None.
53	Eucalyptus	8	G-F	G-F	6	8	10	8	Y		L	Off-site, no tag, DBH estimated; not surveyed. Clear of construction.	None.
54	Eucalyptus	6.5, 4, 3.5	G-F	F	6	6	10	12	M		L	Off-site, no tag, DBH estimated; not surveyed. Co-dominant stems at 1'. Moderate chewing damage of leaves. Clear of construction.	None.
55	Italian stone pine (*Pinus pinea*)	14, 17	G	G	10	12	18	20	M		L	Off-site, no tag, DBH estimated; not surveyed. Co-dominant stems at 3'. Trunk with minor lean down slope, partially corrected. Clear of construction.	None.
56	Eucalyptus	11	F	F	0	6	10	10	M		L	Off-site, no tag, DBH estimated; not surveyed. Decent structure in lower trunk; co-dominant stems at 8'. Clear of construction.	None.
57	Eucalyptus	19	F-P	F	20	8	20	18	M		L	Off-site, no tag, DBH estimated; not surveyed. More elongated scaffolds to S. Slightly sparse canopy. Clear of construction.	None.
58	Eucalyptus	15, 8	F	F	20	15	20	8	M		L	Off-site, no tag, DBH estimated; not surveyed. Elongated / large diameter scaffolds; decent single trunk. Small woody roots visible outside fence area. Clear of construction.	None.
59	Silver dollar gum (*Eucalyptus polyanthemos*)	28	G	F-P	25	25	10	20	M		L	Off-site, no tag, DBH estimated; not surveyed. Multiple co-dominant stems at 8' twisted with included bark. Minor branch failures. Clear of construction.	None.
60	Monterey pine (*Pinus radiata*)	30	G-F	G-F	15	15	18	15	M	X	L-M	Off-site, no tag, DBH estimated; not surveyed. Several 4" roots visible along fence line. Pitch flow may be due to birds/larger insects. 23' N of proposed V ditch.	Install temporary protection fencing.

#	Species	DBH	Health	Structure	Dripline N	Dripline E	Dripline S	Dripline W	Age	DE	CI	Comments	Action
61	Italian stone pine	11, 7, 22	G	F	18	18	18	18	M	X	M	Off-site, no tag. DBH estimated; not surveyed. Multiple trunks. 15' from proposed end of J-ditch.	Cleanly prune roots ≥ 2" diameter if encountered.

Tree Encroachment Summary

- Trees that will need to be removed: 41, 42, 44-49, 50 (9 trees)
- Trees to be saved that will be subjected to dripline encroachment: 43, 60, 61 (3 trees)
- Trees to be saved that will not be encroached: 51-59 (9 trees)

Discussion

The proposed homes have a minor impact on existing trees, since they are located in open areas. Construction encroachment primarily comes from the proposed paths along the south and east property lines. Two black locusts (#41 & 42, Figure 2) along the east property line will need to be removed. Neither tree is in excellent condition; one is nearly dead and the other has relatively poor structure. Their canopies also conflict with adjacent power lines, and clearance pruning has resulted in lopsided canopies.

The remaining tree removals consist of seven trees of heaven. The species is highly undesirable in both urban and natural habitats due to the following characteristics: can grow anywhere, especially disturbed areas; grows quickly with weak branches and wood; produces abundant quantities of seeds; vigorously re-sprouts from the entire root system if the top is damaged. Ideally, the stumps should be treated with systemic herbicide immediately after the trees are removed. Systemic herbicides will be absorbed into the trees, which will help kill roots and mitigate re-sprouting. Unfortunately, treatment is perhaps 60%-70% effective at best and may require multiple applications.

Two trees on the CCCWD property may be affected by the construction of the proposed J & V ditches. I suspect the Monterey pine (#60) will not be significantly affected, but it's likely that large roots ≥ 2" diameter will be encountered near the Italian stone pine (#61). If large roots are encountered, they should be cleanly pruned with a handsaw or sawzall.

The fan palm (#43, Figure 3) at the southeast corner of the property will be subject to moderate encroachment from the proposed path. Palms differ from trees in that they readily regenerate roots at the base of their trunks, so they tolerate disturbance closer than do trees. I still recommend moving the path a few feet further away to reduce encroachment.

Recommendations (to be printed on site plans)

Pre-construction

- Adjust proposed path design to provide 2' additional clearance from tree #43.
- Remove trees #41, 42 & 44-50. Treat stumps with systemic herbicide immediately after removal.
- Prior to construction or grading, contractor shall install fencing to construct a temporary Tree Protection Zone (TPZ) around trees #43 & 60 as indicated on the tree protection plan.
- TPZ fencing shall remain in an upright sturdy manner from the start of grading until the completion of construction. Fencing shall not be adjusted or removed without consulting the project arborist (PA).

Figure 3. Proposed path should be adjusted further from the palm tree (#43) to reduce encroachment.

Foundation, Grading, and Construction Phase

- If roots ≥ 2" diameter are encountered by tree #61 during construction of the proposed J-ditch, roots shall be cleanly pruned with a handsaw or sawzall.
- Pruning shall be performed by personnel certified by the International Society of Arboriculture (ISA). All pruning shall adhere to ISA and American National Standards Institute (ANSI) Standards and Best Management Practices.
- Should TPZ encroachment be necessary, the contractor shall contact the project arborist (PA) for consultation and recommendations.
- Contractor shall keep TPZs free of all construction-related materials, debris, fill soil, equipment, etc. The only acceptable material is mulch spread out beneath the trees.
- Should any damage to the trees occur, the contractor shall promptly notify the PA to appropriately mitigate the damage.

Thank you for the opportunity to provide this report, and please do not hesitate to contact me if there are any questions or concerns.

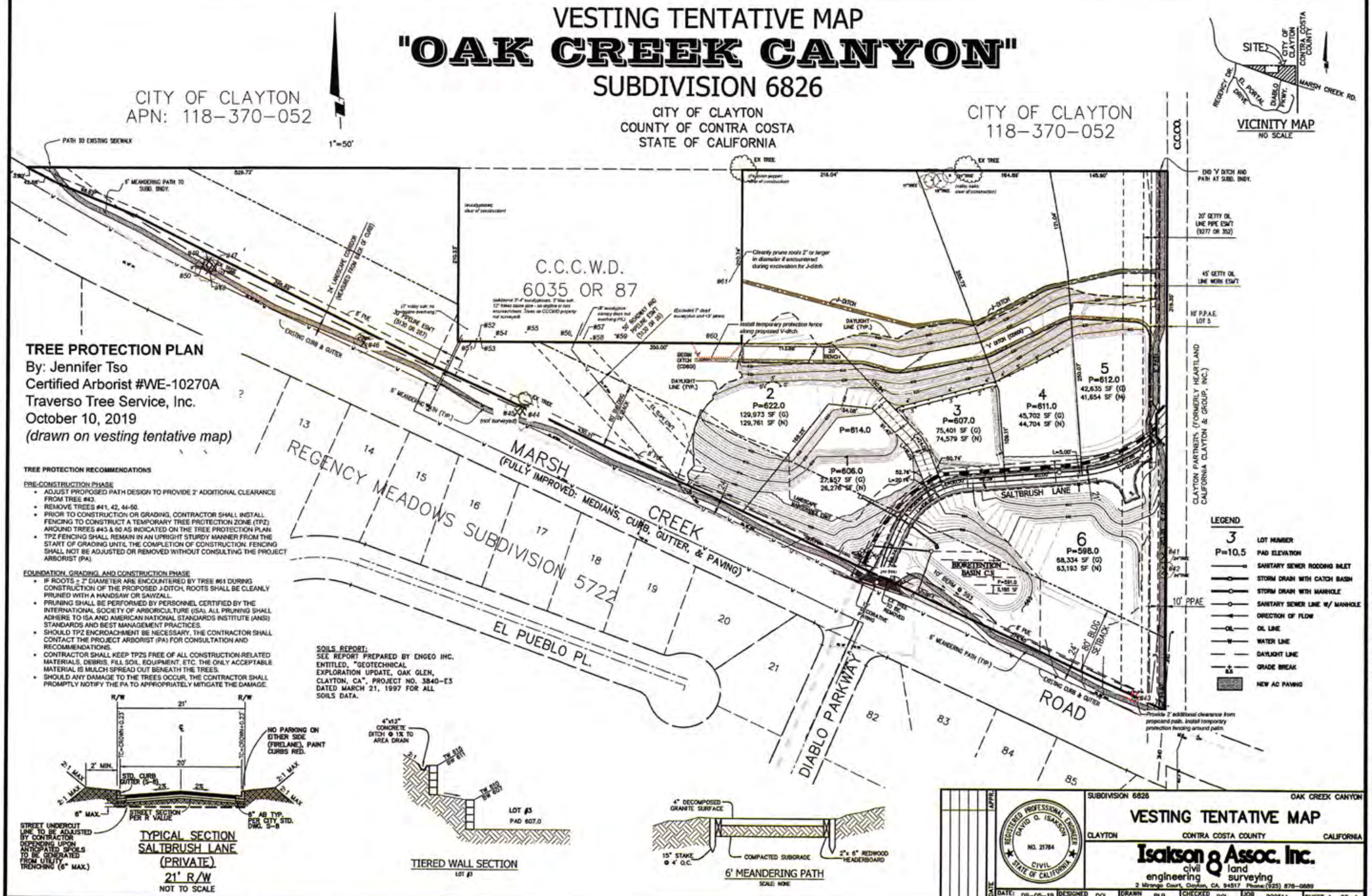
Please see attached tree protection plan.

Sincerely,

Jennifer Tso
Certified Arborist #WE-10270A
Tree Risk Assessor Qualified

VESTING TENTATIVE MAP
"OAK CREEK CANYON"
SUBDIVISION 6826

CITY OF CLAYTON
COUNTY OF CONTRA COSTA
STATE OF CALIFORNIA



TREE PROTECTION PLAN
By: Jennifer Tso
Certified Arborist #WE-10270A
Traverso Tree Service, Inc.
October 10, 2019
(drawn on vesting tentative map)

TREE PROTECTION RECOMMENDATIONS

PRE-CONSTRUCTION PHASE
- ADJUST PROPOSED PATH DESIGN TO PROVIDE 2' ADDITIONAL CLEARANCE FROM TREE #43.
- REMOVE TREES #41, 42, 44-50.
- PRIOR TO CONSTRUCTION OR GRADING, CONTRACTOR SHALL INSTALL FENCING TO CONSTRUCT A TEMPORARY TREE PROTECTION ZONE (TPZ) AROUND TREES #43 & 60 AS INDICATED ON THE TREE PROTECTION PLAN.
- TPZ FENCING SHALL REMAIN IN AN UPRIGHT STURDY MANNER FROM THE START OF GRADING UNTIL THE COMPLETION OF CONSTRUCTION. FENCING SHALL NOT BE ADJUSTED OR REMOVED WITHOUT CONSULTING THE PROJECT ARBORIST (PA).

FOUNDATION, GRADING, AND CONSTRUCTION PHASE
- IF ROOTS ≥ 2" DIAMETER ARE ENCOUNTERED BY TREE #61 DURING CONSTRUCTION OF THE PROPOSED J-DITCH, ROOTS SHALL BE CLEANLY PRUNED WITH A HANDSAW OR SAWZALL.
- PRUNING SHALL BE PERFORMED BY PERSONNEL CERTIFIED BY THE INTERNATIONAL SOCIETY OF ARBORICULTURE (ISA). ALL PRUNING SHALL ADHERE TO ISA AND AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARDS AND BEST MANAGEMENT PRACTICES.
- SHOULD TPZ ENCROACHMENT BE NECESSARY, THE CONTRACTOR SHALL CONTACT THE PROJECT ARBORIST (PA) FOR CONSULTATION AND RECOMMENDATIONS.
- CONTRACTOR SHALL KEEP TPZS FREE OF ALL CONSTRUCTION-RELATED MATERIALS, DEBRIS, FILL SOIL, EQUIPMENT, ETC. THE ONLY ACCEPTABLE MATERIAL IS MULCH SPREAD OUT BENEATH THE TREES.
- SHOULD ANY DAMAGE TO THE TREES OCCUR, THE CONTRACTOR SHALL PROMPTLY NOTIFY THE PA TO APPROPRIATELY MITIGATE THE DAMAGE.

SOILS REPORT:
SEE REPORT PREPARED BY ENGEO INC. ENTITLED, "GEOTECHNICAL EXPLORATION UPDATE, OAK GLEN, CLAYTON, CA", PROJECT NO. 3840-E3 DATED MARCH 21, 1997 FOR ALL SOILS DATA.

200514 - OAK CREEK CANYON (SUBD. 6826) TENTATIVE MAP - 09-05-2019

Appendix C

Geotechnical Report and Peer Review

UPDATED GEOTECHNICAL REPORT

OAK CREEK CANYON
5 LOTS - SUBDIVISION 6826
APN #119-070-008

CLAYTON, CALIFORNIA

SUBMITTED

TO

WEST COAST HOME BUILDERS INC.

CONCORD, CALIFORNIA

PREPARED

BY

ENGEO INCORPORATED

PROJECT NO. 3840.205.202

FEBRUARY 22, 2008

ENGEO
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
WATER RESOURCES
CONSTRUCTION SERVICES

Project No.
3840.205.202

February 22, 2008

Mr. Albert Seeno III
West Coast Home Builders, Inc.
4021 Port Chicago Highway
Concord, CA 94524-4113

Subject: Oak Creek Canyon
5 Lots - Subdivision 6826
APN #119-070-008
Clayton, California

UPDATED GEOTECHNICAL REPORT

Dear Mr. Seeno:

At your request and with your authorization, this report contains the results of our updated geotechnical report presenting our conclusions and recommendations regarding the current proposed development in Clayton, California.

It is our opinion that the proposed development is feasible from a geotechnical standpoint provided that the recommendations contained herein are incorporated into the project plans and implemented during construction. We are pleased to be of service to you on this project and will continue to consult with you and your design team as project planning progresses.

Very truly yours,

ENGEO Incorporated

Jason Bariel, PG
Project Geologist

Theodore P. Bayham, GE, CEG
Principal

jb/tpb/mb: supplemental exploration

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

INTRODUCTION

Purpose and Scope

This report is intended to provide supplemental exploration to address geologic and geotechnical peer review comments by James Joyce Associates on behalf of the City of Clayton, as well as provide an update to our previous work regarding geotechnical aspects for the current planned site development.

The scope of our services has included the following:

1. Review of previously published maps and reports regarding geological and geotechnical characteristics, and presence of landslides at the subject site and nearby properties.
2. Review of stereographic aerial photographs covering the site.
3. Excavation and logging of exploratory test pits and trenches.
4. Sampling and laboratory testing of subsurface materials.
5. Analysis of the geological and geotechnical data.
6. Preparation of this report summarizing our findings and geotechnical design recommendations.

This report was prepared for the exclusive use of West Coast Home Builders Inc. and their design team consultants. In the event that any changes are made in the character, design, or layout of the development, the conclusions and recommendations contained in this report should be reviewed by ENGEO to determine whether modifications to the report are necessary.

Site Location and Description

The approximate 6.5-acre site is situated along the north side of Marsh Creek Road and Diablo Parkway in Clayton, California (Figure 1). The site is further bounded by a private driveway to the east, and Contra Costa County water tank property to the northwest and open space up slope to the north. Currently, the water tank access road is situated across the western portion of the site. The triangular-shaped parcel generally slopes from north to south, with a level fill area constructed along the southeast corner of the property, and an existing swale traversing the property in a northeast-southwest direction between the level fill area and the slope. At the time of our field exploration, the subject site was open space used for cattle grazing. Site vegetation consisted of native grasses.

It is our understanding that a Getty Oil pipeline exists along the eastern boundary of the property and an abandoned pipeline runs east-westerly across the upper portions of the slope in the northern portion of the site. Representatives of Shell Pipelines informed us of another pipeline adjacent to the property along Marsh Creek Road. According to the tentative site plan, setbacks will be provided for these areas.

Previous Work by ENGEO

ENGEO Incorporated previously conducted subsurface exploration at the Oak Creek project site that included 5 lots (formerly known as Oak Glen Property) in 1994, which included the drilling 1 auger boring (Figure 4). In December 1997, ENGEO performed supplemental subsurface investigation which consisted of drilling 4 additional auger borings (see References). The 1997 report was updated again in 2001 (Reference 11). This study updated the geologic and geotechnical data and provided updated geologic mapping, as well as updated recommendations. In 2006, updated remedial grading recommendations based on revised grading plans provided by Isakson and Associates were provided along with revised remedial grading plan (Reference 12). The City of Clayton's peer reviewer, Joyce Associates (JA), advised further characterization of

the sites geology is warranted, including the existence of mapped Nilsen slide, the shallow mapped slide above Lots 1 and 2, and the geologic characteristics of the site bedrock. This report is intended to provide an update of previous findings, and address the comments provided by James Joyce Associates, and the recommendations in this report supersede those in all previous reports. We reviewed the previous reports and have incorporated data from those reports in our findings and conclusions, as appropriate.

Proposed Development

Based on grading plans by Isakson and Associates dated April 18, 2006, the current proposed development includes a 5-lot residential subdivision with interior subdivision roads and utilities servicing the development with a detention pond located in the southeast portion of the site. The majority of the development areas will have cut and fill slopes graded at 2:1. Lots 2 through 5 are flat lots. Lot 1 is a split lot with an 8 foot high 2:1 (horizontal to vertical) slope between the upper and lower pads. Lots 1 through 5 are cut/fill transition lots and Lot 1 is a fill lot. However, after the removal of the landslide material in the vicinity of Lots 1 and 2, Lot 2 will only require fill to achieve design grades. Slopes are generally 2:1 slopes up to 15 feet in height. Retaining walls are planned at the toe of slope in the rear portion of the lots. Cuts for the planned detention basin are approximately 5 feet.

REGIONAL GEOLOGY AND SEISMICITY

Regional Geology

The geologic deposits at the site are mapped as part of the Panoche Formation (Kp), Figure 2. These deposits typically consist of micaceous clay shale interbedded with sandstone (Dibblee, 2006). Surficial deposits along the eastern portion of the site are mapped by Dibblee as alluvium (Qa). Nilsen (1975) had mapped a landslide deposit covering the majority of the site with the eastern portion of the site consisting of a colluvial deposit or small alluvial fan deposit (Figure 3). The mapped Nilsen landslide has two main lobes, with the western lobe encompassing the ridge on the western portion of the site with the water tank, and the eastern lobe encompassing the less prominent ridge located in the center of the site. We did not find evidence of a landslide in the vicinity of the eastern lobe in our review of stereo aerial photographs or during our site visit. During our review of aerial photographs for the western lobe of the mapped landslide, we observed topographic features which could be indicative of an ancient landslide. However, these features could also be related to differential weathering of the bedrock.

The USDA Soil Conservation Services has classified the soil on the northern portion of the subject property as belonging to the Los Osos Series. These soils typically are low strength and consist of well-drained soils underlain by soft, fine-grained sandstone and shale. The USDA also characterized the Los Osos Series with a high shrink-swell potential, moderate to high erosion, and low permeability. The soils along the southwest and southeast portions of the property are classified by the USDA as belonging to the Capay Series and Perkins Series. These soils generally form in alluvial areas and have a moderate to high shrink/swell potential and are typically low to medium strength soils. The USDA describes these soils as having a high corrosivity to uncoated steel.

Faulting and Seismicity

The site is not located within an Alquist-Priolo Earthquake Fault Zone; however, large (>M6) earthquakes have historically occurred in the San Francisco Bay Area and many earthquakes of low magnitude occur every year. No active faults are known to pass through the project site, according to published geologic maps (Dibblee, 2006; Crane, 1988). The nearest active fault is the Greenville fault located approximately 1 mile southeast of the project site, which is capable of a maximum probable earthquake Richter magnitude of 6.9 with a maximum probable ground acceleration of 0.57g at the site (Blake, 1994). The Concord fault is located approximately 4 miles southwest of the site, and is capable of a maximum probable ground acceleration of 0.40g at the site. Other active faults in the San Francisco Bay Area capable of producing significant ground shaking at the site include the Calaveras fault, 10 miles southwest; the Cordelia fault, 22 miles northwest; the Green Valley Fault, 14 miles northwest, the Hayward fault, 17 miles west; and the San Andreas fault, 35 miles west.

The United States Geologic Survey has evaluated the Bay Area seismicity through a study by the Working Group on California Earthquake Probabilities (WGCEP, 2003). In their study, the WGCEP evaluated the 30-year probability of M6.7 or greater earthquakes in the Bay Area. According to their conclusions, the Bay Area has a 30-year probability of 62 percent for such an event. The Hayward - Rogers Creek and the Concord - Green Valley faults were assigned a 30-year probability of 27 percent and 4 percent, respectively. It should, therefore, be expected that the site will experience one or more episodes of strong ground shaking during the design life of the proposed improvements.

Clayton Fault. According to the Seismic Safety Element for Contra Costa County (1975), the Clayton fault is shown to dip easterly at approximately 70 degrees, with an east-side thrusting over the west block. Several studies have been performed on the nearby Clayton fault. Dibblee, 1980, shows the Clayton fault approximately 500 feet north of the northern boundary of the project.

According to previous site work performed by Brabb, et al., 1971, the Clayton fault is located approximately 2,000 feet north of the northern boundary of the project. A later study provided by Woodward-Lungren, 1974, mapped the possible southern limit of the Clayton fault at Marsh Creek Road, in a northwest-southeast line of projection along the western edge of the Contra Costa County reservoir.

An extensive study provided by Purcell, Rhoades & Associates in their 1978 soil and geological investigation for the neighboring Regency Meadows project south of Marsh Creek Road included the excavation of several trenches to determine the southern limits and location of the Clayton fault. Their findings did not indicate any signs of faulting on the proposed Regency Meadows development.

An independent study was concurrently performed by Purcell, Rhoades & Associates in 1978, which included the excavation of a trench along the northwestern boundary of the proposed Oak Creek Canyon (then Oak Glen) development, with the southeastern limits of the trench located at the rear of the Contra Costa County reservoir building pad. The results of this study indicated that the original fault delineation for the Clayton fault prepared by Woodward-Lundgren in 1974 did not extend into the proposed Oak Creek Canyon development, but rather followed either the orientation determined by Brabb, et al. in 1971, or extended further west at the base of the hills of the Keller Ranch property.

SUPPLEMENTAL FIELD EXPLORATION

To address several peer review comments by James Joyce Associates, ENGEO performed a supplemental field exploration on November 30 and 31, 2007. This exploration consisted of logging an additional 6 exploratory test pits and two exploratory trenches at the site. The approximate exploration locations of the test pits and trenches are shown on Figure 4. These locations were predetermined and reviewed by JA prior to field work. JA was consulted on the location of additional test pits and trench performed during the course of the field exploration. The test pits and trenches were located by pacing from existing features and the locations should be considered accurate to the degree implied by the method used.

The test pits were excavated throughout the site to a maximum depth of 13 feet at the locations shown on Figure 4. An ENGEO geologist logged the excavations. The test pits and trenches were excavated with an excavator equipped with a 30-inch bucket. The logs depict subsurface conditions within the test pits and at the time the exploration was conducted. Subsurface conditions at other locations may differ from conditions noted at these locations. In addition, stratification lines represent the approximate boundaries between soil types and the transitions may be gradual. The test pit and trench logs are presented in Figures 6 and 7.

LABORATORY TESTING

Following excavation, we reexamined the samples in our laboratory to confirm field classifications. Representative samples recovered from test pits were tested for the following physical characteristics:

Characteristic	Test Method	Location of Results Within this Report
Atterberg Limits	ASTM D-4318	Appendix A

Laboratory test results from samples recovered during our subsurface exploration of the site are included on the boring logs and in Appendix A as noted above. Laboratory testing from previous explorations has also been incorporated into our conclusions and recommendations where appropriate.

FINDINGS

Subsurface Conditions

Panoche Formation (Kp) - Bedrock at the site comprises interbedded sandstone, siltstone, and claystones of the Cretaceous Panoche Formation. In general, the sandstone is well cemented, moderately strong to strong, massive to laminated, orange brown where weathered. Siltstone is generally dark gray brown to orange brown, friable to moderately strong, and thin bedded. Claystone encountered is dark gray, friable to moderately strong, preferentially sheared, and thin bedded. Bedding observed in the test pits and trenches throughout the site ranged from a strike of S89W to N36W and dipping 10 to 50 degrees to the north or northeast.

Existing Fill (Qaf) - Existing man-made fills materials have been imported and placed in the lower lying flat portion of the site. Some of this material was placed as engineered fill and tested by ENGEO in 1995 in the southeast portion of the site as shown on the site geologic map. As of our final testing and observation report, the pad fills had not been completed. Of the planned fills, approximately 4 feet had been placed. A keyway and drain were constructed along the southern edge of the fill slope, draining to the ditch at the south western boundary of the site.

Alluvium (Qal) - The swale in the southeast portion of the site and the imported fills in the vicinity of the proposed detention basin are underlain by alluvium. Our previous explorations revealed several feet of existing fill are underlain by moderately expansive silty clay ranging from 2 to25 feet below ground surface. ENGEO drilled one boring associated with our 1994 exploration (Reference 9). The boring ended in alluvium at a depth of 26.5 feet. Bedrock was not encountered in the boring

Residual Soil and Colluvium (Qc). The site bedrock is typically mantled with about 2 to 3½ feet of residual soil formed from weathering and decomposition of the underlying bedrock. The

residual soil and colluvial soils generally consist of silty clay with varying sand; these soils are moderate to high in plasticity and considered highly expansive.

Deposits of soils exceeding 3½ feet have been designated as colluvium (Qc) and these occur in the swales and ravines and at the base of the slope in the vicinity of Lots 3, 4, and 5. Colluvium is a soil deposit formed from downslope movement and deposition of residual soil by such processes as slope-wash, sloughing/shallow sliding, and creep. Soil creep is the slow, nearly continuous downhill movement of the soil mantle on steep terrain induced by gravity and moisture-related volume changes. Several of the test pits excavated in swale areas across the site encountered colluvium to depths ranging from 4 to 7 feet. The colluvium typically consists of silty clay or clayey silt with occasional scattered rock fragments.

Landslide (Qls). As previously discussed a large landslide was mapped at this site by Nilsen, (Figure 3), which was discussed in References 10 and 11 by ENGEO. A principal focus of this current supplemental exploration was to further characterize site conditions to determine if there was any evidence of the mapped Nilsen slide. In Reference 11, ENGEO had identified a relatively shallow landslide involving soil landslide debris in the western swale above Lots 1 and 2. Trenches T-1, T-2, and test pits TP-2, TP-3, and TP-4 were excavated near the limits of the previous postulated large slide as shown on Figure 4. We encountered soil to a depth of up to 8 feet in our trenches and test pits overlying bedrock units. Cross-Section A-A' on Figure 8 drawn longitudinally through the shallow soil landslide depicts the probable geometry of the slide feature.

As discussed in Reference 11, we did not find evidence of the postulated large ancient landslide mapped by Nilsen in our review of stereo aerial photographs, or during this or our previous explorations. To resolve peer review comments about whether or not there exists evidence of the postulated Nilsen landslide, ENGEO performed two exploratory trenches at the limits of the mapped feature at the approximate location shown on Figure 4. Both trenches encountered

bedrock units of moderately weathered, and moderately to highly fractured claystone and siltstone interbedded with fine to medium grained, moderately to highly weathered sandstone typical of the Panoche Formation. The strike of bedding in trench T-1 ranged from N36W to N65W, dipping 10 to 38 degrees to the northeast. Increased weathering was noted from Stations 0+50 to 0+80 which coincided with the swale above the proposed Lots 1 and 2. In the same portion of the trench, the dip of bedding of the siltstone and sandstone became shallower, and we observed evidence of surficial expansive soil creep at the bedrock-soil contact. The strike of bedding in trench T-2 ranged from N55W to N62W; dipping from 35 to 39 degrees to the northeast. The bedding encountered in the trenches generally coincides with bedding observed in our exploratory test pits through out the subject property. We also observed continuous exposure of intact bedrock in both exploratory trenches. Based on the results of this supplemental exploration, we conclude that there is no evidence of the postulated large landslide feature mapped by Nilsen. Furthermore, during our supplemental trenching work, the City of Clayton contract geologic peer reviewer, Mr. Jim Joyce, CEG met with our Certified Engineering Geologist to observe the locations of and the conditions in the exploratory trenches and test pits; it was concurred by both ENGEO and Mr. Joyce that the length and locations of the trenches and test pits were adequate to determine there was no evidence of the deep-seated landslide as previously postulated by Nilsen.

Groundwater

Ground water was not encountered in the test pits or trenches at the time of excavation. Fluctuations in ground-water levels occur seasonally and over a period of years because of variations in precipitation, temperature, irrigation and other factors. Future irrigation may cause an overall rise in ground-water levels.

CONCLUSIONS

Based on our previous and current supplemental exploration, we conclude that the proposed development of site is feasible from a geotechnical standpoint. The recommendations included in this report, along with sound engineering practices, should be incorporated in the design and construction of the project.

Slope Stabilization Measures

ENGEO recommends that the surficial landslide and areas of colluvium mapped along slopes, in areas identified on Figures 4 and 5 be overexcavated and removed, and replaced with properly drained engineered fill. The location, extent and depth of the required overexcavation areas and anticipated subdrainage has been depicted on the Remedial Grading Plan (Figure 5). For clarity, remedial grading concepts are also depicted on the cross-sections provided in Figures 8 and 9.

Expansive Soils

The clayey soils at this site have Plasticity Indices (PI) ranging from 20 to 54, which indicates these are considered moderate to very high potential for expansion, shrink-swell behavior. Expansive soils shrink and swell as a result of Seasonal fluctuation in moisture content. This can cause heaving and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations. Building damage due to volume changes associated with expansive soils can be reduced through proper foundation design. Successful construction on expansive soils requires special attention during construction. It is imperative that exposed soils be kept moist by watering for several days before placement of concrete. Mitigation measures should include the prevention of moisture variation.

Compressible Soils

During our field explorations, layers of soft, medium stiff to stiff clay and silty clay were encountered to depths between approximately 4 and 13 feet below existing grades; these layers were typically encountered in the swales in the western and eastern portion of the site and in the alluvium and imported fills in the southeastern portion of the site. The fine-grained deposits in these areas appear to be potentially compressible and could result in measurable consolidation settlements. Compressible soils should be removed and replaced prior to fill placement in these areas. The actual depth of removal of soft and compressible soils should be determined during grading by the Geotechnical Engineer.

Seismic Hazards

Potential seismic hazards resulting from a nearby moderate to major earthquake may include primary ground rupture, ground shaking, lurching, liquefaction, dynamic densification, lateral spreading, and earthquake-induced landsliding. These hazards are discussed below. Risks from seiches, tsunamis, and inundation due to embankment failure are currently considered low at the subject site.

Ground Rupture. No known seismogenic faults have been mapped within the Oak Creek Canyon project site; therefore, the potential for ground rupture is considered low. Sympathetic ground movements due to an earthquake on a nearby active fault are possible, but the risk is anticipated to be very minor.

Ground Shaking. 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. To mitigate the shaking effects, all structures should be designed using sound engineering judgment and the latest California Building Code (CBC) requirements as a minimum.

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 prescribed lateral forces are generally considered to be substantially smaller than the equivalent forces that would be associated with a major earthquake. Structures should 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. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake (SEAOC, 1996).

Based on the subsurface soil conditions encountered and local seismic sources for seismic design the site can be classified as Soil Profile S_C in accordance with the 2007 California Building Code (CBC), and Site Class C in accordance with the 2006 International Building Code (IBC); the tables below provide seismic design criteria in accordance with the UBC and IBC.

TABLE I
2007 UNIFORM BUILDING CODE - Chapter 16

ITEM	DESIGN VALUE	SOURCE
Seismic Zone	4	Figure 16-2
Seismic Zone Factor	0.40	Table 16-I
Soil Profile Type	S_D	Table 16-J
Seismic Source Type	B	Table 16-U
Near Source Factor, N_a	1.3	Table 16-S
Near Source Factor, N_v	1.6	Table 16-T
Seismic Coefficient, C_a	$(0.44N_a)$	Table 16-Q
Seismic Coefficient, C_v	$(0.64N_v)$	Table 16-R

*Greenville fault located approximately 1.5 km from the site.

ITEM	DESIGN VALUE
Site Class	C
0.2 second Spectral Response Acceleration, S_s	1.5
1.0 second Spectral Response Acceleration, S_1	0.60
Site Coefficient, F_a	1.0
Site Coefficient, F_v	1.0
Maximum considered earthquake spectral response accelerations for short periods, S_{MS}	1.50
Maximum considered earthquake spectral response accelerations for 1-second periods, S_{M1}	0.90
Design spectral response acceleration at short periods, S_{DS}	1.00
Design spectral response acceleration at 1-second periods, S_{D1}	0.60

Lurching. Ground lurching is a result of the rolling motion imparted to the ground surface during energy released by an earthquake. Such rolling motion can cause ground cracks to form. The potential for the formation of these cracks is considered greater at contacts between deep alluvium and bedrock, such as those at the margins of valley flood plains. Such an occurrence is possible at the subject site as in other locations in the Bay Area, but the offset or strain is expected to be very minor. Proposed construction of engineered fills underlying all developed portions of the Oak Creek Canyon project is expected to mitigate this hazard.

Liquefaction. Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary loss of shear strength because of pore pressure build-up under the cyclic shear stresses associated with earthquakes. Based on the material types and densities (blow counts) of materials encountered in our borings, the risk of liquefaction is considered low to negligible at this site.

Earthquake-Induced Densification. Densification of loose sand above the groundwater level during earthquake shaking could cause settlement of the ground surface. In addition, densification

of liquefiable soils, below the ground-water level, can cause detrimental settlement at the ground surface. Loose sand layers were generally not encountered above the groundwater level and, as described above, the liquefaction potential within the Oak Creek Canyon project site is considered low. Therefore, the potential for earthquake-induced densification can be considered low.

Lateral Spreading. Lateral spreading is a failure within a nearly horizontal soil zone, commonly associated with liquefaction, which causes the overlying soil mass to move towards a free face or down a gentle slope. Since the potential for liquefaction is considered low, and the proposed development area is not adjacent to a free face, it is our opinion that lateral spreading is unlikely.

RECOMMENDATIONS

Grading

All grading and site development plans have been coordinated and should continue to be coordinated with the Engineering Geologist and the Geotechnical Engineer to modify the plans such that they mitigate known soil and geologic hazards. Detailed locations of keyways, subdrains, debris benches, and subexcavation areas should be shown on the final grading plans upon their completion. Sequence of grading issues, such as placement of various cut materials in specific locations, should have also been evaluated during review of final 40-scale grading plans.

The Geotechnical Engineer or qualified representative should be present during all phases of grading operations to observe demolition, site preparation, grading operations, and subdrain placement. The Geotechnical Engineer should be notified a minimum of 72 hours prior to the commencement of any grading or stripping operations at the site. This is to provide time to coordinate the work with the Grading Contractor. After the grading operations commence, geologic observations of cut areas should be made at frequent intervals. This is advised so that revised geologic recommendations can be incorporated into updated grading plans as grading proceeds.

Ponding of storm water, other than within engineered detention basins, should not be permitted at the site, particularly during work stoppage for rainy weather. Before the grading is halted by rain, positive slopes should be provided to carry the surface runoff to storm drainage structures in a controlled manner to prevent erosion damage.

Demolition and Stripping

Grading should begin with the removal of existing structures and associated foundation systems, any buried pipes, septic tanks, leach fields, debris piles, designated fences, trees and associated root

systems, and any other deleterious materials. Underground structures that will be abandoned or are expected to extend below proposed finished grades should be removed from the project site.

All existing non-engineered fill, vegetation and soft or compressible soils should be removed as necessary for project requirements. The depth of removal of these materials should be determined by the Geotechnical Engineer or qualified representative in the field at the time of grading. Evaluation of unsuitable deposits should be performed during grading by sampling and laboratory analyses.

Areas to receive fill, slabs-on-grade, or structural foundations and those areas that serve as borrow for fill should be stripped of existing vegetation. Topsoil is estimated to be from 4 to 8 inches in thickness depending on location. Actual depths will be determined by the Geotechnical Engineer or qualified representative in the field during grading. Site strippings should be reserved for placement on graded slopes prior to installation of proposed erosion control measures. After placement on graded slopes, any remaining strippings and organically contaminated soils which are not suitable for use as engineered fill may be used in approved open space areas or landscape areas. These materials may also be blended into engineered fills provided the organic content of the fill is increased less than 3 percent by weight of the non-stripping soils after blending. Any topsoil retained for future use in landscape areas should be approved by the Landscape Architect and stockpiled in areas where it will not interfere with mass grading operations.

All exploratory geologic test pits excavated during site explorations are shown on Figure 4. It will be necessary to remove and recompact all loose soil within the test pits, where it will remain below final grades and is located within proposed improvement areas. Within the development areas, excavations resulting from demolition, clearing, and/or stripping which extend below final grades should be cleaned to firm undisturbed soil as determined by the Geotechnical Engineer's representative.

Subgrade Preparation

Following demolition, clearing, and stripping, all areas to receive fill, slabs-on-grade or pavement should be scarified to a depth of at least 12 inches, moisture conditioned, and compacted to the requirements for engineered fill presented below. The finished subgrade should be firm and non-yielding under the weight of compaction equipment.

Fill Materials

The site soils and bedrock containing less than 3 percent organics are suitable for use as engineered fill. Import materials, if any are needed, must meet the requirements contained in Section 2.02B, Part I of the Guide Contract Specifications. The Geotechnical Engineer should be informed if any importation of soil is contemplated. A sample of the proposed import material should be submitted to the Geotechnical Engineer for evaluation prior to delivery at the site.

Placement of Fill

Overcompaction of expansive materials (PI >12) may produce an undesirable environment for expansion in the zone of significant seasonal moisture variation; therefore, special requirements for compaction of expansive soils are necessary within the upper 5 feet in building areas. This recommendation is not to be interpreted as a requirement to remove and replace the top five feet within all lots, but is to be used when fill is placed within the top 5 feet of finished grade. The following compaction control requirements should be generally applied to engineered fills.

TABLE II

DESCRIPTION	MATERIALS	MINIMUM RELATIVE COMPACTION (%)	MINIMUM MOISTURE CONTENT PERCENTAGE POINTS ABOVE OPTIMUM MOISTURE
Within the upper 5 ft	Expansive	87 to 92	+4 %
	Non-expansive	90	+2 %
From 5 to 20 ft	Expansive	90	+3 %
	Non-expansive	90	+2 %

Maximum dry densities and moisture contents should be determined in accordance with ASTM D-1557, latest edition. Plasticity Index determinations, and possibly supplemental swell test data, should be made as a part of grading control. All fills should be placed in lifts not exceeding 12 inches or the depth of penetration of the compaction equipment used, whichever is less.

Keyways

After stripping, mass grading should begin with construction of keyways and subdrains. All fills should be adequately keyed into firm natural materials unaffected by shrinkage cracks. Keyways should be compacted in accordance with the specification presented above for fills greater than 5 feet deep. Anticipated keyway sizes and locations should be determined based on the final grading plans by the Geotechnical Engineer. Typical minimum keyway sizes and subdrains are shown on Figure 10 and 11. The actual depth of the keyways will be determined in the field by the Geotechnical Engineer during grading. Filling above keyways should be benched into firm competent soil or bedrock and drained as appropriate. Unless otherwise recommended by the Geotechnical Engineer, benches should be constructed at vertical intervals of not less than 5 feet.

Debris Benches

Debris benches with keyways will be required at the toes of cut or natural slopes as shown on the remedial grading plan. The debris bench should be provided with a concrete V-ditch discharging

into an approved outlet. All debris benches will require periodic maintenance consisting of the removal and disposal of accumulated slope detritus. Proper access should be provided for the heavy equipment which may be required for removal of slide debris from benches and paved areas. All debris benches and buttress fills should be jointly designed by the Civil and Geotechnical Engineers to optimize stability, cut/fill balance, and drainage concerns. Recommendations for mass grading are generally applicable to landslide reconstruction and buttress fill installation.

Construction of Subsurface Drainage Facilities

Subsurface drainage systems should be installed in all keyways, swales or natural drainage areas, and landslide removal areas. Swales and drainage courses should be overexcavated to a firm base as determined by the Geotechnical Engineer during grading. A trench subdrain should then be installed through the center of the subexcavation as shown in Figure 11. The approximate locations of the recommended subdrains should be shown on the final grading plans. Depending on the actual conditions encountered during grading, similar subsurface drainage facilities may be recommended within existing stock ponds, springs or low-lying areas.

Subdrains should also be added where wet conditions are encountered during excavations. Subdrain systems should consist of a minimum 6-inch-diameter perforated pipe encased in at least 18 inches of Caltrans Class 2 permeable material or coarse drain rock wrapped in geotextile filter fabric. For selected keyway and bench subdrains, premanufactured synthetic edge drains may be substituted for the perforated pipe and permeable material. Typical subdrain details are shown in Figure 11. The subdrain pipe should meet the requirements contained in Section 2.05, Part I of the Guide Contract Specifications. Discharge from the subdrains will generally be low but in some instances may be continuous. Subdrains should outlet into open drainages or the proposed storm drain system, and their locations should be documented for future maintenance.

In addition, we recommend installing subdrains along the toes of downhill slopes adjacent to cut lots within the residential development. The subdrains should be located at the toes of slopes used

to transition between cut lots. The subdrain system should be at least 3 feet deep and 12 inches in width. The subdrain should consist of a 4-inch-diameter perforated pipe, perforations placed down, surrounded by a filter medium. The filter medium may consist of Class 2 permeable material or clean, crushed rock or gravel encapsulated in filter fabric. The top 12 inches of subdrain trench backfill should consist of native compacted soil. Where solid pipe is used as the collector to discharge to an approved outlet, the trench backfill material should consist of native compacted soil.

Not all sources of seepage have been uncovered during our field work because of the intermittent nature of some of these conditions and their dependence on long-term climatic conditions. Furthermore, new sources of seepage may be created by a combination of changed topography, manmade irrigation patterns and potential utility leakage. Since uncontrolled water movements are one of the major causes of detrimental soil movements, it is of utmost importance that the Geotechnical Engineer be advised of any seepage conditions encountered during grading so that remedial action may be initiated, if necessary.

Cut-Fill Transition Lots and Cut Lots

Some single-family lots in this project will likely be entirely in cut or traversed by a cut/fill transition. It can be anticipated that significant variations in material properties may occur in areas of cut or cut/fill transition if not mitigated during site grading. It is our opinion that there is a potential for significant differential in swell characteristics across cut areas and cut/fill transitions. Such situations can be detrimental to building performance. Figure 12 represents the typical overexcavation recommended to mitigate the effects of differential materials located under a structure. In summary, we recommend that cut lots be overexcavated 2 feet, scarified 12 inches, and recompacted; cut/fill transition lots should be overexcavated 3 feet to provide a uniform thickness of engineered fill within the entire foundation area.

Graded Slopes

In general the following slope gradient guidelines may be applied for mass grading design of both permanent cut and fill slopes:

TABLE III

ALLOWABLE SLOPE GRADIENT (H:V)	MAXIMUM ALLOWABLE SLOPE HEIGHT (FT)		
	GENERAL (On Site Material)	GENERAL FILL WITH GEOGRID REINFORCEMENT	SELECTED FILL On low to moderate expansive
2:1	8	20	20
2.5:1	15	40	40
3:1	>15	>40	>40

The current grading plan utilizes 15 foot high 2:1 slopes throughout the project. It is our opinion, that these planned 2:1 slopes are acceptable provided that stabilization measures are utilized, such as overexcavation and reconstruction as engineered fill buttress slope with select fill materials with a Plasticity index of 25 or less, or reconstruction as an engineered fill buttress slope with geogrid reinforcement for materials with PI's greater than 25. The geogrid reinforcement shall consist of Tensar BX1200 or approved equivalent and have a width of 11 feet minimum, measured from the face of the finished slope into the slope horizontally. For convenience, a full roll width of 13.1 feet can be used. The recommended spacing between layers shall be 3 feet typical from the toe of the slope to within 4 feet of the top of the reinforced slope. Verification of the actual slope gradient is the responsibility of the contractor and surveyor.

All cut slopes should be viewed by the Engineering Geologist during slope grading for adverse bedding, seepage, or bedrock conditions which may affect slope stability. In the event that adverse geologic conditions are detected during grading of the cut slopes, overexcavation and reconstruction of these slopes may be necessary. Track rolling to compact faces of slopes is not sufficient. Slopes should be overbuilt at least 2 feet and cut back to design grades.

Unsuitable Material Removal Area (Alternate)

As an alternative to generate additional onsite fill material, identified areas above Lots 1 and 2, as depicted on Figures 5 and 8, may be removed and such materials may be incorporated into engineered fills at the site. We estimate the final grades in these areas would be as depicted in Figures 8 as the "Optional Proposed Grades". During grading, supplemental recommendations related to remedial grading and/or subdrainage would be provided as necessary. If unsuitable bedrock conditions are encountered during grading the unsuitable material should be over-excavated 15 feet, measured horizontally, and grades restored using properly drained engineered fill. For slopes steeper than 3:1 additional slope stabilization measures, such as geo-grid reinforcement may also be necessary.

Foundation Recommendations

The proposed house structures may be supported utilizing a number of foundation alternates as discussed in the following sections of this report. It has been our experience that pier-and-grade-beam foundations are suitable for lots where building areas will be located in proximity to or along slopes, or where building areas may have a split-level condition. Where fills underlie building envelopes and subdrainage is present an alternate system such as shallow continuous footings may be appropriate. For relatively level pads setback at least 10 feet from downslope areas the use of post-tensioned slabs, structural mat foundations is preferred. If near-slope portions of lots are supported with properly designed retaining walls, spread footing or structural mat foundations may be designed for level-ground conditions may be acceptable. The following table summarizes the recommended and alternative foundation types for the subject lots:

TABLE IV
Recommended Foundation Types by Lot Number

Lot Numbers	Preferred Foundation Alternate	Optional Foundation Alternate
1	Continuous Spread Footings	Pier-and-grade-beam
2, 3, 4, and 5	Post-Tensioned Slab	Continuous Spread Footings ; Pier-and-grade-beam

Pier-and-Grade-Beam Foundations. The proposed houses may be supported on a friction pier-and-grade-beam foundation system as listed in Table IV. In pier foundation design, deeper more widely spaced piers with stiffer grade beams are preferred in order to make the foundation design less susceptible to changes in subgrade conditions over time. The following criteria should be used to design the piers:

TABLE V
Pier-and-Grade-Beam Recommendations

Minimum pier depth:	10 feet minimum and 5 feet into competent bedrock, whichever is greater in depth.
Minimum pier diameter:	16 inches for piers up to 20 feet deep; and 18 inches for piers greater than 20 feet deep.
Minimum pier spacing:	3 pier diameters, center-to-center. Where closer spacing is unavoidable, the piers should be designed with a reduced skin friction of 330 psf.
Maximum allowable skin friction:	500 pounds per square foot (psf). This value may be increased by one-third when considering seismic or wind loads. Friction in the upper 36 inches or as should be ignored.

Piers located on or within 5 feet (measured horizontally) of downhill slopes should be designed to resist lateral creep loads using a uniform pressure of 300 psf acting on 1½ times the pier diameter against the upper 3 feet of the pier. Lateral loads may be resisted by passive pressures generated by the soils below a depth of 3 feet. For passive resistance, an equivalent fluid weight of 300 pounds per cubic foot (pcf) acting on 2 times the pier diameter may be used for the portions below a depth of 3 feet. The pier reinforcement should be designed by the Structural Engineer. Where applicable, the pier reinforcement should be tied to the grade beam as recommended by the Structural Engineer.

The pier spacing should be determined from the load-bearing capacity of the piers. All exterior and interior piers should be tied together with a well-reinforced grade-beam system to act as a rigid grid. The grade-beam reinforcement will be dependent on the pier spacing and the structural loads to be supported, but in no case should less than four No. 5 rebar be used, two in the top and two in the bottom of the beam. Grade beams should be constructed to span between the piers without bearing on the underlying expansive soil. We recommend that a minimum 2-inch void be constructed below grade beams by placing a compressible material at the soil surface prior to casting concrete. The void-forming material should be approved by ENGEO prior to construction. Grade beams should be kept to the minimum width that is structurally practical to avoid uplift forces associated with swelling soils. Isolated piers may be used to support floor loads and isolated point loads; however, the number of isolated piers should be kept to a minimum. We will be glad to consult with your Structural Engineer on this matter on a case-by-case basis.

Provisions must be made to prevent surface water from flowing under the structure. To cause water to flow away from the structure, at least 6 inches of soil should be placed and compacted on the outside of the grade beam, and sloped away from the foundation at right angles to the grade beam. Pier hole drilling should be done under the observation of the Geotechnical Engineer or his/her qualified representative to confirm that the above recommendations are being complied with and so that alternative action may be implemented when subsurface conditions vary from those encountered in our explorations. If refusal to drilling is encountered, the Geotechnical Engineer, in consultation with the Structural Engineer, should determine what measures, if any, need to be taken. In order to minimize potential future pier settlements, all loose soil should be removed from the bottom of pier holes prior to placing concrete. Pier holes should not be allowed to desiccate before pouring concrete. Depressions at the top of the piers resulting from drilling operations or from any other cause should be backfilled to prevent ponding, and concrete collars occurring at the top of the piers as a result of excess concrete placement should be removed to prevent unnecessary uplift forces against the piers. The

foundation plans should be reviewed by the project Geotechnical Engineer when they become available to check for conformance with the above recommendations.

Continuous Spread Footings. Structures may be supported on shallow continuous spread "T"-footings. This system may be combined with raised floor systems or slabs-on-grade. The footings should be interconnected and have a minimum width of 15 inches and have a minimum depth of embedment of 24 inches. The depth of the footings should be measured from the lowest adjacent finished grade. Embedment depth of footings should be increased to a minimum depth of 36 inches for footings along slopes and/or located closer than 5 feet (measured horizontally) to downslope areas that are steeper than 5:1 (horizontal to vertical).

Continuous footings should be designed by a Structural Engineer and reinforced with top and bottom steel to provide structural continuity and to permit spanning of local irregularities. Footings should be designed to form a rigid interconnected grid and reinforced to accommodate a differential movement of 1 inch over 20 feet. In addition, the structural engineer should consider designing the footing reinforcement to limit excessive deflections in the framing and wall finishes.

The shallow continuous footings should be designed for an allowable bearing pressure of 2,500 pounds per square foot (psf); this value may be increased by one-third for wind and seismic loads. A passive resistance pressure of 300 pounds per cubic foot (pcf), equivalent fluid weight, may be used for design if the area in front of the footing is level for at least 8 feet, where the upper 1 foot of footing embedment should be neglected for passive resistance pressure. For foundations located less than 8 feet from the edge of slopes (measured horizontally) passive resistance should be neglected in the upper 3 feet of foundation embedment. A base friction factor of 0.30 may be used in the design.

Footings founded in expansive soils may be subjected to detrimental uplift forces along the sides of the footings. To help reduce the potential for uplift pressures in expansive soils, we recommend the portion of these foundations above the top of the footings be formed and the top of the footings should be a minimum of 18 inches below the lowest adjacent grade. Footing excavations should be kept moist prior to placing foundation concrete and should be backfilled with native soil. The foundation plans should be reviewed by a Geotechnical Engineer when they become available to check for conformance with these recommendations.

Post–Tensioned Slabs. Post-tensioned slabs are suitable to support the proposed structures as listed in Table IV above. We recommend a 10-inch minimum slab thickness. The perimeter should be thickened an additional 2 inches, with a 6-inch minimum soil backfill height against the slab at the perimeter. The post-tensioned slabs should be designed to impose a maximum allowable bearing pressure of 1,000 pounds per square foot (psf) for dead-plus-live loads. This value may be increased by one-third when considering wind and seismic loads. The proposed structure may not be capable of undergoing the differential movements that the mat can sustain; hence, stiffeners may have to be considered. The Structural Engineer should be consulted on this matter.

The following recommendations reflect the latest California Building Code that requires PT criteria per the Post-Tensioning Institute "Design of Post-Tensioned Slabs-on-Ground" Third Edition:

Center Lift Condition:

Edge Moisture Variation Distance, em = 5.0 feet
Differential Soil Movement, ym = 4.0 inches

Edge Lift Condition:

Edge Moisture Variation Distance, em = 4.0 feet
Differential Soil Movement, ym = 1.7 inches

A uniform subgrade material should be provided under post-tensioned mats. The top 12 inches of pad subgrade should be moisture conditioned at least 2 percentage points above optimum moisture content by sprinkling subgrade soils uniformly immediately prior to concrete placement. Do not allow the subgrade to dry prior to concrete placement.

Slab Moisture Vapor Reduction. When buildings are constructed with concrete slabs-on-grade, such as post-tensioned mats, water vapor from beneath the slab will migrate through the slab and into the building. This water vapor can be reduced but not stopped. Vapor transmission can negatively affect floor coverings and lead to increased moisture within a building. When water vapor migrating through the slab would be undesirable, we recommend the following to reduce, but not stop, water vapor transmission upward through the slab on grade.

1. Install a vapor retarder membrane directly beneath the slab. Seal the vapor retarder at all seams and pipe penetrations. Vapor retarders shall be Class A vapor retarder in accordance with ASTM E 1745 "Standard Specification for Plastic Water Vapor Retarders used in Contact with Soil or Granular Fill under Concrete Slabs." Vaper retarders should be installed and sealed as recommended by the manufacturer and at all seams and pipe penetrations..
2. Concrete shall have a concrete water-cement ratio of no more than 0.5.
3. Provide inspection and testing during concrete placement to check that the proper concrete and water cement ratio are used.
4. Consider moist cure slabs for a minimum of 3 days.

The Structural Engineer should be consulted as to the use of a layer of clean sand (less than 5 percent passing the U.S. Standard No. 200 Sieve) placed on top of the vapor retarder membrane to assist in concrete curing. In our past experience, we have observed that concrete slabs retain moisture and may take several months to fully hydrate. Provide sufficient time to air dry floor slabs before floor covering application, such as vinyl floor tile and wood flooring placement. Alternatively, apply a floor sealant over the concrete to minimize moisture from accumulating under the flooring. Also, the use of a lower water/cement ratio and higher strength concrete will reduce

the amount of water in the slab and help expedite the hydration time. Protect foundation subgrade soils from seepage by providing impermeable plugs within utility trenches as described in the "Utilities" section.

Foundation Drainage. For a raised floor system, it is recommended that subsurface drains be provided around the perimeter of the residential houses to help collect subsurface seepage beneath foundations, as illustrated on Figure 13. The subdrainage trench should be at least 12 inches wide and extend at least 6 inches below the bottom of the perimeter grade beam. The trench should be provided with a 4-inch-diameter perforated pipe (with perforations down) surrounded by either Class 2 permeable material or drain rock encapsulated in filter fabric (6-oz. minimum). All trenches and pipes should have a minimum slope of 1 percent, and must be constructed within 12 inches of the foundation. ENGEO should be consulted if these criteria can not be achieved.

The under-floor area should be sloped away from the foundation and drain into crawlspace drain inlets to remove any water that may enter the crawl space. This drain should outlet into an approved location well outside the structure, or if approved by the Geotechnical Engineer, may connect into the perimeter subdrain outlet system as shown on Figure 13. In addition, under-floor crawl spaces should be provided with a liberal number of ventilation openings to reduce differential soil moisture conditions.

Closed roof downspout collector pipe and perimeter subdrains can be constructed in a single trench, if desired; however, the closed collector pipe must be placed above the subdrain pipe and in no case may the subdrain pipe be connected to the closed drain pipe system. In addition, under-floor crawl spaces should be provided with a liberal number of ventilation openings to reduce differential soil moisture conditions in accordance with current building code requirements.

Secondary Slab-on-Grade Construction. This section provides guidelines for secondary slabs such as porch slabs, exterior patio slabs, walkways, driveways, and steps. Secondary slabs-on-grade should be constructed structurally independent of the foundation system. This allows slab movement to occur with a minimum of foundation distress. Where slab-on-grade construction is anticipated, care must be exercised in attaining a near-saturation condition of the subgrade soil before concrete placement. Slabs-on-grade should be designed specifically for their intended use and loading requirements. Some of the site soils have a high expansion potential; therefore, cracking of conventional slabs should be expected. As a minimum requirement, slabs-on-grade should be reinforced for control of cracking. Slab reinforcement should be designed by the Structural Engineer. In our experience, welded wire mesh is generally not sufficient to control slab cracking. Therefore, we recommend the Structural Engineer consider using a minimum of No. 3 bars for design of the slab reinforcement.

Slabs-on-grade should have a minimum thickness of 4 inches with a thickened edge extending at least 6 inches into compacted soil to minimize water infiltration. A 4-inch-thick layer of clean crushed rock or gravel should be placed under sidewalk and driveway slabs. As an alternative to providing a 6-inch-thick edge, a minimum 5½-inch-thick slab could be placed over 4 inches of clean crushed rock or gravel.

Retaining Walls

Small retaining walls may be used in conjunction with the planned development. If incorporated into house design, retaining walls not free to deflect (or rotate at the top) should be designed as restrained walls, and at-rest earth pressures should be used. Other retaining walls not adjoining house structures may be designed for active earth pressures since these walls are anticipated to be free to rotate at the top of the walls.

Retaining walls should be designed to withstand the following equivalent fluid pressures, which do not include increases due to surcharge and hydrostatic pressures.

Backfill Slope Condition (horizontal:vertical)	Active Pressure (pounds per cubic foot)	At-Rest Pressure (pounds per cubic foot)
Level	50	75
4:1	55	80
3:1	60	90
2:1	70	100

Retaining walls supported on shallow continuous footings should have a minimum width of 15 inches and have a minimum depth of embedment of 24 inches. The depth of the footings should be measured from the lowest adjacent finished grade. Embedment depth of footings should be increased to a minimum depth of 36 inches for footings along slopes and/or located closer than 5 feet (measured horizontally) to downslope areas that are steeper than 5:1 (horizontal:vertical). The shallow continuous wall footings should be designed for an allowable bearing pressure of 2,000 pounds per square foot (psf); this value may be increased by one-third for wind and seismic loads. A passive resistance pressure of 300 pounds per cubic foot (pcf), equivalent fluid weight, may be used for design if the area in front of the wall is level for at least 8 feet. The upper one foot of wall embedment should be neglected for passive resistance pressure. For foundations located less than 8 feet from the edge of slopes (measured horizontally) passive resistance should be neglected in the upper 3 feet of wall embedment. To develop passive resistance, the designer may consider incorporating a structural key incorporated into the footing, provided the key is located at least 8 feet from the face of the slope. A base friction factor of 0.35 may be used in the design.

For retaining walls supported on drilled piers, the following criteria are recommended. The drilled piers should be at least 12 inches in diameter and designed for an allowable skin friction of 500 psf. Skin friction should be disregarded in the upper 12 inches of embedment. Resistance to lateral loads can be obtained from passive resistance against the drilled pier face. Passive

resistance can be calculated by using 300 pcf equivalent fluid weight, using a shape factor of 2.0. Passive pressure should be neglected in the upper one foot of embedment at the toe of the wall. For piers located along slopes, the uppermost 3 feet of embedment should be neglected for passive resistance.

Drilled piers should be free of loose soil and debris prior to concrete placement. If water collects in the pier shaft, it should be pumped out prior to the placement of concrete. Concrete should be placed by means of a tremie-pipe or similar device to avoid concrete contamination by soils dislodging from the pier shaft. Drilling below bedrock may be difficult and require drill rigs capable of drilling moderately strong sandstone bedrock materials, and the use of rock barrels/buckets may be needed to maintain plumbness and the integrity of piers.

All retaining walls should be provided with drainage facilities to prevent the build-up of hydrostatic pressures behind them. Wall drainage may be provided using a 4-inch-diameter perforated pipe (SDR 35 or approved equivalent) embedded in Class 2 permeable material, or free-draining gravel surrounded by synthetic filter fabric. The width of the drain blanket should be at least 12 inches. The drain blanket should extend to about one foot below the finished grades. As an alternative, prefabricated synthetic wall drain panels can be used. The upper foot of wall backfill should consist of on-site clayey soils. Drainage should be collected by perforated pipes and directed to an outlet approved by the Civil Engineer.

Retaining Wall Drainage.

All retaining walls should be provided with drainage facilities to prevent the build-up of hydrostatic pressures behind the walls. Wall drainage may be provided using a 4-inch-diameter perforated pipe (such as SDR-35 or approved equivalent) embedded in free-draining gravel surrounded by synthetic filter fabric (at least 6 ounces per square yard), or Class 2 permeable material. The thickness of the drainage medium extending up the back of wall should be at least 12 inches and should extend to approximately one foot below finished grades. The upper one foot of wall backfill should consist of compacted site soil materials. As an alternative, prefabricated synthetic wall drain panels, which meet the minimum requirements listed in the Guide Contract Specifications and are pre-approved by ENGEO, can replace the granular drainage medium. Drainage should be collected by solid pipes and directed to an outlet approved by the Civil Engineer. All backfill should be placed in accordance with the recommendations provided above for engineered fill. Light equipment should be used during backfill compaction to minimize possible overstressing of the walls. The foundation details and structural calculations for the walls should be submitted for review.

Preliminary Pavement Design

The following preliminary pavement section has been determined for a Traffic Index of 5 and the assumed R-value of 5 according to methods contained in Topic 608.4 of Highway Design Manual by Caltrans and City of Clayton requirements.

Traffic Index	AC (inches)	AB (inches)
5.0	3.0	10.0
6.0	3.5	13.0
7.0	4.0	15.5

Notes: AC is asphaltic concrete
AB is aggregate base Class 2 Material with minimum R = 78

The above pavement section is provided for estimating only. The actual subgrade material should be tested for R-value. The Traffic Index should be confirmed by the Civil Engineer and the City of Clayton. Pavement materials and construction should conform to the specifications and requirements of the Standard Specifications by the Division of Highways, Department of Public Works, State of California, city requirements and the following minimum requirements.

- All pavement subgrades should be scarified to a depth of 12 inches below finished subgrade elevation, moisture conditioned to at least 3 percentage points above optimum, and compacted to at least 90 percent relative compaction and in accordance with city requirements (ASTM Methods).
- Subgrade soils should be in a stable, non-pumping condition at the time aggregate baserock materials are placed and compacted.
- Adequate provisions must be made such that the subgrade soils and aggregate baserock materials are not allowed to become saturated.
- Aggregate base materials should meet current Caltrans specifications for Class 2 Aggregate Base and should be compacted to at least 95 percent of maximum dry density at a moisture content of at least optimum (ASTM Methods).
- Asphalt paving materials should meet current Caltrans specifications for asphalt concrete and should be compacted to at least 95 percent of maximum wet density (Caltrans Methods) unless otherwise noted by the City.
- All concrete curbs separating pavement and irrigated landscaped areas should extend into the subgrade and below the bottom of adjacent aggregate baserock materials. Alternatively, median and edge drains can be installed to help prevent infiltration of water under pavement areas.

Drainage Requirements

It is very important that all lots be positively graded at all times to provide for rapid removal of surface water. Ponding of water under floors or seepage toward foundation systems at any time during or after construction must be prevented. As a minimum requirement, finished grades should

generally provide a slope of at least 3 percent within 5 feet from exterior walls at right angles to them to allow surface water to drain positively away from the structures. Care should be exercised to ensure that landscape mounds will not interfere with these requirements. All lots should be drained individually. Storm water from roof downspouts should be conveyed in closed drain systems to an outlet that extends through the curb or to an approved outlet.

If planting adjacent to a building is desired, the use of plants that require very little moisture is recommended. Trees should be avoided in close proximity to structures. Sprinkler systems should not be installed where they may cause ponding or saturation of foundation soils. Such ponding or saturation could result in undesirable soil swell, loss of compaction and consequent foundation and slab movements. Irrigation of landscape areas should be limited strictly to that necessary for plant growth.

Building Setback Distance

Where building pads are adjacent to uphill slopes, all permanent structures should be set back from the toe-of-slope a distance equal to one-half the vertical graded slope height or 15 feet, whichever is less. Where building pads are adjacent to downhill slopes, all permanent structures should generally be set back from the top-of-slope. Structures should be located no closer than 15-feet from the top-of-slope. If structures are to be located closer than 15-feet from the top-of-slope pier-and-grade-beam or continous spread footing foundations should be utilized. Slope set-back requirements should be evaluated on a lot-by-lot basis after the final grading plan is developed.

Erosion Control

In addition to vegetated cover, viable erosion mitigation measures may include concrete or asphalt-lined drainage facilities and slopes graded to 3:1 (horizontal:vertical) or less. These measures are typically used on slopes with heights greater than 30 feet. The purpose of the drainage facilities is to intercept and divert the surface water runoff from the slopes and, combined with the

3:1 or flatter slopes, reduce runoff velocities, water infiltration, and sloughing or erosion of the slope surfaces. Erosion of graded slopes can be mitigated by hydroseeding, landscaping, or placement of topsoil materials prior to the winter rains following rough grading. All landscaped slopes should be maintained in a vegetated state after project completion with drought tolerant vegetation requiring drip irrigation.

The tops of fill or cut slopes should be graded in such a way as to prevent water from flowing freely down the slopes. Due to the nature of the bedrock, slopes may experience severe erosion when grading is halted by heavy rain. Therefore, before work is stopped, a positive gradient away from the slopes should be provided to carry the surface runoff away from the slopes to areas where erosion can be controlled. It is vital that no completed slope be left standing through a winter season without erosion control measures having been provided.

Utilities

Allow the Geotechnical Engineer to observe all utility trench backfill. Use well-graded import or native material less than ¾ inch in maximum dimension for pipe zone backfill (i.e. material beneath and immediately surrounding the pipe). Use native soil for trench zone backfill (i.e. material placed between the pipe zone backfill and the ground surface). Compact backfill in accordance with the recommendations provided above for engineered fill. Use fine- to medium-grained sand or a well-graded mixture of sand and gravel for pipe zone backfill import material. Avoid using this material within 2 feet of finish grades. In general, avoid using uniformly graded gravel for pipe or trench zone backfill due to the potential for migration of: (1) soil into the relatively large void spaces present in this type of material; and (2) water along trenches backfilled with this type of material. Provide all utility trenches entering buildings and paved areas with an impervious seal consisting of native materials or concrete where the trenches pass under building perimeters or curb lines. Extend the impervious plug a minimum of 3 feet to

either side of the crossing to prevent surface water percolation into the sands under foundations and pavements. Trapped water will remain trapped in a perched condition, allowing clays to develop their full expansion potential.

Avoid locating utility trenches upslope of any foundation area without a Geotechnical Engineer review of the placement, depth and proposed backfill material. Exercise care where utility trenches are located beside foundation areas. Locate utility trenches constructed parallel to foundations entirely above a plane extending down from the lower edge of the footing at an angle of 45 degrees. Provide utility companies and Landscape Architects with this information. Construct utility trenches in paved areas in accordance with City of Clayton requirements; however, avoid compaction of native trench backfill by jetting. Notify owner if a conflict between city or other agency requirements and the recommendations contained in this report is observed to provide a resolution prior to submitting bids.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report is issued with the understanding that it is the responsibility of the owner to transmit the information and recommendations of this report to developers, contractors, buyers, architects, engineers, and designers for the project so that the necessary steps can be taken by the contractors and subcontractors to carry out such recommendations in the field. The conclusions and recommendations contained in this report are solely professional opinions.

The professional staff of ENGEO Incorporated strives to perform its services in a proper and professional manner with reasonable care and competence but is not infallible. There are risks of earth movement and property damages inherent in land development. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our work.

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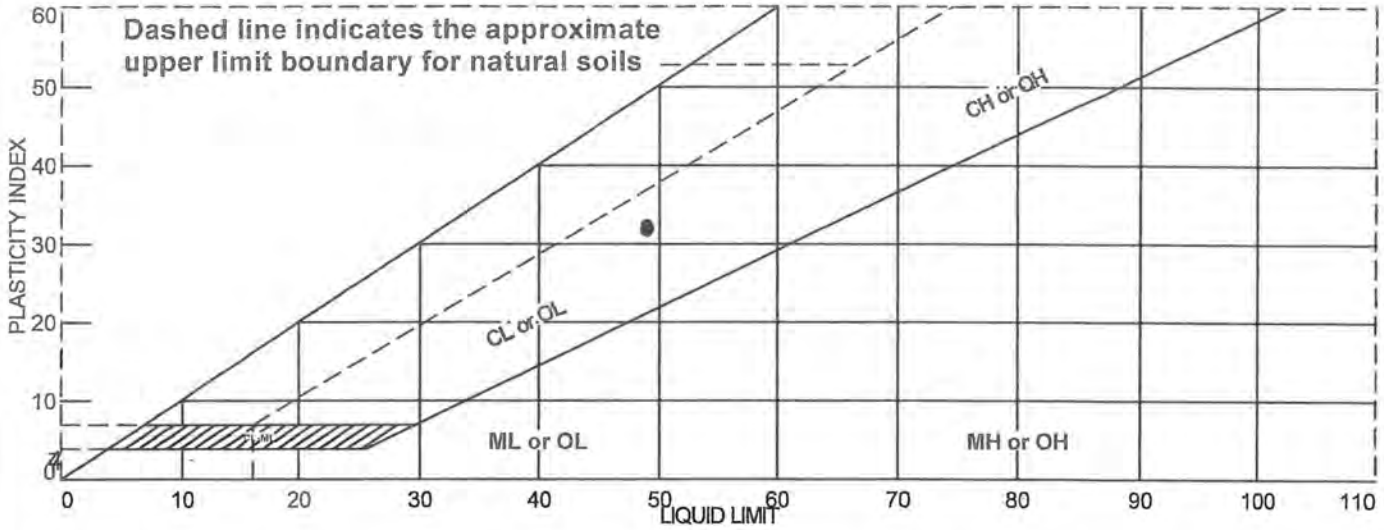
APPENDIX A

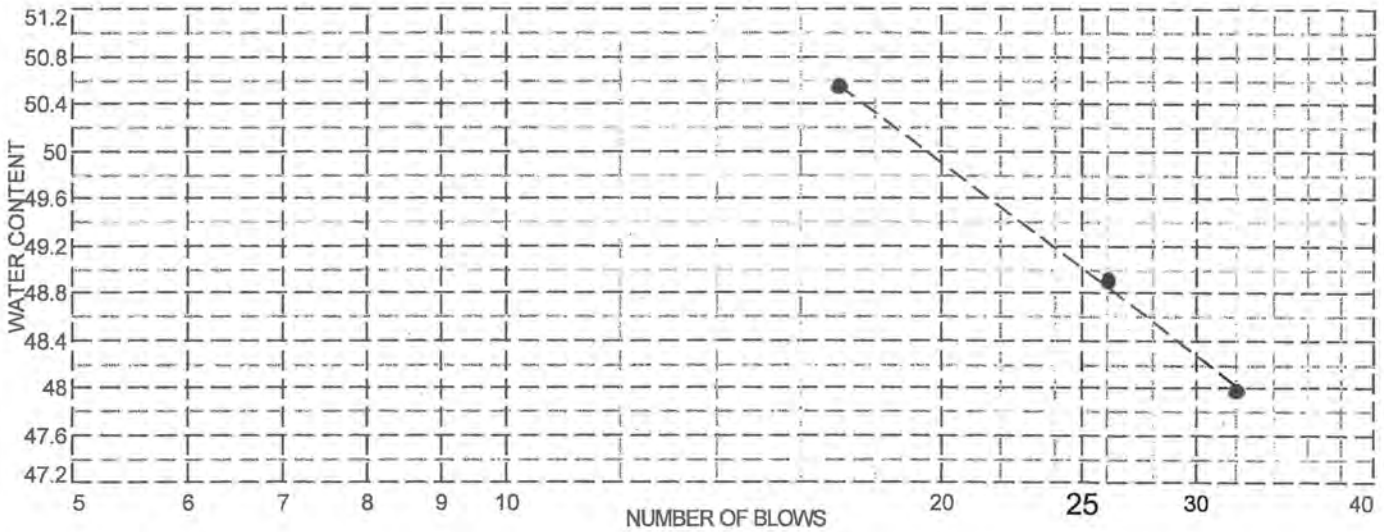
Laboratory Tests

1. Atterberg Limits (ASTM D-4318)

   Performed primarily on cohesive soils. Includes the Liquid Limit and the Plastic Limit. From these, a Plasticity Index can be computed which allows classification of the soil and is an indirect measure of its expansion characteristics.

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark yellowish brown silty CLAY to CLAY	49	17	32			CL-CH

Project No. 3840.2.052.02 **Client:**

Project: Oak Creek Canyon. Clayton, CA

● **Sample Number:** Bulk 1

Remarks:

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Plate

APPENDIX B

Guide Contract Specification

GUIDE CONTRACT SPECIFICATIONS

PART I - EARTHWORK

PREFACE

These specifications are intended as a guide for the earthwork performed at the subject development project. If there is a conflict between these specifications (including the recommendations of the geotechnical report) and agency or code requirements, it should be brought to the attention of ENGEO and Owner prior to contract bidding.

PART 1 - GENERAL

1.01 WORK COVERED

A. Grading, excavating, filling and backfilling, including trenching and backfilling for utilities as necessary to complete the Project as indicated on the Drawings.

B. Subsurface drainage as indicated on the Drawings.

1.02 CODES AND STANDARDS

A. Excavating, trenching, filling, backfilling, and grading work shall meet the applicable requirements of the Uniform Building Code and the standards and ordinances of state and local governing authorities.

1.03 SUBSURFACE SOIL CONDITIONS

A. The Owners' Geotechnical Exploration report is available for inspection by bidder or Contractor. The Contractor shall refer to the findings and recommendations of the Geotechnical Exploration report in planning and executing his work.

1.04 DEFINITIONS

A. Fill: All soil, rock, or soil-rock materials placed to raise the grades of the site or to backfill excavations.

B. Backfill: All soil, rock or soil-rock material used to fill excavations and trenches.

C. On-Site Material: Soil and/or rock material which is obtained from the site.

D. Imported Material: Soil and/or rock material which is brought to the site from off-site areas.

E. Select Material: On-site and/or imported material which is approved by ENGEO as a specific-purpose fill.

F. Engineered Fill: Fill upon which ENGEO has made sufficient observations and tests to confirm that the fill has been placed and compacted in accordance with specifications and requirements.

G. Degree of Compaction or Relative Compaction: The ratio, expressed as a percentage, of the in-place dry density of the fill and backfill material as compacted in the field to the maximum dry density of the same material as determined by ASTM D-1557 or California 216 compaction test method.

H. Optimum Moisture: Water content, percentage by dry weight, corresponding to the maximum dry density as determined by ASTM D-1557.

I. ENGEO: The project geotechnical engineering consulting firm, its employees or its designated representatives.

J. Drawings: All documents, approved for construction, which describe the Work.

1.05 OBSERVATION AND TESTING

A. All site preparation, cutting and shaping, excavating, filling, and backfilling shall be carried out under the observation of ENGEO, employed and paid for by the Owners. ENGEO will perform appropriate field and laboratory tests to evaluate the suitability of fill material, the proper moisture content for compaction, and the degree of compaction achieved. Any fill that does not meet the specification requirements shall be removed and/or reworked until the requirements are satisfied.

B. Cutting and shaping, excavating, conditioning, filling, and compacting procedures require approval of ENGEO as they are performed. Any work found unsatisfactory or any work disturbed by subsequent operations before approval is granted shall be corrected in an approved manner as recommended by ENGEO.

C. Tests for compaction will be made in accordance with test procedures outlined in ASTM D-1557, as applicable. Field testing of soils or compacted fill shall conform with the applicable requirements of ASTM D-2922.

D. All authorized observation and testing will be paid for by the Owners.

1.06 SITE CONDITIONS

A. Excavating, filling, backfilling, and grading work shall not be performed during unfavorable weather conditions. When the work is interrupted by rain, excavating, filling, backfilling, and grading work shall not be resumed until the site and soil conditions are suitable.

B. Contractor shall take the necessary measures to prevent erosion of freshly filled, backfilled, and graded areas until such time as permanent drainage and erosion control measures have been installed.

PART 2 - PRODUCTS

2.01 GENERAL

A. Contractor shall furnish all materials, tools, equipment, facilities, and services as required for performing the required excavating, filling, backfilling, and grading work, and trenching and backfilling for utilities.

2.02 SOIL MATERIALS

A. Fill

1. Material to be used for engineered fill and backfill shall be free from organic matter and other deleterious substances, and of such quality that it will compact thoroughly without excessive voids when watered and rolled. Excavated on-site material will be considered suitable for engineered fill and backfill if it contains no more than 3 percent organic matter, is free of debris and other deleterious substances and conforms to the requirements specified above. Rocks of maximum dimension in excess of two-thirds of the lift thickness shall be removed from any fill material to the satisfaction of ENGEO.

2. Excavated earth material which is suitable for engineered fill or backfill, as determined by ENGEO, shall be conditioned for reuse and properly stockpiled as required for later filling and backfilling operations. Conditioning shall consist of spreading material in layers not to exceed 8 inches and raking free of debris and rubble. Rocks and aggregate exceeding the allowed largest dimension, and deleterious material shall be removed from the site and disposed off site in a legal manner.

3. ENGEO shall be notified at least 48 hours prior to the start of filling and backfilling operations so that it may evaluate samples of the material intended for use as fill and backfill. All materials to be used for filling and backfilling require the approval of ENGEO.

B. Import Material: Where conditions require the importation of fill material, the material shall be an inert, nonexpansive soil or soil-rock material free of organic matter and meeting the following requirements unless otherwise approved by ENGEO.

Gradation (ASTM D-421):	Sieve Size	Percent Passing
	2-inch	100
	#200	15 - 70
Plasticity (ASTM D-4318):	Liquid Limit	Plasticity Index
	< 30	< 12
Swell Potential (ASTM D-4546B): (at optimum moisture)	Percent Heave	Swell Pressure
	< 2 percent	< 300 psf
Resistance Value (ASTM D-2844):	Minimum 25	
Organic Content (ASTM D-2974):	Less than 2 percent	

A sample of the proposed import material should be submitted to ENGEO for evaluation prior to delivery at the site.

2.03 SAND

A. Sand for sand cushion under slabs and for bedding of pipe in utility trenches shall be a clean and graded, washed sand, free from clay or organic material, suitable for the intended purpose with 90 to 100 percent passing a No. 4 U.S. Standard Sieve, not more than 5 percent passing a No. 200 U.S. Standard Sieve, and generally conforming to ASTM C33 for fine aggregate.

2.04 AGGREGATE DRAINAGE FILL

A. Aggregate drainage fill under concrete slabs and paving shall consist of broken stone, crushed or uncrushed gravel, clean quarry waste, or a combination thereof. The aggregate shall be free from fines, vegetable matter, loam, volcanic tuff, and other

deleterious substances. It shall be of such quality that the absorption of water in a saturated surface dry condition does not exceed 3 percent of the oven dry weight of the samples.

B. Aggregate drainage fill shall be of such size that the percentage composition by dry weight as determined by laboratory sieves (U. S. Series) will conform to the following grading:

Sieve Size	Percentage Passing Sieve
1½-inches	100
1-inch	90 - 100
#4	0 - 5

2.05 SUBDRAINS

A. Perforated subdrain pipe of the required diameter shall be installed as shown on the drawings. The pipe(s) shall also conform to these specifications unless otherwise specified by ENGEO in the field.

Subdrain pipe shall be manufactured in accordance with one of the following requirements:

Design depths less than 30 feet

- Perforated ABS Solid Wall SDR 35 (ASTM D-2751)
- Perforated PVC Solid Wall SDR 35 (ASTM D-3034)
- Perforated PVC A-2000 (ASTM F949)
- Perforated Corrugated HDPE double-wall (AASHTO M-252 or M-294, Caltrans Type S, 50 psi minimum stiffness)

Design depths less than 50 feet

- Perforated PVC SDR 23.5 Solid Wall (ASTM D-3034)
- Perforated Sch. 40 PVC Solid Wall (ASTM-1785)
- Perforated ABS SDR 23.5 Solid Wall (ASTM D-2751)
- Perforated ABS DWV/Sch. 40 (ASTM D-2661 and D-1527)
- Perforated Corrugated HDPE double-wall (AASHTO M-252 or M-294, Caltrans Type S, 70 psi minimum stiffness)

Design depths less than 70 feet

- Perforated ABS Solid Wall SDR 15.3 (ASTM D-2751)
- Perforated Sch. 80 PVC (ASTM D-1785)
- Perforated Corrugated Aluminum (ASTM B-745)

B. Permeable Material (Class 2): Class 2 permeable material for filling trenches under, around, and over subdrains, behind building and retaining walls, and for pervious blankets shall consist of clean, coarse sand and gravel or crushed stone, conforming to the following grading requirements:

Sieve Size	Percentage Passing Sieve
1-inch	100
¾-inch	90 - 100
3/8-inch	40 - 100
#4	25 - 40
#8	18 - 33
#30	5 - 15
#50	0 - 7
#200	0 - 3

C. Filter Fabric: All filter fabric shall meet the following Minimum Average Roll Values unless otherwise specified by ENGEO.

Grab Strength (ASTM D-4632).....180 lbs
Mass Per Unit Area (ASTM D-4751).....6 oz/yd^2
Apparent Opening Size (ASTM D-4751).....70-100 U.S. Std. Sieve
Flow Rate (ASTM D-4491).....80 gal/min/ft^2
Puncture Strength (ASTM D-4833) .....80 lbs

D. Vapor Retarder: Vapor Retarders shall consist of PVC, LDPE or HDPE impermeable sheeting at least 10 mils thick..

2.06 PERMEABLE MATERIAL (Class 1; Type A)

A. Class 1 permeable material to be used in conjunction with filter fabric for backfilling of subdrain excavations shall conform to the following grading requirements:

Sieve Size	Percentage Passing Sieve
¾-inch	100
½-inch	95 - 100
3/8-inch	70 - 100
#4	0 - 55
#8	0 - 10
#200	0 - 3

PART 3 - EXECUTION

3.01 STAKING AND GRADES

A. Contractor shall lay out all his work, establish all necessary markers, bench marks, grading stakes, and other stakes as required to achieve design grades.

3.02 EXISTING UTILITIES

A. Contractor shall verify the location and depth (elevation) of all existing utilities and services before performing any excavation work.

3.03 EXCAVATION

A. Contractor shall perform excavating as indicated and required for concrete footings, drilled piers, foundations, floor slabs, concrete walks, and site leveling and grading, and provide shoring, bracing, underpinning, cribbing, pumping, and planking as required. The bottoms of excavations shall be firm undisturbed earth, clean and free from loose material, debris, and foreign matter.

B. Excavations shall be kept free from water at all times. Adequate dewatering equipment shall be maintained at the site to handle emergency situations until concrete or backfill is placed.

C. Unauthorized excavations for footings shall be filled with concrete to required elevations, unless other methods of filling are authorized by ENGEO.

D. Excavated earth material which is suitable for engineered fill or backfill, as determined by ENGEO, shall be conditioned for reuse and properly stockpiled for later filling and backfilling operations as specified under Section 2.02, "Soil Materials."

E. Abandoned sewers, piping, and other utilities encountered during excavating shall be removed and the resulting excavations shall be backfilled with engineered fill as required by ENGEO.

F. Any active utility lines encountered shall be reported immediately to the Owner's Representative and authorities involved. The Owner and proper authorities shall be permitted free access to take the measures deemed necessary to repair, relocate, or remove the obstruction as determined by the responsible authority or Owner's Representative.

3.04 SUBGRADE PREPARATION

A. All brush and other rubbish, as well as trees and root systems not marked for saving, shall be removed from the site and legally disposed of.

B. Any existing structures, foundations, underground storage tanks, or debris must be removed from the site prior to any building, grading, or fill operations. Septic tanks, including all drain fields and other lines, if encountered, must be totally removed. The resulting depressions shall be properly prepared and filled to the satisfaction of ENGEO.

C. Vegetation and organic topsoil shall be removed from the surface upon which the fill is to be placed and either removed and legally disposed of or stockpiled for later use in approved landscape areas. The surface shall then be scarified to a depth of at least eight inches until the surface is free from ruts, hummocks, or other uneven features which would tend to prevent uniform compaction by the equipment to be used.

D. After the foundation for the fill has been cleared and scarified, it shall be made uniform and free from large clods. The proper moisture content must be obtained by adding water or aerating. The foundation for the fill shall be compacted at the proper moisture content to a relative compaction as specified herein.

3.05 ENGINEERED FILL

A. Select Material: Fill material shall be "Select" or "Imported Material" as previously specified.

B. Placing and Compacting: Engineered fill shall be constructed by approved and accepted methods. Fill material shall be spread in uniform lifts not exceeding 8 inches in uncompacted thickness. Each layer shall be spread evenly, and thoroughly blade-mixed to obtain uniformity of material. Fill material which does not contain sufficient moisture as specified by ENGEO shall be sprinkled with water; if it contains

excess moisture it shall be aerated or blended with drier material to achieve the proper water content. Select material and water shall then be thoroughly mixed before being compacted.

C. Unless otherwise specified in the Geotechnical Exploration report, each layer of spread select material shall be compacted to at least 90 percent relative compaction at a moisture content of at least three percent above the optimum moisture content. Minimum compaction in all keyways shall be a minimum of 95 percent with a minimum moisture content of at least 1 percentage point above optimum.

D. Unless otherwise specified in the Geotechnical Exploration report or otherwise required by the local authorities, the upper 6 inches of engineered fill in areas to receive pavement shall be compacted to at least 95 percent relative compaction with a minimum moisture content of at least 3 percentage points above optimum.

E. Testing and Observation of Fill: The work shall consist of field observation and testing to determine that each layer has been compacted to the required density and that the required moisture is being obtained. Any layer or portion of a layer that does not attain the compaction required shall be reworked until the required density is obtained.

F. Compaction: Compaction shall be by sheepsfoot rollers, multiple-wheel steel or pneumatic-tired rollers or other types of acceptable compaction equipment. Rollers shall be of such design that they will be able to compact the fill to the specified compaction. Rolling shall be accomplished while the fill material is within the specified moisture content range. Rolling of each layer must be continuous so that the required compaction may be obtained uniformly throughout each layer.

G. Fill slopes shall be constructed by overfilling the design slopes and later cutting back the slopes to the design grades. No loose soil will be permitted on the faces of the finished slopes.

H. Strippings and topsoil shall be stockpiled as approved by Owner, then placed in accordance with ENGEO's recommendations to a minimum thickness of 6 inches and a maximum thickness of 12 inches over exposed open space cut slopes which are 3:1 or flatter, and track walked to the satisfaction of ENGEO.

I. Final Prepared Subgrade: Finish blading and smoothing shall be performed as necessary to produce the required density, with a uniform surface, smooth and true to grade.

3.06 BACKFILLING

A. Backfill shall not be placed against footings, building walls, or other structures until approved by ENGEO.

B. Backfill material shall be Select Material as specified for engineered fill.

C. Backfill shall be placed in 6-inch layers, leveled, rammed, and tamped in place. Each layer shall be compacted with suitable compaction equipment to 90 percent relative compaction at a moisture content of at least 3 percent above optimum.

3.07 TRENCHING AND BACKFILLING FOR UTILITIES

A. Trenching:

1. Trenching shall include the removal of material and obstructions, the installation and removal of sheeting and bracing and the control of water as necessary to provide the required utilities and services.

2. Trenches shall be excavated to the lines, grades, and dimensions indicated on the Drawings. Maximum allowable trench width shall be the outside diameter of the pipe plus 24 inches, inclusive of any trench bracing.

3. When the trench bottom is a soft or unstable material as determined by ENGEO, it shall be made firm and solid by removing said unstable material to a sufficient depth and replacing it with on-site material compacted to 90 percent minimum relative compaction.

4. Where water is encountered in the trench, the contractor must provide materials necessary to drain the water and stabilize the bed.

B. Backfilling:

1. Trenches must be backfilled within 2 days of excavation to minimize desiccation.

2. Bedding material shall be sand and shall not extend more than 6 inches above any utility lines.

3. Backfill material shall be select material.

4. Trenches shall be backfilled as indicated or required and compacted with suitable equipment to 90 percent minimum relative compaction at the required moisture content.

3.08 SUBDRAINS

A. Trenches for subdrain pipe shall be excavated to a minimum width equal to the outside diameter of the pipe plus at least 12 inches and to a depth of approximately 2 inches below the grade established for the invert of the pipe, or as indicated on the Drawings.

B. The space below the pipe invert shall be filled with a layer of Class 2 permeable material, upon which the pipe shall be laid with perforations down. Sections shall be joined as recommended by the pipe manufacturer.

C. Rocks, bricks, broken concrete, or other hard material shall not be used to give intermediate support to pipes. Large stones or other hard objects shall not be left in contact with the pipes.

D. Excavations for subdrains shall be filled as required to fill voids and prevent settlement without damaging the subdrain pipe. Alternatively, excavations for subdrains may be filled with Class 1 permeable material (as defined in Section 2.06) wrapped in Filter Fabric (as defined in Section 2.05).

3.09 AGGREGATE DRAINAGE FILL

A. ENGEO shall approve finished subgrades before aggregate drainage fill is installed.

B. Pipes, drains, conduits, and any other mechanical or electrical installations shall be in place before any aggregate drainage fill is placed. Backfill at walls to elevation of drainage fill shall be in place and compacted.

C. Aggregate drainage fill under slabs and concrete paving shall be the minimum uniform thickness after compaction of dimensions indicated on Drawings. Where not indicated, minimum thickness after compaction shall be 4 inches.

D. Aggregate drainage fill shall be rolled to form a well-compacted bed.

E. The finished aggregate drainage fill must be observed and approved by ENGEO before proceeding with any subsequent construction over the compacted base or fill.

3.10 SAND CUSHION

A. A sand cushion shall be placed over the vapor retarder membrane under concrete slabs on grade. Sand cushion shall be placed in uniform thickness as indicated on the Drawings. Where not indicated, the thickness shall be 2 inches.

3.11 FINISH GRADING

A. All areas must be finish graded to elevations and grades indicated on the Drawings. In areas to receive topsoil and landscape planting, finish grading shall be performed to a uniform 6 inches below the grades and elevations indicated on the Drawings, and brought to final grade with topsoil.

3.12 DISPOSAL OF WASTE MATERIALS

A. Excess earth materials and debris shall be removed from the site and disposed of in a legal manner. Location of dump site and length of haul are the Contractor's responsibility.

PART II - GEOGRID SOIL REINFORCEMENT

1. DESCRIPTION:

Work shall consist of furnishing geogrid soil reinforcement for use in construction of reinforced soil slopes and retention systems.

2. GEOGRID MATERIAL:

2.1 The specific geogrid material shall be preapproved by ENGEO.

2.2 The geogrid shall be a regular network of integrally connected polymer tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil or rock. The geogrid structure shall be dimensionally stable and able to retain its geometry under construction stresses and shall have high resistance to damage during construction, to ultraviolet degradation, and to all forms of chemical and biological degradation encountered in the soil being reinforced.

2.3 The geogrids shall have an Allowable Strength (T_a) and Pullout Resistance, for the soil type(s) indicated, as listed in Table I.

2.4 Certifications: The Contractor shall submit a manufacturer's certification that the geogrids supplied meet the respective index criteria set when geogrid was approved by ENGEO, measured in full accordance with all test methods and standards specified. In case of dispute over validity of values, the Contractor will supply test data from an ENGEO-approved laboratory to support the certified values submitted.

3. CONSTRUCTION:

3.1 Delivery, Storage, and Handling: Contractor shall check the geogrid upon delivery to ensure that the proper material has been received. During all periods of shipment and storage, the geogrid shall be protected from temperatures greater than 140 °F, mud, dirt, dust, and debris. Manufacturer's recommendations in regard to protection from direct sunlight must also be followed. At the time of installation, the geogrid will be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be repaired by placing a patch over the damaged area. Any geogrid damaged during storage or installation shall be replaced by the Contractor at no additional cost to the owner.

3.2 On-Site Representative: Geogrid material suppliers shall provide a qualified and experienced representative on site at the initiation of the project, for a minimum of three days, to assist the Contractor and ENGEO personnel at the start of construction. If there is more than one slope on a project, this criterion will apply to construction of the initial slope only. The representative shall also be available on an as-needed basis, as requested by ENGEO, during construction of the remaining slope(s).

3.3 Geogrid reinforcement may be joined with mechanical connections or overlaps as recommended and approved by the Manufacturer. Joints shall not be placed within 6 feet of the slope face, within 4 feet below top of slope, nor horizontally or vertically adjacent to another joint.

3.4 Geogrid Placement: The geogrid reinforcement shall be installed in accordance with the manufacturer's recommendations. The geogrid reinforcement shall be placed within the layers of the compacted soil as shown on the plans or as directed.

The geogrid reinforcement shall be placed in continuous longitudinal strips in the direction of main reinforcement. However, if the Contractor is unable to complete a required length with a single continuous length of geogrid, a joint may be made with the Manufacturer's approval. Only one joint per length of geogrid shall be allowed. This joint shall be made for the full width of the strip by using a similar material with similar strength. Joints in geogrid reinforcement shall be pulled and held taut during fill placement.

Adjacent strips, in the case of 100 percent coverage in plan view, need not be overlapped. The minimum horizontal coverage is 50 percent, with horizontal spacings between reinforcement no greater than 40 inches. Horizontal coverage of less than 100 percent shall not be allowed unless specifically detailed in the construction drawings.

Adjacent rolls of geogrid reinforcement shall be overlapped or mechanically connected where exposed in a wrap around face system, as applicable.

The Contractor may place only that amount of geogrid reinforcement required for immediately pending work to prevent undue damage. After a layer of geogrid reinforcement has been placed, the next succeeding layer of soil shall be placed and compacted as appropriate. After the specified soil layer has been placed, the next geogrid reinforcement layer shall be installed. The process shall be repeated for each subsequent layer of geogrid reinforcement and soil.

Geogrid reinforcement shall be placed to lay flat and pulled tight prior to backfilling. After a layer of geogrid reinforcement has been placed, suitable means, such as pins or small piles of soil, shall be used to hold the geogrid reinforcement in position until the subsequent soil layer can be placed.

Under no circumstances shall a track-type vehicle be allowed on the geogrid reinforcement before at least six inches of soil have been placed. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and the geogrid reinforcement. If approved by the Manufacturer, rubber-tired equipment may pass over the geosynthetic reinforcement at slow speeds, less than 10 mph. Sudden braking and sharp turning shall be avoided.

During construction, the surface of the fill should be kept approximately horizontal. Geogrid reinforcement shall be placed directly on the compacted horizontal fill surface. Geogrid reinforcements are to be placed within three inches of the design elevations and extend the length as shown on the elevation view unless otherwise directed by ENGEO. Correct orientation of the geogrid reinforcement shall be verified by ENGEO.

Table I
Allowable Geogrid Strength
With Various Soil Types
For Geosynthetic Reinforcement In
Mechanically Stabilized Earth Slopes

(Geogrid Pullout Resistance and Allowable Strengths vary with reinforced backfill used due to soil anchorage and site damage factors. Guidelines are provided below.)

SOIL TYPE		MINIMUM ALLOWABLE STRENGTH, T_a (lb/ft)*		
		GEOGRID Type I	GEOGRID Type II	GEOGRID Type III
A.	Gravels, sandy gravels, and gravel-sand-silt mixtures (GW, GP, GC, GM & SP)**	2400	4800	7200
B.	Well graded sands, gravelly sands, and sand-silt mixtures (SW & SM)**	2000	4000	6000
C.	Silts, very fine sands, clayey sands and clayey silts (SC & ML)**	1000	2000	3000
D.	Gravelly clays, sandy clays, silty clays, and lean clays (CL)**	1600	3200	4800

* All partial Factors of Safety for reduction of design strength are included in listed values. Additional factors of safety may be required to further reduce these design strengths based on site conditions.

** Unified Soil Classifications.

PART III - GEOTEXTILE SOIL REINFORCEMENT

1. DESCRIPTION:

   Work shall consist of furnishing geotextile soil reinforcement for use in construction of reinforced soil slopes.

2. GEOTEXTILE MATERIAL:

   2.1 The specific geotextile material and supplier shall be preapproved by ENGEO.

   2.2 The geotextile shall have a high tensile modulus and shall have high resistance to damage during construction, to ultraviolet degradation, and to all forms of chemical and biological degradation encountered in the soil being reinforced.

   2.3 The geotextiles shall have an Allowable Strength (T_a) and Pullout Resistance, for the soil type(s) indicated as listed in Table II.

   2.4 Certification: The Contractor shall submit a manufacturer's certification that the geotextiles supplied meet the respective index criteria set when geotextile was approved by ENGEO, measured in full accordance with all test methods and standards specified. In case of dispute over validity of values, the Contractor will supply the data from an ENGEO-approved laboratory to support the certified values submitted.

3. CONSTRUCTION:

   3.1 Delivery, Storage and Handling: Contractor shall check the geotextile upon delivery to ensure that the proper material has been received. During all periods of shipment and storage, the geotextile shall be protected from temperatures greater than 140 °F, mud, dirt, dust, and debris. Manufacturer's recommendations in regard to protection from direct sunlight must also be followed. At the time of installation, the geotextile will be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be repaired by placing a patch over the damaged area. Any geotextile damaged during storage or installation shall be replaced by the Contractor at no additional cost to the owner.

3.2 On-Site Representative: Geotextile material suppliers shall provide a qualified and experienced representative on site at the initiation of the project, for a minimum of three days, to assist the Contractor and ENGEO personnel at the start of construction. If there is more than one slope on a project, this criterion will apply to construction of the initial slope only. The representative shall also be available on an as-needed basis, as requested by ENGEO, during construction of the remaining slope(s).

3.3 Geotextile Placement: The geotextile reinforcement shall be installed in accordance with the manufacturer's recommendations. The geotextile reinforcement shall be placed within the layers of the compacted soil as shown on the plans or as directed.

The geotextile reinforcement shall be placed in continuous longitudinal strips in the direction of main reinforcement. Joints shall not be used with geotextiles.

Adjacent strips, in the case of 100 percent coverage in plan view, need not be overlapped. The minimum horizontal coverage is 50 percent, with horizontal spacings between reinforcement no greater than 40 inches. Horizontal coverage of less than 100 percent shall not be allowed unless specifically detailed in the construction drawings.

Adjacent rolls of geotextile reinforcement shall be overlapped or mechanically connected where exposed in a wrap around face system, as applicable.

The Contractor may place only that amount of geotextile reinforcement required for immediately pending work to prevent undue damage. After a layer of geotextile reinforcement has been placed, the succeeding layer of soil shall be placed and compacted as appropriate. After the specified soil layer has been placed, the next geotextile reinforcement layer shall be installed. The process shall be repeated for each subsequent layer of geotextile reinforcement and soil.

Geosynthetic reinforcement shall be placed to lay flat and be pulled tight prior to backfilling. After a layer of geotextile reinforcement has been placed, suitable means, such as pins or small piles of soil, shall be used to hold the geotextile reinforcement in position until the subsequent soil layer can be placed.

Under no circumstances shall a track-type vehicle be allowed on the geotextile reinforcement before at least six inches of soil has been placed. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and the geotextile reinforcement. If approved by the Manufacturer, rubber-tired equipment may pass over the geotextile reinforcement as slow speeds, less than 10 mph. Sudden braking and sharp turning shall be avoided.

During construction, the surface of the fill should be kept approximately horizontal. Geotextile reinforcement shall be placed directly on the compacted horizontal fill surface. Geotextile reinforcements are to be placed within three inches of the design elevations and extend the length as shown on the elevation view unless otherwise directed by ENGEO. Correct orientation of the geotextile reinforcement shall be verified by ENGEO.

Table II
Allowable Geotextile Strength
With Various Soil Types
For Geosynthetic Reinforcement In
Mechanically Stabilized Earth Slopes

(Geotextile Pullout Resistance and Allowable Strengths vary with reinforced backfill used due to soil anchorage and site damage factors. Guidelines are provided below.)

SOIL TYPE	MINIMUM ALLOWABLE STRENGTH, T_a (lb/ft)*		
	GEOTEXTILE Type I	GEOTEXTILE Type II	GEOTEXTILE Type III
A. Gravels, sandy gravels, and gravel-sand-silt mixtures (GW, GP, GC, GM & SP)**	2400	4800	7200
B. Well graded sands, gravelly sands, and sand-silt mixtures (SW & SM)**	2000	4000	6000
C. Silts, very fine sands, clayey sands and clayey silts (SC & ML)**	1000	2000	3000
D. Gravelly clays, sandy clays, silty clays, and lean clays (CL)**	1600	3200	4800

* All partial Factors of Safety for reduction of design strength are included in listed values. Additional factors of safety may be required to further reduce these design strengths based on site conditions.

** Unified Soil Classifications.

PART IV - EROSION CONTROL MAT OR BLANKET

1. DESCRIPTION:

Work shall consist of furnishing and placing a synthetic erosion control mat and/or degradable erosion control blanket for slope face protection and lining of runoff channels.

2. EROSION CONTROL MATERIALS:

2.1 The specific erosion control material and supplier shall be pre-approved by ENGEO.

2.2 Certification: The Contractor shall submit a manufacturer's certification that the erosion mat/blanket supplied meets the criteria specified when the material was approved by ENGEO. The manufacturer's certification shall include a submittal package of documented test results that confirm the property values. In case of a dispute over validity of values, the Contractor will supply property test data from an ENGEO-approved laboratory, to support the certified values submitted. Minimum average roll values, per ASTM D 4759, shall be used for conformance determinations.

3. CONSTRUCTION:

3.1 Delivery, Storage, and Handling: Contractor shall check the erosion control material upon delivery to ensure that the proper material has been received. During all periods of shipment and storage, the erosion mat shall be protected from temperatures greater than 140 °F, mud, dirt, and debris. Manufacturer's recommendations in regard to protection from direct sunlight must also be followed. At the time of installation, the erosion mat/blanket shall be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be removed by cutting OUT a section of the mat. The remaining ends should be overlapped and secured with ground anchors. Any erosion mat/blanket damaged during storage or installation shall be replaced by the Contractor at no additional cost to the Owner.

3.2 On-Site Representative: Erosion control material suppliers shall provide a qualified and experienced representative on site, for a minimum of one day, to assist the Contractor and ENGEO personnel at the start of construction. If there is more than one slope on a project, this criteria will apply to construction of the initial slope only. The representative shall be available on an as-needed basis, as requested by ENGEO, during construction of the remaining slope(s).

3.3 Placement: The erosion control material shall be placed and anchored on a smooth graded, firm surface approved by the Engineer. Anchoring terminal ends of the erosion control material shall be accomplished through use of key trenches. The material in the trenches shall be anchored to the soil on maximum 1½ foot centers. Topsoil, if required by construction drawings, placed over final grade prior to installation of the erosion control material shall be limited to a depth not exceeding 3 inches.

3.4 Erosion control material shall be anchored, overlapped, and otherwise constructed to ensure performance until vegetation is well established. Anchors shall be as designated on the construction drawings, with a minimum of 12 inches length, and shall be spaced as designated on the construction drawings, with a maximum spacing of 4 feet.

3.5 Soil Filling: If noted on the construction drawings, the erosion control mat shall be filled with a fine grained topsoil, as recommended by the manufacturer. Soil shall be lightly raked or brushed on/into the mat to fill the mat voids or to a maximum depth of 1 inch.

PART V - GEOSYNTHETIC DRAINAGE COMPOSITE

1. DESCRIPTION:

Work shall consist of furnishing and placing a geosynthetic drainage system as a subsurface drainage medium for reinforced soil slopes.

2. DRAINAGE COMPOSITE MATERIALS:

2.1 The specific drainage composite material and supplier shall be preapproved by ENGEO.

2.2 The drain shall be of composite construction consisting of a supporting structure or drainage core material surrounded by a geotextile. The geotextile shall encapsulate the drainage core and prevent random soil intrusion into the Continuous Spread Footings structure. The drainage core material shall consist of a three dimensional polymeric material with a structure that permits flow along the core laterally. The core structure shall also be constructed to permit flow regardless of the water inlet surface. The drainage core shall provide support to the geotextile. The fabric shall meet the minimum property requirements for filter fabric listed in Section 2.05C of the Guide Earthwork Specifications.

2.3 A geotextile flap shall be provided along all drainage core edges. This flap shall be of sufficient width for sealing the geotextile to the adjacent drainage structure edge to prevent soil intrusion into the structure during and after installation. The geotextile shall cover the full length of the core.

2.4 The geocomposite core shall be furnished with an approved method of constructing and connecting with outlet pipes or weepholes as shown on the plans. Any fittings shall allow entry of water from the core but prevent intrusion of backfill material into the core material.

2.5 Certification and Acceptance: The Contractor shall submit a manufacturer's certification that the geosynthetic drainage composite meets the design properties and respective index criteria measured in full accordance with all test methods and standards specified. The manufacturer's certification shall include a submittal package of documented test results that confirm the design values. In case of dispute over validity of design values, the Contractor will supply design property test data from an ENGEO-approved laboratory, to support the certified values submitted. Minimum average roll values, per ASTM D 4759, shall be used for determining conformance.

3. CONSTRUCTION:

3.1 Delivery, Storage, and Handling: Contractor shall check the geosynthetic composite upon delivery to ensure that the proper material has been received. During all periods of

shipment and storage, the geosynthetic drainage composite shall be protected from temperatures greater than 140 °F, mud, dirt, and debris. Manufacturer's recommendations in regards to protection from direct sunlight must also be followed. At the time of installation, the geosynthetic drainage composite shall be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be removed or repaired. Any geosynthetic drainage composite damaged during storage or installation shall be replaced by the Contractor at no additional cost to the Owner.

3.2 On-Site Representative: Geosynthetic drainage composite material suppliers shall provide a qualified and experienced representative on site, for a minimum of one half day, to assist the Contractor and ENGEO personnel at the start of construction with directions on the use of drainage composite. If there is more than one application on a project, this criterion will apply to construction of the initial application only. The representative shall also be available on an as-needed basis, as requested by ENGEO, during construction of the remaining applications.

3.3 Placement: The soil surface against which the geosynthetic drainage composite is to be placed shall be free of debris and inordinate irregularities that will prevent intimate contact between the soil surface and the drain.

3.4 Seams: Edge seams shall be formed by utilizing the flap of the geotextile extending from the geocomposite's edge and lapping over the top of the fabric of the adjacent course. The fabric flap shall be securely fastened to the adjacent fabric by means of plastic tape or non-water-soluble construction adhesive, as recommended by the supplier. Where vertical splices are necessary at the end of a geocomposite roll or panel, an 8-inch-wide continuous strip of geotextile may be placed, centering over the seam and continuously fastened on both sides with plastic tape or non-water-soluble construction adhesive. As an alternative, rolls of geocomposite drain material may be joined together by turning back the fabric at the roll edges and interlocking the cuspidations approximately 2 inches. For overlapping in this manner, the fabric shall be lapped and tightly taped beyond the seam with tape or adhesive. Interlocking of the core shall always be made with the upstream edge on top in the direction of water flow. To prevent soil intrusion, all exposed edges of the geocomposite drainage core edge must be covered. Alternatively, a 12-inch-wide strip of fabric may be utilized in the same manner, fastening it to the exposed fabric 8 inches in from the edge and folding the remaining flap over the core edge.

3.5 Soil Fill Placement: Structural backfill shall be placed immediately over the geocomposite drain. Care shall be taken during the backfill operation not to damage the geotextile surface of the drain. Care shall also be taken to avoid excessive settlement of the backfill material. The geocomposite drain, once installed, shall not be exposed for more than seven days prior to backfilling.

LIST OF FIGURES

N

0 FEET 500

0 METERS 250

BASE MAP SOURCE: MS STREETS AND TRIPS

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

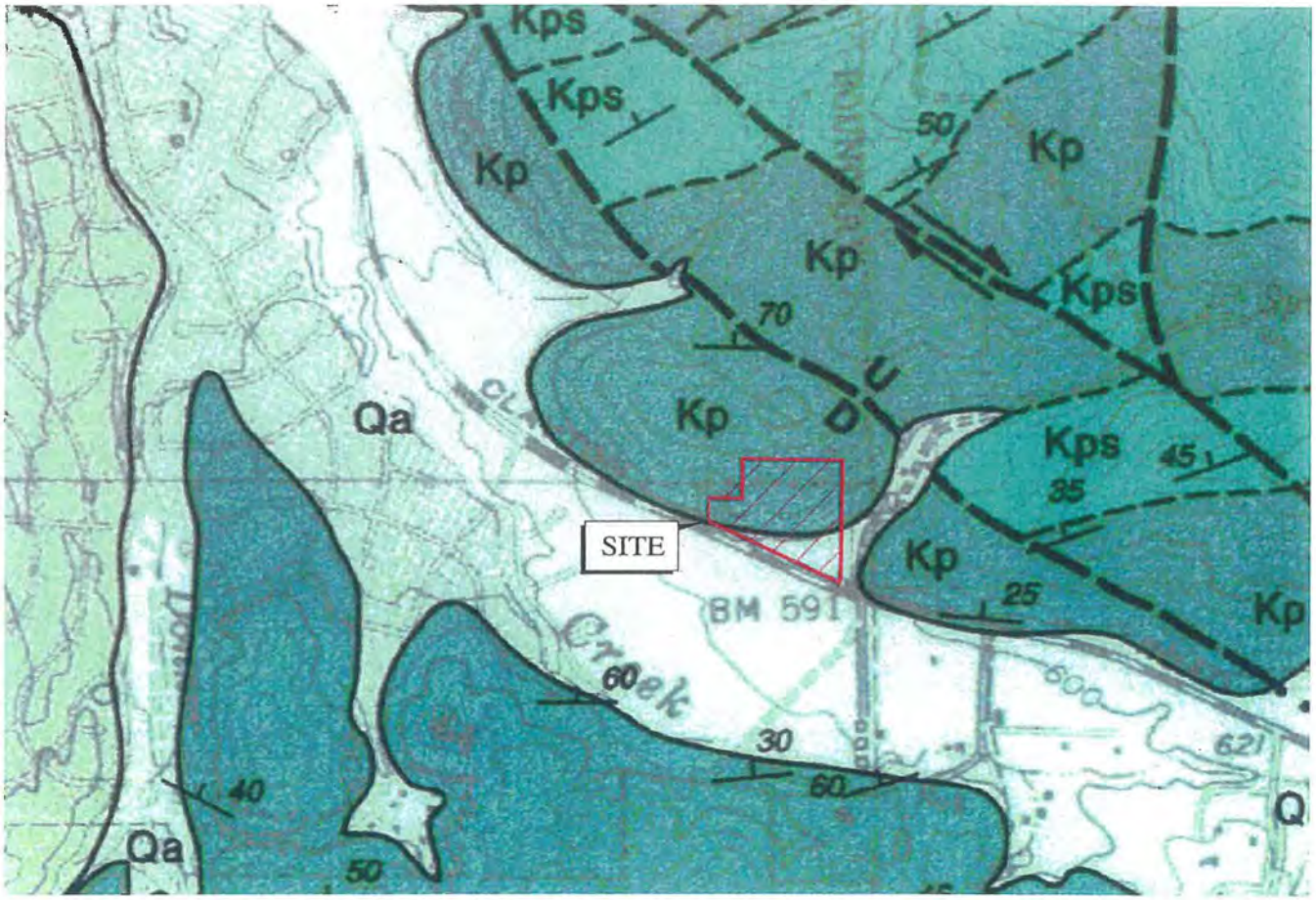
VICINITY MAP

OAK CREEK CANYON

CLAYTON, CALIFORNIA

PROJECT NO.: 3840.205.202	FIGURE NO. 1
DATE: FEBRUARY 2008	
DRAWN BY: JMG	CHECKED BY: TPB

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

BEDROCK CONTACT-DASHED WHERE GRADATIONAL OR APPROXIMATELY LOCATED

SANDSTONE BED

FAULT-DASHED WHERE INFERRED, DOTTED WHERE CONCEALED, QUERIED WHERE EXISTENCE IS DOUBTFUL ; DOUBLE ARROWS INDICATE STRIKE-SLIP MOVEMENT

U — UPTHROWN SIDE

D — DOWNTHROWN SIDE RELATIVELY

Qa — ALLUVIAL GRAVEL, SAND, AND CLAY OF VALLEY AREAS

Kp — PANOCHE FORMATION (CLAY SHALE AND CLAYTONE)

Kps — PANOCHE FORMATION (SANDSTONE)

STRIKE AND DIP OF STRATA

INCLINED VERTICAL OVERTURNED

N

0 FEET 1000

0 METERS 500

BASE MAP SOURCE: DIBBLE, 2006

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

REGIONAL GEOLOGIC MAP
OAK CREEK CANYON
CLAYTON, CALIFORNIA

PROJECT NO.: 3840.205.202		FIGURE NO. 2
DATE: FEBRUARY 2008		
DRAWN BY: JMG	CHECKED BY: TPB	

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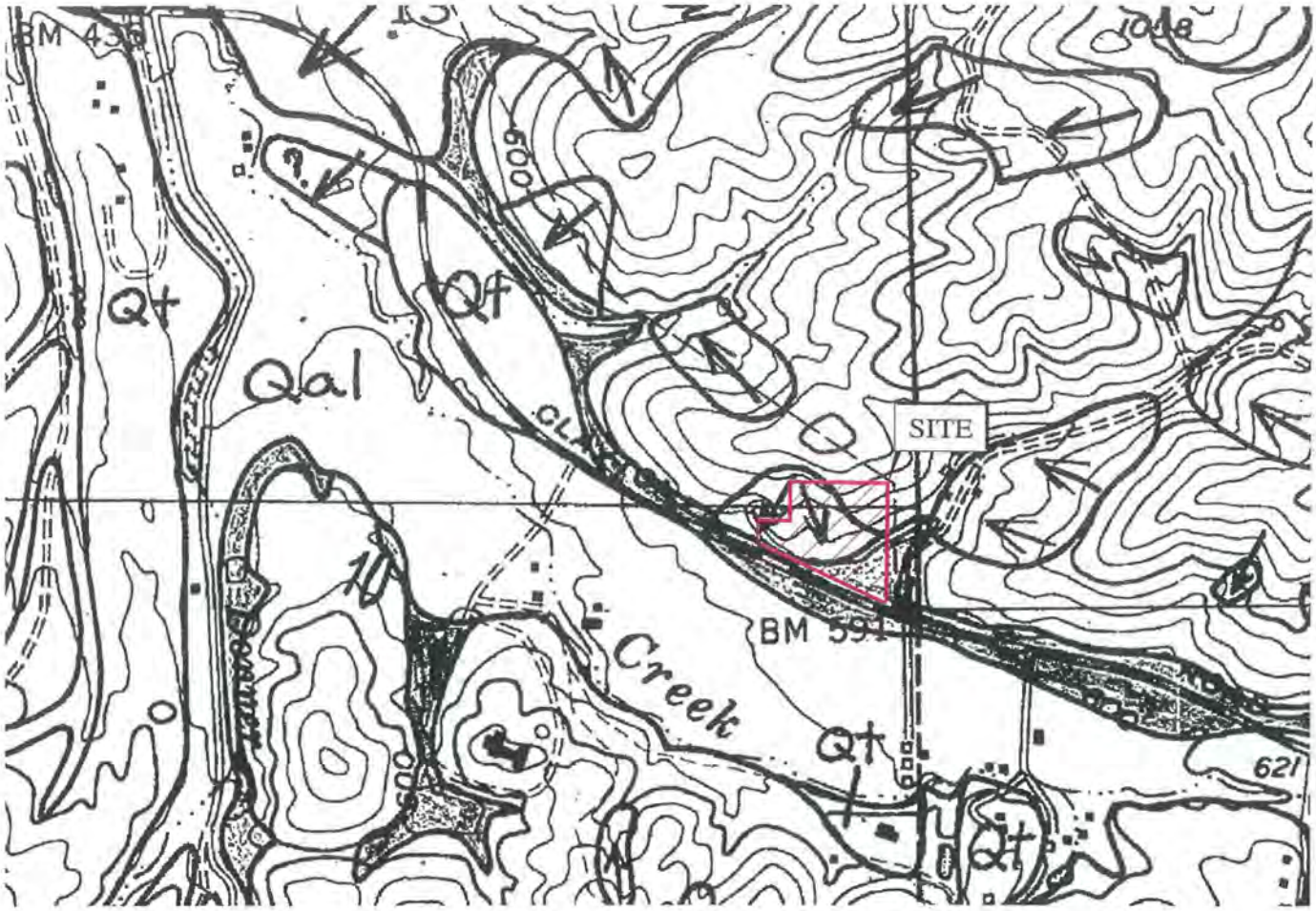
ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

- LANDSLIDE DEPOSIT. ARROWS INDICATE GENERAL DIRECTION OF DOWNSLOPE MOVEMENT. QUERIED WHERE UNCERTAIN
- Qal — ALLUVIAL DEPOSIT
- Qt — ALLUVIAL TERRACE DEPOSIT. QUERIED WHERE UNCERTAIN
- COLLUVIAL DEPOSIT AND/OR SMALL ALLUVIAL FAN DEPOSIT
- BEDROCK. QUERIED WHERE IDENTIFICATION UNCERTAIN

N

0 FEET 1000

0 METERS 500

BASE MAP SOURCE: NILSEN, 1975

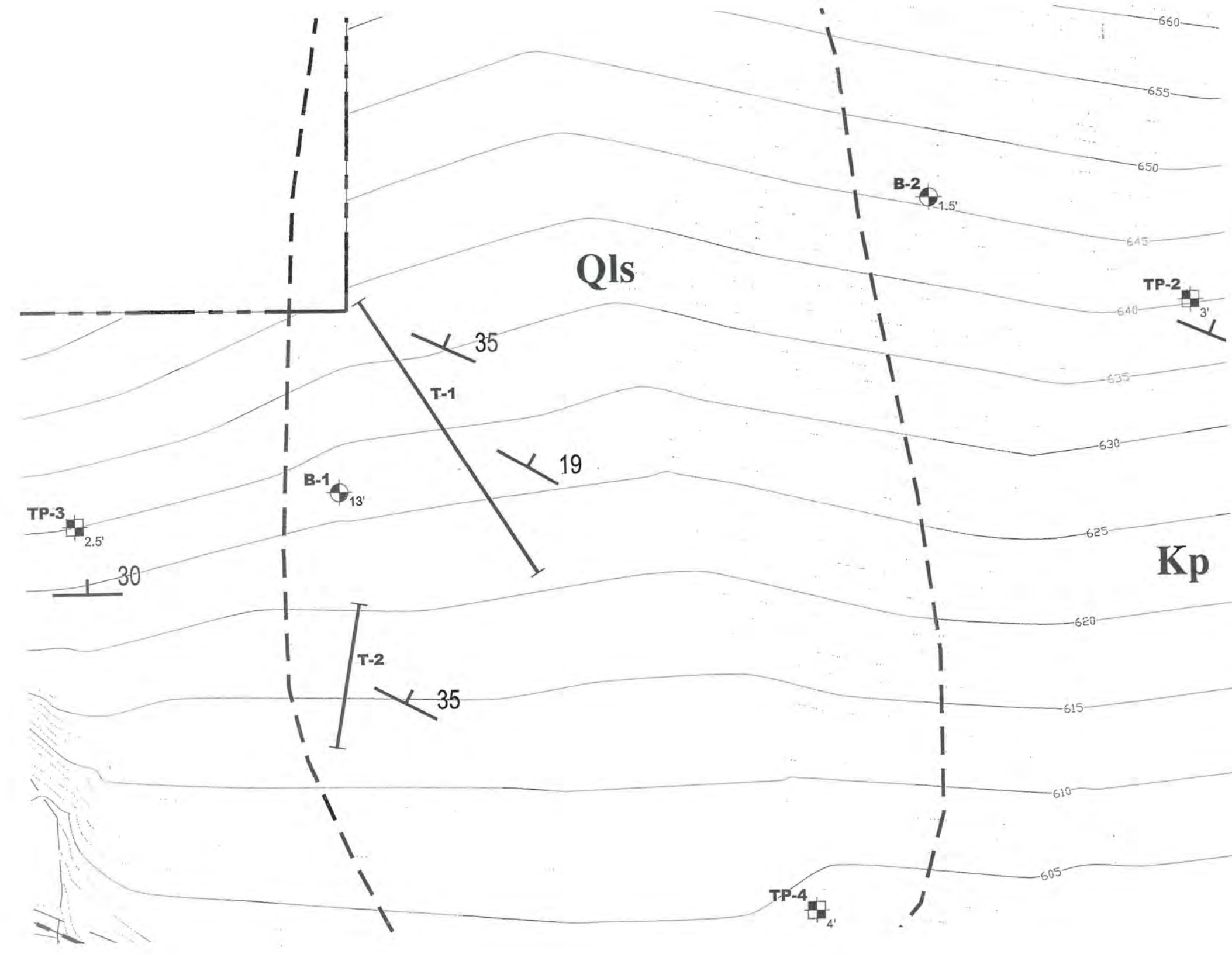
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

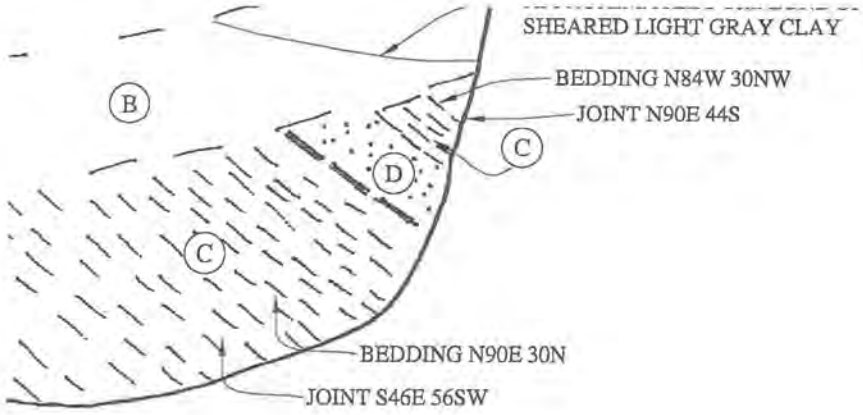
REGIONAL LANDSLIDE MAP

OAK CREEK CANYON

CLAYTON, CALIFORNIA

PROJECT NO.: 3840.205.202	FIGURE NO. 3
DATE: FEBRUARY 2008	
DRAWN BY: JMG	CHECKED BY: TPB

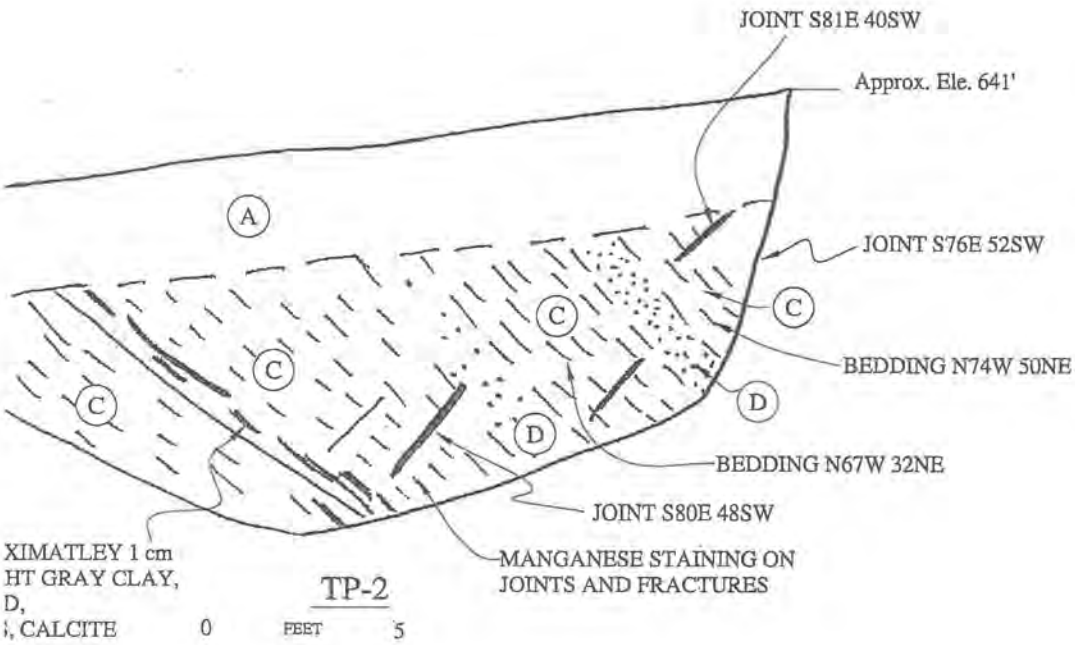

660
655
650
645
640
635
630
625
620
615
610
605
B-2
1.5'
Qls
TP-2
3'
35
T-1
19
B-1
13'
TP-3
2.5'
30
Kp
T-2
35
TP-4
4'



TP-1

0 FEET 5

0 METERS 2.5



TP-2

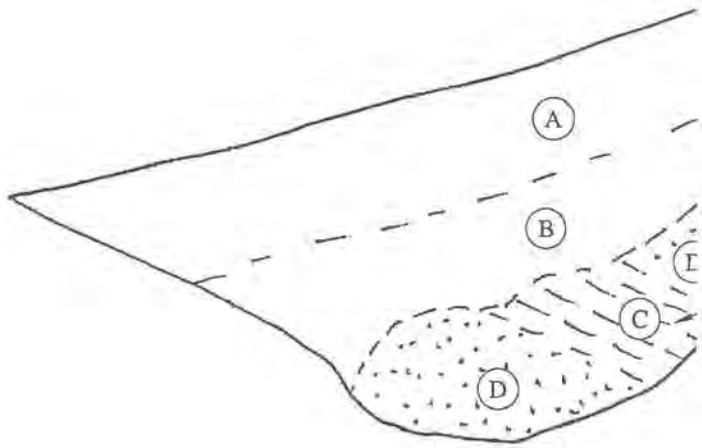
0 FEET 5

TP-4

0 FEET 5

0 METERS 2.5

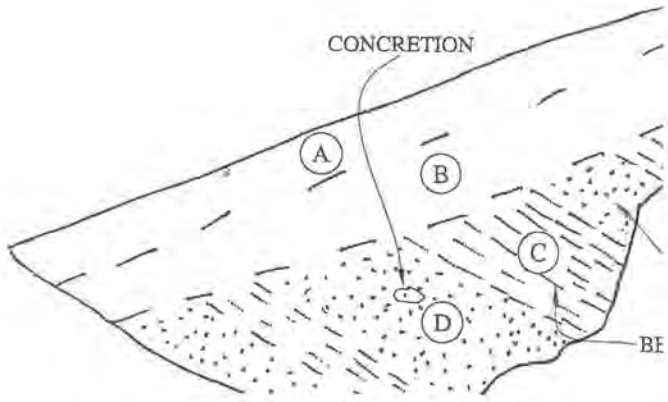
TP-5

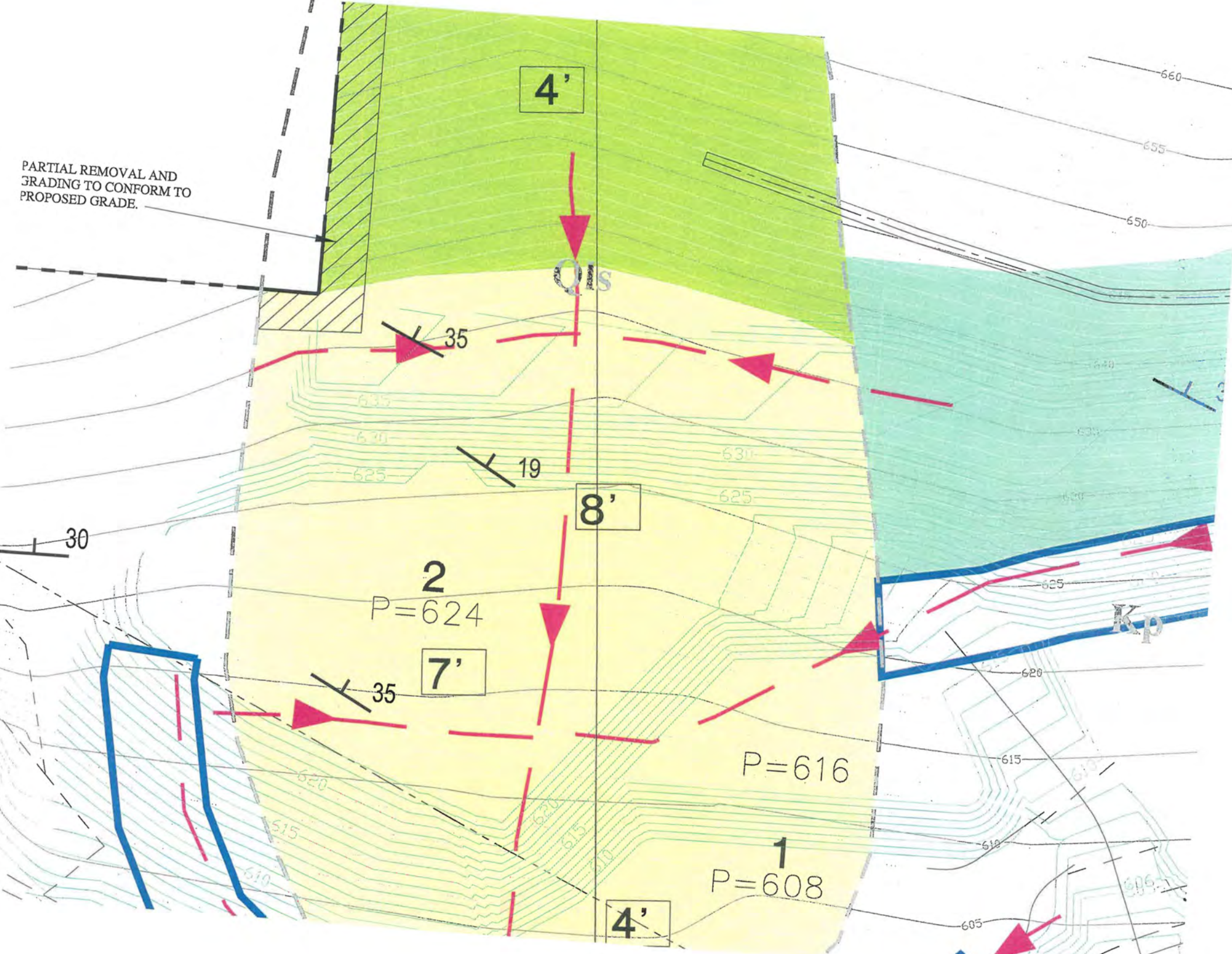


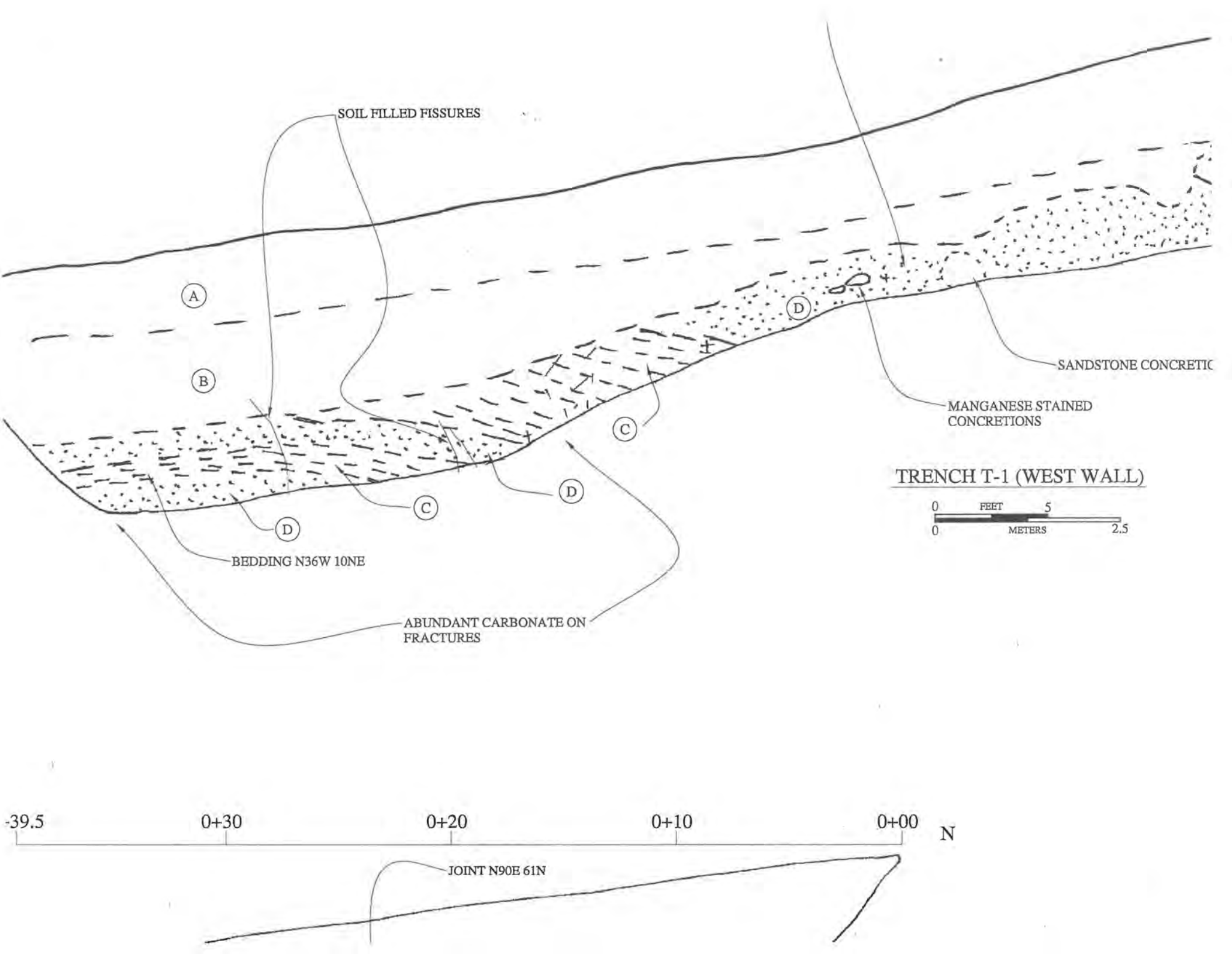
TP-5

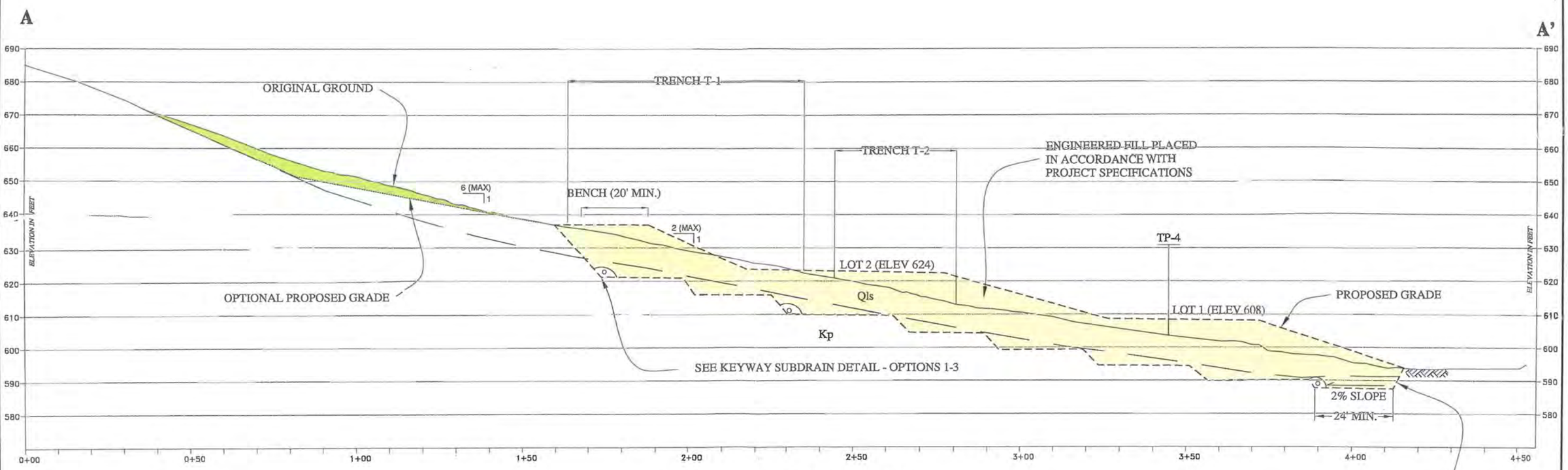
0 FEET 5

0 METERS 2.5




PARTIAL REMOVAL AND GRADING TO CONFORM TO PROPOSED GRADE.
4'
Qls
35
19
8'
30
2
P=624
7'
35
P=616
1
P=608
4'
Kp
660
655
650
635
630
625
620
615
610
605


SOIL FILLED FISSURES
A
B
C
D
SANDSTONE CONCRETIC
MANGANESE STAINED CONCRETIONS
TRENCH T-1 (WEST WALL)
0 FEET 5
0 METERS 2.5
BEDDING N36W 10NE
ABUNDANT CARBONATE ON FRACTURES
-39.5
0+30
0+20
0+10
0+00
N
JOINT N90E 61N



CROSS SECTION A-A'
1"=30'

EXPLANATION

APPROXIMATE AREA OF OPTIONAL UNSUITABLE MATERIAL REMOVAL TO GENERATE FILL

APPROXIMATE LIMITS OF UNSUITABLE MATERIAL REMOVAL AND REPLACEMENT

0 FEET 30
0 METERS 15

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

CROSS SECTION A-A'
OAK CREEK CANYON
CLAYTON, CALIFORNIA

PROJECT NO.: 3840.2.052.02		FIGURE NO. 8
DATE: FEBRUARY 2008		
DRAWN BY: JMG	CHECKED BY: JB	

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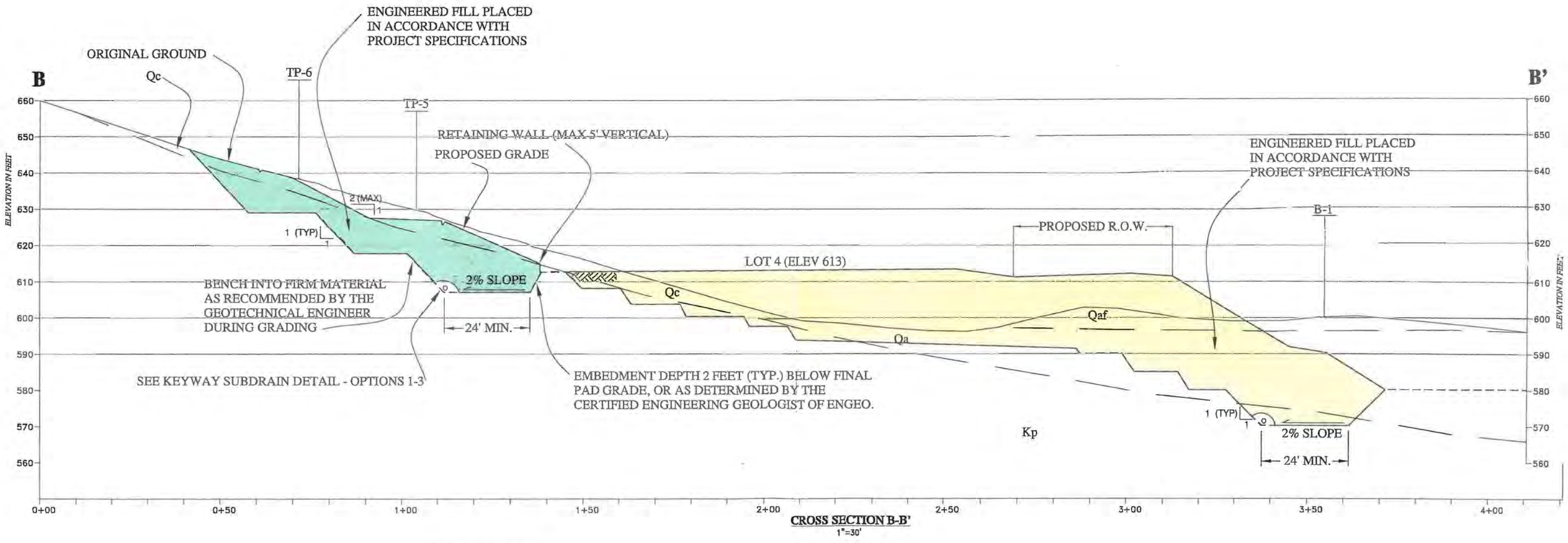

CROSS SECTION B-B'
1"=30'

EXPLANATION

APPROXIMATE LIMITS OF
UNSUITABLE MATERIAL
REMOVAL AND REPLACEMENT

APPROXIMATE LIMITS OF
SLOPE REBUILD

0 FEET 30
0 METERS 15

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

CROSS SECTION B-B'
OAK CREEK CANYON
CLAYTON, CALIFORNIA

PROJECT NO.: 3840.2.052.02	FIGURE NO.
DATE: FEBRUARY 2008	9
DRAWN BY: JMG	CHECKED BY: XXX

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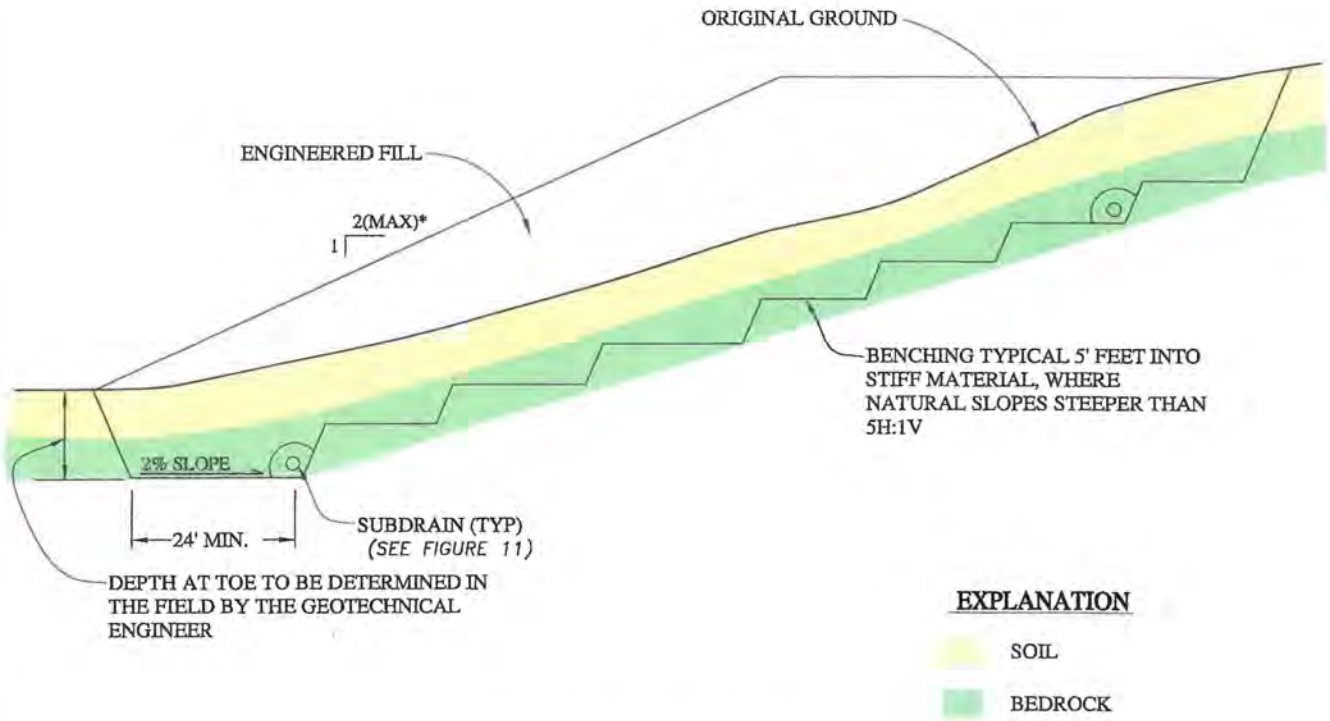


FOR SLOPE HEIGHT AND MAXIMUM SLOPE GRADIENT, REFER TO GRADED SLOPES SECTION OF THE TEXT

***2:1 SLOPE ACCEPTABLE WITH GEOGRID REINFORCEMENT OR THE USE OF SELECT FILL**

NO SCALE

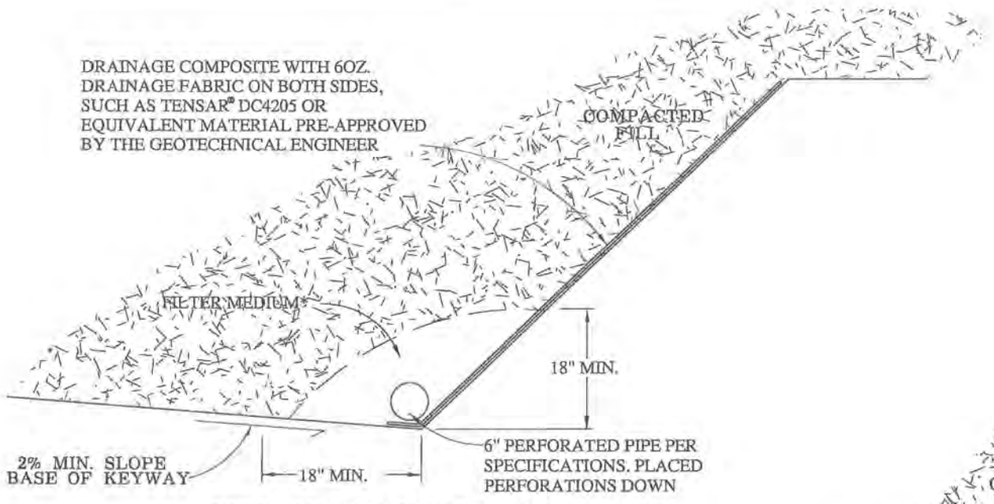
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

TYPICAL KEYWAY SECTION

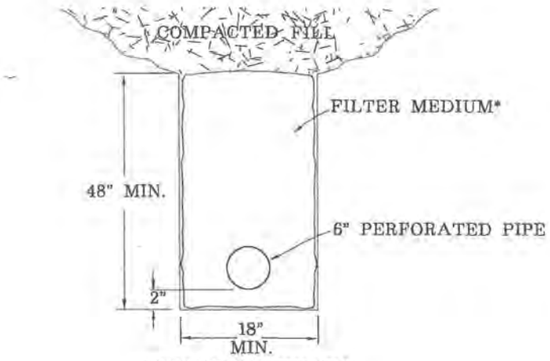
OAK CREEK CANYON

CLAYTON, CALIFORNIA

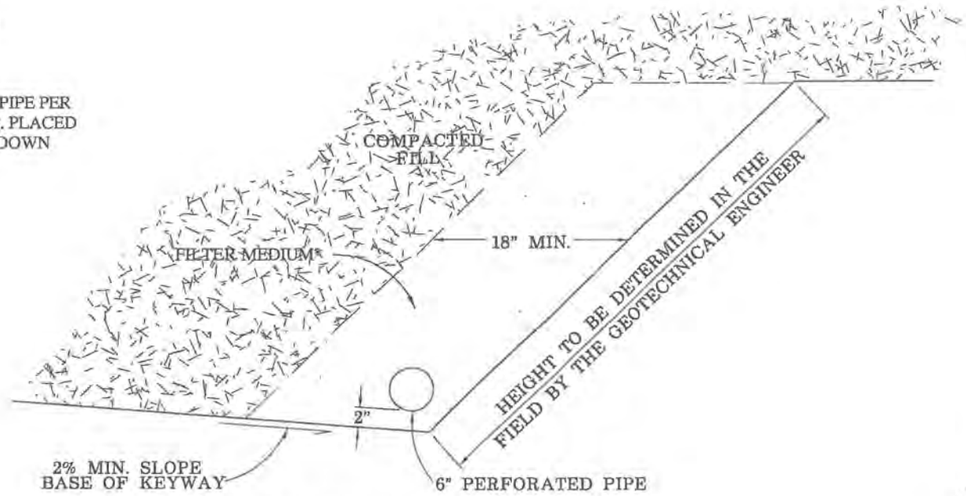
PROJECT NO.: 3840.205.202		FIGURE NO. 10
DATE: FEBRUARY 2008		
DRAWN BY: JMG	CHECKED BY: TPB	



KEYWAY SUBDRAIN - OPTION 1



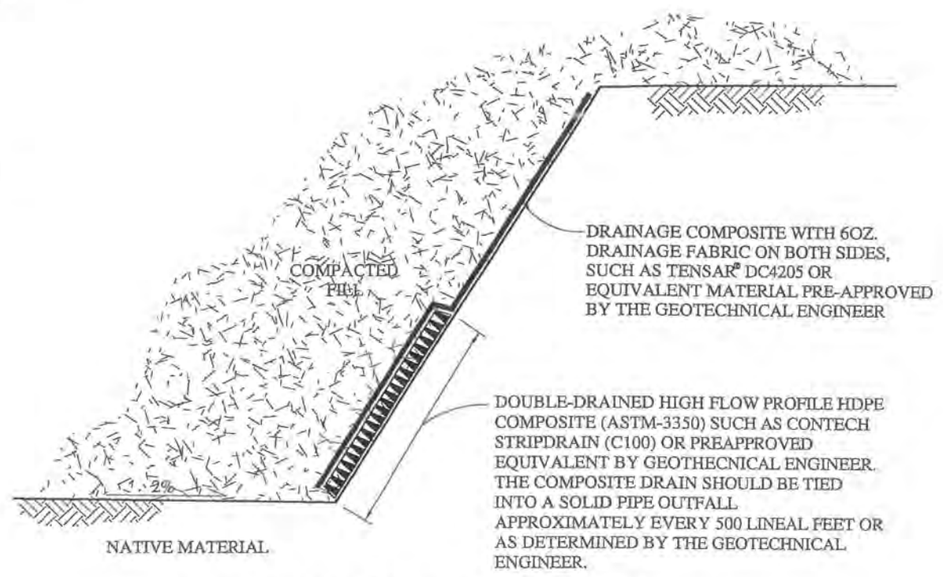
SWALE SUBDRAIN



KEYWAY SUBDRAIN - OPTION 2

NOTES:

1. *ALL PIPE JOINTS SHALL BE GLUED*
2. *ALL PERFORATED PIPE PLACED PERFORATIONS DOWN*
3. *1% FALL (MINIMUM) ON ALL TRENCHES AND DRAIN LINES*



ALTERNATE KEYWAY SUBDRAIN - OPTION 3

(FOR DEPTHS LESS THAN 30 FEET)

*FILTER MEDIUM

ALTERNATIVE A

CLASS 2 PERMEABLE MATERIAL

MATERIAL SHALL CONSIST OF CLEAN, COARSE SAND AND GRAVEL OR CRUSHED STONE, CONFORMING TO THE FOLLOWING GRADING REQUIREMENTS:

SIEVE SIZE	% PASSING SIEVE
1"	100
3/4"	90–100
3/8"	40–100
#4	25–40
#8	18–33
#30	5–15
#50	0–7
#200	0–3

ALTERNATIVE B

CLEAN CRUSHED ROCK OR GRAVEL WRAPPED IN FILTER FABRIC

ALL FILTER FABRIC SHALL MEET THE FOLLOWING MINIMUM AVERAGE ROLL VALUES UNLESS OTHERWISE SPECIFIED BY ENGEO:

GRAB STRENGTH (ASTM D-4632)	180 lbs
MASS PER UNIT AREA (ASTM D-4751)	6 oz/yd^2
APPARENT OPENING SIZE (ASTM D-4751)	70–100 U.S. STD. SIEVE
FLOW RATE (ASTM D-4491)	80 gal/min/ft
PUNCTURE STRENGTH (ASTM D-4833)	80 lbs

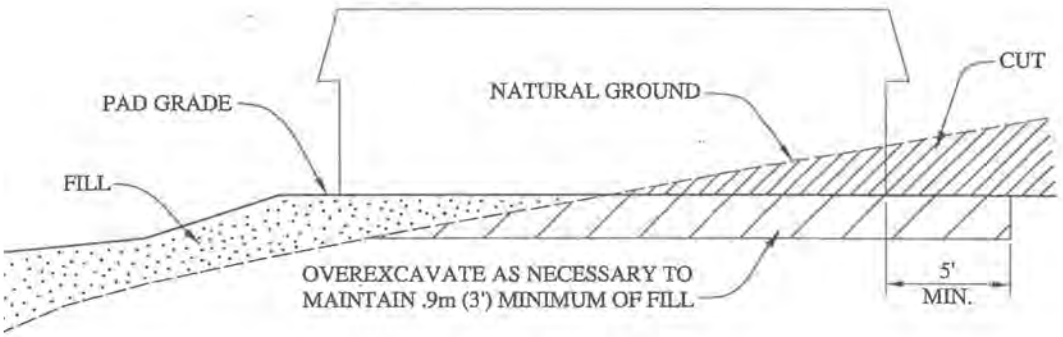
NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

TYPICAL SUBDRAIN DETAILS
OAK CREEK CANYON
CLAYTON, CALIFORNIA

PROJECT NO.: 3840.205.202		FIGURE NO.
DATE: FEBRUARY 2008		11
DRAWN BY: JMG	CHECKED BY: TPB	

G:\Active Projects\3840\3840205201\Drafting\03840.205.202.12 SUBDRAIN



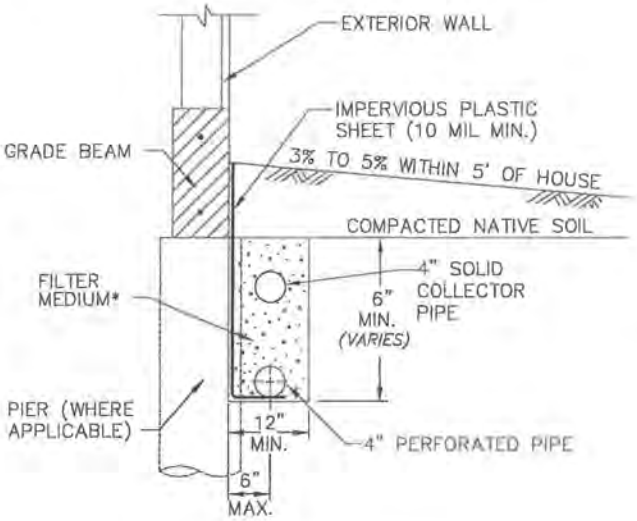
WHERE LOTS ARE PARTIALLY IN FILL, AND PARTIALLY IN CUT, THE CUT PORTION MUST BE OVEREXCAVATED AS SHOWN

CUT/FILL LOT

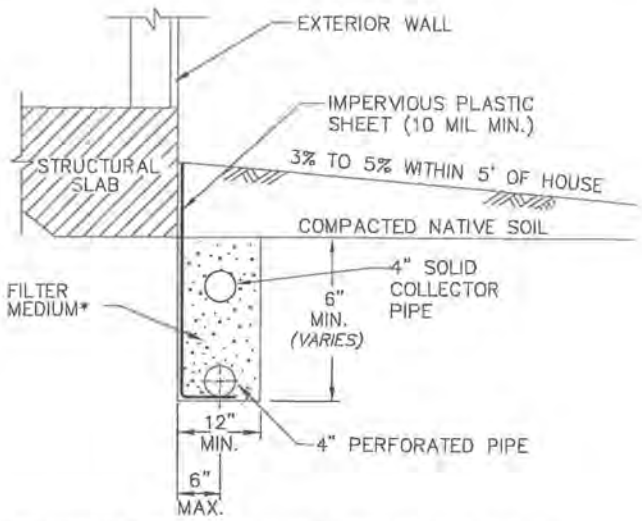
NO SCALE

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	**OVEREXCAVATION FOR CUT/FILL LOTS** **OAK CREEK CANYON** **CLAYTON, CALIFORNIA**	PROJECT NO.: **3840.205.202** DATE: **FEBRUARY 2008** DRAWN BY: JMG CHECKED BY: TPB	FIGURE NO. **12**

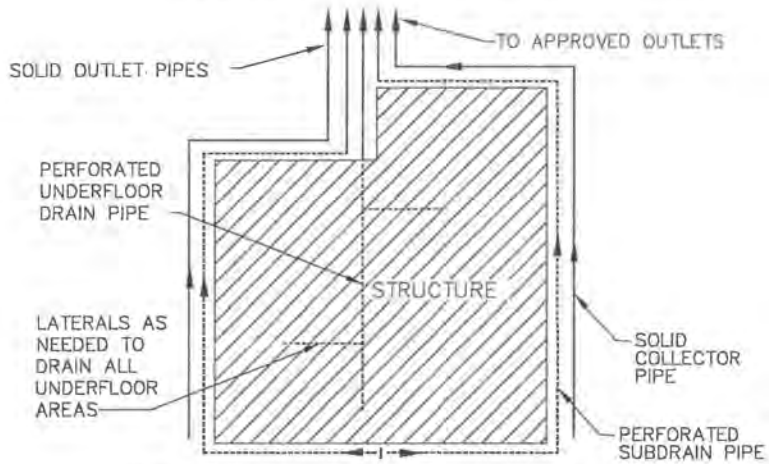
G:\Active Projects\3840\3840205201\Drafting\03840.205.202 13 CUT-FILL DETAIL C



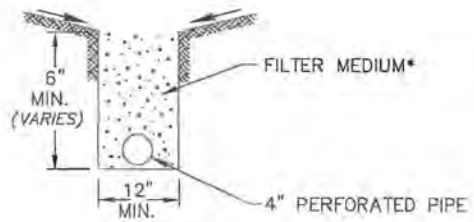
PIER AND GRADE BEAM



COMBINED SUBDRAIN AND PERIMETER DRAIN STRUCTURAL SLAB



TYPICAL FOUNDATION SUBDRAIN PLAN



UNDERFLOOR DRAIN

NOTES:

1. *ALL PIPE JOINTS SHALL BE GLUED*
2. *ALL PERFORATED PIPE PLACED PERFORATIONS DOWN*
3. *1% FALL (MINIMUM) ON ALL TRENCHES AND DRAIN LINES*
4. *THE CLOSED COLLECTOR AND THE PERIMETER SUBDRAIN CAN BE CONSTRUCTED IN A SINGLE TRENCH, IF DESIRED. HOWEVER, THE CLOSED COLLECTOR PIPE MUST BE PLACED ABOVE THE SUBDRAIN PIPE, AND IN NO CASE SHOULD THE TWO SYSTEMS BE INTERCONNECTED*

*FILTER MEDIUM

ALTERNATIVE A

CLASS 2 PERMEABLE MATERIAL

MATERIAL SHALL CONSIST OF CLEAN, COARSE SAND AND GRAVEL OR CRUSHED STONE, CONFORMING TO THE FOLLOWING GRADING REQUIREMENTS:

SIEVE SIZE	% PASSING SIEVE
1"	100
3/4"	90–100
3/8"	40–100
#4	25–40
#8	18–33
#30	5–15
#50	0–7
#200	0–3

ALTERNATIVE B

CLEAN CRUSHED ROCK OR GRAVEL WRAPPED IN FILTER FABRIC

ALL FILTER FABRIC SHALL MEET THE FOLLOWING MINIMUM AVERAGE ROLL VALUES UNLESS OTHERWISE SPECIFIED BY ENGEO:

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MASS PER UNIT AREA (ASTM D-4751)	6 oz/yd^2
APPARENT OPENING SIZE (ASTM D-4751)	70–100 U.S. STD. SIEVE
FLOW RATE (ASTM D-4491)	80 gal/min/ft
PUNCTURE STRENGTH (ASTM D-4833)	80 lbs

NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

FOUNDATION DRAIN DETAILS

OAK CREEK CANYON

CLAYTON, CALIFORNIA

PROJECT NO.: 3840.2.052.01		FIGURE NO. 13
DATE: FEBRUARY 2008		
DRAWN BY: JMP	CHECKED BY: JB	

C: \Active Projects\3840\3840205201\Drafting\03840.205.202 fndn subdrain BORROWED FROM 3193120(

ALAN KROPP
& ASSOCIATES, INC.
GEOTECHNICAL
CONSULTANTS

ALAN KROPP, CE, GE
JAMES R. LOTT, CE, GE
JEROEN VAN DEN BERG, CE
THOMAS M. BRENCIC, CE

February 25, 2020
P-8764, L-31991

Mr. Kevin English
West Coast Home Builders, Inc.
4021 Port Chicago Highway
Concord, CA 94520

RE: Geotechnical/Geological Peer Review
Oak Creek Canyon Project
Clayton, California

Dear Mr. English:

At your request, we performed a geotechnical and geological peer review of the geotechnical investigation and improvement plans for the proposed Oak Creek Canyon residential subdivision in Clayton, California. The purpose of this peer review was to evaluate whether the documents submitted conform to City standards and generally accepted geotechnical and geological practices. This peer review builds on the previous peer reviews performed by James Joyce, who also participated in the current peer review.

DOCUMENTS REVIEWED

The documents that we reviewed in our current evaluation include:

Published Materials

- Nilsen, Tor H., 1975, "Preliminary Photointerpretation Map of Landslide and Other Surficial Deposits of the Clayton 7-1/2' Quadrangle, Contra Costa County, California", U. S. Geological Survey Open File Map 75-277-12, 1:24,000.
- Dibblee, Thomas W., Jr., 1980, "Preliminary Geologic Map of the Clayton Quadrangle, Contra Costa County, California", U. S. Geological Survey Open-File Report 80-547, 1:24,000.
- Dibblee, Thomas W., Jr., 2006, "Geologic Map of the Clayton Quadrangle, Contra Costa County, California", Dibblee Geology Center Map #DF-192, 1:24,000.

Consultant Materials

- "Geotechnical Exploration – Oak Glen, Northeast Corner of Marsh Creek Road and Diablo Parkway, Contra Costa County", prepared by Engeo, dated March 31, 1994, Project No. 3840-E1.
- "Update of Geotechnical Exploration, Oak Creek Canyon, Subdivision 6826, APN 119-07-08, Clayton, California", prepared by Engeo, dated December 26, 2001 (Revised January 9, 2002), Project No. 3840.2.050.01.

- "Geotechnical Engineering Investigation, Seminary Tank Rehabilitation Project, Clayton", prepared by DCM Engineering, dated February 14, 2005, File: J-4904-1.
- "Geotechnical Peer Review, Oak Creek Canyon – Subdivision 6826, Marsh Creek Road, Clayton, California", dated February 23, 2007, Job No. 2965.000.
- "Geologic Peer Review, Subdivision 6826, Oak Creek Canyon, Clayton, California", prepared by Joyce Associates, dated October 22, 2007, Job Number 171.05.
- "Updated Geotechnical Report, Oak Creek Canyon, 5 Lots – Subdivision 6826, APN 119-070-008, Clayton, California", prepared by Engeo, dated February 22, 2008, Project No. 3840.205.202.
- "Geologic Peer Review, Subdivision 6826, Oak Creek Canyon, Clayton, California", prepared by Joyce Associates, dated March 19, 2008, Job Number 171.05.
- "Grading Plan Review, Oak Creek Canyon, 6 Lots – Subdivision 6826, APN 119-070-008, Clayton, California", prepared by Engeo, dated August 24, 2016, Project No. 3840.205.400.
- "Preliminary Grading Plan, Oak Creek Canyon, Subdivision 6826, City of Clayton, County of Contra Costa, State of California", prepared by Isakson and Associates, November 4, 2019, Job No. 200514.
- "Preliminary Grading Plan, Oak Creek Canyon, Subdivision 6826, City of Clayton, County of Contra Costa, State of California", prepared by Isakson and Associates, January 31, 2020, Job No. 200514.
- "Geotechnical Update and Plan Review, Oak Creek Canyon – Subdivision 6826 (6 Residential Lots) Clayton, California", prepared by Engeo, dated February 6, 2020, project number 3840.205.401.

In addtion, we received an undated draft copy of a Preliminary Corrective Grading Plan (prepared by Engeo) that used the 2019 grading plan (prepared by Isakson and Associates) as a base. However, we did not receive the March 21, 1997 Geotechnical Exploration Update by Engeo, which contained boring logs from borings drill in 1997.

It should also be noted that we received logs from borings drilled on the adjacent Contra Costa Water District (CCWD) Seminary Water Tank area in 1965, 1991, and 2001. These documents did not have an attached report.

PROPOSED CONSTRUCTION

The proposed project will consist of six residential lots, a new road, and related improvements. Access will be from Marsh Creek Road. Project grading will include a large cut along the uphill side of the development and a fill along the lower side. An engineering fill buttress with geogrid reinforcement will be constructed above the proposed road to improve stability and allow the use of slopes ranging up to 2:1 (h:v) in steepness. Short retaining walls will be built on Lots 2 and 3. The western portion of the property will not be developed.

BACKGROUND DATA

Published geologic maps such as Dibblee (2006; 1980) show that the site is underlain by Cretaceous-age sedimentary rocks of the Panoche Formation. These rocks consist principally of interbedded sandstone

and shale. Traces of the Clayton fault are shown approximately 500 and 1500 feet northeast of the site. Bedding attitudes west of the Clayton fault are shown to dip moderately to steeply north in the project vicinity. The low-lying portion of the site is mapped as alluvium. No landslides are shown within the site.

Nilsen (1975) prepared a preliminary photo-interpretive map of landslides and surficial deposits covering the subject site. The central and western portions of the site and the CCWD water tank are mapped as a large landside, which extends from the edge of Marsh Creek Road to near the top of the ridge to the north. The eastern portion of the site is mapped as undifferentiated bedrock. The low-lying portion of the site adjacent at the mouth of Oak Creek Canyon is mapped as colluvium.

CONSULTANT'S DATA

In 1994, Engeo performed a boring in the lower portion of the site. Four additional borings were performed by Engeo in 1997. In response to peer review comments provided by Joyce Associates in 2007, an additional investigation was performed by Engeo, which is summarized in their 2008 report. This investigation included six test pits and two test trenches. The purpose of the pits and trenches was primarily to evaluate the extent of landslides within the site and evaluate the properties and bedding orientations of the Panoche Formation bedrock. The borings confirmed that the central and upper portions of the site are underlain by bedrock of the Panoche Formation. The borings show that the site is underlain by sediments consisting mainly of medium stiff to hard, silty and sandy clays, with some interbedded layers of sand, silt, and gravel. At depth, these materials are very dense.

SITE RECONNAISSANCE

The undersigned engineering geologist performed a site visit on December 26, 2019. Overall, the middle and upper portions of the site slope steeply to the south, with slopes ranging up to nearly 2:1 (h:v). The parcel is vacant and is covered with native grasses. A moderately large landslide is present in the western portion of the proposed develeopment area. The lower portion of the site is near level. A CCWD water reservoir (steel tank) is located on a graded pad along the western margin of the proposed development area.

Mr. Joyce also observed the two test trenches performed as a part of the 2008 investigation. At that time, discussions were held with Engeo's Engineering Geologist, Mr. Phil Stuecheli, and a general consensus was reached regarding the geologic conditions.

CONCLUSIONS

It is our opinion that the project documents conform to reasonable standard practices and City requirements regarding the geotechnical aspects of the project. We have the following comments:

1. The preliminary grading plan references a 1997 geotechnical report by Engeo. The grading plan should reference the more recent Engeo report and plan review.
2. There appear to be some differences between the corrective grading plans prepared by Engeo in 2008 and the recent draft copy we received. Key issues are the extent of remedial grading on Lots 3 to 5 and conforming remedial grading areas along the common property line with CCWD. The rationale for these differences should be provided. Also, the recent draft plan did not provide the locations of the 2008 trenches or the borings drilled on CCWD property, and this information should be added (assuming locations of borings on the CCWD property can be established).

3. During our recent reconnaissance, we observed a partially buried plastic pipe extending into the subject site near the southeast corner of the CCWD property. This pipe may be an outlet for subdrains extending beneath the fill that forms the outer portion of the pad for the water tank. We recommend that Engeo evaluate the pipe during project construction and connect it to an appropriate outlet.
4. A discussion of the anticipated future maintenance effort that will be required on the debris catchment bench should be provided by Engeo.
5. Subexcavation of the landslide area and keyways should be observed by an Engeo engineering geologist.
6. During construction, representatives of Engeo should observe the geotechnical aspects of the work, including grading, fill placement, surface and subsurface drainage measures, and foundation excavations. At the conclusion of the work, Engeo should prepare and submit to the City a final report summarizing their services during construction and indicating that the work was performed in accordance with their recommendations.

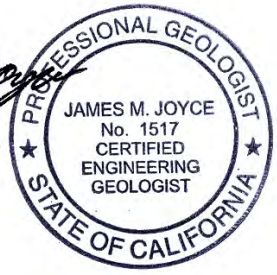
LIMITATIONS AND CLOSURE

This geotechnical peer review has been performed to provide technical advice to assist the City with its discretionary permit decisions. Our services have been limited to an independent review of the referenced documents. The opinions and conclusions presented in this letter are made in accordance with generally accepted geotechnical principles and practices. No other warranty, either expressed or implied, is made.

We trust this provides the information required at this time. If you have any questions, please call.

Very truly yours,

ALAN KROPP & ASSOCIATES
Alan Kropp, G.E.
Principal Engineer



JOYCE ASSOCIATES
James Joyce, CEG
Principal Geologist

AK/JJ/ab

Copies: Addressee (PDF) – kenglish@discoverybuilders.com
Engeo, Attention: Ted Bayham (PDF) – tbayham@engeo.com

Project No.
3840.205.401

March 10, 2020

Mr. Kevin English
West Coast Home Builders. Inc.
4021 Port Chicago Highway
Concord, CA 94520

Subject: Oak Creek Canyon – Subdivision 6826 (6 Residential Lots)
Clayton, California

RESPONSE TO REVIEW COMMENTS BY ALAN KROPP & ASSOCIATES, DATED FEBRUARY 25, 2020

Dear Mr. English:

At your request, this letter provides our response and clarification to several review comments provided by Alan Kropp & Associates (AKA) in their letter dated February 25, 2020, regarding the Oak Creek Canyon residential subdivision in Clayton, California.

Provided below are the AKA geotechnical comments in italics followed by our responses. Comment No. 1 requested information from the project Civil Engineer, Isakson and Associates, Inc., and therefore, not included in this letter.

Comment 2. *There appear to be some differences between the corrective grading plans prepared by Engeo in 2008 and the recent draft copy we received. Key issues are the extent of remedial grading on Lots 3 to 5 and conforming remedial grading areas along the common property line with CCWD. The rationale for these differences should be provided. Also, the recent draft plan did not provide the locations of the 2008 trenches or the borings drilled on CCWD property, and this information should be added (assuming locations of borings on the CCWD property can be established).*

ENGEO Response: The remedial grading plan (draft) provided to AKA as part of their review was tentative and considered a work in process. Once the Civil Engineer 40-scale design plans are final, a final remedial grading plan will be prepared. We have provided locations of the 2008 trenches and borings in the attached Appendix. Once the construction plans are completed, we will update our remedial grading plan to include previous exploration locations, as well as recommendations for conforming grading along the shared property line with the CCWD property, and delineation of areas containing unsuitable material that needs to be removed and replaced, as shown in the 2008 Remedial Grading Plan (Reference 2).

Comment 3. *During our recent reconnaissance, we observed a partially buried plastic pipe extending into the subject site near the southeast corner of the CCWD property. This pipe may be an outlet for subdrains extending beneath the fill that forms the outer portion of the pad for the water tank. We recommend that Engeo evaluate the pipe during project construction and connect it to an appropriate outlet.*

ENGEO Response: We appreciate this reconnaissance note by AKA, and ENGEO will evaluate this site condition during project construction to determine appropriate recommendations. If the pipe is a discharge pipeline for adjacent CCWD facility, the project Civil Engineer will include appropriate connections for future development in final plans.

Comment 4. *A discussion of the anticipated future maintenance effort that will be required on the debris catchment bench should be provided by Engeo.*

ENGEO Response: It is anticipated that the natural slope above the bench will periodically shed debris or accumulations of soil deposits onto the bench and/or within concrete lined drainage ditch, that these will need to be maintained on a periodic and as-needed basis. Bi-annual inspection of ditches is commonly performed on subdivisions with such facilities in the Bay Area to access the need for maintenance and clearing. Maintenance is further discussed in ENGEO's Updated Geotechnical Report, dated February 22, 2008 (Reference 2).

Comment 5. *Subexcavation of the landslide area and keyways should be observed by an Engeo engineering geologist.*

ENGEO Response: We concur with this comment by AKA, and recommend that an ENGEO Certified Engineering Geologist observe and approve all excavations of landslide areas and keyway for suitability to receive engineered fill.

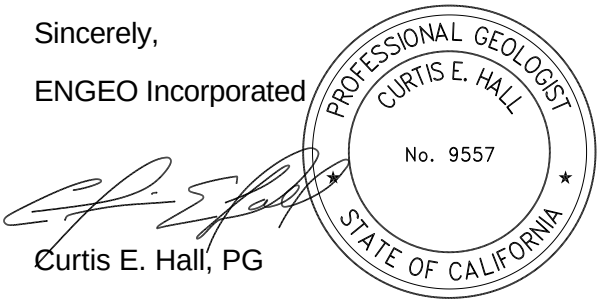
Comment 6. *During construction, representatives of Engeo should observe the geotechnical aspects of the work, including grading, fill placement, surface and subsurface drainage measures, and foundation excavations. At the conclusion of the work, Engeo should prepare and submit to the City a final report summarizing their services during construction and indicating that the work was performed in accordance with their recommendations.*

ENGEO Response: We concur with this comment by AKA, and recommend that ENGEO representatives be present on site during construction to provide testing and observation recommendations in the field. Upon the conclusion of the project, a testing and observation report should be prepared by ENGEO documenting our services and whether or not the site work was completed in accordance with our recommendations or not.

If you have any questions or comments regarding this letter, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated



Curtis E. Hall, PG

Theodore P. Bayham, GE, CEG

Mary Bromfield
ceh/tpb/dt

Attachments: Selected References
Appendix A – Previous CCWD Exploration Information with Locations

SELECTED REFERENCES

1. Alan Kropp & Associates, Inc.; Geotechnical/Geological Peer Review, Oak Creek Canyon Project, Clayton, California; February 25, 2020; P-8764, L-31991.
2. ENGEO; Updated Geotechnical Report, Oak Creek Canyon, 5 Lots – Subdivision 6826, APN 119-070-008, Clayton, California; February 22, 2008; Project No. 3840.205.202.
3. ENGEO; Grading Plan Review, Oak Creek Canyon, 6 Lots – Subdivision 6826, APN 119-070-008, Clayton, California; August 24, 2016; Project No. 3840.205.400.
4. ENGEO; Geotechnical Update and Plan Review, Oak Creek Canyon – Subdivision 6826 (6 Residential Lots), Clayton, California; February 6, 2020; Project No. 3840.205.401.
5. Isakson and Associates, Inc.; Preliminary Grading Plan, Oak Creek Canyon, Subdivision 6826, City of Clayton, County of Contra Costa, State of California; January 31, 2020; Job No. 200514.

APPENDIX A

Previous CCWD Exploration Information with Locations

CONTRA COSTA WATER DISTRICT

ENGINEERING DEPARTMENT FAX TRANSMITTAL

Date: March 7, 2007

Number of Pages: 5 (including Cover Sheet)

NOTE: IF YOU DID NOT RECEIVE ALL OF THE PAGES, OR IF YOU HAVE A QUESTION, PLEASE CALL THE VERIFYING NUMBER BELOW.

TO:	FROM:
James Wang (Name)	Paul Lau (Name)
Discovery Builders (Company Name)	Contra Costa Water District (Company Name)
(Phone Number)	688-8016 (Phone Number - Verifying)
689-2047 (FAX number)	(925) 688-8303 (FAX number)

Subject:

Comments:

FYI

Received Time Mar. 7. 1:17PM

LAND RIGHTS PROJECT
ROUTING SLIP
TREATED WATER

FILE: 701109 REPLY BY: 6-26-01

SUBJECT: Sprint PCS Wireless Boring at Seminary Pump Station Site G7

ENCLOSURES: Routing slips, sprint drawing #2 and Boring Information

	CONCUR:	DATE:		CONCUR:	DATE:
☒ 8 WELCH		6/18/01	☐ 3 NICKERSON		6/19/01
			Laaasack		19JUN 01
☐ ROUTON			☐ AUGUST		
☐ MARTIN			☐ HANSON		
☒ 2 PISILA		6-19-01	☐ 4 ANGELOSANTE		

☐ FOR YOUR INFORMATION
☒ FOR YOUR REVIEW/COMMENTS
☐ FOR YOUR APPROVAL

☐ DISTRICT/USBR OWNED OR MAINTAINED
☐ APPLICANT OWNED OR MAINTAINED
☐ INSPECTOR REQUIRED NO

MESSAGE: Sprint would like to make a test bore at Seminary Pump Station. Please review and comment. If approved do we want to request a copy of the boring logs.

By: Dino Angelosante Date: 6-15-01
Dino Angelosante

COMMENTS: 1. Must coordinate all boring/access with O&M.
2. Must first have positively located all potential utilities @ bore prior to drilling. Any potential conflict will require a site relocation of the bore.
3. Pls provide a copy of the boring logs to CCWD.

☒ 2 SAME COMMENT AS 3-9-01, ATTACHED; EXCEPT NOTE THAT SITE IS STILL IN UNINCORPORATED COUNTY [CLAYTON IS SUBMITTING AN APPLICATION TO ANNEX ADJACENT SECECON-OWNED LANDS (FOR SUB-DIVISION) + THE SEMINARY RESERVOIR INTO THE CITY]. ANY USE PERMIT/CEQA DOCUMENTATION WOULD BE BY THE COUNTY AT THIS TIME.

ATTACH SEPARATE PAGES WITH COMMENTS

By: _____ Date: _____

FORMS/RoutingSlipTreatedW-5-11-01.doc

Received Time Mar. 7. 1:17PM

EXPLORATION DATE	LOGGED BY	TOTAL DEPTH	BORING NO.
August 15, 2001	Peter Schurman	20 feet	B-1
EXPLORATION EQUIPMENT: Mobile B-20 equipped with a 4-inch-diameter, solid-stem auger		BACKFILL MATERIAL: Cement slurry	

FIELD: DEPTH (IN FEET)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT	UNCONFINED COMP. STRENGTH (TSF)	USCS LETTER SYMBOL	DESCRIPTION	LABORATORY: DRY DENSITY (PCF)	MOISTURE CONTENT (%)	OTHER LAB TESTS (SEE LOG LEGEND FOR ABBREVIATION DEFINITIONS)
						SURFACE CONDITIONS: Gravel-surfaced vehicular access way			
						GROUNDWATER CONDITIONS: No free groundwater encountered			
						APPROX. GROUND SURFACE ELEVATION (MSL): N/A			
		1	24	4.0	SC	***Clayey SAND:*** Mottled yellow-brown, ligth brown, and brown, dry-to-moist, medium dense, fine-to-coarse grained, with some silt (FILL)			
5		2	64			***MARINE SEDIMENTARY ROCK:*** Consisting predominantly of sandstone/siltstone, light brown, completely weathered, friable			
10		3	81			grades highly weathered, weak			
15		4	77/11"			***MARINE SEDIMENTARY ROCK:*** Consisting predominantly of shale, mottled gray-brown and orange-brown, completely weathered, friable			
20		5	84/12"			grades highly weathered			

BMI PROJECT NO. 01S-666

LOG OF EXPLORATORY BORING
PROPOSED TELECOMMUNICATIONS FACILITY
SEMINARY PUMP STATION, SF54XC100-A
CONTRA COSTA COUNTY, CALIFORNIA

PLATE 5

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			USCS	DESCRIPTION
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS GREATER THAN NO. 200 SIEVE	GRAVELS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS (LITTLE OR NO FINES)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		GRAVELS (APPRECIABLE FINES)	GM	Silty gravels, poorly-graded gravel-sand-silt mixtures
			GC	Clayey gravels, poorly-graded gravel-sand-clay mixtures
	SANDS MORE THAN 50% OF COARSE FRACTION PASSES NO. 4 SIEVE	SANDS (LITTLE OR NO FINES)	SW	Well-graded sands, gravelly sands, little or no fines
			SP	Poorly-graded sands, gravelly sands, little or no fines
		SANDS (APPRECIABLE FINES)	SM	Silty sands, poorly-graded sand-gravel-silt mixtures
			SC	Clayey sands, poorly-graded sand-gravel-clay mixtures
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	Inorganic silts and very fine sands, silty or clayey fine sands, clayey silts with slight plasticity
			CL	Inorganic clays of low-to-medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and clays of low plasticity
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic silts and clays of high plasticity
HIGHLY ORGANIC SOILS			PT	Peat, humus, swamp soils with high organic content

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

LOG SYMBOLS AND DEFINITIONS

FIELD		LABORATORY	
	STANDARD PENETRATION SPLIT-SPOON SAMPLER (2-INCH OUTSIDE DIAMETER)	-4	% PASSING NO. 4 SIEVE (ASTM TEST METHOD C 136)
	CALIFORNIA SAMPLER (3-INCH OUTSIDE DIAMETER)	-200	% PASSING NO. 200 SIEVE (ASTM TEST METHOD C 117)
	MODIFIED CALIFORNIA SAMPLER (2.5-INCH OUTSIDE DIAMETER)	LL	LIQUID LIMIT (ASTM TEST METHOD D 4318)
	BAG/BULK	PI	PLASTICITY INDEX (ASTM TEST METHOD D 4318)
	THIN-WALLED SHELBY TUBE (3-INCH OUTSIDE DIAMETER)	R-VAL	RESISTANCE VALUE (CALTRANS TEST 301)
	WATER LEVEL (LEVEL ESTABLISHED AS NOTED ON LOGS)	EI	EXPANSION INDEX (UBC STANDARD 29-2)
	WATER OR SEEPAGE ENCOUNTERED (LEVEL NOT ESTABLISHED)	COL	COLLAPSE POTENTIAL (ASTM TEST METHOD D 5333)
		SP	SWELL POTENTIAL (under a specified load) (ASTM TEST METHOD D 4546)
		SL	SWELL PRESSURE (no consolidation) (ASTM TEST METHOD D 4546)

GENERAL NOTES:
1. Lines separating soil or rock strata on logs are approximate boundaries only. Actual transitions may be gradual and, in the case of selectively sampled borings, may vary by as much as the sample interval.
2. In general, Unified Soil Classification designations were evaluated using visual methods only. Actual designations (based on laboratory tests) may vary.
3. Logs represent general soil conditions on the date and at the location indicated. No warranty is provided as to the continuity of soil conditions between individual sample locations.
4. Unconfined compressive strengths reported on the logs (if any) were obtained using a pocket penetrometer.

BMI PROJECT NO. ▶ 01S-666

LOG LEGEND
PROPOSED TELECOMMUNICATIONS FACILITY
SEMINARY PUMP STATION, SF54XC100-A
CONTRA COSTA COUNTY, CALIFORNIA

PLATE 3

FRACTURING	
LOG TERM	DEFINITION
Very Widely	>6 feet
Widely	2 to 6 feet
Moderately	8 to 24 inches
Closely	2-1/2 to 8 inches
Very Closely	3/4 to 2-1/2 inches

ROCK QUALITY DESIGNATION (RQD)	
RQD (%)	ROCK QUALITY
90 - 100	Excellent
75 - 90	Good
50 - 75	Fair
25 - 50	Poor
0 - 25	Very Poor

WEATHERING	
LOG TERM	DESCRIPTION / DEFINITION
Fresh	No visible sign of decomposition or discoloration. Rings under hammer impact.
Slightly Weathered	Slight discoloration inwards from open fractures; otherwise similar to fresh.
Moderately Weathered	Discoloration throughout. Strength less than fresh rock; specimens cannot be broken by hand or scraped with knife.
Highly Weathered	Specimens can be broken by hand with effort and shaved with knife. Texture becoming indistinct but fabric preserved.
Completely Weathered	Minerals decomposed to soil but fabric and structure preserved. Specimens easily crumbled or penetrated.

COMPETENCY			
CLASS	LOG TERM	DESCRIPTION / DEFINITION	APPROXIMATE RANGE OF UNCONFINED COMPRESSIVE STRENGTHS (tsf)
I	Extremely Strong	Many blows with geologic hammer required to break intact specimens.	>2000
II	Very Strong	Hand-held specimens break with pick-end of hammer under more than one blow.	1000 - 2000
III	Strong	Hand-held specimens can be broken with single, moderate blow with pick-end of hammer.	500 - 1000
IV	Moderately Strong	Specimens can be scraped with knife; light blow with pick-end of hammer causes indentations.	250 - 500
V	Weak	Specimens crumble under moderate blow with pick-end of hammer.	10 - 250
VI	Friable	Specimens crumble in hand.	N/A

SMI PROJECT NO. ▶ 01S-666

ROCK CLASSIFICATION LEGEND
PROPOSED TELECOMMUNICATIONS FACILITY
SEMINARY PUMP STATION, SF54XC100-A
CONTRA COSTA COUNTY, CALIFORNIA

PLATE 4

CENTRAL COSTA WATER DISTRICT

ENGINEERING DEPARTMENT FAX TRANSMITTAL

Date: March 6, 2007

Number of Pages: 9
(including Cover Sheet)

NOTE: IF YOU DID NOT RECEIVE ALL OF THE PAGES, OR IF YOU HAVE A QUESTION, PLEASE CALL THE VERIFYING NUMBER BELOW.

TO:	FROM:
JAMES WANG	PAUL CALL
(Name)	(Name)
Discovery Builders	Contra Costa Water District
(Company Name)	(Company Name)
	688-8016
(Phone Number)	(Phone Number - Verifying)
689-2047	(925) 688-8303
(FAX number)	(FAX number)

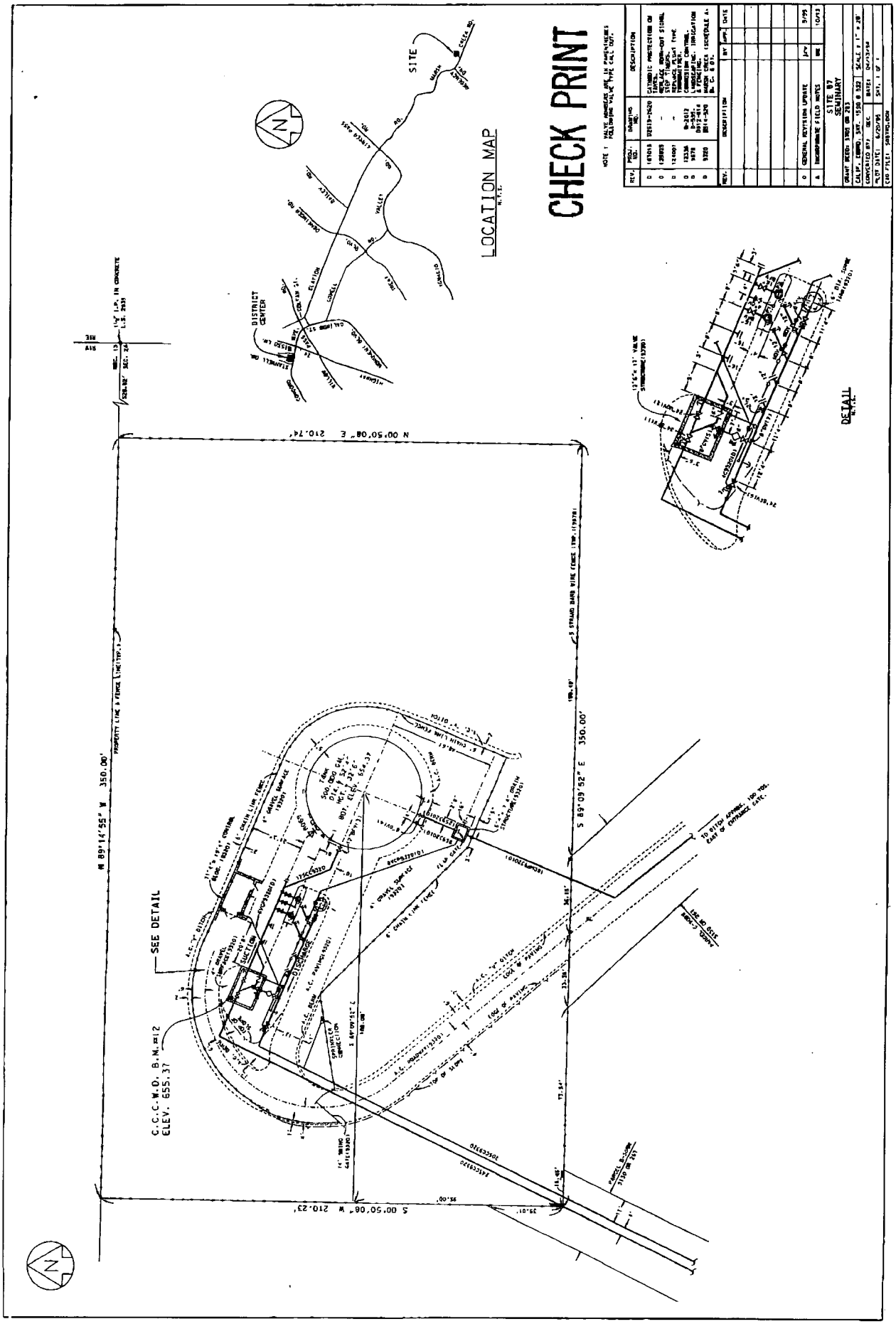
Subject: Geotech Reports at Seminary

Comments:

I'm having problems finding an old Dames & Moore Report with some borings of the site. Here's what I could find.

PAUL C.

Received Time Mar. 6. 4:38PM


CHECK PRINT
LOCATION MAP
SITE
DETAIL
SEE DETAIL
C.C.C.W.D. B.M. #12
ELEV. 655.37
N 89°14'55" W 350.00'
S 89°09'52" E 350.00'
N 00°50'08" E 210.74'
S 00°50'08" W 210.23'
SITE 87
SEMINARY

DCM Engineering

David C. Mathy
Robert A. Kahl
Dru R. Nielson
Brian R. Dodge
Mark D. Sinclair
Marc M. Gelinas

February 14, 2005
File: J-4904-1

Ms. Jill Cunningham
Brown & Caldwell
201 N. Civic Drive, Suite 115
Walnut Creek, CA 94596

Subject: **Geotechnical Engineering Investigation**
Seminary Tank Rehabilitation Project
Clayton, California

Dear Ms. Cunningham:

This letter report summarizes our geotechnical engineering investigation at Contra Costa Water District's Seminary Tank in Clayton, California. The existing reservoir is an above grade welded steel tank with a capacity of 0.5 mg. The tank was constructed in about 1966 and retrofitted with rock anchor tie-downs for seismic stability in about 1992. The current project involves updated evaluations of seismic safety and water quality. This geotechnical investigation provides the specific geotechnical parameters requested by Brown & Caldwell. Background information referenced in this report has been provided by Brown & Caldwell.

1.0 FINDINGS

1.1 Review of Available Information

Previous Test Pits

Logs for four test pits that were apparently excavated for a geotechnical investigation by Soil Mechanics and Foundation Engineers in 1965 for the original design and placement of the Seminary tank are provided on Plate E-3, Log of Reference Test Pits. The location and elevation of these test pits relative to the existing tank location are not known to us at this time. These test pits describe topsoil depths from nothing to 7½ feet over bedrock consisting of sandstone and shale. The deepest test pit was 11 feet.

Previous Boring Logs

The logs for two test borings that were drilled for a geotechnical investigation performed by Dames & Moore in 1991 for design of the existing tank rock anchors are provided on Plates E-1 and E-2, Log of Reference Borings RB-1 and RB-2. The location of these reference borings are shown on Plate 1, Boring Location Map. These borings were logged to depths of 8 feet and 11 feet. Both borings were drilled on the pad cut for the tank, and based on the boring logs, both borings encountered sandstone to the maximum depth explored of 11 feet. We were not provided with copies of the reports from which these logs originated.

Mapping of Site Conditions

Geologic mapping by Graymer and others, *Preliminary Geologic Map Emphasizing Bedrock Formations in Contra Costa County, California, 1994*, describes bedrock at the tank site as shale with minor sandstone (see Plate 2). Bedrock bedding at the site is steeply dipping with no out of slope dip component around the tank perimeter.

Landslide mapping by Nilsen, *Preliminary Photointerpretation Map of Landslide and Other Surficial Deposits of Clayton 7½' Quadrangle, Contra Costa County, California, 1975*, indicates the Seminary tank site is located within a previously mapped landslide. The depth of this landslide and measures taken to mitigate the effects of this landslide for site development are not known to us at this time. However, it is most likely that the landslide mapped by Nilsen represents a failure of the topsoil not the bedrock. The topsoil was removed during grading for the tank pad. There was no evidence of landslide features in our test borings.

Fault zone mapping by the California Department of Mines and Geology, *Maps of Known Active Fault Near - Source Zones in California and Adjacent Portions of California, 1997*, to be used with the 1997 Uniform Building Code identifies the nearest known active fault trace to be the Greenville fault. The Greenville fault is less than 2 km north of the Seminary tank site. Some geology maps identify the section of the Greenville fault near the Seminary tank site as the Clayton fault. Peak ground (i.e., bedrock) acceleration at the site will be on the order of 0.50g (see Plate 3).

The tank is directly underlain by bedrock; therefore, the potential for liquefaction is nil.

Soil Conditions

According to the Soil Survey of Contra Costa County, California, by the Soil Conservation Service (SCS), 1977, the tank site is located near the boundary between two mapped soil units; Perkins gravelly loam and Los Osos clay loam. Although the topsoil has been removed from the tank site, it is noted that the Los Osos soils are described as being underlain by fine-grained sandstone and shale.

Tank Anchorage Design Plans

Plans for seismic improvements to the tank are detailed on *Design of Seismic Improvements, Tank Anchorage, Contra Costa County Water District Seminary Tanks, by Dames & Moore, May 8, 1992.* These plans show 28 rock anchors were installed around the tank at a spacing interval of approximately 6 feet. These rock anchors extend 49 feet beneath the surface of a ringwall that surrounds the tank. The bond length for these rock anchors is 29 feet which starts 20 feet below the top of the ringwall. The anchors were placed in 4-inch diameter pre-drilled holes. The plans

do not specify the method of grouting (i.e., gravity vs. pressure). The plans show that the rock anchors are required to have a capacity of 95 kips for pullout.

Rock Anchor Performance Testing

We reviewed performance testing records for the Seminary tank rock anchors. The testing was performed for the Contra Costa Water District by AVAR Construction Systems on January 25, 1993.

All 28 of the Seminary tank rock anchors were performance tested successfully to 95 kips. No surcharge testing was performed on the rock anchors that would have exceeded their 95 kip design capacity. Creep testing performed on a few of the rock anchors was also successful. The creep test records show there was no movement over the 10 minute length of the test.

1.2 Borings

We drilled, logged, and sampled two borings (Borings B-1 and B-2) at the tank site on January 6, 2005, to depths of 34 feet. These borings were spaced between the locations of the two earlier referenced borings by Dames & Moore (RB-1 and RB-2). The location of all four borings is shown on Plate 1, Boring Location Map. Logs of our borings are provided in Appendix B and logs of reference borings and test pits are provided in Appendix E.

The two borings logged for our investigation were drilled using a tractor-mounted Mobile B-24 drill rig with 4-inch diameter continuous flight, solid-stem augers. Subsurface soil, bedrock and groundwater conditions were logged and representative subsurface bedrock samples were obtained from each boring. Bedrock samples were obtained in the test borings by driving a 2.5-inch inside diameter, 3.0-inch outside diameter Modified California Sampler (MCS) containing thin brass liners into the bottom of the boring or by driving a 1.4-inch inside diameter, 2.0-inch outside diameter Standard Penetration Test (SPT) sampler (ASTM D1586) into the bottom of the boring.

A 140-pound hammer falling 30 inches per blow was used to drive the samplers into the bottom of the borehole. The number of blows required to advance the samplers the last 12 inches of an 18-inch drive are recorded on the boring logs as penetration resistance (blows/ft). Sample penetration of less than 12 inches is noted on the boring logs with the number of blows per total increment of penetration. The penetration resistance values (blows/ft) for the SPT sampler given on the boring logs are actual ASTM D1586 N-values. The penetration resistance that is given on the boring logs for the MCS sampler is a field blow count for the sampler used and has not been correlated to an equivalent SPT N-value.

After the drive samplers were withdrawn from the borehole, the bedrock samples were removed, examined for classification, and sealed to preserve their natural moisture content for laboratory

testing. Classification systems used to describe the bedrock are provided in Appendix A. Descriptions of bedrock and groundwater conditions provided in the boring logs are based on observations during drilling and sampling and on the results of laboratory tests. The borings were backfilled with cement slurry immediately after drilling.

1.3 Laboratory Tests

The following laboratory tests were performed on bedrock samples retrieved from our borings:

- Moisture Content
- Unit Weight
- Atterberg Limits
- Grain Size
- Corrosivity

The results of these laboratory tests are presented in Appendix B, Log of Borings B-1 and B-2. The results of testing for Atterberg limits, grain size, and corrosivity are shown graphically on plates in Appendix C. The Corrosion Engineering Investigation Report by Conceco/Matcor Engineering is included in Appendix D.

1.4 Summary of Subsurface Conditions

For a detailed description of the subsurface conditions encountered in our borings, see Appendix B.

Boring B-1 was drilled between the east side of the tank and the face of a cut slope made during the grading work for the tank pad. The upper 20 feet of the boring penetrated bedrock that consists predominantly of olive brown and dark yellowish brown weathered shale/claystone interbedded with sandstone layers of varying thicknesses. This same bedrock is visible in the cut slope face. At a depth of 20 feet in this boring, a dark gray weathered claystone was encountered that extended to the bottom of the boring. Groundwater seepage was encountered during drilling at a depth of about 24 feet.

Boring B-2 was drilled on the southwest side of the tank. This boring is located about 22 feet from the downhill side of the tank. Boring B-2 encountered about 2 feet of fill material over bedrock, which appears to indicate the cut pad for the tank was widened along the downhill side by placing fill over a benched slope. It is not likely that the fill extends beneath the tank. The fill appeared to consist of fat clays that are consistent with native topsoils. The underlying bedrock consists of olive brown and dark yellowish brown weathered shale/claystone interbedded with sandstone layers of varying thickness to the bottom of the boring. There was no groundwater seepage nor free groundwater encountered in this boring.

2.0 CONCLUSIONS AND RECOMMENDATIONS

2.1 Foundation Design Parameters

The Seminary tank rehabilitation project may require modification of the existing tank foundations and rock anchors (the exact scope of modifications is not known to us at this time). The following geotechnical engineering design parameters are for foundations constructed in undisturbed bedrock.

Allowable bearing capacity for footings having a minimum width of 12 inches and a minimum depth of embedment of 12 inches into undisturbed bedrock. An increase of 20% shall be allowed for each additional foot of width or depth to a maximum value of 6000 psf.	**3,000 psf**
Coefficient of friction between the base of the footing and undisturbed bedrock.	**0.40**
Allowable Passive Pressure (equivalent fluid load) for footings against undisturbed bedrock.	**500 pcf**
Seismic Design Coefficients per 1997 UBC. Based on the Greenville fault (Type B) at less than 2 km from the site.	**Soil Type = S_c** **$N_a = 1.3$** **$N_v = 1.6$** **$C_a = 0.40N_a = 0.52$** **$C_v = 0.56N_v = 0.90$**

2.2 Rock Anchors

The rock anchor performance test results verify the rock anchor capacity of 95 kips. Assuming a drilled hole diameter of 4 inches, a bond length of 29 feet, and a capacity of 95 kips, the rock anchorage bond stress is approximately 22 psi. At this time, we do not know if the rock anchors were gravity grouted or pressure grouted. A bond stress of 22 psi is more consistent with pressure grouting than gravity grouting.

If updated seismic evaluations of the Seminary tank determine that a small amount of additional uplift resistance is needed from these rock anchors (e.g., less than 10%), we recommend that they be performance tested to determine if the existing rock anchors have the desired capacity. However, assuming that the rock anchorage bond stress is 22 psi, it is doubtful if there is much additional capacity in these anchors, especially considering the bedrock is more shale/claystone than sandstone. As such, if significant additional uplift resistance is needed, it will most likely

be necessary to install additional rock anchors. New rock anchors can be designed using the same criteria as the existing rock anchors.

3.0 LIMITATIONS

This report is to only be used for the Contra Costa Water District's Seminary Tank Rehabilitation project in Clayton, California. Recommendations provided in this report may require reevaluation once the final scope of foundation rehabilitation is determined.

4.0 CLOSURE

We appreciate the opportunity to serve Brown & Caldwell and the Contra Costa Water District on this project and trust that this report meets your needs and the needs of the Water District at this time.

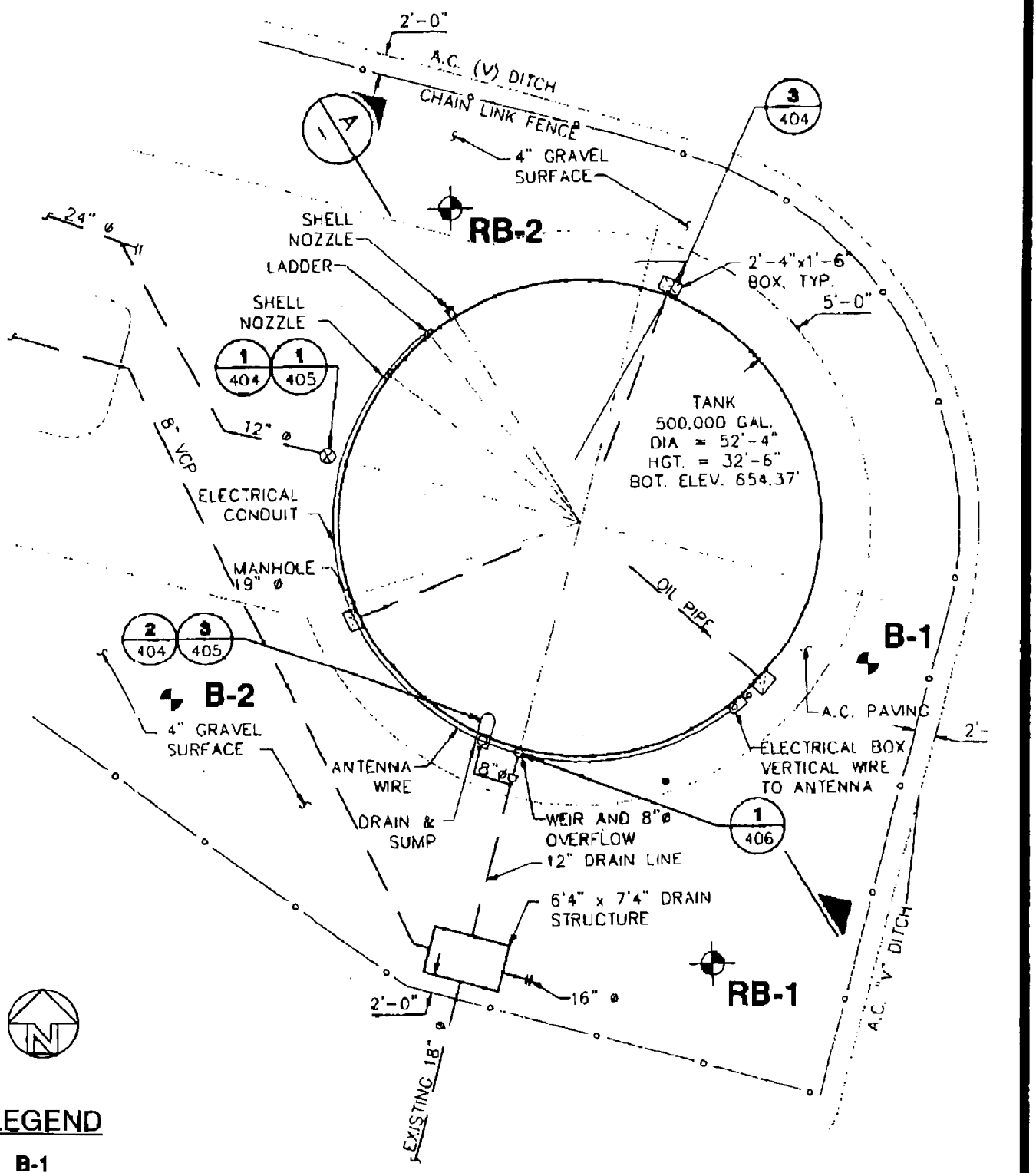
Very truly yours,

DCM ENGINEERING

Mark Sinclair
Staff Geologist

David C. Mathy
Principal Engineer
C.E. 28082
G.E. 569

Enclosures:
Plate 1 – Boring Location Map
Plate 2 – Geology Map
Plate 3 – Seismic Shaking Map
Appendix A (Plates A-1 and A-2)
Appendix B (Log of Borings B-1 and B-2)
Appendix C (Lab Plates C-1 through C-3)
Appendix D (Corrosion Engineering Investigation Report)
Appendix E (Reference Borings and Test Pits by others)



LEGEND

B-1 - Test Boring by DCM/Joyal Engineering

RB-1 - Test Boring by Others

Scale: 1 inch = 16 feet

Site plan reference not known

DCM Engineering

FILE NO. J-4904-1 | FEBRUARY 2005

BROWN & CALDWELL
Contra Costa Water District
Seminary Tank Rehabilitation Project
Clayton, California

BORING LOCATION MAP

PLATE NO. 1.

SECTION E-3

FIELD EXPLORATION
Seminary Hill Site

The geological field exploration consisted of obtaining information about the subsurface soil and rock conditions by drilling 2 small diameter borings. The drilling program was performed and completed on October 15, 1991.

Our drilling contractor was Pitcher Drilling Co., from East Palo Alto, California. Pitcher used a truck-mounted solid flight auger. The primary purpose of the borings was to determine the depth of bedrock, the thickness and relative density of the surficial materials, and general soil conditions for the tank site. Location of the borings was coordinated with District Personnel prior to drilling.

All drilling operations were conducted under the direction of our field engineer. A continuous field log of each boring was maintained, based upon recovered samples, behavior and rate of penetration of the drill rig, and observation of the soil or rock cuttings being augered out of the holes.

Sampling was performed at three to five foot intervals, using the Standard Penetration Test (SPT). The sampler was driven with a 140-pound hammer falling 30 inches. SPT test were performed in accordance with ASTM Test Designation D-1586-64T. The sampling resistance, measured in blows per foot of sampler penetration, or fraction thereof, is shown on the logs adjacent to the appropriate sample. No coring was performed in the bedrock. Drilling operations were stopped upon refusal of the auger (generally at a depth of 8 to 10 feet). Cuttings were collected and examined to identify the bedrock type in preparation of the logs of the borings. Foundation materials were found to be extremely competent and no undisturbed sampling was necessary.

The samples were reviewed by our engineers and classified according to the Unified Soil Classification (USC) System, in accordance with the lithographic classification presented on Plate A-1. As the foundation material is very dense, most of the samples recovered were disturbed by the sampling process and were not suitable for strength testing. However, the

high blowcounts obtained in the field confirm that the tank foundation is in a dense to very dense in-situ condition and has excellent bearing capacity. Explanations of the nomenclature and symbols presented on the logs of the borings are also presented on Plate A-1.

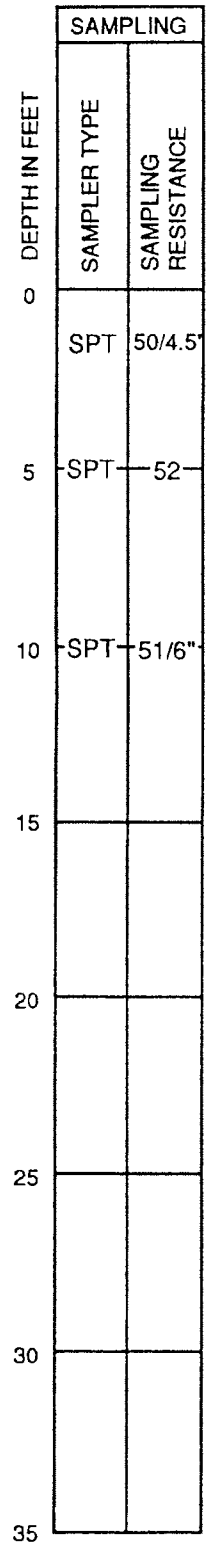
SEMINARY GENERAL SITE DESCRIPTION

The Seminary site is located on the southward facing slope of a ridge. The Seminary tank is built on an excavated pad. The site is underlain by an interbedded sequence of sandstone and shale. Rock is generally thin-bedded, dipping to the North at about 40 degrees, and weathered near the surface. Previous exploration with a backhoe (1965) indicate difficulties to excavate below 5 to 8 foot depth. Original surficial soils varied in thickness from 1/2 to two feet. Sandstone near surface is generally quite fractured but hardens with depth. Shale is thin-bedded and easily excavatable with a backhoe. Logs of backhoe pits excavated in 1965 are included after the logs of borings.

BORING B-1 (Seminary)

DATE DRILLED: 10/15/91

ELEVATION: 654 Feet ±



SAMPLES	SYMBOLS	DESCRIPTION
	SP	BROWN SANDSTONE, rust color streaking
		Becomes harder
		BROWN SANDSTONE, some interbedded shale present

NOTES:

1. Boring completed at a depth of 11 feet on 10/15/91.
2. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. For an explanation of terms used see the Soils Classification Chart and Key to Test Data.
5. No groundwater encountered.

LOG OF BORING

Dames & Moore

BORING B-2 (Seminary)

DATE DRILLED: 10/15/91

ELEVATION: 654 Feet ±

DEPTH IN FEET	SAMPLING: SAMPLER TYPE	SAMPLING: SAMPLING RESISTANCE	SAMPLES	SYMBOLS	DESCRIPTION
0	SPT	50/5"		SP	BROWN TO OLIVE BROWN SANDSTONE, dry, hard, wire at approximately 6 inches, appears to be a welding electrode, (Fill)
5	SPT	50/3"			BROWN SANDSTONE, dry, hard Grading to a fine grained material - almost siltstone Drilling very difficult @ 7.5 feet Refusal
10					
15					
20					
25					
30					
35					

NOTES:

1. Boring completed at a depth of 8 feet on 10/15/91.
2. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. For an explanation of terms used see the Soils Classification Chart and Key to Test Data.
5. No groundwater encountered.

LOG OF BORING

Dames & Moore

TABLE B

SEMINARY NORTH RESERVOIR AND PUMP STATION SITE

BACKHOE PIT LOGS

Pit No.	Depth (feet)	Description
1	0 - 7	BEDROCK; SANDSTONE; light brown, dry, dense to hard; digs easily to 5', then much harder. Breaks out in angular fragments 6" to 18" across below 5'. 2" of topsoil at surface, bedrock crops out at surface near pit location.
2	0 - 7	TOPSOIL; Sandy Silty CLAY; red-brown, dry at surface to damp, hard to stiff; increasing rock fragments with depth.
	7 - 10	BEDROCK; interbedded SHALE and SANDSTONE; green-gray to reddish-brown and light brown, slightly damp, dense to hard; thin bedded, sandstone comes out in blocks to 1' across.
3	0 - 7½	TOPSOIL; Sandy Silty CLAY; red-brown, dry at surface to damp, hard to stiff.
	7½ - 11	BEDROCK; interbedded SANDSTONE and SHALE; light brown to red-brown, damp, dense to hard; very well weathered to 10', then hard.
4	0 - 2	TOPSOIL: Sandy Silty CLAY; red-brown, dry to slightly damp, hard to stiff.
	2 - 10	BEDROCK; SHALE; green-brown, slightly damp, dense; thin-bedded, digs very easily. Few sandstone interbeds 8' to 10'.
	10 - 11	BEDROCK; SANDSTONE; light brown, slightly damp, dense; breaks out fairly readily with backhoe.

ALAN KROPP
& ASSOCIATES, INC.
GEOTECHNICAL
CONSULTANTS

ALAN KROPP, CE, GE
JAMES R. LOTT, CE, GE
JEROEN VAN DEN BERG, CE
THOMAS M. BRENCIC, CE

March 18, 2020
3010-1, L-32011

Mr. Kevin English
West Coast Home Builders, Inc.
4021 Port Chicago Highway
Concord, CA 94520

RE: Supplemental Geotechnical/Geological Peer Review
Oak Creek Canyon Project
Clayton, California

Dear Mr. English:

At your request, we performed a supplemental geotechnical and geological peer review of the new documents we received for the proposed Oak Creek Canyon residential subdivision in Clayton, California. This review is part of our overall peer review work for this project. The purpose of our peer review analyses has been to evaluate whether the documents submitted conform to City standards and generally accepted geotechnical and geological practices.

We previously reviewed other documents sent to us and summarized our review of these documents in our letter to you dated February 25, 2020. In that letter, we indicated that additional materials should be transmitted to complete our review. A response to our comments was submitted by your geotechnical consultant (ENGEO) in their letter dated March 10, 2020.

It is our opinion that with the addition of the recent materials, the set of project documents we have now reviewed substantially conforms to reasonable standard practices and City requirements regarding the geotechnical aspects of the project. The project civil engineer (Isakson and Associates) is now apparently completing the final project plans, and ENGEO notes several items that will be added to these plans in the final stage. We believe these items are very straightforward, and we have confidence they will be added to the plans; therefore, it is our opinion we do not need to review the final drawings. As noted in our previous letter, ENGEO should provide the appropriate monitoring and testing during the geotechnical aspects of site development. Their observations and test results should be provided in a construction monitoring letter at the completion of the work.

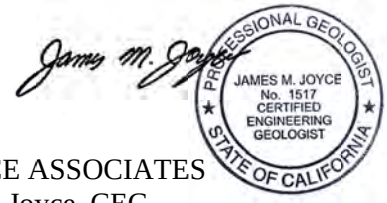
This geotechnical peer review has been performed to provide technical advice to assist the City with its discretionary permit decisions. Our services have been limited to an independent review of the referenced

documents. The opinions and conclusions presented in this letter are made in accordance with generally accepted geotechnical principles and practices. No other warranty, either expressed or implied, is made.

We trust this provides the information required at this time. If you have any questions, please call.

Very truly yours,

ALAN KROPP & ASSOCIATES
Alan Kropp, G.E.
Principal Engineer



JOYCE ASSOCIATES
James Joyce, CEG
Principal Geologist

AK/JJ/ab

Copies: Addressee (PDF) – kenglish@discoverybuilders.com
Engeo, Attention: Ted Bayham (PDF) – tbayham@engeo.com

Appendix D

Environmental Noise Assessment

Environmental Noise Assessment

Oak Creek Canyon 6-Lot Subdivision

Clayton, California

BAC Job # 2017-163

Prepared For:

Raney Planning & Management, Inc.

Attn: Mr. Nick Pappani
1501 Sports Drive
Sacramento, CA 95834

Prepared By:

Bollard Acoustical Consultants, Inc.

Paul Bollard, President

October 3, 2017

BOLLARD
Acoustical Consultants

Introduction

The Oak Creek Canyon 6-Lot Subdivision (project) proposes to construct 6 single-family residential lots in Clayton, California. The project area and site plan are presented as Figures 1 and 2, respectively.

This analysis focuses on future exterior and interior traffic noise levels at the proposed residential lots, off-site traffic noise generation, and construction activity noise generation. Specific noise mitigation recommendations are provided in this analysis to mitigate project noise impacts.

Noise Fundamentals and Terminology

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard, and thus are called sound. Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in levels (dB) correspond closely to human perception of relative loudness. Appendix A contains definitions of Acoustical Terminology. Figure 3 shows common noise levels associated with various sources.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighing network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels in decibels.

Community noise is commonly described in terms of the “ambient” noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}) over a given time period (usually one hour). The L_{eq} is the foundation of the Day-Night Average Level noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

Legend

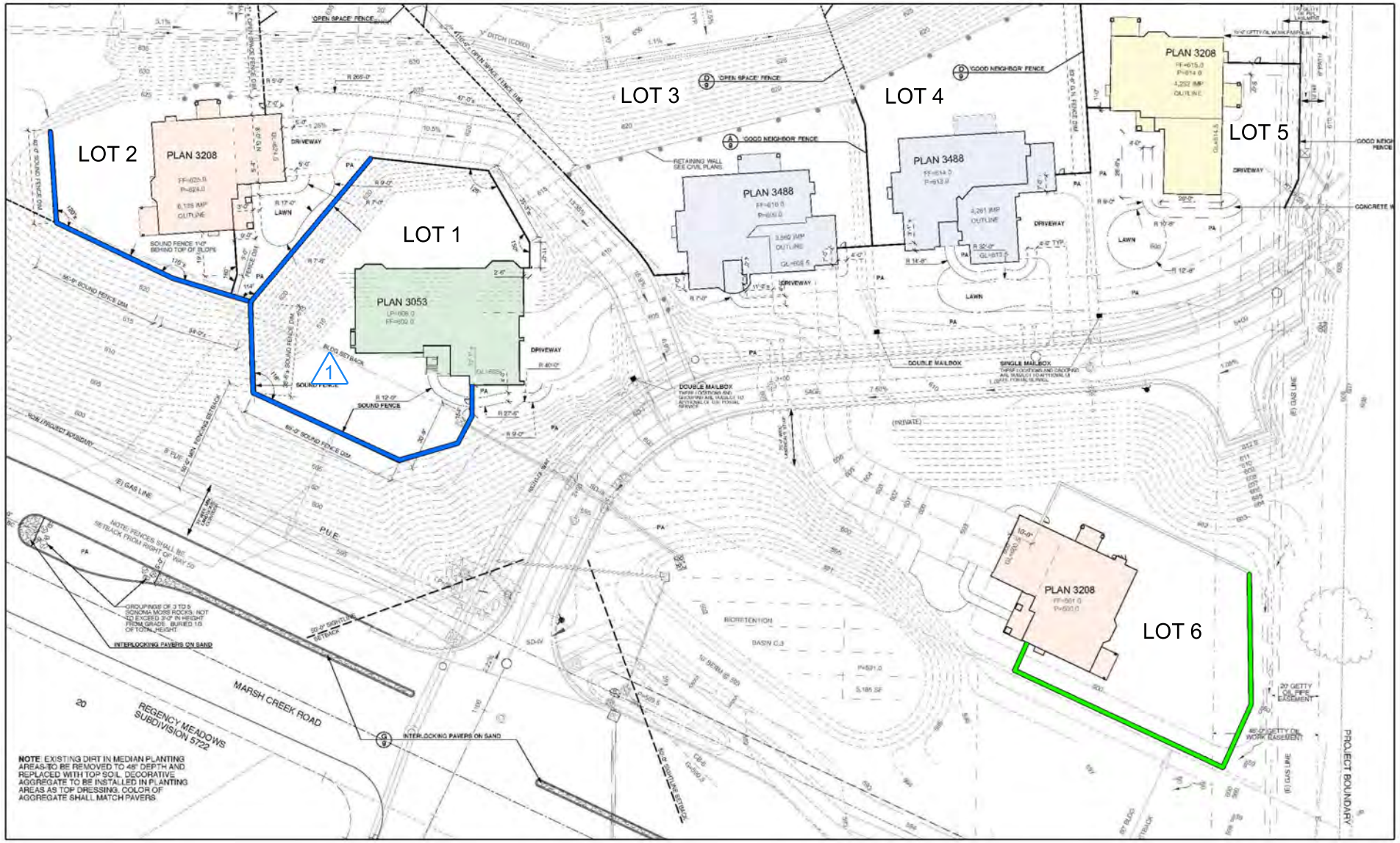
Traffic Noise Measurement Location

N

Scale (feet)

0 125 200

Figure 1
Traffic Noise Monitoring Location
Oak Creek Canyon 6 Lot Subdivision
Clayton, California



Legend

- Traffic Noise Measurement Location
- Proposed 6-Foot Tall Sound Wall
- Recommended 6-Foot Tall Sound Wall

N

Scale (feet)

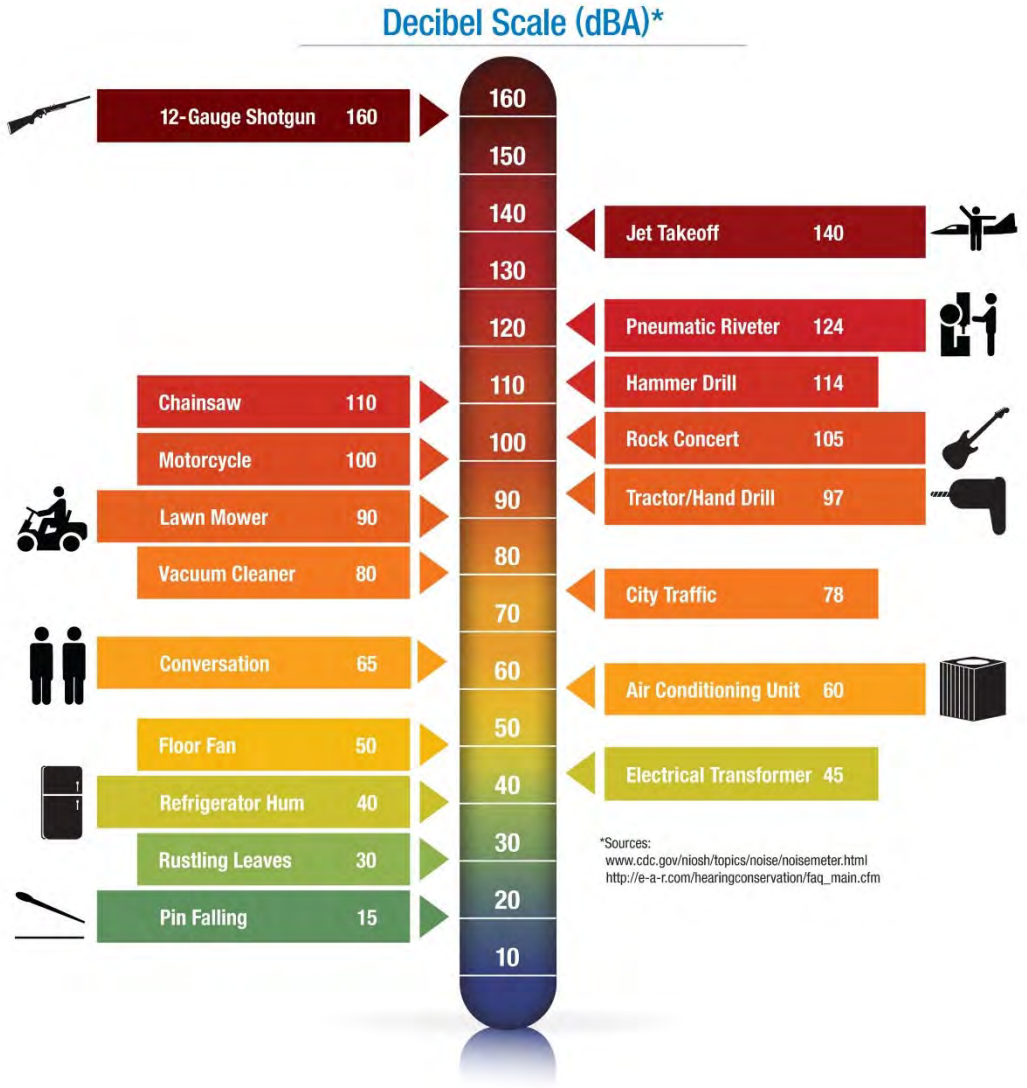
0 40 80

Figure 2

Proposed Site Plan
Oak Creek Canyon 6 Lot Subdivision
Clayton, California

The Day-Night Average Level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment. L_{dn}-based noise standards are commonly used to assess noise impacts associated with traffic, railroad and aircraft noise sources.

Figure 3
Typical A-Weighted Sound Levels of Common Noise Sources



Criteria for Acceptable Noise Exposure

City of Clayton General Plan

For transportation noise sources (traffic, rail, aircraft) affecting new residential land uses, the Noise Element of the City of Clayton General Plan establishes an exterior noise level standard of 60 dB L_{dn}, applied at outdoor activity areas of the residential uses. The intent of this standard is to provide an acceptable exterior noise environment for outdoor activities. Additionally, the City of Clayton utilizes an interior transportation noise level standard of 45 dB L_{dn} or less within noise-sensitive residential dwellings. The intent of this interior noise limit is to provide a suitable environment for indoor communication and sleep.

Existing Ambient Noise Environment at the Project Site

The existing ambient noise environment at the project site is primarily defined by traffic on Marsh Creek Road. To generally quantify existing noise levels at the project site, BAC conducted a long-term (48-hour) noise level survey on the project site from September 13 to September 15, 2017. The ambient noise level measurement location, identified as Site 1 on Figure 1, was selected to quantify existing traffic noise exposure from Marsh Creek Road.

A Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meter was used to conduct the noise level survey. The meter was calibrated before use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

A summary of the continuous noise level measurement results are shown in Table 1. Detailed monitoring results are provided numerically in Appendix B and graphically in Appendix C. The Table 1 data indicate that measured ambient day-night average noise levels at the project site exceeded the City of Clayton 60 dB L_{dn} exterior noise level standard.

Table 1
Summary of Long-Term Ambient Noise Monitoring Results[1]
Oak Creek Canyon 6-Lot Subdivision – Clayton, California

Date	L_{dn}, dB	Average Measured Hourly Noise Levels (dB)					
		Daytime (7 a.m. to 10 p.m.)			Nighttime (10 p.m. to 7 a.m.)		
		L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
Site 1 – Approximately 100 feet from centerline of Marsh Creek Road							
September 13-14, 2017	66	62	56	77	59	46	73
September 14-15, 2017	64	61	55	74	57	37	70

Notes:
[1] The long-term ambient noise monitoring location is identified on Figures 1 and 2.
Source: Bollard Acoustical Consultants, Inc. (2017)

Evaluation of Future Traffic Noise Levels at Proposed Residences

Traffic Noise Prediction Methodology

The Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used to predict traffic noise levels at the project site. The model is based upon the CALVENO noise emission factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA Model was developed to predict hourly L_{eq} values for free flowing traffic conditions, and is considered to be accurate within 1.5 dB in most situations.

Traffic Noise Prediction Model Calibration

According to the City of Clayton planning staff, the segment of Marsh Creek Road adjacent to the project site currently experiences an average daily traffic (ADT) volume of 8,154. Assuming vehicle speeds of 50 MPH, medium- and heavy-truck mix of 2%/2%, and an existing volume of 8,154, the FHWA Model predicts a roadway noise level of 64 dB L_{dn}, 100 feet from the centerline of Marsh Creek Road. The traffic noise level measurement results presented in Table 1, conducted 100 feet from the centerline of Marsh Creek Road, indicate existing traffic noise levels ranged from 64 to 66 dB L_{dn} during the monitoring period. Because the measured traffic noise levels are within 0-2 dB of the predicted FHWA Model traffic noise levels, no model calibration adjustment would be warranted.

Predicted Future Traffic Noise Levels at the Project Site

The FHWA Model was used with future traffic data to predict future traffic noise levels at the proposed noise outdoor activity areas of the development. Future average daily traffic was conservatively estimated by assuming a doubling of traffic volumes relative to existing conditions. As mentioned previously, existing traffic counts for Marsh Creek Road were obtained from the City of Clayton planning staff. The FHWA Model inputs and predicted future traffic noise levels at the project site are shown in Appendix D. The predicted future traffic noise levels at the project lots are summarized below in Table 2. The predicted future traffic noise levels presented below take into account the proposed traffic noise barrier at Lots 1 and 2. The location of the proposed barrier is shown on Figure 2.

Table 2
Predicted Future Exterior Traffic Noise Levels[1]
Oak Creek Canyon 6-Lot Subdivision – Clayton, California

	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5	Lot 6
Setbacks distances from centerline of Marsh Creek Road (feet)[2]						
Backyard Area	110	140	260	330	410	140
Building Facade	130	140	210	260	330	140
Predicted Future Exterior Traffic Noise Levels, L_{dn} (dB)[3,4]						
Backyard Area	58	55	56	54	53	65
1st Floor Facades	57	55	62	61	59	65
2nd Floor Facades	68	68	65	64	62	68

Notes:

1 Detailed FHWA Model inputs and results are provided in Appendix D.

2 Distances were measured from the centerline of Marsh Creek Road to the nearest outdoor activity areas and building facades.

3 At the backyards and 1st floor facades of Lots 1 and 2, the predicted traffic noise levels include the attenuation provided by the proposed property line 6-foot tall CMU noise barriers. Project topography was accounted for in the noise barrier calculations, provided as Appendix E. No noise barrier offsets were applied at elevated, unshielded upper floor facades.

4 A +3 dB offset was applied to the 2nd floor facades due to reduced ground absorption at elevated floor levels.

Source: Bollard Acoustical Consultants, Inc. (2017)

With the exception of Lot 6, the Table 2 data indicate that future traffic noise levels at the proposed outdoor activity areas of the development are predicted to satisfy the City of Clayton 60 dB L_{dn} exterior noise level standard. Therefore, additional analysis is required to ensure compliance with the City's exterior traffic noise level standard at Lot 6.

At the nearest proposed 2nd floor building façades (Lots 1, 2, 6) the Table 2 data indicate that predicted future traffic noise exposure would be approximately 68 dB L_{dn}. This information is used in a subsequent section of this report to assess compliance with the City's interior traffic noise level standard.

Exterior Traffic Noise Mitigation

As shown in Table 2, future Marsh Creek Road traffic noise levels are predicted to be 65 dB L_{dn} within the backyard of Lot 6, exceeding the City of Clayton exterior noise level standard of 60 dB L_{dn} by 5 dB. An analysis of noise barrier effectiveness was conducted for Lot 6 to determine the required noise barrier height to sufficiently reduce traffic noise levels below the city's exterior criteria. The noise barrier effectiveness prediction worksheet is provided as Appendix E. According to the worksheet, which account for the project grading, a 6-foot noise barrier would reduce to Marsh Creek Road traffic noise levels to 58 dB L_{dn}, satisfying the 60 dB L_{dn} standard. The location of the recommended noise barrier is shown on Figure 2. No further consideration of exterior traffic noise mitigation measures would be warranted for the development.

Interior Traffic Noise Mitigation

Future exterior noise levels at the first-floor facades nearest to the adjacent roadways are predicted to be 55-62 dB L_{dn}. Due to reduced ground absorption at elevated positions and lack of shielding by the proposed and recommended noise barriers, noise levels at the second-floor facades of residences are predicted to be 62-68 dB L_{dn}. In order to satisfy the City of Clayton 45 dB L_{dn} interior noise level standard, minimum noise reductions of 17 and 23 dB would be required of the first- and upper-floor building facades, respectively.

Standard residential construction (stucco siding, STC-27 windows, door weather-stripping, exterior wall insulation, composition plywood roof) typically results in an exterior to interior noise reduction of about 25 dB with windows closed, and approximately 15 dB with windows open. Therefore, standard construction practices would be adequate for both first-floor and elevated upper-floor facades of all residences in the development. Mechanical ventilation (air conditioning) should be provided for all residences within this development to allow the occupants to close doors and windows as desired for additional acoustical isolation. No further consideration of interior traffic noise mitigation measures would be warranted for the development.

Evaluation of Off-Site Traffic Noise Level Increases

To assess noise impacts due to project-related traffic increases on the local roadway network, BAC utilized Institute of Transportation Engineers (ITE) trip generation rates in conjunction with the measured existing traffic noise exposure on Marsh Creek Road. According to ITE, a single-family residential unit generates approximately 10 trips per day. Assuming the 6 proposed residential units generate 10 trips per day, the project would result in an additional 60 vehicle trips on Marsh Creek Road during an annual average day. Assuming a vehicle speed of 50 mph, 60 vehicle trips, and a distance of 100 feet from the centerline of Marsh Creek Road, the predicted traffic noise level from the project alone would be 41 dB L_{dn}. As mentioned previously, existing Marsh Creek traffic noise levels were measured to be 64-66 dB L_{dn}. As a result, the additional trips would result in a traffic noise level of increase of less than 0.1 dB L_{dn}.

Therefore, no significant noise impacts due to project-generated traffic are identified for this project.

Evaluation of Construction Noise at Nearest Existing Residences

During project construction, heavy equipment would be used for grading excavation, paving, and building construction, which would increase ambient noise levels when in use. Noise levels would vary depending on the type of equipment used, how it is operated, and how well it is maintained. Noise exposure at any single point outside the project site would also vary depending on the proximity of construction activities to that point. Standard construction equipment, such as graders, backhoes, loaders, and trucks, would likely be used for this work.

The range of maximum noise levels for various types of construction equipment at a distance of 50 feet is depicted in Table 3. The noise values represent maximum noise generation, or full-power operation of the equipment. As one increases the distance between equipment, or increases separation of areas with simultaneous construction activity, dispersion and distance attenuation reduce the effects of combining separate noise sources.

Table 3
Construction Equipment Noise Emission Levels

Equipment	Typical Sound Level (dBA) 50 Feet from Source
Air compressor	81
Backhoe	80
Compactor	82
Concrete mixer	85
Concrete pump	82
Concrete vibrator	76
Crane, mobile	83
Dozer	85
Generator	81
Grader	85
Impact wrench	85
Jackhammer	88
Loader	85
Paver	89
Pneumatic tool	85
Pump	76
Roller	74
Saw	76

Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, Table 12-1. (May 2006)

The nearest sensitive receptors to the proposed project are single-family residences located immediately south of the project site. The nearest sensitive land uses are located at least 100 feet from construction activities which would occur on the project site. As shown in Table 3, construction activities typically generate noise levels ranging from approximately 75 to 90 dB L_{max} at a reference distance of 50 feet from the construction activities. The noise levels from construction operations decrease at a rate of approximately 6 dB per doubling of distance from the source. As a result, maximum construction noise levels would range from 69 to 84 dB L_{max} at the nearest existing residences. In addition, typical residential construction provides a noise level reduction of approximately 25 dBA with the windows closed, which would reduce the maximum noise levels within residences to approximately 44 to 59 dB L_{max}.

Noise generated by project construction could exceed the City's standards for short duration events near residential areas, but such noise would be short-term in duration and would not likely substantially exceed existing ambient noise levels cause by local traffic on Marsh Creek Road. Nonetheless, the following construction noise mitigation measures should be utilized to the extent practical to minimize the potential for adverse public reaction to project construction noise.

- Project construction activities should be limited to daytime hours unless conditions warrant that certain construction activities occur during evening or early morning hours (i.e. extreme heat).
- All noise-producing project equipment and vehicles using internal-combustion engines shall be equipped with manufacturers-recommended mufflers and be maintained in good working condition.
- All mobile or fixed noise-producing equipment used on the project site that are regulated for noise output by a federal, state, or local agency shall comply with such regulations while in the course of project activity.
- Electrically powered equipment shall be used instead of pneumatic or internal-combustion-powered equipment, where feasible.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors.
- Construction site and access road speed limits shall be established and enforced during the construction period.

Conclusions and Recommendations

The preceding analysis focused on exterior and interior traffic noise levels at the proposed residences, off-site traffic noise generation, and construction activity noise generation. In order to ensure compliance with the City of Clayton General Plan noise level standards, the following activity-specific mitigation measures are recommended:

Residential Lots:

1) The construction, as proposed, of a 6-foot tall CMU wall providing shielding of traffic noise for Lots 1 and 2. The location of the proposed noise barrier is shown on Figure 2.

2) The construction of a recommended 6-foot tall CMU wall providing shielding of traffic noise for Lot 6. The location of the recommended noise barrier is shown on Figure 2.

   Suitable materials for the traffic noise barriers include masonry and precast concrete panels. Other materials may be acceptable but should be reviewed by an acoustical consultant prior to use.

3) Standard residential construction practices (stucco siding, STC-27 windows, door weather-stripping, exterior wall insulation, composition plywood roof) would be adequate for all proposed residences.

4) Mechanical ventilation (air conditioning) should be provided for all residences in this development to allow the occupants to close doors and windows as desired to achieve compliance with the applicable interior noise level criteria.

Project Construction:

1) All construction activities must adhere to the City's requirements with respect to hours of construction.

2) Construction equipment must have appropriate sound muffling devices, which shall be properly maintained and used at all times such equipment is in operation.

3) The construction contractor shall locate on-site equipment staging areas so as to maximize the distance between construction-related noise sources and noise-sensitive receptors nearest the project construction areas.

These conclusions are based on the collected noise level data at the project site, the site plan shown on Figure 2, and on noise reduction data for standard residential dwellings and for typical STC rated window data. Deviations from the project site plan shown on Figure 2, could cause future traffic noise levels to differ from those predicted in this analysis. In addition, Bollard Acoustical Consultants, Inc. is not responsible for degradation in acoustic performance of the

building construction due to poor construction practices, failure to comply with applicable building code requirements, or for failure to adhere to the minimum building practices cited in this report.

This concludes BAC's traffic noise assessment for the proposed Oak Creek Canyon 6-Lot Subdivision in Clayton, California. Please contact BAC at (916) 663-0500 or paulb@bacnoise.com with any questions regarding this assessment.

Appendix A

Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
Loudness	A subjective term for the sensation of the magnitude of sound.
Masking	The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.
Noise	Unwanted sound.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the Maximum level, which is the highest RMS level.
RT_{60}	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.
SEL	A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy of the event into a 1-s time period.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.

Appendix B-1
Oak Creek Canyon 6-Lot Subdivision
Ambient Noise Monitoring Results - Site 1
September 13-14, 2017

Hour	Leq	Lmax	L50	L90
12:00	60	76	52	43
13:00	60	76	54	45
14:00	61	77	55	46
15:00	62	80	59	45
16:00	64	82	61	46
17:00	63	74	61	47
18:00	63	76	60	47
19:00	61	79	54	42
20:00	57	73	51	46
21:00	57	71	53	49
22:00	56	73	52	49
23:00	51	70	46	43
0:00	56	91	46	42
1:00	49	66	46	33
2:00	48	68	34	32
3:00	48	67	36	30
4:00	54	73	36	30
5:00	62	76	50	32
6:00	65	77	65	41
7:00	66	77	66	54
8:00	64	80	61	49
9:00	61	75	55	40
10:00	59	77	49	36
11:00	60	80	52	39

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	66	57	62	65	48	59
Lmax (Maximum)	82	71	77	91	66	73
L50 (Median)	66	49	56	65	34	46
L90 (Background)	54	36	45	49	30	37

Computed Ldn, dB	66
% Daytime Energy	78%
% Nighttime Energy	22%

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Appendix B-2
Oak Creek Canyon 6-Lot Subdivision
Ambient Noise Monitoring Results - Site 1
September 14-15, 2017

Hour	Leq	Lmax	L50	L90
12:00	59	77	54	41
13:00	59	75	52	41
14:00	60	74	54	43
15:00	61	72	58	43
16:00	62	75	60	47
17:00	62	77	60	45
18:00	61	75	58	42
19:00	59	72	53	40
20:00	58	70	54	50
21:00	56	75	51	43
22:00	52	72	38	34
23:00	50	69	37	31
0:00	45	68	31	28
1:00	46	67	29	27
2:00	44	63	29	26
3:00	46	68	29	26
4:00	55	75	31	26
5:00	61	74	48	35
6:00	64	76	61	40
7:00	65	77	63	46
8:00	62	74	56	38
9:00	59	73	51	35
10:00	58	73	50	35
11:00	59	71	51	33

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	65	56	61	64	44	57
Lmax (Maximum)	77	70	74	76	63	70
L50 (Median)	63	50	55	61	29	37
L90 (Background)	50	33	41	40	26	31

Computed Ldn, dB	64
% Daytime Energy	79%
% Nighttime Energy	21%

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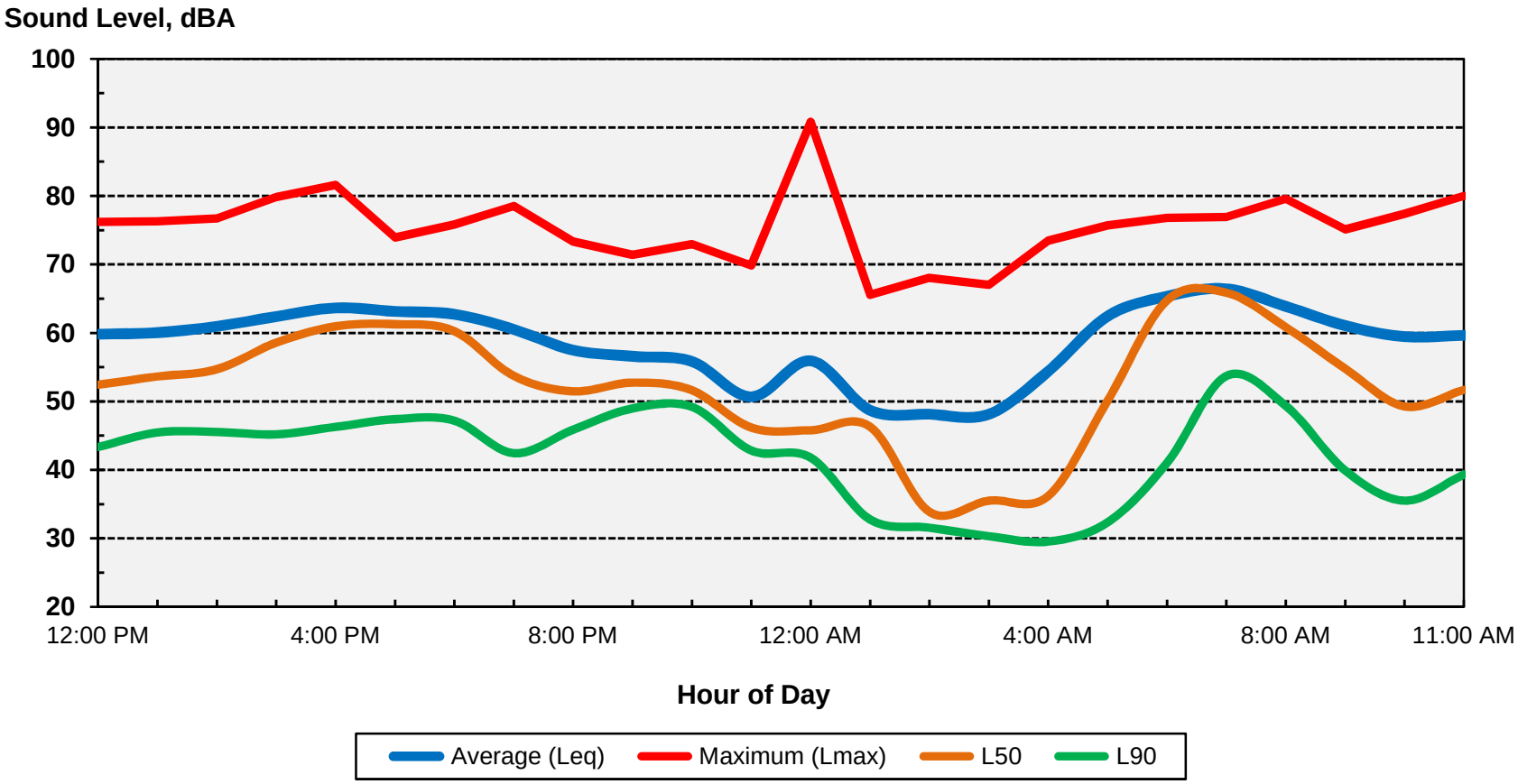
Appendix C-1
Oak Creek Canyon 6-Lot Subdivision
Ambient Noise Monitoring Results - Site 1
September 13-14, 2017



Ldn: 66 dB

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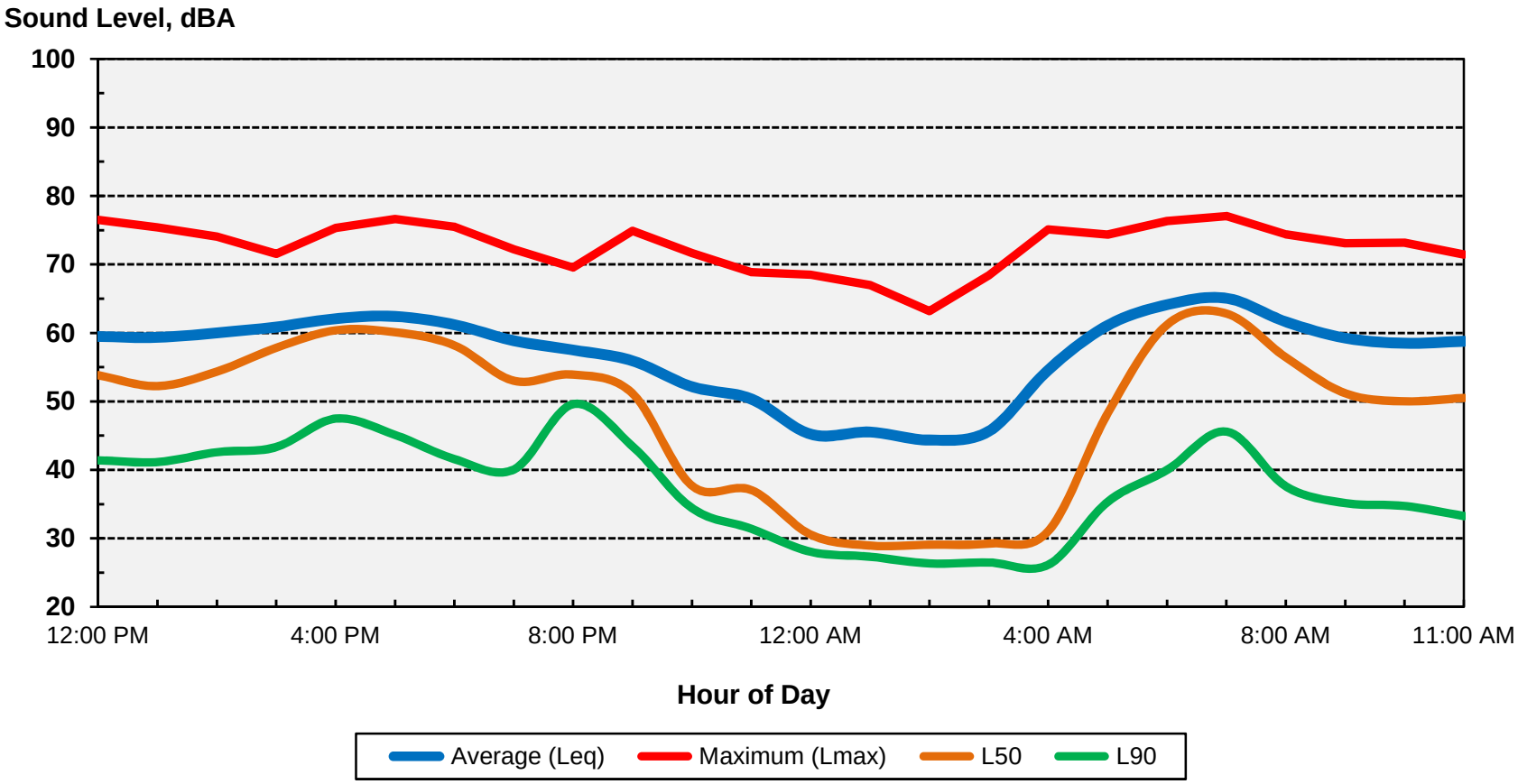
Appendix C-2
Oak Creek Canyon 6-Lot Subdivision
Ambient Noise Monitoring Results - Site 1
September 14-15, 2017



Ldn: 64 dB

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Appendix D-1

FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Prediction Worksheet

Project Information:

Job Number: 2017-163
Project Name: Oak Creek Canyon 6-Lot Subdivision
Roadway Name: Marsh Creek Road

Traffic Data:

Year:	Future
Average Daily Traffic Volume[1]:	16,308
Percent Daytime Traffic:	83
Percent Nighttime Traffic:	17
Percent Medium Trucks (2 axle):	2
Percent Heavy Trucks (3+ axle):	2
Assumed Vehicle Speed (mph):	50
Intervening Ground Type (hard/soft):	**Soft**

Traffic Noise Levels:

				----------L_{dn}, dB----------			
Lot	Description	Distance	Offset (dB)[2]	Autos	Medium Trucks	Heavy Trucks	Total
1	Lot 1 Backyard	110	0	65	55	60	66
2	Lot 2 Backyard	140	0	63	54	58	65
3	Lot 3 Backyard	260	-5	54	45	49	56
4	Lot 4 Backyard	330	-5	52	43	47	54
5	Lot 5 Backyard	410	-5	51	42	46	53
6	Lot 6 Backyard	140	0	63	54	58	65

Traffic Noise Contours (No Calibration Offset):

L_{dn} Contour, dB	Distance from Centerline, (ft)
75	28
70	61
65	131
60	283

Notes: 1. Average Daily Traffic Volume was conservatively estimated by doubling existing traffic volumes obtained from the City of Clayton planning staff (Date: February 2015; ADT: 8154).
2. Conservative offsets of -5 dB were applied at the backyards of Lots 3-5 to account for the shielding of traffic noise provided by the intervening residential building structures.

Appendix D-2

FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Prediction Worksheet

Project Information:

Job Number: 2017-163
Project Name: Oak Creek Canyon 6-Lot Subdivision
Roadway Name: Marsh Creek Road

Traffic Data:

Year:	Future
Average Daily Traffic Volume[1]:	16,308
Percent Daytime Traffic:	83
Percent Nighttime Traffic:	17
Percent Medium Trucks (2 axle):	2
Percent Heavy Trucks (3+ axle):	2
Assumed Vehicle Speed (mph):	50
Intervening Ground Type (hard/soft):	**Soft**

Traffic Noise Levels:

				----------L_{dn}, dB----------			
Lot	Description	Distance	Offset (dB)[2]	Autos	Medium Trucks	Heavy Trucks	Total
1	Lot 1 - 2nd Floor Façade	130	3	66	57	62	68
2	Lot 2 - 2nd Floor Façade	140	3	66	57	61	68
3	Lot 3 - 2nd Floor Façade	210	3	63	54	58	65
4	Lot 4 - 2nd Floor Façade	260	3	62	53	57	64
5	Lot 5 - 2nd Floor Façade	330	3	60	51	55	62
6	Lot 6 - 2nd Floor Façade	140	3	66	57	61	68

Traffic Noise Contours (No Calibration Offset):

L_{dn} Contour, dB	Distance from Centerline, (ft)
75	28
70	61
65	131
60	283

Notes: 1. Average Daily Traffic Volume was conservatively estimated by doubling existing traffic volumes obtained from the City of Clayton planning staff (Date: February 2015; ADT: 8154).
2. A +3 dB offset was applied to the 2nd floor facades due to reduced ground absorption at elevated facades.

Appendix E-1

FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet

Project Information:

Job Number: 2017-163
Project Name: Oak Creek Canyon 6-Lot Subdivision
Roadway Name: Marsh Creek Road
Location(s): Lot 1 Backyard

Noise Level Data:

Year: Future
Auto L_{dn}, dB: 65
Medium Truck L_{dn}, dB: 55
Heavy Truck L_{dn}, dB: 60

Site Geometry:

Receiver Description: Lot 1 Backyard
Centerline to Barrier Distance (C_1): 90
Barrier to Receiver Distance (C_2): 20
Automobile Elevation: 595
Medium Truck Elevation: 597
Heavy Truck Elevation: 603
Pad/Ground Elevation at Receiver: 608
Receiver Elevation[1]: 613
Base of Barrier Elevation: 608
Starting Barrier Height 6

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height[2] (ft)	L_{dn}, dB Autos	L_{dn}, dB Medium Trucks	L_{dn}, dB Heavy Trucks	L_{dn}, dB Total	Barrier Breaks Line of Sight to… Autos?	Medium Trucks?	Heavy Trucks?
614	6	56	47	53	**58**	Yes	Yes	Yes
615	7	55	46	52	**57**	Yes	Yes	Yes
616	8	54	45	50	**56**	Yes	Yes	Yes
617	9	53	44	49	**55**	Yes	Yes	Yes
618	10	52	44	49	**54**	Yes	Yes	Yes
619	11	52	43	48	**53**	Yes	Yes	Yes
620	12	51	42	47	**53**	Yes	Yes	Yes
621	13	50	41	46	**52**	Yes	Yes	Yes
622	14	50	41	46	**52**	Yes	Yes	Yes

Notes: 1.Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)

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Appendix E-2

FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet

Project Information:

Job Number: 2017-163
Project Name: Oak Creek Canyon 6-Lot Subdivision
Roadway Name: Marsh Creek Road
Location(s): Lot 2 Backyard

Noise Level Data:

Year: Future
Auto L_{dn}, dB: 63
Medium Truck L_{dn}, dB: 54
Heavy Truck L_{dn}, dB: 58

Site Geometry:

Receiver Description: Lot 2 Backyard
Centerline to Barrier Distance (C_1): 120
Barrier to Receiver Distance (C_2): 20
Automobile Elevation: 598
Medium Truck Elevation: 600
Heavy Truck Elevation: 606
Pad/Ground Elevation at Receiver: 625
Receiver Elevation[1]: 630
Base of Barrier Elevation: 625
Starting Barrier Height 6

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height[2] (ft)	L_{dn}, dB Autos	L_{dn}, dB Medium Trucks	L_{dn}, dB Heavy Trucks	L_{dn}, dB Total	Barrier Breaks Line of Sight to… Autos?	Medium Trucks?	Heavy Trucks?
631	6	53	44	49	**55**	Yes	Yes	Yes
632	7	53	44	48	**54**	Yes	Yes	Yes
633	8	52	43	48	**53**	Yes	Yes	Yes
634	9	51	42	47	**53**	Yes	Yes	Yes
635	10	50	41	46	**52**	Yes	Yes	Yes
636	11	49	40	45	**51**	Yes	Yes	Yes
637	12	49	40	44	**51**	Yes	Yes	Yes
638	13	48	39	44	**50**	Yes	Yes	Yes
639	14	48	39	43	**50**	Yes	Yes	Yes

Notes: 1.Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)

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Appendix E-3

FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet

Project Information:

Job Number: 2017-163
Project Name: Oak Creek Canyon 6-Lot Subdivision
Roadway Name: Marsh Creek Road
Location(s): Lot 6 Backyard

Noise Level Data:

Year: Future
Auto L_{dn}, dB: 63
Medium Truck L_{dn}, dB: 54
Heavy Truck L_{dn}, dB: 58

Site Geometry:

Receiver Description: Lot 6 Backyard
Centerline to Barrier Distance (C_1): 120
Barrier to Receiver Distance (C_2): 20
Automobile Elevation: 595
Medium Truck Elevation: 597
Heavy Truck Elevation: 603
Pad/Ground Elevation at Receiver: 600
Receiver Elevation[1]: 605
Base of Barrier Elevation: 600
Starting Barrier Height 6

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height[2] (ft)	L_{dn}, dB Autos	Medium Trucks	Heavy Trucks	Total	Barrier Breaks Line of Sight to… Autos?	Medium Trucks?	Heavy Trucks?
606	6	56	48	53	**58**	Yes	Yes	Yes
607	7	55	46	52	**57**	Yes	Yes	Yes
608	8	54	45	51	**56**	Yes	Yes	Yes
609	9	53	44	50	**55**	Yes	Yes	Yes
610	10	53	44	48	**54**	Yes	Yes	Yes
611	11	52	43	48	**53**	Yes	Yes	Yes
612	12	51	42	47	**53**	Yes	Yes	Yes
613	13	50	41	46	**52**	Yes	Yes	Yes
614	14	49	40	45	**51**	Yes	Yes	Yes

Notes: 1.Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)

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